Annual Report
2009-10

High Quality Patient Care · Medical Devices Development · Health Science Studies

Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum
Thiruvananthapuram, Kerala, India - 695 011

Annual Report
2009 - 2010

SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY, TRIVANDRUM
THIRUVANANTHAPURAM – 695011, KERALA

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Medical Science and Technology, Trivandrum
Thiruvananthapuram-695 001

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SCTIMST

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HISTORY

The origin of the Institute dates back to 1973 when the Royal Family of Travencore gifted a multistoried building for the people and Government of Kerala. Sri. P.N. Haskar, the then Deputy Chairman, Planning Commssion, inaugurated the Sree Chitra Tirunal Medical Center in 1976, when patient services including inpatient treatment got underway. At the Satelmond Palace, Poojapura, nearly 11 km away from this Hospital Wing, the Biomedical Technology Wing followed soon, again a gift by the Royal Family.

The concept of amalgamating medical sciences and technology within a single institutional framework was regarded as sufficiently important by the Government of India to declare the center as an Institute of National Importance under the Department of Science and Technology by an Act of Parliament in 1980, and named it as Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum.

Dr. Manmohan Singh, the then Honorable Finance Minister of Government of India, laid the foundation stone of the third dimension of the Institute, Achutha Menon Center for Health Science Studies (AMCHSS) on June 15, 1992. Dr. Murali Manohar Joshi, the then Honorable Minister of Science and Technology and Human Resource Development, Government of India, dedicated the AMCHSS to the nation on January 30, 2000.

OUR MISSION

- Promote research and development in biomedical engineering and technology
- Deliver high quality patient care in selected specialties and subspecialties
- Develop innovative postgraduate training programs in advanced medical specialties, and biomedical engineering and technology
- Participate in public health reforms through research, training and interventions

OUR VISION

- Become a Global Leader in Medical Devices Development, High Quality Patient Care, and Health Sciences Studies by 2020

सत्यमेव जयते

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एवम्
डी.ए.इ. - होमी भाभा प्रोफेसर

Dr. R. Chidambaram
Principal Scientific Adviser to the Govt. of India
&
DAE - Homi Bhabha Professor

MESSAGE

It is a proud privilege for me to note the various activities and achievements of the Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), as highlighted in the Annual Report of the institute for the year 2009-2010. This Institute is one of the premier medical institutions of our country, achieving excellence in patient care, research and development and other activities.

The significance of integrating medical science and technology was recognized by the Government of India by formulating legislation to make the Sree Chitra Tirunal Medical Centre an "Institution of National Importance" with the status of a university. The Hospital Wing has successfully developed several subspecialty areas and they include epilepsy, movement disorders, interventional radiology, neuro-endoscopic surgery, congenital cardiac surgery, sleep disorder and acute coronary care. In some of those areas, SCTIMST is among the leaders in India.

The Biomedical Technology Wing pioneered the indigenous development of medical devices and implants, which led to the establishment of a medical device industry base on indigenous technology in the country. The development of indigenous medical devices can save the country billions of rupees spent on importing these devices from developed countries. This unique facility provides the industrial partner with the opportunity to address the problems of scaling the technology development in the Institute, production, market seeding of the product, as well as training manpower for setting up and running the commercial plant. The quality system conforming to the latest ISO/IEC 17025 is the only such facility in South India in the area of testing and evaluation of medical devices and bio-materials. It is interesting to know the currently the Institute is also focusing on stem cell research, tissue engineering and nanotechnology.

Besides the regular postdoctoral, doctoral and postgraduate courses in medical specialties, public health, nursing and health care technology, the Academic Division is offering off-campus programmes like Master in Epidemiology (MAE), M. Phil in Biomedical Technology, the M. Tech programme in Clinical Engineering (in a unique collaboration with IIT Madras and CMC Vellore) and PhD in Biomedical Devices and Technology.

The School of Public Health - Achutha Menon Centre for Health Science Studies (AMCHSS) - was set up for research, training and consultation in public health and offered the country's first Master's programme in Public Health (MPH) in 1997. It is now running other diploma courses and off-campus programmes which are commendable. The Centre also conducts several short courses in subjects which have growing significance for healthcare, professional ethics, gender sensitization, material and child health, etc., in addition to research and providing consultancy services to national and international agencies. Within a decade, this model has received wide national acceptance and set the trend for public health education in the country. The Ministry of Health Government of India, has recognized the AMCHSS as a Centre of Excellence for Public Health Training.

As a President of the Institute, I am very happy that the doctors, scientists, engineers, nurses, paramedical staff, administrative staff, other supporting staff and the students of the Institute are working hard to fulfill the mandate assigned to Institute by Parliament. The successful integration of technology and medical science within the Institute, as described above over the last 30 years has led to the demand for further expansion of the Institute. I am sure the institute will be able to achieve newer heights in the coming days.

I convey my best wished for the continued success of the activities of the institute in the days to come.

R. Chidambaram

FROM DIRECTOR'S DESK

It is indeed a proud privilege for me, during the first year of my tenure as Director, to list an enviable number of the Institute's achievements during 2009-10. The Hospital Wing, Biomedical Technology (BMT) Wing, and Achutha Menon Centre for Health Science Studies (AMCHSS) worked hard during the 30th year, as in previous years, to fulfill our mandate to deliver high quality patient care in cardiac and neurological specialties, to promote research and development in biomedical engineering and technology, to develop innovative postgraduate training programs, and to participate in public health reforms.

The Hospital Wing witnessed an unprecedented flow of 108715 patients, of which 13888 were new registrations and 94827 were follow-up cases. Out of the 2901 surgeries performed during the period, 1685 were cardiac surgeries and 1216 were neurosurgeries. Despite the enormous burden of patient care, the hospital faculty found enough time to publish 82 articles in indexed journals with a cumulative mean impact factor of 2.15 during 2009-10, compared to 64 articles with a cumulative mean impact factor of 1.45 during 2008-9.

The R. Madhavan Nayar Center for Comprehensive Epilepsy Care of the Hospital Wing continued its status as the number one center in the country of its type attracting medically refractory epilepsy patients from all over India and abroad. The most advanced evaluation and treatment of difficult to control epilepsy patients, comparable to that of the best centers in the United States and Europe, could be provided through a cohesive team of neurologists, neurosurgeons, neuroradiologists, psychologists and supportive staff. By performing 83 epilepsy surgeries during the period, and crossing 1200 for the total number of epilepsy surgeries performed, the Epilepsy Center maintained its status of consistently undertaking the maximum number of epilepsy surgeries per year in India during the last 14 years. The role of functional magnetic resonance imaging (fMRI) and EEG-fMRI in obviating the need for invasive EEG monitoring is undergoing intensive study at the Center. The Post-doctoral Fellowship (PDF) program attracted applicants from all over the county, thereby fulfilling one of the major objectives of the Epilepsy Center to disseminate comprehensive epilepsy care to different parts of our country and neighboring countries like Sri Lanka and Bangladesh.

The Comprehensive Movement Disorder Center maintained its status as the foremost center in this subspecialty in India. During the period, 13 deep brain stimulator implantations/replacements, 2 pallidotomies, 134 botulinum toxin injections were undertaken. The role of transcranial magnetic stimulation in the therapy of movement disorders is undergoing intensive research. The Sleep Disorders Center within one year of its inception registered remarkable progress in outpatient attendance, nocturnal polysomnographic (PSG) recordings and basic research. The chamber to record the influence of temperature on sleep in mice became operational, thereby paving way for similar inquiry during PSG in humans. Invited faculties attended the Computational

Neuroscience Workshop and the Brain Mapping Workshop in November 2009 from IIT-Madras, Indian Institute of Science, Bangalore, National Institute for Advanced Studies, Bangalore, University of Hyderabad, Hyderabad and Institute for Cognitive Neuroscience, Allahabad. The objective assessment of brain-mind interaction was debated and strategies formulated during these workshops.

Electrophysiological evaluation of cardiac arrhythmias and their treatment by selective ablation of the conduction pathways has been the highlight of the Department of Cardiology during 2009-10, as evidenced by the workshop focusing on epicardial approach to ablation of scar-related ventricular tachycardias along with experts from USA and Australia. In addition, an advanced workshop on rotablation technique in coronary intervention was organized during which several patients underwent rotablation and stenting for coronary artery stenosis.

The biomedical technology development progressed at a steady pace with two technologies - porous granules of hydroxyapatite and bioactive composites for dental applications and field-kit for testing antibiotic sensitivity of mastitis in farm animals being transferred for commercial production. Two technology agreements were signed, one for the pre-clinical testing and technology transfer of fluoropassivated and hydrogel sealed vascular graft and the second for a development of a nanoparticle technology for chromatin removal.

The calibration activities were successfully accreditated by NABL in their first audit. The COFRAC, France extended their accreditation for the ISO17025 Quality Management System after their surveillance audit in July 2009; no non-conformities were reported in this audit. Our feedback survey clearly indicated a high level of customers' satisfaction. Industry customers indicated that they could successfully submit our test reports to regulatory authorities. The laboratory level production and evaluations for fibrin glue and rapid test kit for antibiotic sensitivity identification of urinary tract bacterial infections proceeded to advanced stage. User trials at various leading animal houses of the paper-pulp biodegradable laboratory animal contact bedding material resulted in excellent feedback about its performance and acceptability.

Let me list a few more of the major achievements of the BMT Wing during 2009-10: 1) following the commissioning of the TiN coating unit at the BMT wing, the development of Improved Tilting Disc Heart Valve progressed and clinical trials will start soon; 2) the Left Ventricular Assist Device – a joint project with VSSC, Trivandrum has reached animal evaluation phase; 3) various tests systems required for the evaluation of coronary stents have been installed and validated; 4) the Intrauterine Device reached the final stages of toxicological evaluations; 5) functionalized quantum dots capable of selectively picking up C-reactive protein from serum/plasma was developed in the laboratory; 6) use of adult mesenchymal stem cells from bone marrow and adipose tissue for bone and cartilage tissue engineering, and bioreactor for the development of cartilage tissue, liver cells and vascular tissue engineering applications are ongoing; 7) preclinical safety evaluation of bioengineered corneal cell sheet was initiated; 8) decellularised bovine pericardium and jugular vein is at an advanced stage of testing; and 9) and developmental of an in vitro pyrogen test kit for pyrogenicity using human whole blood was completed.

The engineers and scientists of the BMT Wing published 55 articles in indexed journals signalling a healthy growth in the average impact factor from 2 to 3. Four patents were granted and 8 new patents were filed. As member of National Knowledge Resource Consortium, the BMT Wing library has not only full access to full-text of journals, but also has accounts with Patents Information System, Nagpur, NISCAIR, DELNET and STN-Easy facilitating easy retrieval of information.

The Public Health Wing of the Institute, the Achutha Menon Centre for Health Science Studies (AMCHSS), continued to train highly competent and socially committed health professionals in the current year also. The first batch of two PhD students completed their program this year and they ware awarded the degree: one in chronic disease

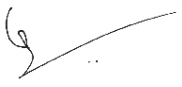
epidemiology and the other in health economics. One of the PhD students was awarded a scholarship from Bielefeld University, Germany to work in their school of public health for three months. Another PhD student was awarded the prestigious Erasmus Mundus External Cooperation Window Scholarship from Sweden for her PhD program in our Institute. There is committed financial and technical support from the Karolinska Institute, Sweden for this PhD student project.

Fifteen Master of Public Health (MPH) and 11 Diploma in Public Health (DPH) students successfully completed their training. Two health professionals were given four-month training in community-based interventions in cardiovascular diseases under the World Health Organization Fellowship Program. In addition 13 MPH and 17 Master of Applied Epidemiology (MAE) students graduated from our off-campus center, the National Institute of Epidemiology, Chennai. We also started an off campus MPH program in the Christian Medical College Vellore this year. Three MPH students are selected for their two months field placement in Bielefeld University, Germany during November-December 2010. All the expenses for the placement will be met through the German Academic Exchange Program.

The faculty of AMCHSS published 21 papers in indexed journals, averaging three publications per faculty, with a mean impact factor of 2.46. In addition, the World Health Organization, Geneva published a discussion paper, which was written by the AMCHSS faculty members. The centre had two consultancies: one from the National Rural Health Mission (NRHM), Government of Kerala to prepare a training manual for gender-based violence and the other from the AIDS prevention and control project under the National AIDS Control Organization of the Government of India for data triangulation of HIV/AIDS in Kerala. The Head of AMCHSS was an invited speaker in the prestigious meeting of the Institute of Medicine of the United States National Academies on a meeting to discuss the challenges of preventing the global epidemic of cardiovascular diseases in developing countries at Washington, DC in July 2009. This year's National Science Day celebration was on gender equity for prosperity and peace which was conducted on February 27, 2010. Since gender issues in health is a core module of the MPH program, the national science day celebration was organized by the AMCHSS in collaboration with other related departments of the Institute. One training manual and two handbooks were developed by AMCHSS for health care providers in Kerala to address gender-based violence as a technical support for the NRHM, Kerala.

Before concluding, let me give the following message to the employees of the Institute.

Shri. Prithiviraj Chavan, the Hon'ble Minister of State for Science and Technology, Government of India during his visit to the Institute on 6th December 2009 expressed profound appreciation of our achievements and encouraged us to scale newer heights. We have to strive hard to sustain the momentum to achieve the world leadership in medical device development, high quality patient care, postgraduate training and public health research. With the augmentation of infrastructure planned, dedicated service of the employees, and unstinted support of the Department of Science and Technology, Government of India, I am sure that we will surge further and further ahead in the coming years.



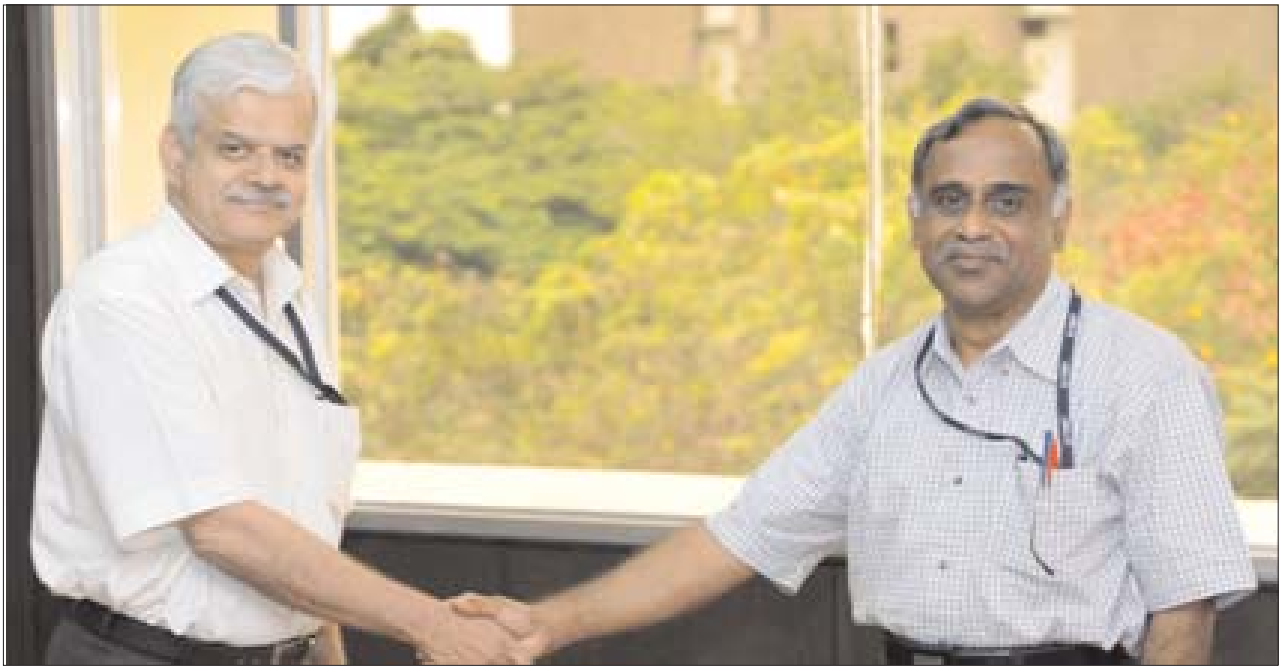
K. Radhakrishnan

HIGHLIGHTS OF THE YEAR

Dr K Mohandas, Director, SCTIMST inaugurating the CME on "Hospital Administration" jointly organized by SCTIMST and Federation of Hospital Administrators, Kerala Chapter on April 7, 2009

Dr. K. Mohandas, Director, SCTIMST inaugurating the International Nurses Day on May 12, 2009

The Institute hosted the 3rd All India Health Science University Vice-Chancellors' Conference from July 3-5, 2009. The theme of the Conference was "Medical Education – The Challenges Ahead". The Conference was inaugurated by Shri. R.S. Gavai, His Excellency the Governor of Kerala.



After 15 years of dedicated and distinguished service as the Director of the Institute, Dr.K. Mohandas retired on July 31, 2009 and handed over the charge to Dr. K. Radhakrishnan, Professor and Head, Department of Neurology, who took over as Director on August 1, 2009.

Dr. K. Radhakrishnan, Director, SCTIMST inaugurated the workshop for strategizing intervention activities in the schools to reduce risk factors of noncommunicable diseases on September 27, 2009.

The Institute in collaboration with the American College of Clinical Engineering and the Indo-US Science and Technology Forum organized "Indo-US Advanced Clinical Engineering Workshop-India (ACEW-INDIA 2009)" from October 5-10, 2009. Dr. M. Chidambaram, Director, National Institute of Technology, Tiruchirapalli inaugurated the workshop.

The group photo of the participants of the Computational Neurosciences Group and Brain Mapping Workshop held at SCTIMST from November 14 - 20, 2009

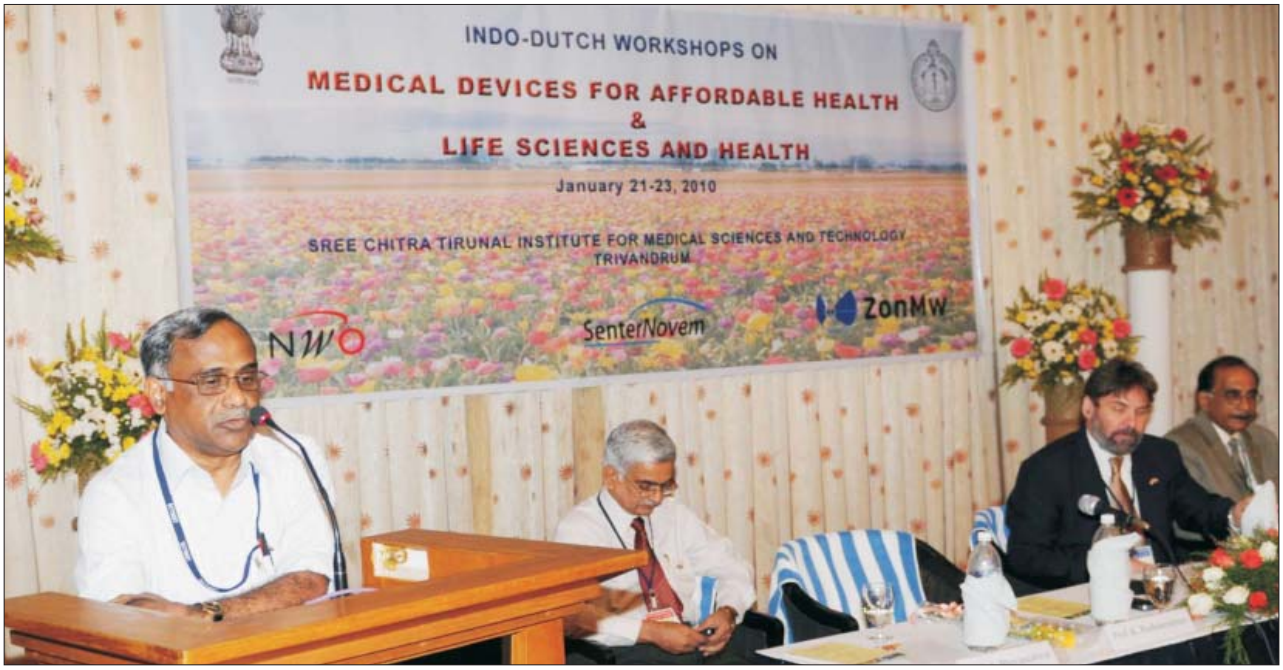
Dr. R. Sankarkumar, Associate Medical Superintendent, Hospital Wing SCTIMST inaugurated the painting competition for children with epilepsy on the National Epilepsy Day, November 17, 2009.

The Institute hosted the 9th Project Advisory Committee (PAC) in Health Sciences of the Department of Science and Technology, Government of India on November 26-27, 2009.

Shri Prithviraj Chavan, Hon'ble Minister of State for Science and Technology, Government of India visited the Institute on December 6, 2009 and addressed the faculty.

Dr. J.M. Tharakan, Dean (Academic Affairs), SCTIMST inaugurated the National Workshop on Psychosocial Interventions in Health Care jointly organized by SCTIMST and International Association of Group Psychotherapy on January 2, 2010.

Signing and exchange of agreement between the Institute and IFGL Refractories Ltd, Kolkatta held on January 13, 2010 for the Technology Transfer of Bioceramic products in dental applications



Dr. K. Radhakrishnan, Director, SCTIMST inaugurated the Indo-Dutch Workshop on Medical Devices for Affordable Health Life Science and Health on January 21, 2010.

The German team led by Dr. Peter Berlit visited the Stroke Unit of SCTIMST on February 8, 2010.

Dr. R. Sankarkumar, Medical Superintendent, Hospital Wing, SCTIMST receiving the award for the second top tax paying assesse in Customs (Public Sector) for the year 2008-2009 in Thiruvananthapuram Commissionerate on February 24, 2010.

Smt. P.K. Sreemathi Teacher, Hon'ble Minister for Health and Social Welfare, Government of Kerala inaugurated the tobacco smoke free households initiative on February 25, 2010, in the AMC Auditorium. Over 200 women mostly from two wards of Nellanad Panchayat participated in this function organized by the Achutha Menon Centre for Health Science Studies

The National Science Day was celebrated in the Institute on February 27, 2010, during which essay competition on 'Gender Equity for Prosperity and Peace' were conducted. Dr. Malini Laloraya, Scientist, Rajiv Gandhi Centre for Biotechnology, Trivandrum gave the keynote address.

World Sleep Day was celebrated on March 19, 2010

HOSPITAL WING

MISSION

- Improve patient health outcomes
- Increase patient satisfaction
- Decrease medical errors, costs and waste
- Serve the underserved

VISION

- Be a global leader in high quality patient care and in postgraduate training programs in cardiovascular, thoracic and neurological diseases by 2020.

FROM THE DESK OF MEDICAL SUPERINTENDENT

The hospital of the Institute has 239 beds and serves as tertiary referral center for cardio-vascular, thoracic and neurologic diseases. With a view to fulfill the mandate assigned by the Government of India, the Institute has always given due importance to patient care activities. With a number of by highly qualified personnel including doctors, nurses and other para-medical staff, various departments of the hospital have updated state-of-the-art facilities for diagnosis and treatment with highly advanced and sophisticated equipments.

With the co-ordination and co-operation of various departments like Neurology, Cardiology, Neurosurgery, Cardiovascular and Thoracic Surgery, Imaging Sciences and Interventional Radiology, Anesthesiology, Biochemistry, Transfusion Medicine, Microbiology, Pathology, the hospital is setting new standards in highly specialized patient care and thereby has become a role model for patient care in our country. The increasing number of patients every day itself is the recognition of the patient care services of the hospital. The fully computerized system for patient registration, computerized data maintenance of the patients' information, the medical records system with computerized patient data base and established procedures for microfilming old charts are certain milestones in the patient care activities of the Institute. One of the unique nature is that the Institute does not allow by-standers for caring inpatients and the Institute has an excellent team of nursing staff supported by unit helpers and cleaning attendants are caring the inpatients with utmost dedication, care and sincerity.

The Institute has a very systematic assessment system for assessing the income and the background of the patients and providing subsidized/free treatment according to the economic status of the patients, which is a unique venture all over the country. In addition to this, the medicosocial workers provide proper assistance to the patients for availing financial support from various sources like Prime Minister's Fund, State Government and various other agencies including charitable organizations. The Institute is also providing free treatment to 'A' category patients i.e financially very poor patients and people who belongs to Scheduled Tribe community with the support of the Government of Kerala. With the assistance of Government of Kerala, the Institute is providing free treatment to the children below the age of 18 years.

For the efficient patient care, the wholehearted support of the Division of Clinical Engineering, Computer Division, Administration Section, Finance and Accounts Division, Pharmacy, Security Wing, Medical Illustration Wing, Motor Transport Wing, Dietary and Laundry are also involved.

With a great quantity of team spirit, dedication and sincerity of its employees, the Institute could provide better patient care during the current year. In the coming days, the Institute will be able to come out with more and more facilities for the patient care and thus serving our patients irrespective of their religion, caste, region, social and economic status.

S.J. Douglas Linsby

Hospital Services:

Dr. S. J. Douglas Linsby, MS
Medical Superintendent

Dr. R. Sankarkumar, MS, MCh
Associate Medical Superintendent

Dr. S. K. Jawahar, MBBS, Dip NB, LLB, MHA
Administrative Medical Officer

Mrs. Vijayamma Harikrishnan, B.Sc. Nursing, M.A.(Pub. Admn.)
Nursing Superintendent

Mrs. S. Sudhamani Amma, M.Sc. Nursing, PGDHRM
Deputy Nursing Superintendent

The hospital continued to provide tertiary care to an increasing number of patients. As a result of reorganisation, up-gradation and commissioning of state-of-the-art equipments, the quality, efficiency and throughput of the hospital increase significantly. Several new diagnostic and therapeutic programmes were started. In its efforts to extend affordable care to the socio-economically disadvantaged sections of the public, the institute provides services in a reduced user charges. This is despite the financial constraints due to steady decline in non-plan grants. The Telehealth and Medical Education Project did more than 140 teleconsultations and 3 continuing medical education programmes.

Some of the important hospital statistics:

(a)	Sanctioned bed strength	: 239
(b)	Bed occupancy rate	: 86.03%
(c)	Average length of stay	: 7 Days
(d)	Bed turnover rate	: 37 patients
(e)	New registration	: 13888
(f)	Repeat cases	: 94827
(g)	Admissions	: 8463
(h)	Percentage of mortality	: 2.06
	(i) Cardiac surgeries	: 1685
	(ii) Neuro surgeries	: 1216
	(iii) Investigations	: 822822

Patient care

During 2009-10, hospital received more new patients in the Out Patient(OP) Department for consultation. Compared to last four years, OP registration has increased during this year. However, the average length of stay and bed turn over remained the same. While the bed occupancy rate reached the highest (87.31%) in five years, free and subsidised group of patients increased by 2%. In addition treatment was provided to members of different groups such as, Central Government Health Scheme, Ex-servicemen Contributory Health Scheme, Scheduled Tribe Scheme, Thalolam Scheme (A Government of Kerala scheme for free medicines and treatment for children below 18 years with chronic diseases).

Training programmes were conducted for different levels of employees such as nurses, cleaning attendants, office staff and others for the development of human resources. For easy mobility of employees and students between the hospital wing and biomedical technology wing of the institute frequent shuttle services started operating.

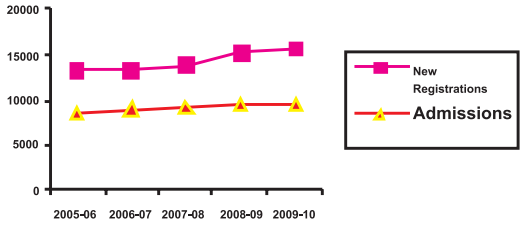


Fig. 1 New Registrations & Admission

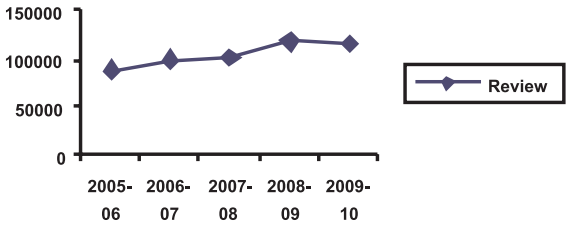


Fig. 2 Follow-up

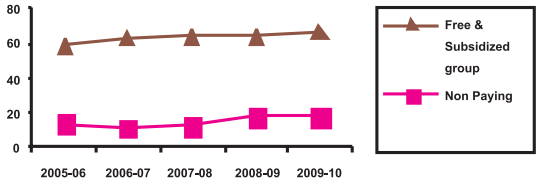


Fig. 3 Free & Subsidized Treatment

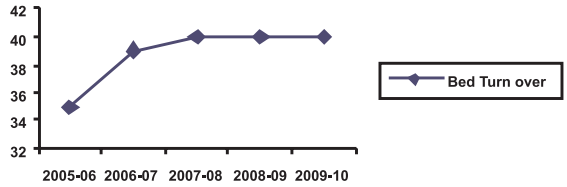


Fig. 4 Bed Turn Over

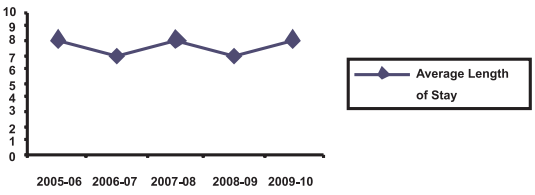


Fig.5 Average Length of Stay

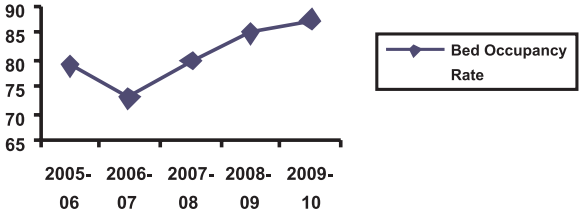


Fig. 6 Bed Occupancy Rate

New Initiatives

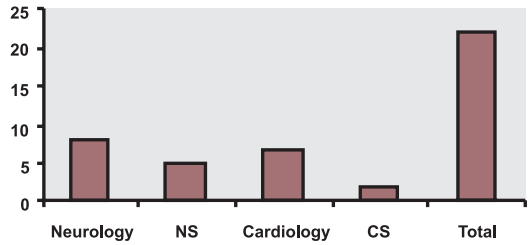
During 2009-10, following initiatives were taken to build infrastructure for the institute to increase the efficiency in service delivery.

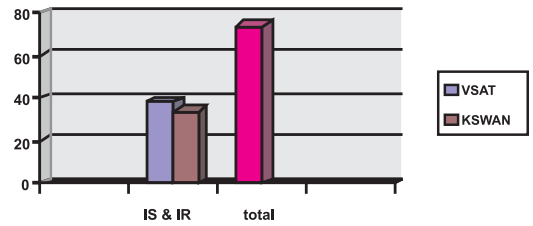
- A state of the art digital subtraction angiography lab for the Department of Imaging Sciences and Intervention Radiology was installed.
- A new state of the art Cath Lab for the Department of Cardiology was procured.
- Central Air Conditioning system was revamped with new plant equipped with Building Management System.
- The electrical substation was renovated with Building Management System and new panel board.
- Two additional floors constructed on the existing AMCHSS complex.
- New drying machine in laundry was acquired.
- Decision was made to replace two autoclaves in the Central Sterile Supply Department with state of the art autoclaves.
- Sanction granted for construction of new canteen space. Canteen Management Committee initiated events to improve the healthy food habits among the staff of the Institute. This include a talk on healthy food habits by an expert, salad and fruit lunch for New Year, poster exhibition on healthy food habits and so on.

Special programmes

- CME on Hospital Administration was organised on World Health Day, 7th April 2009.
- Institute Day was celebrated with cultural and sports activities on during March 2010.

Telemedicine facility





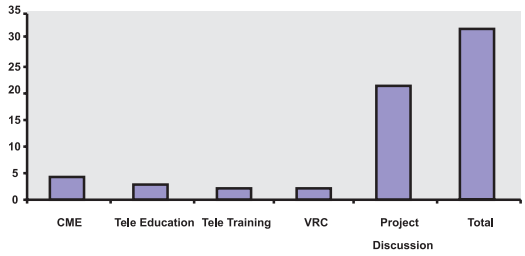


Fig. 9 CME, Tele-education, Tele-training, village resource centre & Project Discussion(Total 32)

International Tele-connectivity

International Tele Project discussions for the Quit Tobaco India and Oxford Health alliance projects of AMCHSS was initiated.

Anesthesiology

Dr. K. Mohan Das, MD
Professor & Director of the Institute (Up to 30.6.2009)

Dr. R.C. Rathod, MD
Professor & Head of Department

Dr. (Mrs.) Rupa Shrinivas, MD, Dip.NB
Professor

Dr. Thomas Koshy, MD
Additional Professor

Dr. Shrinivas V. Gadhinglajkar, MD
Additional Professor

Dr. Prasant kumar Dash, MD
Additional Professor

Dr. P.K. Neema, MD
Additional Professor

Dr. S.Manikandan, MD
Associate Professor

Dr. P. Gayatri, MD, FRCA
Associate Professor

Dr. P.R. Suneel, MD
Associate Professor

Dr. K.P. Unnikrishnan, MD
Associate Professor

Dr. Subrata kumar Singha, M.D
Assistant Professor

Mrs. K.V. Bhuvaneswary
Scientific Assistant

Anesthesia support given during this year for

Cardio vascular & thoracic surgery	1940 cases
Neurosurgery	1250 cases
Neuro & cardiac radiological procedures	750 cases

New Initiatives

Following equipments were added

1. Anesthesia Gas Monitors (11 Nos).
2. ICU Ventilators.
3. Ultrasound machine for vascular access
4. Various Intubating scopes
5. TEE 3D Echocardiography machine

Biochemistry

Dr. P.S. Appukuttan, Ph.D
Professor & Head

Dr. N. Jayakumari, Ph.D
Professor

Dr. G. Sreenivas, Ph.D
Scientist C

K.I. Annamma, B.Sc.,
Junior Scientific Officer

B. Sasikumar, M.Sc.,
Junior Scientific Officer

T.A. Thomas, MSc.
Scientific Assistant

The department of Biochemistry comprises mainly of two wings: a) Central Clinical Laboratory (CCL) where patients samples are analyzed round the clock for hematology, clinical pathology and biochemistry parameters and b) research laboratories where externally funded research program and Ph.D program are undertaken. During the year the department had ten Ph.D students.

New initiatives

The following equipments were purchased during the year:

a) AVANTHI J-25 (BECKMAN, USA) refrigerated high speed centrifuge used for protein purifications:

b) ACTA Prime Plus (GE; USA) used for protein separations.

The central clinical laboratory standardized the following clinical diagnostic tests in the newly acquired OLYMPUS AU400 clinical chemistry analyzer. This has been announced by the department and patients' sample analysis started in early October, 2009.

1. Glycosylated hemoglobin (HbA1C).
2. Microalbumin (urine).
3. LDL cholesterol direct.
4. Magnesium (serum).
5. Lipoprotein(a) [Lp(a)] (serum).

Special programs

i) Two different functional types of human serum anti-α galactoside antibody (anti-Gal) detected.

Affinity purified anti-Gal prepared from about 2 dozen individuals were either agglutinative (T+) or not (T-) towards trypsinized human RBC. T+ anti-Gal agglutinated RBC sugar specifically. This major difference was reflected also in the ability of these antibodies to form immune complex with serum lipoprotein(a) [Lp(a)], thus offering a mechanism for Lp(a) mediated vascular pathology which is implicated in atherosclerosis and stroke. Works are on to correlate anti-Gal Lp(a) immune complex level to vascular pathology.

ii) Dysfunctional HDL and proatherogenic activity

Since dysfunctional HDL has been found to be proatherogenic rather than cardio protective, separation and characterization of various fractions of active and dysfunctional HDL is undertaken to assign the contribution of each towards pro- or anti-inflammatory effect on vessel wall and in preventing LDL oxidation.

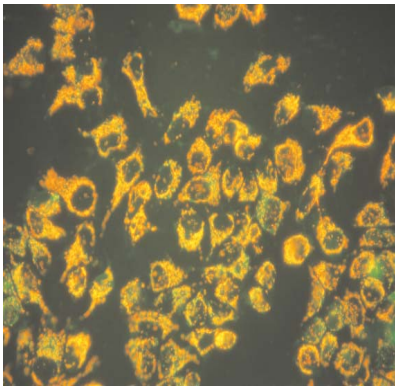
iii) Coronary artery disease in the young.

A project is to establish conventional and non-conventional risk factors that may be responsible for the increased prevalence of cardiovascular disorders observed in younger population in Kerala.

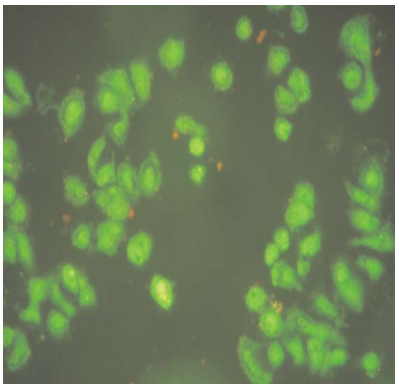
iv) Cancer biology mediators and inhibitors.

Using colon cancer as model, it was demonstrated that low concentration of the nitric oxide (NO) donor, SNAP increase proliferation, migration and differential expression of matrix metalloproteinase , GTPases and cyclic GMP – dependant proliferation. In vitro studies with anti cancer agent aloe emodin on colon cancer cells reveal that it acted by induction of apoptosis, inhibition of cell migration and down regulation of matrix metallo-

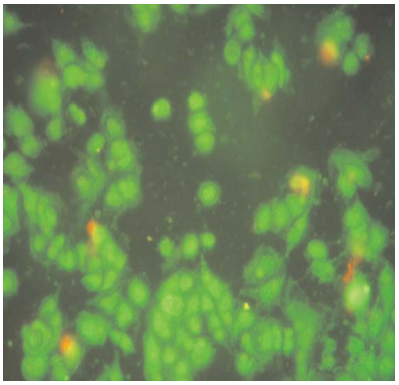
proteinase. A new anti-tumor drug CT-LC4 was shown to act by induction of apoptosis and autophagy through expression of caspases and PARP.



Control



Emodin



Aloe emodin

Status of ongoing/routine activities.

The Central Clinical Laboratory performed a total of 6,66,327 tests during this year in biochemistry, hematology and clinical pathology as detailed below

Biochemistry	:	2,81,120
Hematology	:	1,74,997
Coagulation parameters	:	43,517
Blood gas & electrolytes	:	31,132
Miscellaneous	:	1,35,561
Total	:	6,66,327

Cardiology

Dr. Jaganmohan A .Tharakan, MD, DM
Professor& Head

Dr. Thomas Titus, MD, DM
Professor

Dr. V. K. Ajithkumar, MD, DM
Professor

Dr. S. Sivasankaran, MD, DM, DIP NB
Additional Professor

Dr. K M. Krishnamoorthy, MD, DM
Associate Professor

Dr. S. Harikrishnan, MD, DM
Associate Professor

Dr. Narayanan Namboodri
Assistant Professor

Dr. Bijulal
Assistant Professor

In the academic year 2009-10, the Department of Cardiology continued to provide state-of-the art patient care, along with research and academic programmes. Apart from the ongoing training programmes (4 DM trainees, 3 post-DM trainees and 3 cath lab technical trainees/year), during this period, the department conducted various workshops, initiated new research programmes, and published in many international journals.

The number of new outpatient registrations in Department of Cardiology during the year 4/09 to 3/10 was 7825, and 3675 patients were treated as inpatients. The bed turnover, average length of stay of patients and bed occupancy rate for inpatient services, suggested optimal utilization of

Hospital services for inpatient care. The mortality of 1.77% for inpatients is acceptable and similar to previous years. There was an all-round increase in outpatient related investigation including ECG, exercise stress tests, 2D echo Doppler studies, Holter, HUT tests & transesophageal echo studies.

A new 3-D echo color doppler machine (IE 33 Philips) was installed in the department. 3-D reconstruction of cardiac valves and cardiac defects complemented interventions like atrial septal defect device closure and balloon mitral valvuloplasty. A new digital flat panel Philips cath lab is being commissioned and the number of cardiac catheterization laboratories will be three.

Workshops/training programme

- Conducted electrophysiology workshop focusing on epicardial approach to ablation of scar-related ventricular tachycardias along with Dr. Kalyanam Shivakumar, Director, Cardiac Electrophysiology Services, UCLA (January 11, 2010)
- Conducted electrophysiology workshop at national-level focusing on Cardiac Resynchronisation Therapy along with Dr. Vince Paul, Royal Perth Hospital, Australia (January 29-30, 2010)
- Organized an advanced workshop on rotablation technique in coronary intervention on 18-11-2009. Dr Kirty Punamiya from Mumbai was the external expert and several clinical cases underwent rotablation and stenting for coronary artery stenosis

A. Status of ongoing/routine activities

Performed more than 3000 coronary procedures including 450 angioplasties. Performed more than 300 electrophysiology procedures (including 200 radiofrequency ablations) and 200 permanent pacemaker implantations. More than 30 cases of complex cardiac arrhythmias were mapped and ablated with the assistance of EnSite, the 3-D electroanatomical mapping system. Our institute continues to be the only centre in government sector in South India having this advanced technological tool in the electrophysiology lab. The department continues to do maximum pediatric interventions in India for the last two years.

Invasive and Interventional Procedures during 2009-2010	2009-10
DIAGNOSTIC	
Coronary Angiography	1299
Cardiac Catheterization	165
EPS	59
Coronary angio with cardiac Cath stu dy	139
INTERVENTIONAL	
PTCA	576
ASD DEVICE CLOSURE	225
Balloon Atrial Septostomy	22
Balloon pulmonary valvotomy	8
PTMC	171
PDA COIL CLOSURE	16
PDA DEVICE CLOSURE	145
VSD, CoA, BAV	1 each
PDA Stenting	16
PPI	181
ICD	12
CRT	2
EPS + RFA	129
TOTAL PROCEDURES	3168

New Initiatives during the year

1. Research Programmes

- Electroanatomic characterisation of scars-correlation between electroanatomic scar and MRI reconstructed scar: The proposed study is an observational study designed to characterize the electrogram features of substrate scars delineated by 3D Electro-anatomic mapping and MRI in patients of ischemic and non-ischemic cardiomyopathy with documented ventricular tachycardia. The correlation of 3D electro-anatomic scars with MRI defined scars will also be studied.

- Plaque characterization by virtual histology intravascular ultrasound in patients with chronic stable angina and type 2 diabetes: The study proposes to characterize the atherosclerotic plaques by virtual histology-intravascular ultrasound (VH-IVUS) analysis of the target coronary vessels of patients with chronic stable angina and diabetes who are undergoing percutaneous coronary intervention and to compare the plaque characteristics with patients of chronic stable angina and without diabetes.
- Research into the novel applications of magnetocardiography in the recording of cardiac electromagnetic field, in collaboration with Indira Gandhi Centre for Atomic Research, Kalpakkam, India.

Cardiovascular and Thoracic Surgery (CVTS)

Dr. K. Jayakumar M.S, M.Ch
Professor and Head of Department

Dr. R. Sankarkumar M.S, M.Ch.
Professor

Dr. K G Shyamkrishnan. M.S, M.Ch
Professor

Dr. M. Unnikrishnan M.S, M.Ch
Professor

Dr. S.R.Krishnamanohar M.S, M.Ch
Professor

Dr. Manoranjan Misra M.S, M.Ch
Assistant Professor (on leave)

Dr. Baiju.S. Dharan M.S, M.Ch
Assistant Professor

Dr. Vivek V. Pillai M.S, M.Ch
Assistant Professor

Dr. Varghese T. Panicker M.S, M.Ch
Assistant Professor

In the year 2009-2010, 1721 cardio vascular and thoracic operations were performed, of this 1429 were open-heart procedures. The details are furnished below.

Adult Cardiac Operations

Open Heart - 984

These include
1. Coronary artery bypass surgery
2. Valve replacement surgery
3. Ascending aortic aneurysm repair
4. Adult congenital heart disease, etc.,

Closed Heart - 292

These include
Surgeries for complex aortic aneurysms & aortoiliac occlusive

diseasesLung surgery including VATS
Beating heart surgeries
Coarctation repair- adult and paediatric
PDA division- adult and paediatric
BT shunt operation

Congenital heart surgeries

Open Heart : 445

These include all simple and complicated cardiac surgeries of infants and children.

Activities of CVTS

Beating heart CABG workshop conducted by Dr. S. Bhattacharya in July 2009.

Completed multicentric trial of Sree Chitra Vascular graft prosthesis and brought out Graft Monogram. Started CVTS research lab and wet lab for giving surgical training using animal hearts.

PROJECTS

Ongoing Projects:

Clinical outcomes of tissue valves and mechanical valves in women of child bearing age - 10 year follow up study.

Homograft valve bank project

Clopidogral in neonatal BT shunts

Cellular and Molecular Cardiology

Dr. Renuka Nair, PhD, MNAMS, MNASc
Scientist- G

Dr. K. Shivakumar, PhD
Scientist-F

Research on the cardiac response to injurious and protective agents remains the focus of the Division. The major areas of research are: isolation, expansion and application of stem cells; and cellular response to hypoxia and hypertrophy-stimulating factors. Ongoing studies are supported by externally-funded research projects. Two projects were completed during the year in focus. There are two ongoing projects.

New initiatives during the year
-Two students joined the Ph.D

Special programmes
– Four fellows were awarded the Ph.D. degree

(i) Ms. Aghila Rani G: "Regulatory signals for expansion of human adult cardiac stem cells."

(ii) Ms. Sangeetha Mohan: "NF-κB plays a role in cardiac fibroblast survival under hypoxia."

(iii) Mr. Sumith Panicker; "Regulation of high glucose induced monocyte chemoattractant protein 1 gene in endothelial cells."

(iv) Ms. Vandana Sankar: "Delineation of mechanism of action of an Ayurvedic antihypertensive formulation and assessment of its efficacy in prevention of cardiac remodeling"

Status of ongoing activities: Summarized below is the outcome of completed and ongoing research projects.

Co-ordinated regulation of the cardiac fibroblast cell cycle and the resistance of these cells to apoptosis - The ability to proliferate in response to mitogens, retained throughout adult life, and resistance to programmed cell death are central to the role of cardiac fibroblasts in myocardial remodeling post injury. Surprisingly, however, the mechanisms that govern cell cycle progression and apoptosis resistance in these cells remain unclear. Over the past few years, this laboratory has remained focused on the regulation of the cardiac fibroblast cell cycle and survival strategies in cardiac fibroblasts. Several lines of evidence, generated during the current year, strengthened the earlier finding that NFkB, the stress-related transcription factor, protects cardiac fibroblasts against hypoxic injury and that selective regulation of cIAP2 expression by NF-kB may, at least in part, mediate the pro-survival role of NF-kB during hypoxia. Additionally, it was found that these cells are more resistant than fibroblasts of non-cardiac origin to oxidative stress and that NFkB and cIAP-2 may be involved in a protective role in such a setting as well.

It was shown earlier in this laboratory that hypoxia delays G1⁄S transition in cardiac fibroblasts under hypoxia by a mechanism involving p38 MAPK-dependent induction of p27. Investigations carried out in pursuance of these observations clearly demonstrated a cyclin expression profile and phosphorylation status of the retinoblastoma gene product that were consistent with delayed G1⁄S transition. Importantly, evidence was obtained in support of a link between p38 MAPK, skp2 and p27 induction in hypoxic cardiac fibroblasts.

Determination of genetic component in hypertension and cardiac hypertrophy. The study was aimed at identifying the genetic and environmental factors involved in the development of hypertension and cardiac complications in the local population. Evaluation of the demographic details of the patients registered in the Cardiology Department of the Institute showed that cardiovascular disorders have a familial tendency. An important observation was that hypertension was detected only after the development of cardiac ailments with the mean age at detection being 50 years. Hence healthy blood donors were screened, and 5.1% were found to be hypertensive with a mean age of 35years. This suggests that hypertension remains undetected and untreated for about 15 years leading to pathological cardiac remodeling. Prompt detection and treatment of hypertension can possibly prevent the development of cardiac complications. Among the polymorphic markers screened, the C allele in intron 7 of peroxisome proliferator receptor alpha (PPARα) showed a positive association with cardiac hypertrophy and dislipidemia. The PPARα 7C allele is associated with reduced expression of the PPARα gene.

Modulation of energy metabolism in the prevention of cardiac remodeling: PPARα is a key regulator of fatty acid metabolism. Cardiac hypertrophy is associated with a shift in energy metabolism from predominantly fatty acid to glucose. Though beneficial initially, in the long run this leads to energy depletion. Hence it was hypothesized that reactivation of PPARα can prevent cardiac remodeling. A study was initiated using spontaneously hypertensive rats to examine the cardiac consequence of reactivation of PPARα.

Autocrine and paracrine mechanisms in human resident cardiac stem cell signaling following hypoxic injury: Stem cell therapy is recognized as an important mechanism of myocardial repair. As stem cell transplantation is associated with a number of problems, the ideal strategy

would be to facilitate the resident cardiac stem cells to repair the injured tissue. Understanding the biology of stem cells and their fate following pathologic insults is essential for promoting in situ repair of injured myocardium. A study was therefore designed for delineation of the behavior of cardiac stem cells isolated from atrial biopsies obtained at the time of insertion of catheter for coronary artery bypass graft in patients with coronary artery disease.

Clinical Engineering

K.Vijayakumar, B.Sc, B.Sc(Engg), PGDHHA
Engineer G and Head

Koruthu P. Varughese, B. Sc(Engg), PGDEDT, PGDCA, MBA
Engineer G

G.Mohanlal, B.Sc(Engg), MBA
Engineer F

B.Madhusoodanan Pillai, B.Sc(Engg), PGDCA, MBA
Scientist Engineer F

N.Sivanandan, (Up to 28-02-2010)
J.E. (Electrical)

P. Ganesan
J.E. (Electrical) (From 01-03-2010)

As in previous years, the activities of the Clinical Engineering Division included installation of new equipments, and maintenance of equipment and utilities, keeping maximum uptime. This year also the Engineering Department was involved in the installation of a number of most modern, sophisticated hi-tech equipments in various departments of the hospital complex. More than 95% of the installation work for the new, imported 600 TR, Hi-tech AC Plants was completed. The biplane flat panel detector Catheterization lab system for Interventional Radiology was made fully functional. Site preparation for a new Cardiology catheterization lab was completed and installation of the machinery is fast progressing. Major equipment indented for the modernization of electrical substation has already been received and installation work is in progress. Modernization of the main passenger lift in Achutha Menon Centre is in the final stage. Purchase procedures for two new lifts, one for the nurses' hostel and another one in the AMC building have been completed. Modernization work on three lifts (one in Nurses' hostel and two in the faculty hostel) has already been commenced.

Another important event in the department was the commencement of demonstration and practical classes for the M.Tech (Clinical Engineering) students of the Institute. Also we have actively participated in the Advanced Clinical Engineering Workshop – India conducted during 5th to 10th October 2009 at Trivandrum, organized by the American College of Clinical Engineering and our institute. Other Apprenticeship training programmes for the various technical education levels are being continued with full allocated strength.

Computer Division

Mrs. G. Geetha, B.Tech(E&C), M.Tech(Comp. Science)
Scientist F

Mr. B. Suresh Kumar, B.Tech(Comp. Science), M.Tech(Comp. Science)
Engineer B

Mr. L.R. Rejith, MCA

Mr. K.S. Saji, B.Tech (Comp. Science)

Routine activities involved in the areas of graphical user interface based software development, installation, Web site updating, network management, tender processing, training for students/staff, hardware and software maintenance of all the user programs including the maintenance of PACS clients and storage backup. Hardware includes maintenance of 12 higher end servers with a remarkable uptime of 99.9% and around 778 computer hardware devices including servers, PCs, thin clients, printers, routers, wireless access points, gateway security appliance and switches.

Division made major progress with the expansion of system environments as follows:-

New Software Developments and Hardware Implementations Salary, Pension, Arrears – 6th pay implementation incontinuation – Modifications in GUI based program was made for revised pay fixation calculation of temporary /permanent staff

Biometric Attendance System – Integrated biometric unit system in BMT Wing with the software's of Administration, Academic Division and automated staff/student enrolment and relieve.

Wireless Access for internet - Additional access points were installed in Block 1, Block 2 and Block 3 providing internet access to PG Students with authentication in their common room.

Veritas Backup Software – Implemented automatic tape backup of institute data & PACS data using Veritas Enterprise backup software.

Medical Records – Patient Chart Scanning - Program was made for scanning medical records directly to store in database with permissions to view at different places and Initiated the scanning of patient charts before year 1990.

Modifications in existing softwares - Program for recording arrival of Prime Minister Fund Sanctions, display system for printing of lab reports in Blood Collection Room, program for monitoring Apprentice Stipend Statement for sending summary to Board of Apprenticeship Training in Chennai., software for the Income Tax Deduction Statement (TDS) automatic uploading and program for the scheduling of admissions in Cardiology

Gateway Security Appliance - Integrated new gateway security appliance for internet and LAN securiy.

Imaging Sciences & Interventional Radiology

Dr. A.K. Gupta, MD, PDCC
Professor & Head

Dr. T.R. Kapilamoorthy, DMRD, MD
Additional Professor

Dr. C. Kesavadas, DMRD, MD
Additional Professor

Dr. Bejoy Thomas, MD, DNB
Associate Professor

Dr. Narendra K. Bodhey, MD, DNB
Associate Professor

Dr. Hima S. Pendharkar, MD, DM
Assistant Professor

DR. R.S. Jayasree, PhD
Scientist – C

Department of Imaging Sciences & Interventional Radiology is providing diagnostic imaging and interventional radiology services in neuro and vascular diseases and of other systems. Department has inpatient admission facility and intensive care management. Department provides imaging facilities such as CT, MRI and ultrasound to the Institute's OP patients and inpatients. This is the only department in our Institute, which provides imaging services to all patients referred from anywhere on OPD basis.

Interventions are done for difficult cases of intracranial aneurysms, cerebral AVMs, cerebral dural fistulas, Vein of Galen aneurysms, spinal AVMs; thoracic and abdominal aortic aneurysms etc. are referred to our department from across the country.

Department provides excellent state of the art imaging services with currently available latest technologies in MRI, Helical CT and colour Doppler. Portable colour Doppler, CR system and PACS are the other advanced techniques available in the department. PACS is linked with HIS. CT Angio, 3D CT, Virtual Endoscopy, Virtual Angioscopy, Vascular Doppler, Transcranial Doppler and MRI of epilepsy, stroke, brain tumours and spine are routinely done.

Various invasive procedures done are listed under interventional procedure in the Table.

Investigation Procedure Done

A. Diagnostic Procedures

No.	Procedures	No. Of Cases
1	Plain X -rays	36040
2	MRI Scans	4205
3	CT Scans	5237
4	US Scans	3384

B. Invasive Diagnostic Procedures

No.	Pro cedures	No. of Cases
1	4 Vessel Angiogram	384
2	Peripheral Angio	8
3	Aortogram	98
4	Spinal Angiogram	21
5	Renal Angiogram	2
6	Barium swallow	5
7	Fluoroscopy	2
8	Venogram	1
9	Percutaneous Transhepatic Biliary Drainage (PTBD)	1
10	Balloon Occlusi on Test (BOT)	1
11	Pulmonary angio	2
12	WADA test	7
	Total	532

C. Interventional Procedures

No	Interventional Procedures	Total (No.of cases / Procedures done)
1	AVM (glue & onyx)	11
2	Facial AVM	2
3	Scapular AVM - PVA	1
4	Submandibular AVM - PVA	1
5	CCF balloon + coil	2
6	Thrombolysis	5
7	Uterine artery embolisation	8
8	Bronchial artery embolisation	22
9	CCF embolisation	3
10	Direct embolisation	1
11	Spinal artery embolisation	1
12	Chemo embolisation	8
13	Vertebroplasty	8
14	JNA PVA	1
15	Sinogram	1
16	Carotid body tumour	3
17	Aneurysm coiling	9
18	Gastro clinoidal artery- coiling	1
19	Basilar trunk aneurysm- coiling	1
20	NAF - PVA	1
21	Oesophageal dilatation	1
22	VAG coiling	1
23	Orbital / vertebral haemangioma	7
24	CC F-PVA	1
25	IVC filter	2
26	IVC gum	1
27	Peritoneal mass-PVA	1
28	Angioplasty	48
29	DAVF embolisation	4
30	DAVF -PVA	5
31	DAVF – coiling	1
32	DAVF (glue / onyx)	11
33	Renal artery pseudoaneurysm coiling	1
34	Stenting	15
35	Aortic stenting cutdown procedure	5
36	CCF – gold ball	4
37	Check haemangioma- PVA	1
38	SETROL injection for venous malformation	3
39	Venous malformation	1
40	Biliary DVA	1
41	Haemangiomatosis- PVA	1
42	Facial haemangioma	1
43	Neuropheringial mass	1
44	AVF – glue	1
45	Vertebral folstal – coiling	1
46	HCC	2
47	PLDD	1
48	TACE	1
	Total	213

D. Interventional radiology services:

I. New OP registrations	- 261
ii. IP Admissions	-293
iii. Interventional radiology procedures	-213

A total of 213 Interventional Radiological procedures were done. Two hundred and ninety three patients were admitted under interventional radiology.

New Initiative:-

New procedure of radio frequency ablation of liver tumour under CT guidance was started.

New Project:

- " Development of iron oxide nanoparticle probes for organ specific molecular MR imaging" funded by BRNS was started.
- Multimodality neuroimaging in presurgical work up of patients with temporal lobe epilepsy (TLE) –Principal Investigator, funded (Rs.4.25 lakhs) by Kerala State Council for Science, Technology and Environment
- A post-marketing safety study in patients with moderate renal insufficiency who receive OMNISCAN (Gadodiamide Injection) for contrast-enhanced magnetic resonance imaging (MRI) – project report (multimodaly epilepsy imaging) presentation at Kerala state science, technology and environment council. Principal Investigator, Multicenter trial (Sponsored by GE Healthcare)
- Development of neurofeedback system using EEG and realtime fMRI Collaborative Project with Scientists & Technologists of Indian Origin Abroad Programme of Department of Science & Technology, Govt. of India
- Collaborating with the Center of Excellence in Magnetic Resonance Imaging: SWI imaging with Prof.Mark E Haacke, The Magnetic Resonance Institute for Biomedical Research, Detroit, MI, USA 2008-10
- 'Setting up of a collaborative Brain mapping unit and a Neurogenetic unit'. (Funding Rs.27 lakhs) with Kerala State Council for Science, Technology and Environment).

Dissertation work guided in the department and submitted

1) Endovascular treatment of brain arterio-venous malformations with onyx, DM Neuroradiology project report submitted to Sree Chitra Tirunal Institute of Medical Sciences & Technology.
2) Clinical features, imaging findings and management of spinal vascular malformations, DM Neuroradiology project report submitted to Sree Chitra Tirunal Institute of Medical Sciences & Technology.
3) To assess the clinico-angiograpic profile of patients with brain arteriovenous malformation presenting with native hemorrhage, DM Neuroradiology project report submitted to Sree Chitra Tirunal Institute of Medical Sciences & Technology.

Library

The library has a collection of 14007 books and 14506 back volumes of journals. During the current year, 270 books and 161 back volumes were added and 103 journals were subscribed. Electronic access to most of the journals we subscribe also has been activated and is available throughout both the campuses.Being part of National Knowledge Resource Consortium, our library has access to full text of journals, in addition to those we subscribe.

Microbiology

Dr. Kavita Raja, DCP, MD, MPhil(Clin.Epidem)
Professor and Head

Smt. Molly Antony, MSc, DMV
Scientist F

Dr. Muraleedhar Katti, MSc, PhD, FISCD
Associate Professor

Smt. K. Naseema, MSc, MLT
Scientific Assistant

Smt. Gracy Varghese BSc, MLT(CMAI)
Scientific Assistant

New initiatives during the year:

Introduced the mucous extractor for taking endotracheal aspirates, by the correct method.

Information on specimen collection introduced in the reports section of intranet

Renovation activities completed with new reception area

and Faculty room.

Antibiotic panel for different isolates modified according to CLSI standards.

Special programmes: HOMOGRAFT project is continuing

Status of ongoing/routine activities:

Bacteriology : Infection Control Rounds of HOD with ICN, based on isolates in the lab with advise given on management. VITEK Identification System was used to identify pathogens like MRSA in wounda, Stenotrophomonas maltophilia, Achromobacter xylosoxidans and resistant *Candida tropicalis* that caused infective endocarditis. These are pathogens with a peculiar antibiotic profile; hence this identification resulted in giving appropriate treatment to patients.

Viral Serology: Around 15000 samples were processed in the VIDAS system, which gives accurate, highly sensitive and quick reports.

Serology Nephelometry helped to give accurate results for around 2000 serum samples for CRP, ASO,RPR, TPHA etc.

Molecular Biology The PCR for TB routinely done, was upgraded by the introduction of the Gel-Doc system, which is also safer and helps in storing the results electronically.

One case of Tuberculous meningitis was diagnosed as MDR TB by Alert system and PCR and patient improved following appropriate alternative therapy. Isolate sent to a reference lab in Bangalore for sensitivity testing.

Other activities

Initiated surveillance of Ventilator associated pneumonia (VAP). Criteria for VAP and data for December discussed with Infection Control Nurse. VAP rate for all ICUs generated as part of infection control measures.

Diagnostic utility of the new test Procalcitonin in sepsis initiated in Neurology ICU.

Neurology

Dr. K. Radhakrishanan, MD, DM, FAMS, FAAN
Director & Senior Professor

Dr. Muralidharan Nair, MD, DM
Professor and Head

Dr. C . Sarada, MD, DM
Professor

Dr. Sanjeev V. Thomas, MD, DM
Professor

Dr. Asha Kishore, MD, DM
Professor

Dr. P.S. Mathuranath, MD, DM
Associate Professor

Dr. Abraham Kuruvilla, MD, Dip Am Boards Neurology
Associate Professor

Dr. R. Ashalatha, MD, DM
Associate Professor

Dr. C. Rathore, MD, DM
Assistant Professor

Dr. S. Sajith, MD, DM
Assistant Professor

Dr. Shyam, MD, DM
Assistant Professor

Epilepsy Section

The R. Madhavan Nayar Center for Comprehensive Epilepsy Care saw an increase in number of outpatient attendance, video-EEG admissions and the number of EEGs performed. More than 1000 epilepsy surgeries were performed till now. The number of intracranial recordings also increased by 40%. More number of extratemporal surgeries were performed. Two out-patient clinics run on Wednesdays and Fridays. The rural outreach epilepsy clinics in the first and third Sundays of every month also functions smoothly. Two to three epilepsy surgeries are carried out every week. All aspects of epilepsy care are provided, including psychosocial counseling and occupational therapy.

Designated Activities

Total number of surgeries	- 91
Temporal	- 62
Extra temporal	- 23
Callosotomy	- 1
Hemispherectomy	- 3
Hypothalamic hamartoma	-2
VNS Implantation	-3
Invasive monitoring	- 4
Cortical stimulation & mapping (CSMP)	- 5
Electrocorticography	- 89

Epilepsy Clinic attendance	- 4845 cases
Ward admissions	- 999 cases
VEEG admissions	- 835 cases
SEEG	- 3321 cases
Outreach Clinic attendance	- 1339 cases
Group sessions	- 2030
Occupational Therapy services	- 883

Research programmes and collaborative programmes

Evaluation of patients with medically refractory temporal lobe epilepsy based on MDR 1 polymorphism. In collaboration with Rajiv Gandhi Center for Biotechnology, Trivandrum

Camps and Awareness program

Epilepsy Camp in Pathanamthitta

An epilepsy camp and awareness program was conducted by R.Madhavan Nayar Centre for Comprehensive Epilepsy Care, SCTIMST in St. Luke's Hospital, Pathanamthitta on 11.10.09. Thirty-one patients with epilepsy were examined and counselled by a team consisting of Dr. Rajesh Iyer, Dr. Atampreet Singh, Dr. Shivakumar, Dr. Pandurang, Dr. Anis and Dr.Jayachandran D (Senior MSW). The program was organized by Malankara Orthodox Social Service Society and Moltizer International, Germany.

Mile stones achieved

Sleep Disorder Section

The Center for sleep disorder saw an increase in number of outpatient attendance, PSG, CPAP trials and MSLT admissions. All aspects of sleep disorder care are provided, including psychosocial counseling.

Designated Activities

Total number of PSGs	- 110
Total number of CPAP trials	- 25
Total number of MSLT	- 15
Total number of neuropsychological assessment and counseling	- 40

Research programmes and collaborative programmes

Development of temperature sensor for measuring core body temperature during sleep. In collaboration with National Institute for Technology, Trichy

Transcranial magnetic stimulation studies in patients with narcolepsy and sleep apnea

Camps and Awareness program

1) Group Sessions

Group therapy sessions for patients are conducted for over thirty minutes prior to sleep clinic moderated by Medical Social Worker. In that session, patients discuss their problems, share experiences and get to know each other.

2) World Sleep Day 2010

World Sleep Day was celebrated on March 19, 2010 under the slogan "Sleep Well, Stay Healthy".

A public meeting was organized in the Sleep center, BMT Wing of SCTIMST, Poojapura on the same day from 10.AM to 1 PM. The meeting was presided by, Dr. M.D. Nair Head of Department of Neurology, SCTIMST, Dr. Ashalatha. R, Sleep-in-charge, Department of Neurology, SCTIMST, Dr.Sarada, Senior Professor, Department of Neurology, SCTIMST and Dr. Mohan Kumar. V, TAC Chairman, SCTIMST. Dr. G. S. Bhuvaneswar, Head of BMT Wing, SCTIMST was the Chief Guest. He in his inaugural address emphasized the need for sleep and its role in leading a healthy life. He offered all assistance for organizing such programs in future. A total of 110 people attended the sleep day celebration program, which also included patients and their relatives. The inaugration programme was followed by a poster presentation by Dr. Kamalesh Gullia, which focused on the neurophysiological basis of sleep.

Neuromuscular Disorders Subsection

The NM subsection caters to the management issues of patients with disorders of muscles, nerves, plexus and anterior horn cells of the spinal cord. Besides coordinating the investigations and treatment protocols of these patients, this subsection runs a specialty review clinic aimed at follow-up of their response to treatment.

Neuromuscular Review Clinic (802 patients)

This clinic is conducted on every Tuesday for four hours. This has one Neuromuscular consultant, two residents, one Neuro nurse, one senior medical social worker, one occupational therapist and one Physiotherapist to advise regarding further exercises and activities to promote functional recovery. Any additional monitoring, investigations and consultations from other specialties are advised from this clinic. The patients based on the disease activity are reviewed at 3 months, 6 months or 1 yearly interval.

Group Sessions:

Group therapy is conducted over one hour prior to each review clinic for patients with specific disease like Myasthenia gravis. Moderated by the Neuromuscular consultant, Neuro nurse and a senior medical social worker, patients frankly discuss their disease states, clear their doubts, share their experience with other patients with the same disease and get to know each other. This reduces their distress, frustrations and self pity and enable them to cope up better with their disease.

Specialised Treatment modalities: -

Large Volume Plasma Exchange	– 160 sessions.
Small volume Plasma Exchange	– 102 sessions.
High dose Intravenous Immunoglobulins	– 115 sessions.
Thymectomy for Myasthenia gravis	-15
Mechanical ventilation Neuromedical ICU	-61

Acute Flaccid Paralysis (AFP) program

AFP program under National Polio Surveillance Project, Government of India – WHO initiative has identified the Neurology department of our institute as a state nodal centre to periodically report AFP cases so that accelerated strategies can be adopted to ensure the interruptions of wild Poliomyelitis transmissions.

New Ventures started in the Neuro Muscular Section

Inching technique and 2nd Lumbrical/interossei latency difference in the diagnosis of Carpal tunnel syndrome.

Clinical profile of patients with MUSK positive Myasthenia Gravis

Started a Neuromuscular Case discussion Forum for the Postgraduates every Saturday 3-4 pm

New Clinical studies started in Prion Diseases, and SSPE on Natural History

Stroke Program

Established Comprehensive Stroke Care Program.

New initiatives during the year

Establishment of Neurosonology lab: The newly procured Ultrasound machine is being standardized on intracranial as well extrcranial vascular and tissue imaging. Along with Transcranial Doppler machine, it is expected to establish a dedicated Neurosonology Lab in the current year.

Developed Institutional protocols for management of Acute Ischemic and Hemorrhagic strokes and Cerebral Venous thrombosis.

Special programs

Comprehensive Stroke Care program: Multidisciplinary approach to complicated stroke situations.

Weekly teaching/demonstration sessions for stroke patients and caregivers in post stroke ehabilitation and Nutrition.

Designated Activities

Stroke outpatient clinic: In addition to the routine services, coordinating speech, physio and occupational therapy and weekly teaching/demonstration sessions in post stroke rehabilitation and Nutrition for patients and caregivers. Stroke clinic attendance: 1570

Comprehensive stroke care

Various designated activities are running smoothly. Acute stroke care (intensive care facility and thrombolytic therapy), Intermediate stroke care and continued care including adequate monitoring of treatment and rehabilitation. Dedicated Stroke Thrombolysis bed has been allotted in the NMICU.

Patient management conference: routine multi-disciplinary meeting once in two weeks to make final decision on management of difficult cases. Cases discussed in current year: 57

Transcranial Doppler studies: 110

Research programmes and collaborative programmes

Long-term complications of oral anticoagulation after cardiac valve replacement

Acute Stroke – Awareness, Attitude and Practice among general practitioners in Kerala

Ongoing studies

Cervical arterial dissection: clinical, radiological features and long term outcome- retrospective study

Benefit of combined treatment with Transcranial Magnetic stimulation in addition to routine Physiotherapy in post - stroke functional outcome - Prospective study.

Studies planned for the current year

Incidence of asymptomatic intra cranial carotid disease in patients with CAD – Ultrasound based study

Does the combined effect of central stimulation and peripheral stimulation enhance neuroplasticity in acute stroke patients? – TMS based study.

Workshops/training progremmes held during the year

Observed World Stroke Day on Oct 29, 2009.

The one-day program included teaching as well as experience sharing sessions for patients and caregivers.

Cognition & Behavioural Neurology Section.

Staff details with qualifications as on 31.03.2010

Neurologist – 1, Speech Therapist-2, Neuropsychologists-3, Ph.D scholars – 4, Sociologist-1, Programme coordinator cum Data Manager – 1

Overview of the division

The section provides clinical services to patients with cognitive problems and dementia. It also provides advice & technical support to the Alzheimer's & Related Disorders Society of India (ARDSI), a voluntary organization that helps dementia patients and carers. The section also carries out clinical & basic science research in the field of Dementia, Cognition and Behaviour.

Designated activities

Research programmes and collaborative programmes

In addition to the ongoing research programs a new National Institute of Health (NIH) USA, funded multi-centric Indo-US collaborative project, the Kerala-Einstein study, commenced in mid-year 2008. A new project of assessment of life-time diet on the development of cognitive problems and dementia in older age, has been initiated.

Workshops/training programmes held during the year

The Computational Neuroscience Workshop 2009 from 14th to 18th and the Brain Mapping Workshop 2009 on the 19th and 20th November 2009, were both held. It was attended by 8 invited faculties from other universities, including IIT-Madras, Indian Institute of Science, Bangalore, National Institute for Advanced Studies, Bangalore, University of Hyderabad, Hyderabad and Institute for Cognitive Neuroscience, Allahabad. The two workshops were attended by 50 delegates, from masters level students to junior faculty levels.

Status of ongoing/routine activities

Speech Evaluation	- 1110
Speech therapy	- 723
Audio Evaluation	- 297
Neuropsychological Testing	– 933
IQ Assessments	– 161
Counselling Sessions	– 232
Memory & Neurobehavioural Clinic Attendance	– 294
New Patients with Dementia	– 62

Comprehensive Care Centre for Movement Disorders

Overview: Besides its regular activities, the Movement Disorder section expanded it services to include motor physiology laboratory facilities. Tremor analysis and repetitive transcranial magnetic stimulation (rTMS) studies are now performed regularly for diagnostic and research purposes(photograph to be included). The attendance in Movement Disorder Clinic and Botulinum Toxin Clinic rose from previous years. A second neurologist and a clinical psychologist have become permanent faculty in the program. Clinical research fellowship and Ph.D programs have begun in the section. Dr. Asha Kishore was accepted as a member of the international consortium on Genetic Epidemiology of Parkinson's disease. A new study on genetic screening for LRRK2 mutations in Parkinsons disease in South Indian patients was completed.

Two new research collaborations were established at national and international levels. The research collaboration with Indira Gandhi Centre for Atomic Research , Kalppakam, Tamil Nadu is ongoing. The prototypes of a MEMS based wireless glove for tremor analysis system and optical tracking device for quantifying involuntary movements were developed. A new research collaboration for developing therapeutic paradigms using transcranial magnetic stimulation was established with the Hospital Sal Petriere, Paris. Two international clinical trials testing novel drugs in Parkinson's disease and one in Dystonia were completed. An eight year study examining the long term stability of deep brain stimulation in Parkinson's disease was completed.

Summary of designated activities

Deep Brain Stimulation Surgery	-7
DBS Neurostimulator replacement:	-6
DBS programming sessions:	-73
Pallidotomy:	-2
Botulinum Toxin Injection:	-148
Movement disorder clinic attendance:	-1514
TMS studies:	-120

Neurosurgery

Dr. Suresh Nair, MCh
Professor & Head of the Department

Dr. Ravi Mohan Rao, MS, MCh, Dip N B
Professor

Dr. Girish Menon, MCh, Dip N B
Associate Professor

Dr. Mathew Abraham, MS, FRCS, MCh
Assistant Professor

Dr. H. V. Easwer, MCh
Assistant Professor

Dr. K. Krishnakumar, MS, MCh
Assistant Professor

Dr. C.V. Gopalakrishnan, MS, MCh
Assistant Professor

Dr. George Vilanilam, MS, MRCS, MCh
Assistant Professor

The department of neurosurgery continued to maintain high standards in patient care and academic pursuits as in previous years.

Operative: Thrust was given to subspecialty oriented development and the major areas of operative focus were microvascular surgery, surgery of the skull base, endoscopic surgery, epilepsy surgery, movement disorder surgery and spinal instrumentation. Emphasis was given to minimally invasive procedures with the aid of neuronavigation equipment. A total of 1342 cases were operated with an overall mortality of 2.95 % , results which are comparable with the best centres of the world.

Outpatient: There has been a steady increase in our patient load and our drainage area now extends to neighbouring states as well.

Academic : The faculty and the students maintained the high standards and our institute was well represented in all major national and international conferences symposiums & seminars. Five candidates successfully completed their MCh training and four new residents joined the department.

New Initiatives during the year (Include major capital equipment purchased and their end use)

Intraoperative neurophysiological monitoring device. SSEP, cranial nerve monitoring and Brain stem evoked potential monitoring have helped in reducing operative morbidity

Status of ongoing activities:

Departmental activities:

Day to day activities of the department include OPD and the operation theatre functioning five days a week. The weekend is the academic day wherein regular Neuroradiology meetings are held followed by grand rounds and case discussion or seminars. There has been a significant change in trend in management of pituitary tumors with most of them being operated by endoscopic approach.

Pathology

Dr. V.V. Radhakrishnan, MD, FAMS
Professor Senior Grade and Head

Dr. Sandhyamani, MD, FAMS, FICP
Professor

Dr. Annamma Mathai
Scientist D

Mr. N.S. Radhakrishnan
Scientific Assistant

During the period the division has performed histopathological analysis in 1750 surgical specimens in patients undergoing surgical treatment for neuro and cardiac diseases. Intra-operative tissue diagnosis (frozen section) was performed in 586 patients. Enzyme histochemical and immunohistochemical studies were performed in 62 muscle biopsies. Immunopathological investigations were performed in 2450 cases. Apart from the service oriented diagnostic work, the department also conducted weekly teaching programmes (case demonstration, CPC and seminars) for the postgraduate students in neurology and neuro- surgery and neuroradiology. The division also undertook training programmes for postgraduate students in Pathology from Medical College, Trivandrum, Kottayam and AIMS Kochi

4. New Equipment purchased during the year-Nil

Research programmes. During the year, the division initiated the following research programmes.

A. Mycobacterial research:

1. During the year, 3 major lipid antigens of Mycobacterium tuberculosis bacilli were isolated and characterized. These include cord factor (Trehalose 6,6′ dimycolate), lipoarabinomannan and sulpatides. With these antigens immunoassays such as ELISA were standardized for the diagnosis of tuberculous meningitis, tuberculous pleural effusion, tuberculous lymphadenitis. These assays are extremely useful in culture negative patients with tuberculosis.
2. The role of cord factor in invitro chemotaxis of neutrophils from patients with pulmonary tuberculosis and tuberculous meningitis were evaluated. As an extension of this study, a research project has been recently submitted to DBT for funding.
3. Four recombinant mycobacterial antigens – Esat-6, HspX, Tb8.4 and PlcA were isolated and characterized. A cocktail containing these four recombinant mycobacterial antigens were applied in a immunoassay and it was found to be extremely useful in the serodaignosis of pulmonary tuberculosis
4. With these recombinant mycobacterial antigens we could distinguish patients with latent tuberculosis from those with BCG vaccinated individuals. This observation has great epidemiological application as well as in tuberculosis control programmes.
5. A specific immunohistochemical techniques have been introduced to detect mycobacterial antigens in tuberculous lesions.
6. Nested PCR test is standardized for the diagnosis of tuberculous pleural disease and this assay could distinguish tuberculous pleural effusion from those patients with malignant pleural effusion.

Transfusion Medicine

Dr. Jaisy Mathai
Scientist G & Head

Dr. P.V. Sulochana
Scientist G

Dr. S. Sathyabhama
Scientist F

Transfusion Services has been redesignated as Dept of Transfusion Medicine

Department continues to provide round the clock service with blood & components for surgical and medical management with extension of support to outside hospitals. This has been possible by maximizing each collected unit with nearly 100% blood component separation, appropriate use of blood and institution of blood conservation strategies. Hospital Transfusion Committee meetings provide inputs for further improvement. A major decision has been to create awareness on Clinical Transfusion Practice to all faculty, PGs and nurses.

Participation in External Quality Assessment Scheme in Immunohaematology

provide a base for us to develop such a program for Blood banks in the State. Mobile camps (43 nos.) have helped us to increase our voluntary donor pool and have almost doubled from previous years.

New initiatives

- Donor counseling on health risk factors and the beneficial effects of regular blood donations are having an impact on donor life style modification and repeat blood donations.

- SOP Manual Version 3 introduced for use in Blood Bank
- Laminar flow bench was purchased with a design for Class 100 requirement with an efficiency of 99.97 % through HEPA filter.

Programs

15th chapter meeting of Indian Society for Blood Transfusion & Immunohematology (ISBTI) was organized at SCTIMST on 31st Oct 2009. Inaugural function started with prayer, welcome by Dr. Jaisy Mathai HOD DTM, presided by Dr. Vijayakumar President ISBTI Kerala Chapter and inaugurated by Associate Medical Supdt. Dr. R. Sankar Kumar. Mr. C. Balagopal, Managing Director TerumoPenpol Ltd and Dr. K.G. Shyamkrishnan offered felicitation, Dr .S . Sathyabhama gave vote of thanks.

Dr. Kabitha Chatterji HOD DTM AIIMS, Dr. Suseela Innah Depeuty Director KSACS, Dr. Kumary K.C. Usha HOD DTM Medical College Trivandrum presented papers on 'Case studies at AIIMS on legal aspects of blood banking, Role of SBTCs in Blood Transfusion Services, Transfusion Transmitted Diseases' respectively and " Current issues in blood banking" was moderated by Dr. P.V. Sulochana and Dr. Usha Kandasamy. This was followed by free paper session.

- CME on clinical Transfusion Practice was conducted on behalf of Hospital Transfusion Committee on 27/02/2010. Dr Suseela Innah of Jubilee Medical Mission hospital, Medical College, Thrissur, Dr. P.V. Sulochana DTM SCTIMST, Dr. D. Meena Medical College Trivandrum and Dr. P.K. Dash SCTIMST spoke on "Preanalytical errors and blood groups", "Blood components and clinical transfusion practices", "Adverse effects of blood transfusion" and "Blood Conservation" respectively.
- World Blood Donor Day 2009 was celebrated on June 14th with participation of 104 repeat regular voluntary blood donors and 34 voluntary organizations supporting us in voluntary blood donations Dr. Jaisy Mathai CBTO gave the welcome address, Dr. K. Mohandas, Director, SCTIMST presided and inaugurated the function. Dr. V. Geetha, Director Medical Education gave the Key note address, Dr M Unnikrishnan , Professor, CVTS offered felicitation and Dr. P.V. Sulochana gave vote of thanks. The inaugural function was followed by health talk by Dr. Biju Soman, Asst Professor AMC on "Some basic facts about Diabetes Mellitus". This was followed by skit organized by students of SCTIMST and entertainment program by SFM Radio.

Training

- 29 Medical Officers from DHS, Medical Colleges, RCC & Private sectors underwent training in Modern Blood Banking Technology arranged by Kerala State AIDS Control Society in 5 batches
- As part of the State training policy, a total of 52 Drug Inspectors in two batches had orientation on blood bank activities during 2009 and 2010

BIOMEDICAL TECHNOLOGY WING

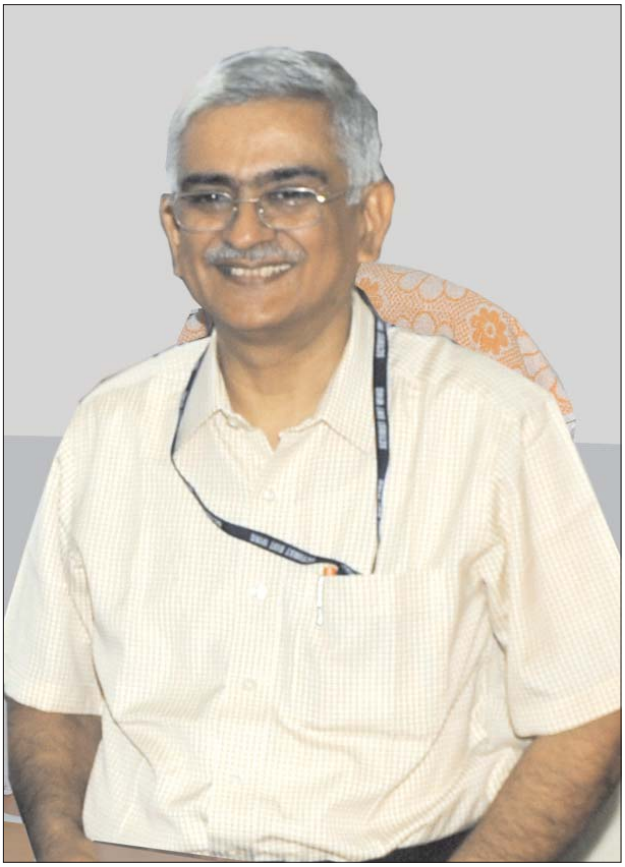
MISSION

To deliver high quality healthcare technology through innovation in science and education.

VISION

1. 50% self sufficiency
   a) 20% self sufficiency through externally funded R&D
   b) 20% self sufficiency through testing services
   c) 10% self sufficiency through technology transfer
2. 30 new technologies including 5 tissue engineered products
3. Two technology transfers to multi national companies
4. Fully functional incubator and 2 industry sponsored R&D Centres.
5. 50 papers in Biomaterials or equivalent leading scientific journal.
6. Fully functional National Testing Centre with 2 franchisee/PPP testing centres in the country
7. Two Bhatnagar Awards

FROM THE DESK OF THE HEAD BIOMEDICAL TECHNOLOGY WING



Substantial progress was made in the three major activity areas of the Wing – (1) Product development and technology transfer (2) Biomedical testing services to industry and (3) Research and development. I am happy to highlight these achievements for the year 2009-10.

Technology transfers & agreements

Two technologies were relicensed (a) hydroxyapatite and bioactive composites based porous granules for dental applications to M/s IFGL Refractories Ltd, Kolkatta and (b) the FIELD KIT for testing antibiotic sensitivity of mastitis in farm animals to HIMEDIA labs, Mumbai. Two other agreements were also signed - one with M/S TTK Healthcare Ltd for the project and subsequent technology transfer of fluoro-passivated and hydrogel sealed vascular graft and the other with Tata Memorial Centre, Mumbai with regard to the collaborative work on a nanoparticle technology for chromatin adsorption.

Post technology transfer

Glass Ionomer cement:- Technology transfer of Glass ionomer cement was continued with the training of three more scientists from industry partner, M/s Anabond Stedman Pharma Research Ltd, Chennai being trained during January-February 2010.

Disposable ECG electrodes: A small-scale assembly line for the electrodes has been set-up at the site of the industrial partner; biological testing of the materials used in it is under progress.

Products - laboratory level production and evaluation

The lab level production and evaluation of (i) Fibrin glue and (ii) Rapid test kit for antibiotic sensitivity of urinary tract ecoli infection is successfully continuing :

User trials of the Paper Pulp Based Biodegradable Laboratory-animal Contact Bedding material at various leading animal houses across the country resulted in excellent feedback about its performance and acceptability. Commercialization of the product through the industry partner involved in the user trials is in progress and expected to be completed during the coming year.

Testing services

NATIONAL ACCREDITATION BOARD FOR TESTING AND CALIBRATION LABORATORIES (NABL) accredited the calibration services at the first assessment itself. Comite Francais D'Accreditation (COFRAC) of France continued accreditation of biological testing services following the surveillance audit with no non-conformities being reported.

Our feedback survey showed that our Industry customers have successfully used our test reports as part of their submission to regulatory authorities like BIS, US-FDA, Drug Controller General of India and for CE for their product approval and licensing.

Income from testing services has shown a steady increase during the year like in the previous years. Further growth is constrained by shortage of laboratory space. The completion of the construction of the new buildings will greatly help in supporting this growth in the coming years.

Inter-laboratory comparison (ILC) studies in cytotoxicity testing and tests for local effects after implantation were organized between (i) NAMSA Laboratories, USA, (ii) Shriram Institute for Industrial Research, New Delhi, India and the BMT Wing. The results confirmed the high quality of our testing services.

Developmental activities of an in vitro test kit for the evaluation of pyrogenicity using human whole blood was completed and the product is presently undergoing detailed validation. This kit is suitable for evaluating a wide spectrum of products to measure the undetected non-endotoxin pyrogens of chemical or biological nature.

Progress of major targeted projects:

- Improved Tilting Disc Heart Valve – clinical trials are planned to start during 2010-11 with the completion of the preclinical testing and the setting up the Titanium nitride coating in the wing.
- Left Ventricular Assist Device (LVAD): joint project with VSSC, Trivandrum has reached animal evaluation phase
- Coronary stent system: Various tests systems required for the evaluation of coronary stents have been installed and validated. A new design has been validated using FEA and prototypes are undergoing in-vitro testing.
- Intrauterine device – this collaborative project with the industrial partner M/s HLL Lifecare Ltd, Trivandrum made excellent progress. The product reached its final version in the 3rd iteration and is in the final stages of preclinical safety testing in our toxicological laboratory. Clinical trials are being planned to start in early 2011.

Tissue Engineering & Targeted Drug Delivery

Research projects started as a part of the initiatives in Tissue Engineering and Targeted Drug delivery made good progress during the year. The major milestones reached during the year are:--

1) Large segmental bone defect repair – the preclinical studies using our HABG ceramic scaffolds in a goat model showed excellent results. A project for clinical evaluation of this product by the Orthopedics Department of CMC, Vellore has been submitted to DBT for funding.
2) Work in the areas of Cartilage Tissue engineering and the use of autologous Adipose derived stem cells is showing promising results.
3) Bioreactors have been designed and fabricated as a part of this initiative as they are an important part of these technologies – especially in areas like, cartilage, liver, small diameter artery and skin tissue engineering. Validation of the reactors are in progress.
4) Preclinical evaluation in a rabbit model of the bioengineered corneal epithelial cell sheet has progressed with excellent results. Clinical trials are expected to start in the coming year with the completion of the process validation using human limbal stem cells.
5) Work on oral delivery of insulin using different type of nanoparticles, gene delivery and other applications of nanoparticle based drug delivery made good progress under the DST funded Facility for Advanced Drug Delivery program.

Research in Biomaterials:

Steady progress was made in biomaterials research and many of them have been submitted / published in leading indexed journals. A number of projects in the field of nanoparticle based products like, oral insulin delivery and in polymer scaffold development for tissue engineering promise excellent outcomes in the coming 5 to 10 years. 55 articles were published in indexed journals out of a total of 67 during the year with a healthy growth in the average impact factor from 2 to 3. Four patents were granted and 8 new patents filed.

Academic Programs

The M.Phil program started in August 2009 made good progress with a batch of enthusiastic students and an equally enthusiastic faculty. The PhD program continued to attract a good number of students with the number of applications continuously increasing every year.

G. S. Bhuvaneshwar

BIOMEDICAL TECHNOLOGY DEVELOPMENT

The year 2009-10 was yet another year of consolidation of the various programs and projects at the BMT wing. While the research projects continued to make progress and new projects were initiated, the interaction with industry for technology development and testing continued to increase.

Highlights

Two technologies were re-licensed this year, marking the confidence of the industry in the products already transferred. The hydroxyapatite and bioactive composites based porous granules for dental applications was relicensed to M/s IFGL Refractories Ltd, Kolkatta and the FIELD KIT for testing antibiotic sensitivity of mastitis in farm animals was relicenced to HIMEDIA labs, Mumbai.

The sponsored project agreement for the development and technology transfer of coatings for Vascular Graft was also executed with M/s TTK Healthcare during the year.

The technology development projects sponsored by HLL Lifecare and VSSC made substantial progress and the funding agencies reported satisfaction with the progress during the reviews.

The successful grant of accreditation for the Calibration activities by NABL at the first assessment itself was a key achievement of the year. A surveillance audit by COFRAC of France for the continued accreditation of the quality system for testing services was also a success and no nonconformities were reported. The testing services offered by the Institute continued to patronized by the medical device industry as well as academia and research institutions.

On an overall basis, the research projects made steady progress leading to a good number of publications in leading indexed journals together with an increased number of patent applications. Emphasis on moving the product development programs towards clinical trials was maintained as can be seen from the growing number of them moving closer towards this advanced milestone.

Patents And Publications

Year	Patents granted	New patents filed
2007-08	5	6
2008-09	10	9
2009-10	4	8

Status

Patents held (sealed) = 85 Nos.

Patents filed and pending = 48 Nos.

Designs held (sealed) = 13 Nos.

Publications – 55 publications in indexed journals out of a total of 67 published during the year from BMT Wing. The table below shows a healthy growth during the last 3 years.

Year	Publications in indexed journals	Average Impact Factor
2007-08	19	2.67
2008-09	30	2.03
2009-10	55	3.01

Product Development, Technology Transfer & Industrial Linkages

Artificial Organs

(a) Device Testing Lab

Development of Improved Tilting Disc Heart Valve :

The project involves the development of an improved tilting disc heart valve with objectives of reducing thrombotic potential, ensuring MRI compatibility and improved performance characteristics. Major part of the preclinical evaluation has been completed and the product is found to be safe and functionally superior to the current model of the TTK-Chitra valve. The Industrial partner is organizing a pilot production for commencement of clinical trials this year.

Development of Coronary Stent Systems :

The project aims at the development of a coronary stent system for PTCA stenting. Various tests systems required for the evaluation of coronary stents have been installed and validated. The design validation using finite element analysis and other analytical studies has been completed. A titanium nitride coating process to minimise the elution of metallic ions to the surrounding tissues and there by minimizing the restenosis potential of the stent has been

developed. Studies on the use of curcumin complexes as a potential drug for using in the drug eluting model of the device has shown very good promise. With the identification of two vendors for fabrication of the mtal stents to our design, about one hundred stent prototypes were made for various preclinical studies. Animal trials are planned for the current year.

Vascular Graft:

The project (executed in collaboration with Division of Polymer Processing) aims at imparting a thrombo-resistant flouro polymer coating on the fabric along with closure of the graft pores using hydrogel. After the standardisation of the processes, an industrially sponsored project has been initiated for the preclinical data collection and for carrying out the animal trials.

(b) Modelling & Prototyping Lab

Centrifugal Blood pump for cardiopulmonary bypass:

The project under funding by the Technology Development Board (TDB), Govt. of India made progress with the rectification carried out in the mould and identification of lighter magnet which is able to provide better coupling torque than earlier one. Prototypes assembled with the new magnets are showing better performance than the previous one. A new design of pivot bearing assembly has been made to correct problems in the pump. An Electromagnetic flow meter development is also in progress. A review meeting was conducted by TDB to review the progress.

Left Ventricular Assist Device (LVAD):

This joint project with VSSC, Trivandrum made further progress with VSSC carrying out modification in the drive/control unit based on the feedback on the initial three animal experiments on swine model. A few more Ex-vivo experiments with the modified unit is planned. In-vitro evaluation of devices received from VSSC, including bench-top performance evaluation, surface profile analysis etc., were carried out. In vitro evaluation of pumps to select devices for ex-vivo evaluations was also conducted. The Joint Project committee consisting of members from VSSC and SCTIMST reviewed the progress of the project. A proposal for next phase of development has been submitted to VSSC.

Ex-vivo evaluation of SCTIMST-VSSC LVAD is in progress

Membrane Oxygenator:

Laboratory continued to interact with the industry partner to identify and correct the complaint of low oxygenation complaint received from the industrial partner and identified design changes to overcome the issue.

Biomaterial And Biological Products

Bioceramics lab

The know how for hydroxyapatite and bioactive composites based porous granules for various infrabony defect-filling application was re-licensed to IFGL REFRACTORIES Ltd., (IFGL), Kolkata. Technology Transfer Documents were handed over to the firm and technical training was also imparted to the staff of the company in production and QC aspects.

Biosurface Technology

Nanomaterials for Drug Delivery:

Heparin nanoparticles with three different drug loading were synthesised and its whole blood clotting time was evaluated. A size reduction of the particles and an increase

in drug load were observed with increasing concentration of heparin. However, the zeta potential was similar. A sustained release of heparin was observed in simulated fluids and corresponding increase in whole blood clotting time was observed. Heparin loaded nanoparticles were administered to rats orally and subcutaneous along with subcutaneous injection of plain heparin. It was observed that the plasma heparin levels in rats administered with nanoparticles (oral as well as subcutaneous) were maintained at a level of over 4 IU/ml for 9 hours where as the required level is about 2 IU/ml. Dose optimization and other studies are in progress.

PLGA nanoparticles based growth factor (VEGF) delivery system was studied at the site of rabbit ear for 10 days. Qualitative changes in angiogenesis were observed compared to controls and plain PLGA particles without growth factor. Quantitative analysis of angiogenesis is being carried out.

Methoxy PEG palmitate nanoparticles with an average particle size of 500nm were developed for curcumin delivery. The nanoparticle suspension is highly stable with a zeta potential of -48.5 mV. Curcumin encapsulation efficiency was 56% with only 14% of the drug released in 60 hours. However, there was no pH dependency since the release was similar in pH 7.4 as well as in pH 1.2 media. Further studies like cytotoxicity and biocompatibility along with reduction of particles size (already achieved up to 160nm) are being planned. The procedure for preparing PEG-laurate and PEG-linoleneate nanoparticles as a curcumin delivery device was standardised and characterized by DLS and TEM. Further studies on drug encapsulation, in vitro release and stability studies, and the cytotoxicity of the drug loaded nanoparticles are in progress.

A new procedure for preparing gold nanoparticles by utilizing diamino-PEG was developed. This finds application in targeted drug delivery and facilitates visualizing the site of action. The hydrodynamic diameter (including PEG as spacer arm) of these mono-dispersed particles were around 15.6 nm (DLS) and was observed as 4nm (core size) using TEM. The conjugation of a drug, methotrexate, and a chromophore, dansyl chloride, to these nanoparticles was demonstrated. Internalisation of these nanoparticles was also demonstrated on HepG2 cells.

Wound Dressings:

Growth factor (bFGF) loaded chitosan sponges on fibroblast cell growth were studied. The significant effect of bFGF on cell proliferation and collagen synthesis was demonstrated on comparison with sponges without growth factor. Further studies on tissue regeneration and wound healing (burn wounds) on small animals are being planned.

Dental products

Glass Ionomer Cement:

Three scientists from industry partner Anabond Stedman Pharma Research Ltd, Chennai were trained on glass ionomer cement technology during January-February 2010. This was necessitated as the earlier trained personnel left the services of the company and technology transfer activity was affected. Three batches of the polymer and 4 batches of glass were prepared and characterized during the training period. It is expected that the product will be ready for clinical evaluation be the end of 2010.

Technology Transfer of dental composites:

Dental composites (Restofill) and Stedbond-S bonding agent continued to sell well in the market as per industry feedback received. Action is being initiated to relicense some of the dental technologies to other entrepreneurs as well.

Organically modified ceramic based dental composite:

Large animal experiments (pulp and dentine test) were successfully carried out on basset hound dogs for ormocer based dental composite material as per ISO 7405 procedure. Three dogs were subjected to the study. Period of observation were 7 days, 28 days and 70 days. Each dog had test material, imported control ormocer material (Admira) and imported glass ionomer cement (Fuji II) as negative control. At the end of these periods the tooth material was extracted and subjected to histopathology studies. MicroCT analyses of 15 extracted teeth were also completed. A comparative study on variation in Vickers

hardness and diametral tensile strength of thermocycled samples of Bis GMA based radiopaque composite and non-radiopaque composite was also carried out.

A project proposal was submitted and approved for funding by internal technology development fund for development of bioactive bone cement based on organically modified ceramic resin and work has just commenced on the same. The project envisages developing composite materials for bone replacement comprising organically modified ceramic resin and osteo-conductive inorganic material as filler.

Development of Intrauterine Device:

The project in collaboration with HLL Lifecare Ltd entered its final stage of development and preliminary activities of technology transfer have been initiated. Toxicological studies such as Ames test, maximisation test, pyrogen test, intracutanous irritation test, acute systemic toxicity test etc. were completed for core material with and without the drug and the membrane material. Currently genotoxicity studies and muscle implantation studies are in progress which is expected to be completed soon. Documents related to technology transfer and preliminary plans for multicentric evaluation have been initiated. Clinical trials are expected to be started during the second half of 2010.

In vivo Models & Testing

Know-How for 'Field Kit for Antibiotic sensitivity testing' was transferred to M/s HIMEDIA Laboratories Pvt ltd, Mumbai during March 2010

Laboratory Animal Science

User trials of the Paper Pulp Based Bio Degradable Laboratory Rodent Contact Bedding material at various leading animal houses across the country resulted in excellent feedback about its performance and acceptability. Commercialization of the product through the industrial partner has been initiated.

Microbiology

The rapid test kit for antibiotic sensitivity identification of urinary tract ecoli infection is being developed. Initial studies for efficacy has been completed successfully and a larger batch 200 kits is being produced for the next phase of product validation.

Polymer Division

Dispensable and biodegradable polymeric bone cement for minimally invasive treatment of bone diseases and vertebral compression fractures.

Under this programme, the in vivo long-term performance of candidate biodegradable polymeric bone cement was studied with the implantation of candidate bone cement in a rabbit animal model for 2 years. The histopathological investigation of harvested bone with bone cement implant has revealed substantial bone growth within the porous structure of the candidate bone cement and resorption of polymeric bone cement. The degraded polymeric bone cement is found to be biocompatible. The cement has passed the genotoxicity tests. Shelf life is found to be satisfactory.

The setting characteristics of the stored bone cement are within the acceptable limit as per ISO 5833/1-1999 E. this material has considerable potential in the treatment of bone lesions and vertebral compression fractures. Clinical trials are being planned for the treatment of vertebral trabecular bone lesions viz. haemangioma and tumours. Product validation of the newly prepared bone cement with reference to efficacy for treatment of vertebral compression fractures has been initiated with DST project.

Thrombosis Research Unit

Fibrin Glue:

Fabrication of Class100 clean room and installation of equipments for scale up of Fibrin Glue has reached 90% completion. Small pool fractionation of fresh frozen plasma obtained from our blood bank has resulted in production of more than 100 sets of fibrin glue components (fibrinogen concentrate and affinity purified thrombin). Forty percent of the product was used for quality assurance of the product and tissue engineering research in the lab. Sixty percent were given to the Neurosurgery and Cardiovascular surgery departments of our hospital for clinical use.

Anti snake venom from chicken egg:

Shelf life of anti venom antibodies (IgY) purified from chicken egg was found to be >3y in the lyophilized

condition. Safety and efficacy of the stored antivenom was verified using animal models. Comparison of efficacy was made between commercially available horse antibodies and in-house produced egg yolk antibodies using rabbit models. Chicken IgY was found to be effective and safe for therapeutic use based on the biochemical and haematological tests carried out in the experimental model.

Tissue Engineering & Regenerative Medicine Division

Novel scaffold materials for tissue engineering:

Development of different fabrication methods for scaffolding technologies like freeze drying, gas foaming, electrospinning etc. is ongoing. Materials were shared with other labs within campus and collaborating labs elsewhere in the country. An industry has envinced interest in the polymer macrocapsules for immunoisolation and some scaffolds for cartilage tissue regeneration and discussions were taken up on this regard.

Diagnostics And Instrumentation

Instrumentation lab

Development of Disposable ECG electrodes:

Technology development for disposable ECG electrodes being carried out in collaboration with an industrial partner made progress with the prototype electrodes being evaluated at bench tests as per the international standard. The prototypes were found to satisfy the requirements. The biological testing of these materials is under progress and a small scale assembly line for these electrodes has been set-up at the site of the industrial partner. These assembled electrodes will be soon subjected to animal evaluation and subsequently to clinical evaluation.

Development of Portable Medical Electrical Safety Analyser:

This project is being carried out in collaboration with CDAC, Thiruvananthapuram and is aimed at development of portable equipment to enable periodic electrical safety testing of medical equipment in hospitals.

The first few prototypes were fabricated and evaluated at Electronics Regional Testing Laboratory (South) and based on the inputs from these tests, the final prototype were designed and fabricated. On completion of the bench testing and calibration of the final prototype, a field trial in hospitals to study its suitability for the intended purpose is being planned. Simultaneously, a suitable industrial partner is being identified to initiate commercialization for this equipment.

Development of instrumentation for Bio-impedance application:

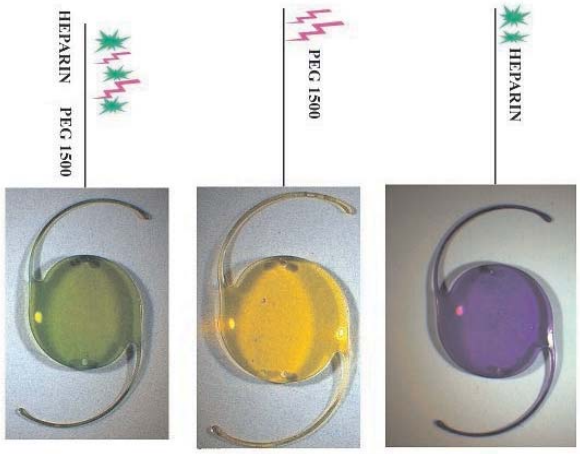
A functional prototype of multi-frequency (40 kHz – 400 kHz), dual channel, impedance pneumography based respiration monitor was designed and developed. Preliminary testing of this prototype on volunteers also indicated that by simply taking an average of the two measurements recorded from the two channels it was possible to reduce movement artefacts for all the frequencies. Further work is in progress to develop a standalone monitor suitable for clinical evaluation in patients.

Laboratory for Polymer Analysis

C-Reactive measurements: Functionalized quantum dots capable of selectively picking up C – Reactive protein from serum/plasma was developed in the laboratory. The method is sensitive, cost effective and devoid of biologically derived components such as antibodies.

A novel approach for modifying the surface of IOLs with heparin and PEG was developed. Such a surface containing mixed layers of heparin and PEG may be more biocompatible.

Surface modified IOLs. Blue, Yellow and Green indicate the presence of heparin, PEG and heparin + PEG respectively



Toxicology

The developmental activities of an In vitro pyrogen test kit for the evaluation of pyrogenicity using human whole blood was completed and the product is presentaly undergoing detailed validation. This kit is an ELISA based method for pyrogen test and will be suitable for evaluating wide spectrum of applications to measure the undetected non-endotoxin pyrogens, like any chemical or biological nature. The project was supported by DBT, New Delhi.

Technology Transfer & Project Coordination

Technology Business Division

The division continued to provide support to the technology transfer and project coordination activities and focused on strengthening alliances with medical device industry. It also coordinated the testing services offered by the institute in medical device evaluation.

During the year the following Technology Transfer agreements were signed:

1. Technology Transfer agreement of porous Hydroxyapatite and Bioactive HABG composite for Dental Applications to IFGL REFRACTORIES LIMITED, Kolkata on 13th January 2010.IFGL's bioceramic division is engaged in production and marketing of bioceramic products like hydroxyapatite orbital implants, alumina based hip joint femoral head, bone regenerative granules and blocks etc.
2. The Technology transfer agreement of Field Kit for Antibiotic Sensitivity Test on Mastitic Milk was signed with M/s HIMEDIA LABORATORIES LTD during March 2010.
3. The collaborative project cum technology transfer agreement for coatings for vascular graft was signed with M/s TTK Healthcare Ltd on 30th March 2010

An agreement was also signed with Tata Memorial Centre, Mumbai with regard to the collaborative work of the nanoparticle technology for chromatin adsorption

The Technology development initiatives of the Institute were backed up by the suggestions from the Technology Development committee which met twice in the year during during 28th and 29th April 2009 and 12th and 13th October 2009.

The Internal Research Conclave (RESCON) for the review of research projects was co-ordinated by the division during 4th,5th and 6th August 2009.

Review meetings were co-ordinated for collaborative projects with the industry and also with the licensees of the Institute.

Biomaterials Research & Development

Bioceramics Laboratory

The Lab is continuing with the design and development of bioceramics and related materials. New initiatives in technology development are :

1. Micro and nano-porous bioceramic substrates having capacity to carry drugs and biologics for the treatment of refractory osteomyelitis and osteonecrosis.
2. Coating of hydroxyapatite layers on to titanium implant surface using Pulsed Laser Deposition technique, so as to increase the integration with bone.
3. Silica-based biosensors for the detection of markers in blood for diagnostic applications.

Biosurface Technology

The in vitro/in vivo correlation is the fundamental requirement in the understanding of gastrointestinal permeability of the drug. The in vitro test was standardized with Caco-2 cell line. The correlation of insulin permeability and its efficacy on diabetic rats were established. The decrease in transepithelial electrical resistance (TEER) and corresponding loss of integrity of the epithelial tight junctions by confocal microscopy was also established.

Haemocompatible gene delivery system was developed with cationic pullulan (CP), a natural polysaccharide with inherent liver affinity. Hemocompataibility, in vitro transfection efficiency, uptake mechanism and intra cellular trafficking of the derivative were compared with PEI a potent transfecting agent. Derivatives were found to have comparable transfection efficiency to that of PEI and were internalised by the HepG 2 cells via ASPGR and clathrin mediated endocytosis. The nuclear trafficking studies showed that the CP/plasmid complexes were remaining in cytoplasm whereas PPE/plasmid complexes were localized in the nucleus after 4 hours of incubation.

The preliminary studies on two batches of gold bhasmas procured from the market were evaluated. The results of the two batches were not correlating. The batch to batch variation of these preparations was obvious from these data. Further evaluation of fresh batches of gold bhasmas from a standard source is under progress. This study id being undertaken, as gold bhasmas are highly efficient in ayurvedic treatments.

Conjugation of cyclodextrin on magnetic particles was attempted as a basic exploratory component of the project. Cyclodextrin conjugated nanoparticles had an increased level of drug encapsulation efficiency. Cyclodexrins facilitated enhanced stabilization of the drug, however, the zetapotential was decreased. Drug conjugates like hayluronic acid-curcumin and polyvinyl pyrolidone-curcumin were prepared by layer by layer assembly and characterized. The ability of these conjugates in targeting will be studied using suitable cell lines. Possibility of delivering more than one drug will be evaluated.

Dental Products lab

Polymer Scaffold development for small diameter vascular graft :

Biodegradable scaffold

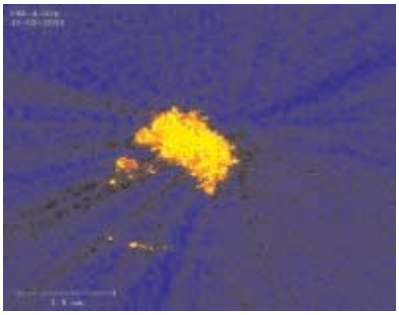
The project in collaboration with thrombosis research group made substantial progress during the year. In vitro degradation studies of polycaprolactone scaffolds for vascular graft application was completed. These included (a) Weight loss by gravimetric estimation, (b) molecular weight loss by Gel permeation Chromatography (GPC) and (c) mechanical characterization by Universal Testing Machine (UTM). Morphological changes after one year in vitro degradation were studied using Scanning Electron Microscopy (SEM) and porosity changes using Micro-computed tomography (Micro-CT).

Silver nanoparticle incorporated-polycaprolactone scaffolds (Ag-PCL) scaffolds were prepared and properties such as porosity, pore size distribution, pore size etc. was determined by Micro-CT analysis. Ag-PCL scaffoldsfor animal studies (Rabbit model) and in vitro degradation analysis were also prepared. The samples were modified biologically by thrombosis research group. Toxicology evaluation of PCL scaffolds was initiated by preparing samples from degraded and nondegraded scaffolds.

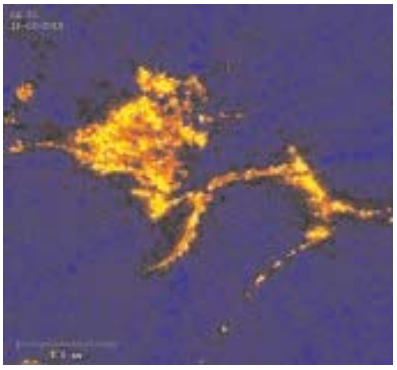
Quantum dots as drug carriers for cardiovascular disease:

New research was initiated in the lab during the year on nanotechnology which has an impact on the key challenges of targeted drug delivery, an area of immense potential in biomedical research. Novel inorganic quantum dots core shell structure based on Cadmium selenide core surrounded by Zinc sulphide shell were synthesised in the lab. The quantum dots were characterised by particle size analysis, transmission electron microscopy and X-ray diffraction. The quantum dots developed were found to be in the range of 2-20 microns in size. A project proposal for developing quantum dots as drug carriers for cardiovascular disease under Women scientist scheme has been approved and funded by DST and work started. The project envisages cardiovascular applications for the quantum dots such as development of core shell structure, optimisation of shell thickness, improving the hydrophilicity of the shell structure, incorporation of tissue plasminogen activator streoptokinase to convert plasminogen to plasmin and lyse clot formation.

Quantum dots changing colour with reducing particle size



Micro CT images of CdSe quantum dot



Micro CT image of CdSe QD with ZnS core shell

Organically modified ceramic based dental composite:

Large animal experiments (pulp and dentine test) were successfully carried out on basset hound dogs for ormocer based dental composite material as per ISO 7405 procedure. Three dogs were subjected to the study. Period of observation were 7 days, 28 days and 70 days. Each dog had test material, imported control ormocer material (Admira) and imported glass ionomer cement (Fuji II) as negative control. At the end of these periods the tooth material was extracted and subjected to histopathology studies. MicroCT analyses of 15 extracted teeth were also completed. A comparative study on variation in Vickers hardness and diametral tensile strength of thermocycled samples of Bis GMA based radiopaque composite and non-radiopaque composite was also carried out.

A project proposal was submitted and approved for funding by internal technology development fund for development of bioactive bone cement based on organically modified ceramic resin and work has just commenced on the same. The project envisages developing composite materials for bone replacement comprising organically modified ceramic resin and osteo-conductive inorganic material as filler.

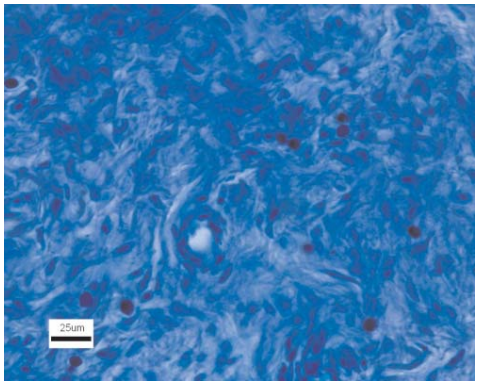
Development of hemostatic scaffold using biodegradable polymer and biomimetic extracellular matrix components for healing of chronic dermal wounds :

Under this new project in collaboration with thrombosis research unit, development of biodegradable scaffolds for wound dressing material, l-lactide synthesis was initiated. Crystals of l-lactide was synthesised by treating polylactic acid at high temperature under vacuum to remove water in presence of catalyst. The crystals were characterised using infrared and NMR spectroscopy.

Lactide crystals

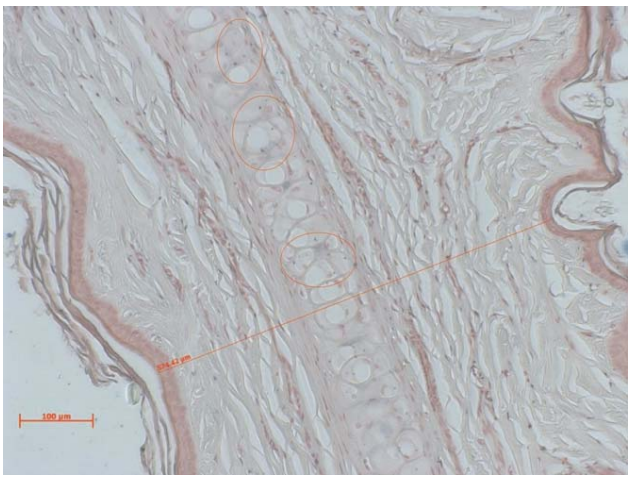
Histopathology Laboratory

Study on clinically retrieved heart valves and orthopaedic periprosthetic tissue continued as part of research.



Mast cells in interfacial membrane at bone metal interface of total knee joint human prosthesis

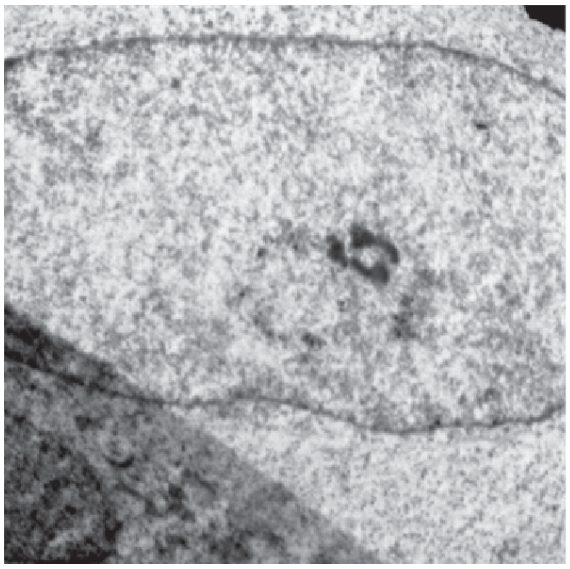
Research also included a study on penetration of magnetic nanoparticles across biological barriers under influence of external magnetic field.



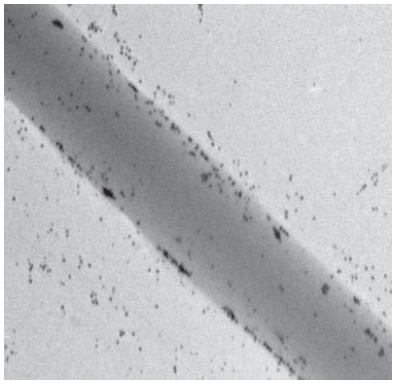
Ferrite Dextran coated nanoparticles applied to rabbit pinna under influence of magnetic field

Transmission Electron Microscopy laboratory

Light Microscopy and Transmission Electron Microscopy study of cells and tissues (soft & hard) and its response to materials if any (in vitro) and from experimental animals (in vivo), as part of the research activities .

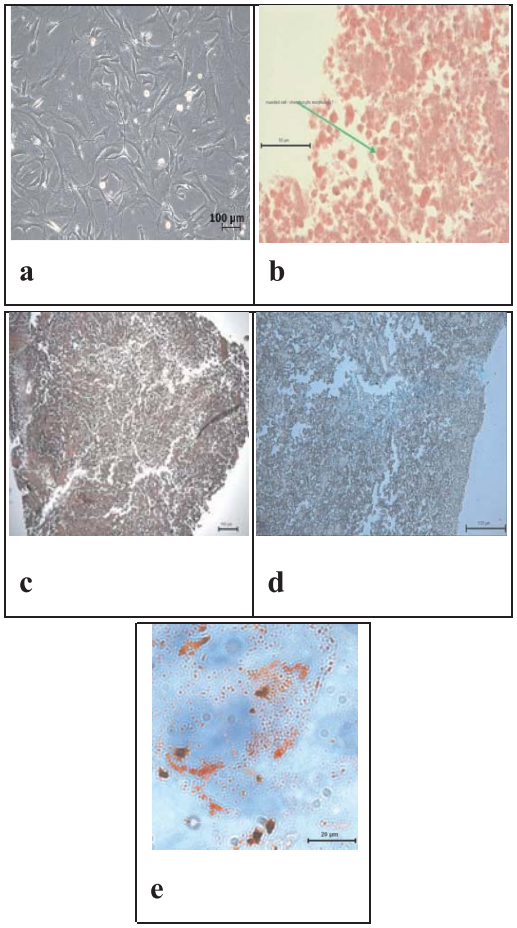


Mulberry leaves infested with Gemini Virus , 22nd Kerala Science Congress, Peechi, 2010 – Best Poster

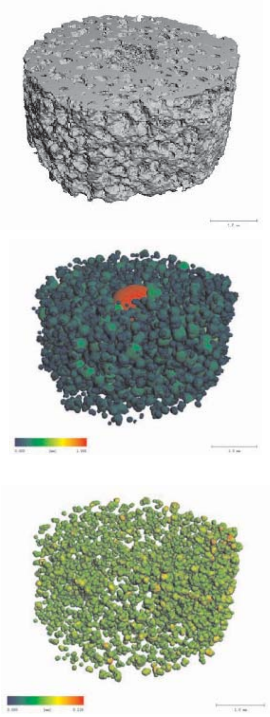


Gold nanoparticles grown over Peptide nanotubes

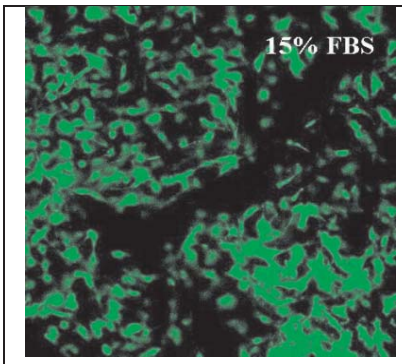
Specific Area of Tissue Engineering Research: Ceramics as Bone substitutes - Bone Tissue engineering; Adult Stem Cell Research (MSCs) from Bone marrow and Adipose tissue; Cartilage Tissue Engineering and Adipose Tissue Engineering.



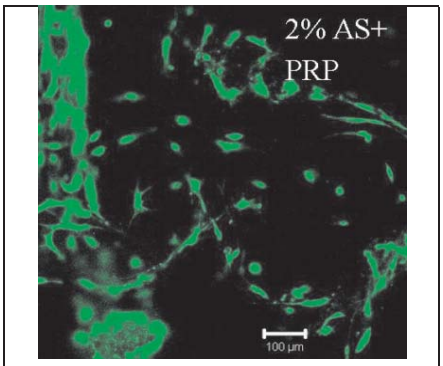
Rabbit ADMSCs differentiated to chondrocytes (b, c, d) depicting proteoglycan and glycosaminoglycan deposition respectively and adipocytes (e).



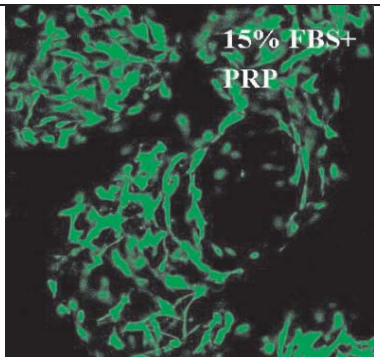
Micro-CT imaging of cellular adhesion on hydroxyapatite scaffolds



15% FBS



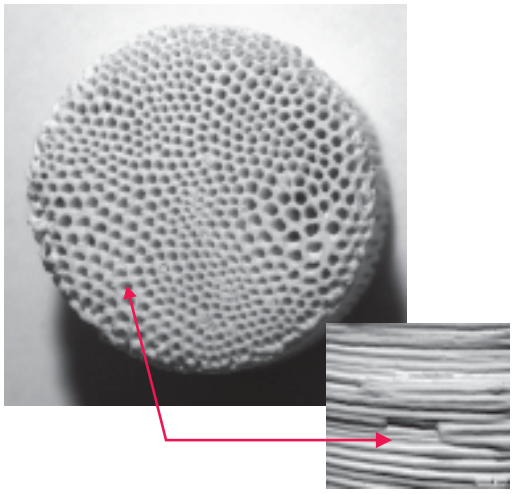
2% AS + PRP

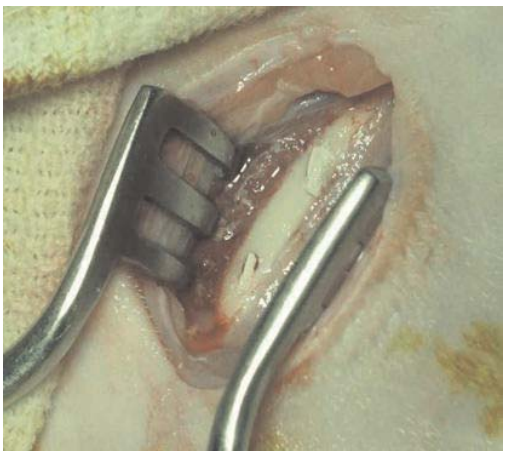


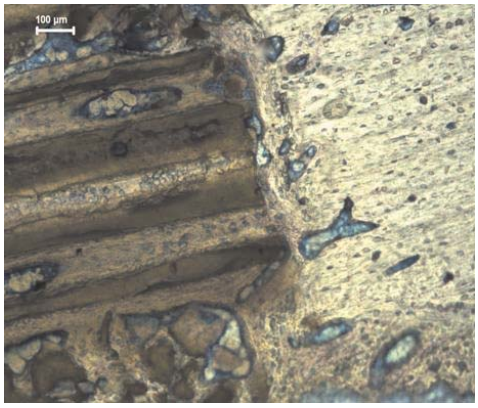
15% FBS + PRP

Viability profile of human bone marrow-derived mesenchymal stem cells grown in autologous serum & FBS in combination with platelet rich plasma over the bioceramic

Porous HAP substrates with channel like pores implanted in rabbit femur defect







Polymer Lab

Under the programme on "Studies on radiopaque polymers for biomedical applications", new radiopaque polyurethanes were prepared for applications such as catheters using chain extenders, trans-2,3-diiodo-2-butene-1,4–diol and bishydroxyethyl ether of iodinated bisphenol A. Diisocyanates, 4,4'methane diisocyanate (MDI)/1,6 hexane diisocyanate (HDI) and polyols, poly(tetramethylene oxide)/poly(propylene glycol)/poly(ethylene glycol adipate) polyol. Radiopaque iodinated methyl methacrylate-co-glycidyl methacrylate copolymers were also prepared. The newly synthesized polymers were characterized for chemical composition, radiopacity, mechanical, thermal, physicochemical and biological properties.

Polymer Processing

Biological evaluation of fluoropassivated and gel sealed vascular graft:

The objectives of the project are to apply a fluoropolymer coating onto polyester vascular graft to passivate the surface and later seal the pores of the graft with a biodegradable hydrogel. The fluoropolymer coating would reduce surface thrombogenicity and biodegradable hydrogel sealing eliminate the need of pre-clotting the graft just before implantation. During the current year coating conditions of fluoropolymer on full length graft was optimized and determined the porosity of the coated grafts. Biodegradable hydrogel was derived from oxidized alginate and gelatine. Hydrogel forming solutions suitable for spray coating was prepared by dissolving the ingredients in water. A series of formulations were prepared that give sufficient working time for spray coating by adjusting the solution concentration and varying the degrees of oxidation of sodium alginate. Water permeability of hydrogel coated graft as a function of spray coating time was also determined. Hydrogel sealed grafts showed acceptable results.

Synthesis and Characterization of Radiopaque Polyurethanes for Medical Applications:

This project aimed to develop a polyurethane materials that are opaque to X-rays but permit visible light to pass through. The intended application was to replace the barium sulphate filled polymers used in the medical applications with radiopaque polyurethane. Five new compounds were iodinated so that they can be used as radiopacifying chain extenders in the synthesis of radiopaque polyurethanes. They are: 4,4-Bis(4-hydroxyphenyl)valeric acid, Bisphenol-F, 4,4´ Bisphenol-AF, Bisphenol-S and hydroquinone bis(2-hydroxyethyl) ether. The iodinated compounds were characterized by NMR and IR spectroscopy. Properties of the compounds such as melting point, thermal properties, etc. were also determined. Synthetic procedures for producing six new radiopaque polyurethanes from diols such as polytetramethylene glycol, Polycaprolactone diol, Poly hydroxyl terminated adipate and polypropylene glycol were standardised. Mechanical properties of these polyurethanes were evaluated and found that the tensile strength varied from 8 MPa to 45 MPa indicating that polyurethanes with a wide range of mechanical properties can be synthesized by using different types of diol, diisocyanate and radiopacifier. Dynamic mechanical analysis showed that the glass transition temperatures of polyurethanes varied from -45oC to +58oC depending on the monomer used. Polyurethanes were further characterized for their thermal stability by TGA, molecular weight distribution by GPC and radiopacity by X-ray. Samples were tested for processability and cell culture cytotoxicity as well.

Controlled release of curcumin from non-degradable polymer matrices:

This project is part of NMITLI funded project on coronary stent. Considerable time was invested to make curcumin

with enhanced aqueous solubility (see figure). Water soluble curcumin was prepared by complexing it with cyclodextrin and derivatives of cyclodextrin. Curcumin content in the curcumin-cyclodextrin complexes were determined. Stability/ degradation of curcumin-cyclodextrin complexes in deionized water and at alkaline and acidic pH conditions for different time periods were studied. It was observed that curcumin and its complexes were much more stable in low pH solutions than alkaline solutions. In order to achieve sustained release of curcumin, complexes and curcumin were loaded in Ethylene vinyl acetate copolymer matrix. Curcumin content in the polymer matrix varied from 2 to 16% by wt. A suitable technique for quantitative determination of released curcumin from the curcumin loaded films was developed. Estimation of curcumin release at different time periods is ongoing. Water absorption studies of curcumin loaded EVA films of different curcumin contents are in progress.

Figure: Curcumin from two sources and water soluble complexes made from them

Novel Microporous Polymeric Membranes for Medical Applications:

The ultimate objective of the project is to develop a micro-porous membrane from compatible blends of thermoplastic polyurethane and poly dimethyl siloxane rubber. The initial objective is to study in detail the biostability of the polyurethanes and their blends.

- The biostability of the blends could be established and found to be better when compared to the neat new generation polycarbonate urethanes.
- The blends of polyurethane and polydimethyl siloxane were stretched uniaxially to develop porosity. The processing conditions such as stretching rate, temperature, holding time were varied and the percentage porosity developed was estimated.
- The cell adhesion studies on such porous polymeric membranes and the long term implantation studies in rabbits are in progress.

Combination Products of Polymer-Ceramic Nanocomposites with Cells and Growth Factors for Bone Tissue Engineering Applications:

The ultimate objective of this project is to develop innovative nano-composite materials. It is also envisaged to design nano-composite systems that could interact in a predictable and controllable way with biological systems. Bioresorbable electrospun nano-composite fibers were fabricated using electrospinning that could lead to the development of an ideal scaffold for bone tissue engineering applications.

The targets achieved during the current year are summarized as follows:

- Nano hydroxyapatite filled poly(ε –caprolactone) (PCL) and PCL- polycaprolactone-polyethyleneglycol-polycaprolactone triblock copolymer (CEC) blends were electrospun at appropriate conditions
- The electrospun micro/nanofibrous composites obtained were characterized by mechanical testing and scanning electron microscopy.
- The cell adhesion and cell proliferation studies were initiated.

Development of Degradable Composites as Bone Substitutes:

The aim of the project is to develop appropriate degradable compositions based on polycaprolactone (PCL) and hydroxyapatite (HAP)/bioglass (BG) to use as bone substitutes in the form of burr-hole buttons and so on. Such composition are prepared and shaped in such a way that the composites shall be capable of implanting in the bone. The major objective of the study is to evaluate the ISO requirements in order to develop compositions suitable for a bone substitute.

- Appropriate polymer-ceramic composites were prepared by melt mixing in a Brabender plasticorder

using the biodegradable polymer, polycaprolactone (PCL) and hydroxyapatite (HAP)/ bioglass (BG).

- The composites passed the cytotoxicity, intracutaneous irritation tests and acute systemic toxicity tests.
- The composites could be shaped into burr hole buttons by machining.

Development of a Dura Substitute by Electrospinning of ε-Caprolactone-Co-Lactide Polymers :

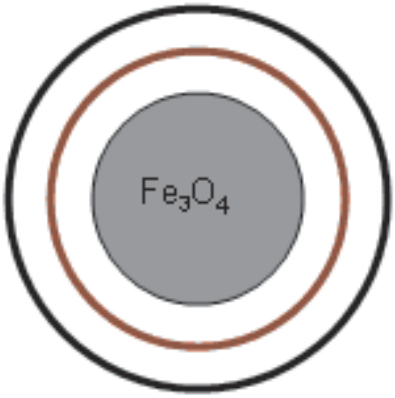
The main objective is to develop innovative porous polymer scaffold materials with tailored properties and to explore the interaction mechanisms at nanoscale between the cells and porous membranes/scaffolds. It is also envisaged to design nano-fibrous structures that could slowly degrade over a period of time. Thus the current project could lead to the development of an ideal dura substitute for neurosurgery applications.

- Synthesis and characterization of caprolactone-co-lactide polymers
- The optimization of the ratio of the monomers and the molecular weights are in progress.

Polymer Analysis

DBT funded programme (Designing molecularly imprinted polymers as substrates for glucose) was completed this year. From this project, different polymeric formulations for the selective adsorption of glucose were emerged. Interesting methodologies were formulated to visualize the binding of glucose onto the polymers. The synthesis and optimization of fluorescent molecularly imprinted polymer film capable of binding glucose with a concomitant changes in fluorescence was one of the major outcome of the project. Such polymers have tremendous possibilities to tune further to pick up glucose directly from fluids such as tear.

Loading of adequate quantity of hydrophobic drugs (e. g. methotrexate, pacilitaxel etc) onto various delivery vehicles such as magnetic nanoparticles, quantum dots and gold nanoparticles is one of the challenges. Additionally bioavailabilities of many drugs are lower due to reduced water solubility. We reasoned that these issues can be addressed by conjugating the specific drugs onto biocompatible and water soluble polymers such as polyvinyl pyrrolidone, hyaluronic acid etc. We synthesised several drug conjugates and these molecules were used to modify the nanoparticles using the concept of layer by layer assembly. Using this approach we succeeded in developing nanoparticles capable of carrying more than one drug.

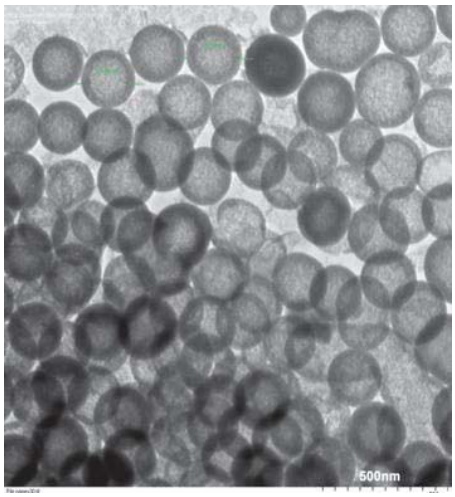


Magnetic nano particles modified by layer by layer assembly:

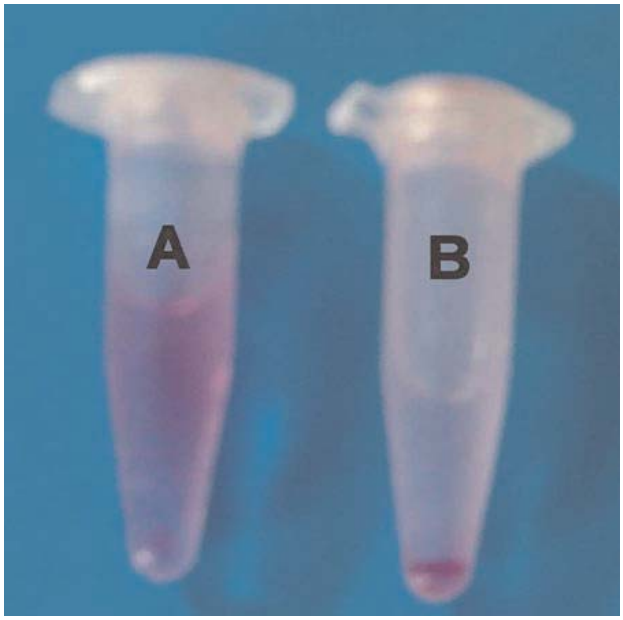
We designed one shot process for the synthesis of gold nanoparticles using drug conjugates. This relatively greener approach yielded gold nanoparticles stabilized by polymer chains containing drug/drugs. This approach is interesting in the sense that additional chemical steps are not required for further modification of the nano particles to suit them in drug delivery applications. Efforts have also been expended to develop multifunctional gold nano particles for the simultaneous cellular imaging and drug delivery.

We also made initiatives for the development novel materials for drug delivery and wound closure applications. Materials containing various components such as cyclodextrins and macro monomers based on biopolymers (e. g. HA) were synthesized and characterized. Formulations polymerizable by visible light were synthesized which could be used for wound closure applications. Another novelty of the materials was the easy removal from the application site by lowering the temperature (e. g. moisten with ice cold water).

Another initiative was the synthesis of silica based smart nano capsules which release the encapsulated drug at a pH around 7. The drug was totally protected at pH ~2. These capsules could be used in the delivery of drugs which are susceptible to acidic pH through oral routes.



pH responsive nano capsules



The included compound is totally protected
by the capsules at lower pH (~2) [B]
while it is completely released at a higher pH (~7) [A].

Tissue Engineering & Biological Research

Device Testing Lab

Bioreactor Development:

The division has initiated programs for the development of bioreactors which are meant for providing suitable microenvironment for the cell culture and cell differentiation for tissue engineering applications. Three programs (in collaboration with the divisions of Thrombosis Research, Tissue culture and Tissue Engineering & Regenerative Technologies) for cartilage tissue, liver cells and vascular tissue engineering applications have been taken up. The systems have been developed and are undergoing validation studies.

Biological Tissue Development :

A program has been initiated by the Division of In vivo Models and Testing for the development of functionally characterised biological tissue for medical applications, in collaboration with the Kerala State Live Stock Development Board (KLDB). The division is supporting the program by way of carrying out mechanical characterisation and application development.

The division is supporting the Department of Radiology in the standardization of event related fMRI technique for developing spike triggered fMRI . This program focuses on the activation of specific brain areas by providing cognitive or motor stimuli in synchrony with the MRI scan.

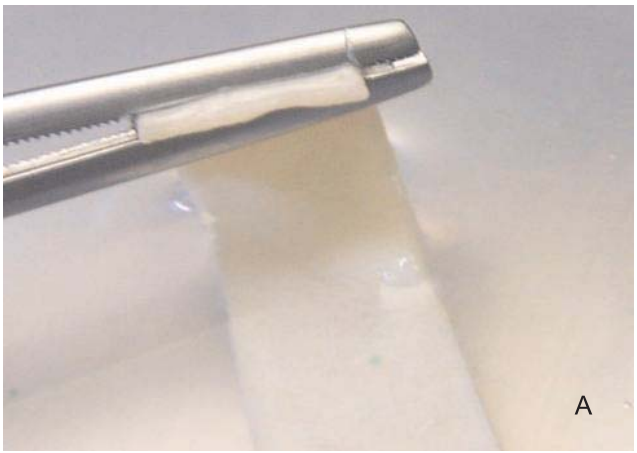
In-Vivo Models & Testing

Decellularised Bovine pericardium:

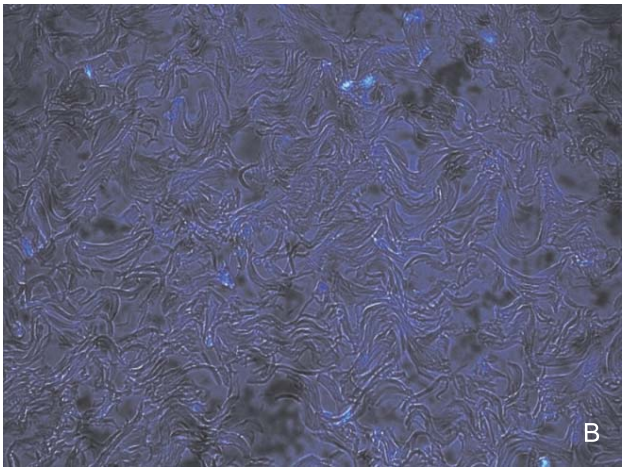
A technique for non-detergent based decellularisation of animal tissue for biomedical application was developed and an Indian Patent application made. A multi centre DBT project was sanctioned to develop medical device such as Bovine jugular vein and Bovine pericardium for cardiovascular application using the above technique. In this project, Government of Kerala undertaking, Kerala Live stock development board has been upgraded to produce animal tissue of biomedical quality with our guidance.

As part of this infrastructure and documents for collecting animal tissue based on EN12442 (part 2) was established at the KLDB farm at Kulathupuzha. A total of 14 collections

were made and the process standardized. On each collection, serum and brain samples were sent to Southern Regional Disease Diagnostic laboratory, Hebbal Bangalore for screening BSE and other relevant bovine diseases. The collected bovine pericardium and bovine jugular vein was transported to SCTIMST, Trivandrum in liquid nitrogen which were decellularised and processed. The decullarisation process has been optimized based on tissue response, calcification response and immune response using juvenile Wistar rat subcutaneous implantation model. Samples from the optimised process were subjected to Bioburden assessment at various stages of collection and processing. Finished product (Bovine pericardium and bovine jugular vein graft) was subjected to Sterility test and mechanical testing. Sterilization procedure developed was found to be adequate. This group has also passed Direct contact Cytotoxicity testing using L929 fibroblast cells. Mechanical testing revealed adequate mechanical properties for the required purpose. Other preclinical testing such as 'In-vivo hemocompatibilty testing' and 'Implantation study' in pig LA and Aortic patch model is scheduled to start this month. 'Subchronic toxicity', Systemic toxicity', 'Intracutaneous irritation' and 'Sensitization studies' are planned this year. Chemical and heavy metal residue evaluation has also started.



A: Decellularised Bovine pericardium: gross appearance, note the spongy appearance because loosening of ECM and collagen fibre separation.



B: Decellularised Bovine pericardium under fluorescence microscopy after Hoechst 33258 staining. (400X)

C: Decellularised bovine jugular vein showing intact vein valve cusp

D: Decellularised jugular vein 0.2Dcl group explant after 200 days as interposing graft in pig aorta. Note the complete endothelialization and minimum thickening of wall. There is no evidence of calcification also.

Microbiology

The Division provides research support to other laboratories and these are handled as research requests. In the year 2009 we had one research requests from other department in BMT wing. A substantial amount of work goes into these studies as the tests carried out are not standard microbiology tests but are designed to suite the particular request.

From Dental products lab the research request was for evaluating anti-microbial activity of silver nanoparticles incorporated into polymer scaffolds PCL for applications in vascular graft development.

The research focus of the Division continues to be in understanding the molecular mechanisms of bacteria in biofilms. A project "Delineating mechanisms of biofilm formation in urinary catheters: characterization of the role of E.coli secretory proteins and influence of environmental signals funded by KSCSTE Govt. of Kerala was completed.

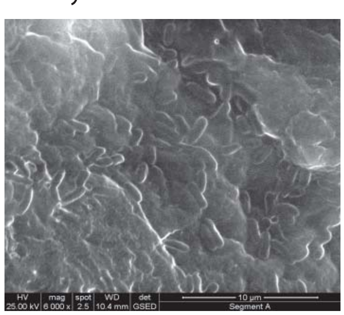


Fig 1 ESEM picture of Curli positive E.coli strain showing ascending motility

The dynamics of biofilm formation on urinary catheters under nutrient limiting conditions and influence of drugs like aminoglycosides and nitrofurans was done. Various genes expression were looked into of which a few genes were found to be overexpressed in biofilm mode.

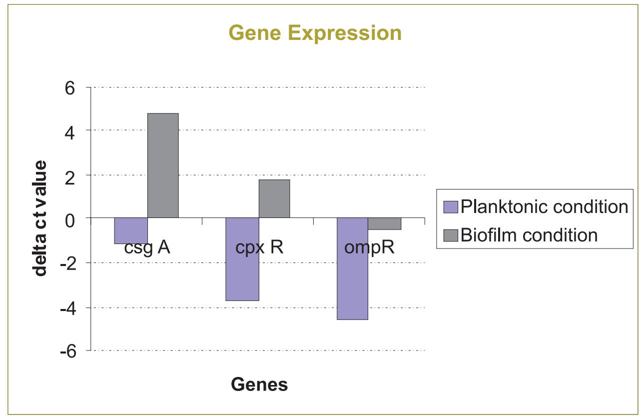


Fig: 2 RTPCR data of genes expression normalised to houskeeping gene lacz in E.coli biofilm versus planktonic

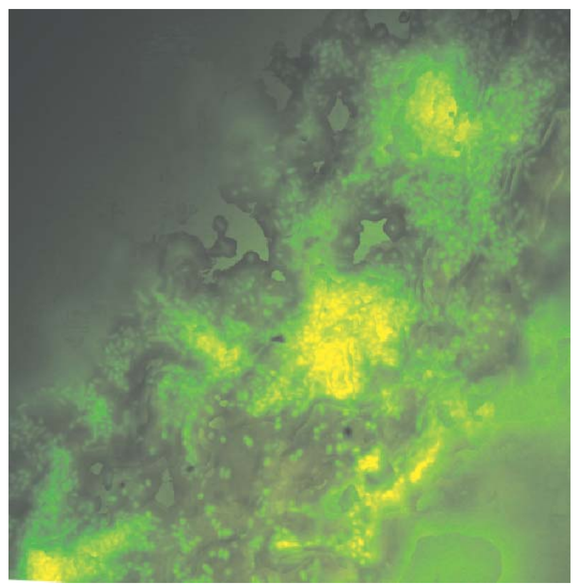


Fig: 3 E.coli biofilm on Foley's latex catheter on exposure to PBMC cultures.

Tissue engineered hybrid artificial lung Model for Testing pollutants and drugs:

The alveolar epithelium is unique by virtue of its position in the body and by virtue of its function. Being primarily responsible for respiration it has a large surface area exposed to air facilitating efficient diffusion directly from air

to blood. This site provides immense possibilities for understanding molecular pathology of alveolar diseases, development of novel treatment methodologies and as testing system for drugs, chemicals and pollutants. Here we are trying to harness this unique site and develop a tissue architecture combining scaffolds and alveolar pneumocytes and fibroblast and looking at viable endpoints for developing a test module for drugs or pollutants.

Molecular medicine

Axonal regeneration and reestablishing the functional connections between neurons have been the biggest challenges in neurobiology. Failure of central nervous system axon regeneration is mainly due to the inhibitory signals from the environment surrounding the CNS lesion and due to inability of damaged axons to re-grow efficiently. The research focuses on how the axons grow under various conditions like in presence of growth factors, biological scaffolds, electrically conducting polymeric scaffolds etc. The main focusing is on how the synaptic vesicles are transported when the growth cone develops; how the dynamics of actin and tubulin polymerization alters under various growth conditions; how the branching patterns of axons vary in presence of growth factors like neuronal growth factor and transformation growth factor-alpha.

PC12 cells, HEK cells and primary neurons are being used as model systems. Transforming candidate genes like synaptotagmin, VAMP, synapsin etc in these cells is being carried out to understand how the cargo transport of synaptic proteins to the active terminal of axonal growth get affected under various axonal growth conditions as well as in regenerating axons after an injury. Scaffolds like agarose and conducting polymers have been used to guide the neurons to form functional synapses. The recombinant growth factor developed in the laboratory, TGF alpha, found to induce axonal sprouting in culture neurons and dynamics of this axonal growth has been studied as a model to understand how the axons are guided towards specific signals.

In addition, the molecular checkpoints in neurons on gene expression of critical proteins, specifically mediated through RNA-protein interactions is being studied. Such regulations allow posttranslational control of protein expression and elicit physiologically significant functional effects in a faster pace. The studies so far have shown that there are specific target sites in Synaptotagmin and Jerky for RNA interaction. These results help in the modeling of the axonal growth based on the molecular interactions occurring within the cells.

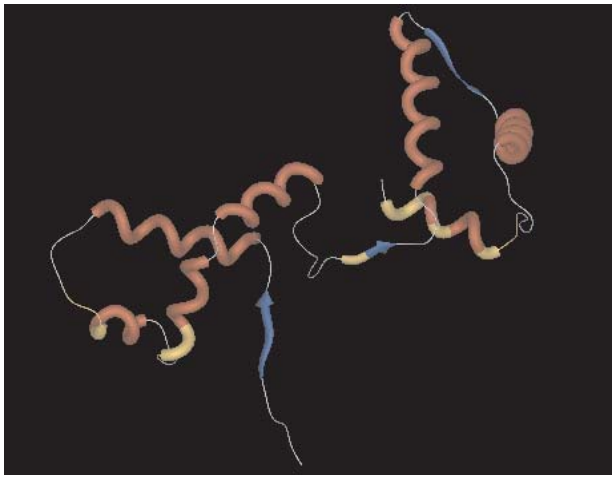


Figure 1. Jerky protein structure modelled using I-TASSER

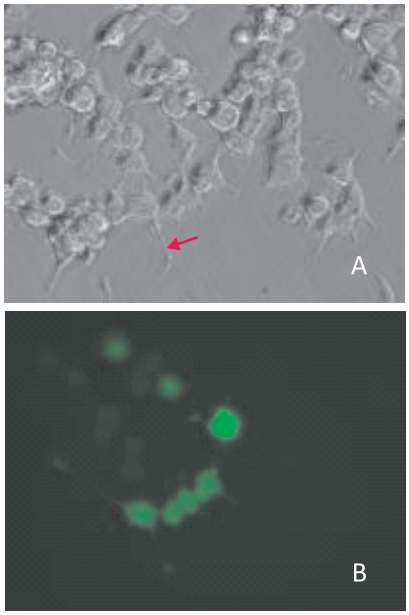
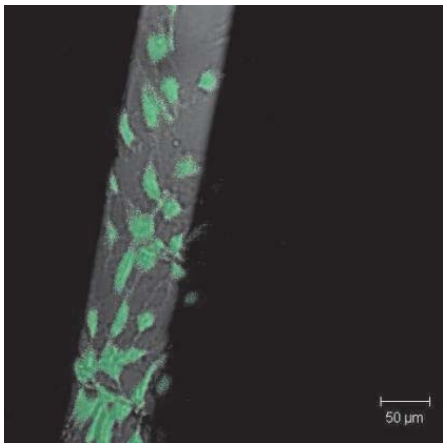


Figure 2. PC12 cells in presence of neuronal growth factor. A. Cells showing axonal sprouting (arrow head). B. Cells transformed with GFP-syt gene; green fluorescence indicates the expression pattern of the protein.

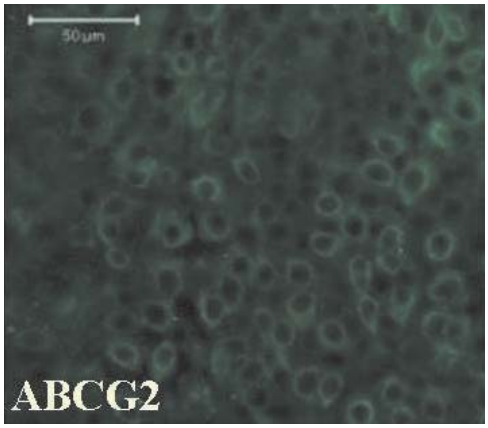
Tissue Culture Laboratory

Preclinical evaluation of bioengineered corneal cell sheet was initiated. Rabbit limbal stem cell deficiency (LSCD) model was created and limbal cell sheet was transplanted to LSCD eye. Modified polyethylene terephthalate film was used as a thermoresponsive substrate for culture as well as a transfer tool for cell sheet transplantation.

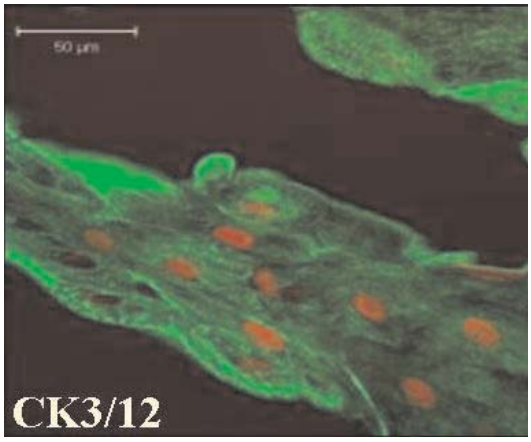
Initial prototype of bioreactor for bioartificial liver project was fabricated and tested for various parameters. Search for alternate cell source for hepatocyte is ongoing. Cell culture studies are undergoing to optimize the bioreactor conditions and evaluation. Polysaccharide based scaffolds were synthesized and evaluated for the study under microgravity. Cells with scaffold under microgravity is initiated.



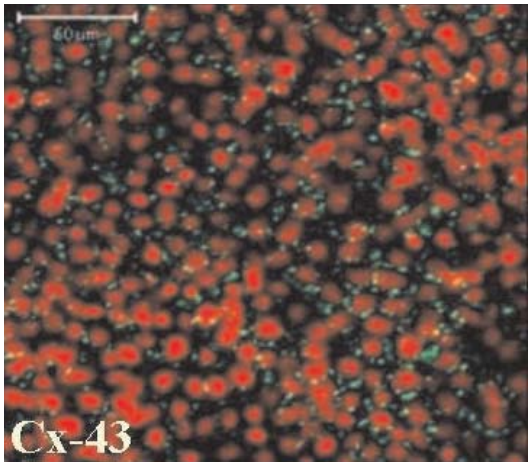
Mesenchymal stem cells adhered to hollow fibers of prototype bioreactor



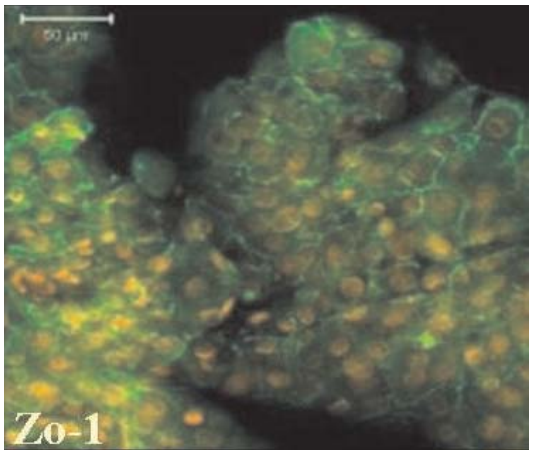
ATP Binding Cascade Protein – G2 (ABCG2) expression in corneal cell sheet



Cytokerarin 3/12 (CK 3/12) expression in corneal cell sheet



Connexin-43 (Cx-43) expression in corneal cell sheet



Zona Occuldins- 1 (ZO-1) expression by in corneal cell sheet

Toxicology

A new project entitled 'Evaluation of molecular toxicity of newly developed materials intended for biomedical applications' is ongoing under the support of Indian Council of Medical Research (ICMR), New Delhi. The objective of the project is to evaluate the molecular level toxicity of the six newly developed materials and their chemical leachants on mtDNA, antioxidant enzymes, lipid peroxidation and cytogenetic effects. The expected out come of the project will be a cardinal change in approach to biocompatibility evaluations leading to a paradigm shift in bringing in newer regulations for development of safer medical devices, implants and tissue engineered organs for life time application.

Standardization of the following new technique/methods is presently ongoing :-

- Immunotoxicology using T and B lymphocyte proliferation assay.
- Standardization of evaluation of Cytokines
- Isolation of DNA and identification of DNA damage from whole blood and tissues using HPLC method.
- In vitro human lymphocyte culture for chromosomal studies
- In vitro human lymphocyte culture for micronucleus studies.

The Development of National GLP Guidelines & Identification and selection of National Regulatory Guidelines for Testing and Evaluation of Medical Devices is ongoing. A Road map for this has been made and action initiated. This is supported by the National GLP Compliance Monitoring Authority, Dept. of Science and Technology, New Delhi

Thrombosis Research Unit

Vascular Tissue Engineering program initiated by the lab for construction of small diameter vascular graft is a team work involving different investigators resulted in development of a scaffold, a bioreactor, tissue construction process and an animal model for testing the tissue engineered construct for thrombus deposition and stability of endothelial cells in the lumen. The biodegradable & bio mimetic polycaprolactone scaffold was fabricated in small diameters (2mm/3mm/4mm and 6 mm diameter) and 100mm length. Scaffold was found to have optimum physicochemical properties (tensile strength and suture retention), degradation rate and optimum porosity for formation of endothelial cell monolayer in the lumen. A two channels bioreactor was designed and a working prototype developed as a single unit – one channel for circulating the endothelial culture medium in the lumen of scaffold and the second one for the smooth muscle cell medium in the outer zone of the scaffold. When endothelial cells were seeded under dynamic conditions the monolayer released nitric oxide into the medium indicating the normal function of the lumen. After the tissue engineered vascular graft with 3mm diameter was exposed to blood (ex vivo, see fig1A) EC was intact with no signs of thrombus deposition (fig 1B), whereas on bare graft thrombus deposition was evident (fig 1C).

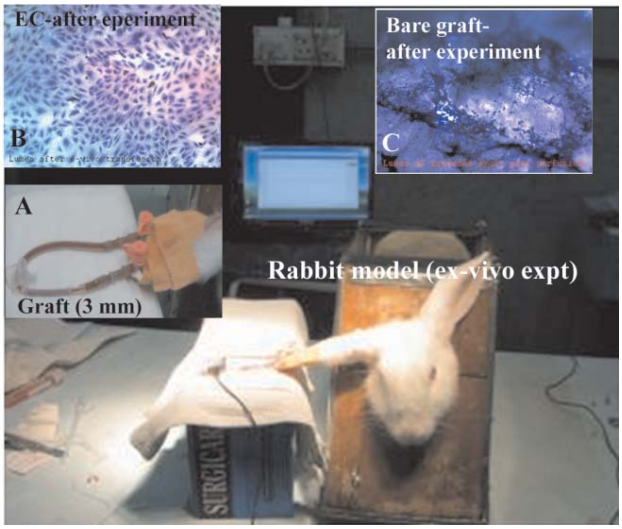


Fig 1. Rabbit model for testing stability of EC layer in the tissue engineered vascular graft. A, graft during the experiment; B, micrograph of EC-seeded graft after experiment; C, micrograph of bare scaffold after experiment.

Skin tissue engineering program progressed reasonably well. Main focus was to identify and develop autologous cell source for construction of dermal and epidermal components of the skin. Two main cell sources that are found to be feasible; (i) circulating keratinocyte

progenitor cells (KPCs) and (ii) adipose derived mesenchymal stem cells (ADMSC) and both cell types were isolated from human tissues, grown in culture and were characterized using specific markers. Compiled flow cytometric analysis data from 4 experiments is shown in figure 2A which demonstrate that KPCs expressed P63, & CK5, and these cells multiplied in culture with time as seen by expression of proliferating cell nuclear antigen (PCNA). Co-culture of these KPCs with skin derived primary fibroblasts resulted in self assembled cells sheets. More than 95% of ADMSCs in second passage expressed characteristic markers (CD105 and vimentin) as seen in the flow cytometric analysis (Fig 2B). In addition, keratinocyte culture was established from circulating progenitors, and epidermal layer of adult skin tissue whereas fibroblasts were from dermal layer of skin tissue.

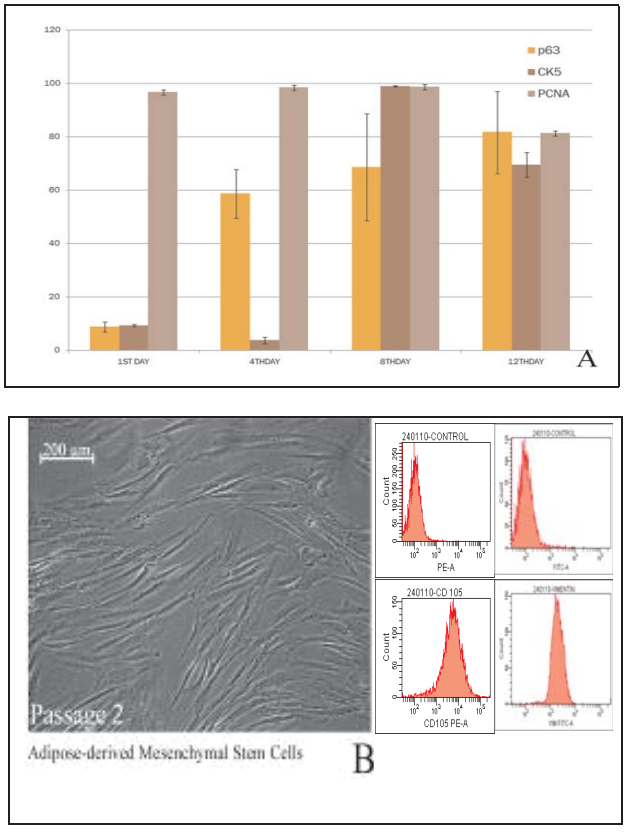


Fig.2. Data showing identification and characterization using flow cytometry with specific markers of: A, keratinocyte precursors during 12 days of cell culture and B, adipose derived mesenchymal stem cells in second passage.

Standardization of the culture matrix for homing and differentiation of neuronal progenitors was done. Neurons that differentiated from the circulating progenitors were characterized using specific markers; βtubulin 3 and MAP-2(fig 3 A&B). Hyaluronic acid and laminin were identified as important components of the matrix for growth and differentiation of neuronal progenitors. With an objective to identify autologous neuronal progenitors for regenerative therapy, blood samples from 30 Parkinson's disease patients were analyzed for the presence of circulating neuronal progenitors using nestin as the marker in flow cytometric analysis. It was found that the percentage of nestin positive cells in the monocyte fraction of PD patient's circulation is comparable with that in normal volunteers.

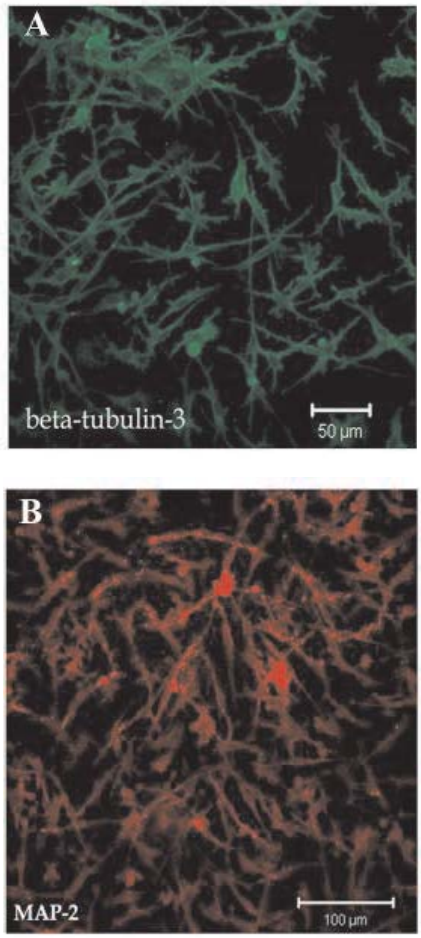


Fig3. Neurons differentiated from circulating human blood express specific markers.

Tissue Engineering & Regenerative Medicine

During the year, the lab made progress in the different programs related to tissue engineering as follows

Islet Immuno Isolation with XenoTransplantation and Stem Cell Regeneration to Islets as Strategies for Treatment of Diabetes

The goals was to seek multiple strategies for treatment of diabetes without immunosuppression, namely ;- 1. Immunoisolation – that allows for allo/xeno transplantation; 2. Stem cell differentiation toward pancreas regeneration

Even though the DBT sponsored project on the subject was closed, the work was continued in the area and the following salient features were obtained during the last year.

1. Develop about 5 different 3 D porous scaffold structures that permit islet cells to adhere, grow and remain functional. The scaffold structures additionally permit mesenchymal stem cells to be functional and allow for its differentiation to islet cells.
2. Obtain pancreatic progenitor (PP) stem cells, umbilical cord stem cells, adipose stem cells and bone marrow stem cells to trans-differentiate to insulin producing cells on different 3D scaffolds developed in house.
3. In the comparative experiments of the PP, Umbilical cord and bone marrow stem cells on scaffolds, it was determined that PP was the better of the stem cells in terms of their functionality. through in vitro and in vivo experiments.
4. Further studies are ongoing in this area with incorporation of vascularisation and innervation mainly to enhance the insulin release characteristics for the differentiated islet cells.
5. Rabbit adipose stem cells could be successfully differentiated to islet like clusters. Studies with human adipose stem cell differentiation to islets is also initiated.

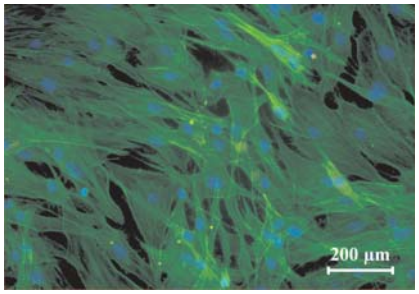


Fig 1 : Rabbit adipose mesenchymal stem cells stained for actin

In an ongoing DBT funded program on lung tissue engineering which is a collaborative effort with Department of Microbiology, several biomaterials were prepared and characterised for physicochemical properties and ability to support the coculture of alveolar epithelial and fibroblast cells. A hyaluron hybrid graft and another biopolymer hybrid copolymer were identified as better biomaterials for the coculture studies. Materials were supplied as porous scaffolds and electrospun materials for growing lung cells at the P.I lab. A new material specifically made for the program is an UV polymerized temperature responsive NIPAM polymer for coating Petri plate or other systems. A new project on epithelial cell mesenchymal interactions and a role of angiogenesis was also sanctioned by DBT in collaboration with the Department of Microbiology, BMT Wing.

Ongoing lab program of "Biopolymer Composites for medical applications":

Several biopolymer injectable and fast setting and biodegradable gels were prepared. The gels were noncytotoxic and some of the gels were useful for encapsulation of living cells and others could be modified to form scaffold within which cells could be seeded and grown. Mesenchymal stem cells of different origins could also be grown and differentiated to adult cell types on these scaffolds.

The Centre of excellence in Tissue engineering (COE) program of the DBT program is ongoing with the research programs of the first phase of 5 years addressing the issues of cartilage, bone, hepatocyte tissue engineering by various laboratories.

An electrospinning facilty was set up at and several

materials made in nanofibrous and microporous structures. Atomic force microscope has been used for probing and imaging the nanostructures. Bioreactors are designed for cartilage and hepatocyte tissue engineering.

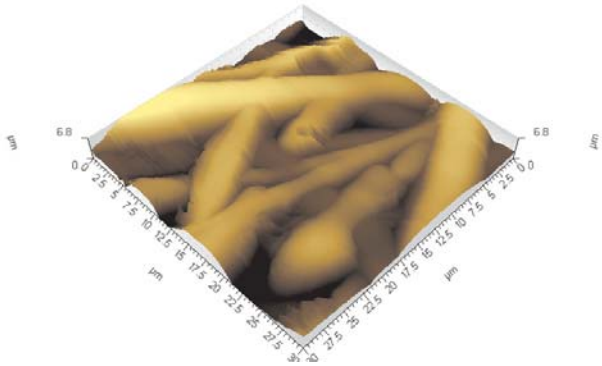


Fig 2 : AFM image of hybrid nanostructure

For the cartilage tissue engineering program, a new fast gelling, biodegradable and injectable two component gel has been prepared for cartilage tissue engineering. The material is also implicated for wound healing, and drug delivery applications.

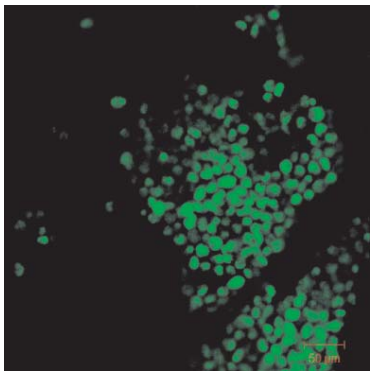


Fig 3 : Viable chondrocytes encapsulated in a gel

Bioglass has been prepared by alternate route and have implications in cartilage tissue engineering. PVA_PCL IPN and bioglass biphasic scaffolds prepared for osteochondral tissue engineering. Construct validated and work ongoing. Synthesis of new biodegradable biomaterials Polyphosphazenes initiated. (one composition) found non cytotoxic and potential as a biodegradable material for scaffold preparations or coating material. A Cartigen dynamic bioreactor (TGT technologies) was purchased and standardization experiments of the equipment, scaffolds and cell seeded scaffolds were conducted. Both chondrocytes and mesenchymal stem cells with growth factor combinations were assessed.

In collaboration with DAO, a perfusion bioreactor for cartilage tissue engineering was designed. Design changes were made in the chamber to take into consideration easy loading of the sample construct and also for the seating of the pressure transducer.

In vivo implantation of cartilage constructs (chondrocyte seeded PVA-PCL constructs) in a mice xyphoid cartilage defect was first initiated at Georgia Institute of Technology while visiting under the Joint Indo-US Center program. The experiments revealed good integration of constructs through Micro CT analysis and histology

In vivo implantation of cartilage constructs was initiated in a rabbit cartilage defect site. Two groups of animals which had chondrogenic constructs implanted in differing modes showed good integration of constructs and mixture of newly regenerated hyaline and fibrous cartilage. A third group with MSC and scaffolds in vivo results are awaited.

Collaborative studies on our scaffolds and tissue engineering the growth plate defect in goats as well as in vivo studies of articular cartilage in a goat model using our PVA-PCL IPN scaffolds and chondrocytes were initiated at CMC Vellore.

Quality Management Systems, Testing & Technical Services

Quality Systems

Calibration Cell

The Calibration Cell addresses the equipment calibration, maintaining traceability in measurements, reference material requirements and coordination of inter laboratory comparisons of the BMT Wing.

During the current year, the Cell obtained accreditation from the National Accreditation Board for Testing and Calibration Laboratories (NABL), New Delhi as per ISO 17025 standard for the thermal and mechanical calibrations.

During 2009 the Cell carried out 335 calibrations. Of these, 290 were directly related to the testing services under the

scope of COFRAC accreditation. Interlaboratary comparison (ILC) studies in cytotoxicity testing and tests for local effects after implantation were organized between NAMSA Laboratories, USA; Shriram Institute for Industrial Research, New Delhi, India; and SCTIMST.

List of Accredited Tests - 2009

No	Name of Test	Reference
1.	Animal skin irritation test	ISO 10993 -10: 6.3
2.	Intracutaneous reactivity test	ISO 10993 -10 B -2/ USP 28(88)
3.	Test for local effects after implantation: implantation in subcutaneous tissue implantation in muscles and in bone(s)	ISO 10993 -6: 4, 5, 6
4.	Acute systemic toxicity: acute intravenous application	ISO 10993 -11: 6.5.4/ USP 28(88)
5.	Acute systemic toxicity: acute intraperitoneal application	ISO 10993 -11: 6.5.5/ USP 28(88)
6.	Standard practice for assessment of haemolytic properties of material	ISO 10993 -4 ASTM 756
7.	Ma ximisation test for delayed hypersensitivity	ISO 10993 -10: 7.4
8.	Closed patch test for delayed hypersensitivity	ISO 10993 -10: 7.5
9.	Penile irritation test	ISO 10993 -10 B -5
10.	Vaginal irritation test	ISO 10993 -10: B -7
11.	Systematic toxicity – Selection of tes t for Pyrogenicity -testing for pyrogenic substances of either endotoxin or non -endotoxin origin(pyrogen test)	ISO 10993 -11: 7.1 / USP 28(88)
12.	Medical -surgical material. Medical devices and materials biocompatibility. Extraction methods	ISO 10993 -12
13.	Standardised method for extraction of medical plastics	ASTM F 619 -03
14.	Invivo test for genotoxicity -- Micronuclei test	ISO 10993 -3: 4.4.2/ OECD n °474
15.	Invivo test for genotoxicity -Metaphase analysis in rodent bone marrow	ISO 10993 -3: 4.4.2/ OECD n °475
16.	Invitro test for genotoxicity - carcinogenicity and reproductive toxicity	ISO 10993 -3: 4.4 / OECD n °471
17.	Sterility test to check particularly the date of "end of use" of the product - Medical device	USP 28(71)
18.	Partial thromboplastin time (PTT)	ISO 109 93-4
19.	Fibrinogen Assay	ISO 10993 -4
20.	Prothrombin Time (PT)	ISO 10993 -4
21.	Quantification of platelet aggregates	ISO 10993 -4
22.	Compliment Activation test	ISO 10993 -4 B.6
23.	Haematology - Leucocyte Count	ISO 10993 -4 C.6.1.2.1
24.	Leucocyte adhesion on materials - Light microscopy	
25.	Tests for in vitro cytotoxicity	ISO 10993 -5

Quality Cell

Activities of Quality Cell include the implementation, maintenance and improvement of management systems to assure that the facilities, equipment, personnel, methods, practices, records and its control are in conformance to the requirements of the standards.

Following are the major activities of the quality cell during the year:

a. COFRAC surveillance assessment was carried out on July 13th, 2009 and non conformances reported were nil.

b. Training: ISO/IEC 17025:2005 Quality Management System & Internal Auditor Training for six technical personnel were conducted from 16th -19th February, 2010 at IDEMI, Mumbai.

c. NABL pre-assessment- was conducted on 9th October 2009 at Calibration Cell. There were 2 non-conformities observed during the audit. NABL assessment was completed on Nov 13th & 14th, 2009 and accreditation to Mechanical and Thermal Calibration was granted from 14.01.2010 to 13.01.2012 (2 years)

d. Management Review Committee met on 28th July 2009. Three Technical Management Committee meetings were held on 1st July 2009, 21st September 2009 & 27th January 2010.

e. As per schedule, two internal audits were carried out in May and November 2009.

Testing Services

Customer Service Cell

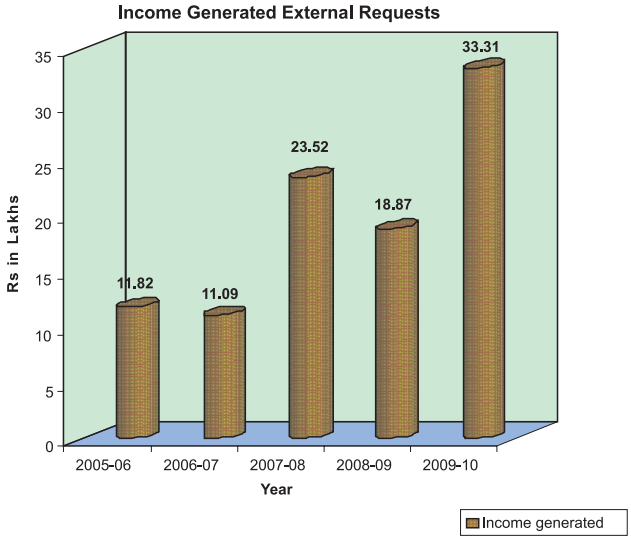
Testing & Evaluation Activity:

The Customer Service Cell (CSC) is the nodal point for all the testing and evaluation services for medical devices and biomaterials offered by the institute. The cell continuously interacts with medical device industries, research institutions, and academia. It makes available to external customers, the necessary information and counselling for proper selection of tests as well as reasonable access to the laboratories.

This year also the testing service of the Institute was able to support the medical device industry for testing of their materials and devices for biocompatibility evaluations. The trends on the enquiry reveal that the industry is getting more and more conscious on tests performed through quality standards. This is also evident from the feedback from the customers obtained through the Customer feedback survey conducted by the Customer Service Cell that all the customers from the industry has benefited from the accredited reports. Many of our respondents from the industry has commented on their successful submission of our test reports to regulatory authorities like BIS,US FDA, Drug Controller General of

India and for CE certification. The year saw a rise in the number of test requests and simultaneously an increase in number of test materials and income.

Description	External			Internal		
	2007-08	**2008-09**	**2009-10**	**2007-08**	**2008-09**	**2009-10**
Work orders	465	400	**533**	299	388	**421**
No. of test materials handled	1728	1380	**2175**	813	1627	**1550**
Income (Rs)	23,52,881	18,87,300	**33,31,352**	18,73,869	20,22,000	**20,19,02**



Study based device evaluation services:

Customer Service Cell co-ordinates the study based programs for functional and safety evaluation of devices and biomaterials for product qualification. The animal evaluation in large animal models is usually undertaken in a study mode. During the year studies were undertaken for biofunctional and histopathology evaluation of coronary stents, evaluation of storage efficieny of plasma bags, accelerated aging etc. The year saw study budgets amounting to about Rs 50 lakhs being committed.

Summary of Testing Services offered by Various Laboratories

Bioceramics

Offers the internal and external customers

a. X-Ray Powder Diffraction
b. Scanning Electron Microscopy, Environmental Scanning electron Microscopy and EDS analysis.
c. Inductively coupled plasma Emission Spectroscopy for elemental analysis

Dental Products

Testing facility was extended to internal and external customers alike on a chargeable basis. The number of samples tested was Micro CT (62), FT- Raman Spectrometer (358), UTM (637), FT-IR spectrometer (40) and thermocycling (72). Revenue of nearly Rs. 4 lakhs was generated through testing alone during the year which is 25% higher than last year.

Device Testing Lab

Four accelerated ageing studies on various medical devices were completed and three new studies taken up during the year.The division continued to support the information management activities of the BMT Wing

Histopathology lab

The laboratory is unique in the country as a histopathology laboratory having facilities to undertake routine as well as a wide range of specialized techniques for evaluation of biocompatibility of various materials as per International standards and pre-clinical evaluation of medical devices as per approved protocols. The laboratory is well equipped for evaluation in soft and hard undecalcified tissues, with and without materials. Technical staffs are skilled in carrying out specialized techniques in histopathology. The laboratory has been accredited by Le Comite Francais d'accretation (COFRAC) of France for its Quality System based on ISO/IEC 10725 and follows the Institute Quality System. The laboratory received a record number of samples for evaluation of biocompatibility as per ISO 10993-6 and large study based requests for evaluation in pre-clinical studies from both Indian Industry and research groups and International research groups. Student based studies from National Institutes and histopathological studies on cartilage constructs and corneal substitutes were also carried out.

In Vivo Models & Testing

Animal evaluation of Supracore- Sirolimus eluting coronary stents in porcine coronary artery model. This is an Industry sponsored project where a drug eluting stent is evaluated in Porcine coronary artery model for its probable safety and efficacy. Attempts were made in this study to meet GLP requirements. Project is completed.

Microbiology

The division functions on the quality platform as per ISO 17025 with regular external and internal audits. The Sterility test for medical devices and materials as per United States Pharmacopeia and Salmonella typhimurium reverse mutation (Ames) Assay based on ISO 10993 part 3 are accredited.

Accredited tests:

- Sterility test as per United States Pharmacopeia 31/ NF 26
- The Salmonella typhimurium reverse mutation (Ames) Assay based on ISO 10993 part 3

Tests performed for maintenance of quality system:

- Microbiological monitoring of controlled environment
- Microbiological analysis of water

Test performed in support of research & development:

- Antimicrobial activity testing of materials
- Evaluation of biomaterial – bacterial interactions by bacterial adhesion studies.

Other tests :

- Spore viability test
- Culture and Sensitivity

Polymer Analysis

As in pervious years, considerable efforts were expended to maintain the quality system in the laboratory. The laboratory generated good revenue during this period by extending its analytical facilities to external organizations. The service of the laboratory was also used by almost all groups in the Biomedical Technology Wing.

Polymer processing

The laboratory offers following test services to external and internal customers: Mechanical testing of materials and devices (15 external samples tested) & Dynamic mechanical analysis (24 external samples tested). Apart from these polymer processing facilities such as mixing, extrusion and injection moulding are also extended to the customers. During the reporting period about 9 samples were mixed and supplied for external customers.

Tissue culture laboratory

The quality system was maintained as per ISO 17025 in the tissue culture laboratory. Surveillance by the French team evaluated the conformity to the quality requirement. Around 170 test samples were evaluated for cytotoxicity and cytocompatibility.

Thrombosis Research Unit

During the last year volume of testing for hemocompatibility was large. Several types/batches of RBC storage bags and platelet storage bags were evaluated for the bag manufacturing industry and reports were issued on time. Real-time storage study included a battery of tests and some of them were standardized specifically for the purpose.

In vitro blood compatibility of coronary stent was evaluated for manufacturing industry. A battery of tests was done for different batches of metal stent and drug-eluting stent to ensure the hemocompatibility of the device.

New tests were standardized and a study for the bag manufacturing industry was initiated to evaluate the stability of various proteins in the fresh frozen plasma during the 1 year storage period.

A test was standardized for measurement of post transfusion recovery of RBCs using 51Cr-labeling and tracking of radioactivity in blood and urine of the recipient in 24h period after blood transfusion. An animal model was developed and study was initiated as per the request of a blood bag manufacturing company.

Cytocompatibility evaluation of drug coated coronary stent was done using smooth muscle cell and endothelial cell primary cultures for the industry.Tests were standardized for dose-finding assay of drugs to be used for coating on coronary stents and the study was initiated for a stent manufacturing industry.Materials were tested for hemocompatibility for various internal and external customers and the tested materials include metals, polymer and decellularized tissues.

Platelet function testing facility was extended for the patients of cardiology department of our Institute and for patients from other hospitals to evaluate bleeding disorder.

Participated in a Proficiency testing (haematology & haemostasis) program accredited by NATA (Australia) for the year 2010.

Toxicology

The testing carried out at Toxicology included external requests from various industrial customers for test for delayed hypersensitivity, intra-cutaneous and skin irritation, Acute systemic toxicity, test for local effects after implantation, Pyrogen test, vaginal and penile irritation, In vivo Mammalian chromosomal Aberration test, In vivo Mammalian erythrocyte micronucleus test, Assessment of Haemolytic properties etc. Collaborative work was also carried out with the different labs. The lab was also involved in the Physico-chemical analysis of potable water.

Transmission Electron Microscopy

Samples for analyses are received from research students – Biological Samples received and prepared (fixed, embedded, sectioned, stained and photographed) for evaluation under Transmission Electron microscopy (TEM).

Inorganic samples - nanoparticles analyzed and photographed under TEM.

Technical Services

Laboratory Animal Science

Supplies Quality Research animals for testing and research. Animal care and management based on CPCSEA guidelines as well as ISO- 10993 Part-2 guidelines.

Library

The library has a collection of 10527 books and 5498 back volumes of journals. During the current year, 349 books were added and 61 journals were subscribed. The collection includes 2224 standards specifications and 275 patent specifications. Electronic access to most of the journals which we subscribe in print format is available throughout both the campuses.

Being part of National Knowledge Resource Consortium, our library has access to full text of journals in addition to those we subscribe, ASTM Standards and Indian Standards. The library has accounts with Patents Information System, Nagpur, NISCAIR, DELNET and STN-Easy for the easy retrieval of information.

The information management system and library automation is based on the UNESCO software, CDS/ISIS and bar coding has been implemented. The library information and the CD-ROM collection are available to both the wings through intranet.

Precision Fabrication facility

Precision Fabrication Facility executed 93 work orders relating to fabrication, machining and designing of Jigs & Fixtures, mould making, prototype component machining for the various projects and for other department R&D activities.

Work orders were executed for the major programs of the wing are:-

- Coronary Stent development project:- stent radial strength measurement fixture and Stent tracking fixture for stearability study on stent.
- IUD project:- Mould with core pin for IUD outer membrane, Mould for 2mm Dia X 10mm long silicone rod
- Capsule endoscopy project:- Spherical Caps
- Blood Pump project:- Magnet Holding Fixtures, Pivots & Bearing
- Bioreactors for various Tissue Engineering Projects:- Rocking system for BAL Bio reactor for rocking the BR Module at low speed, Bio reactor Chamber for Tissue Bio reactor setup, Fiber Assembly Holder for BAL-Bioreactor , Fabrication of DO Sensor Chamber- For Dissolved Oxygen Measurement.
- Vascular graft project:- Accelerated Durability Test system setup fixture

Various other work orders were also executed like vial holders, mice restrainer,moulds for pellets compressing, Titanium samples for TiN system qualification, support plate fixture for laser micrometer etc.

BIOMEDICAL TECHNOLOGY WING 2009-10

Dr. G.S. Bhuvaneshwar, MS, PhD
Head, BMT Wing

Dr. Chandra P. Sharma, FBSE
Associate Head, BMT Wing

Artificial Organs

Dr. G.S. Bhuvaneshwar, M.S., PhD
Leader, DAO & Head, BMT Wing

Mr. C.V. Muraleedharan, M.Tech
Engineer G & Scientist In Charge, Device Testing lab

Mr. D.S. Nagesh, M.Tech
Engineer F & Scientist In Charge, Modelling & Prototyping lab

Mr. V. Vinod Kumar, M.Tech
Engineer C

Mr. Sujesh Sreedharan, ME
Engineer C

Mr. V. Arun Anirudhan, B.Tech
Engineer C

Mr. M.K. Sajithlal, B.Tech
Engineer B

Mr. G. Renjith, B.Tech
Engineer B

Mr. C.V. Muraleedharan, Dip in Mech. Engg
Scientific Assistant

Bioceramics and SEM Laboratory

Dr. P.R. Harikrishna Varma, PhD
Scientist E & Scientist In Charge

Dr. Manoj Komath, PhD
Scientist E

Mr. R. Sreekumar, BSc
Junior Scientific Officer

Mr. S. Vijayan, MSc
Junior Scientific Officer

Mr. S. Suresh Babu, MSc
Scientific Assistant

Biosurface Technology Division

Dr. Chandra P. Sharma, M.Tech, MS, DSc, MEBE, FBSE
Senior Scientist G

Dr. M.R. Rekha, PhD
Scientist C

Mr. Willi Paul, MSc
Scientific Assistant B

Calibration Cell

Mr. C.V. Muraleedharan, M.Tech
Engineer G & Scientist In Charge

Mrs. Leena Joseph, B.Tech
Engineer C

Mr. V. Armugham, Dip. Elec. Engg
Scientific Assistant

Mr. R.P. Rajesh, B.Tech
Scientific Assistant

Dental Products Laboratory

Dr. V. Kalliyana Krishnan, PhD
Scientist G & Scientist In Charge

Dr. P.P. Lizymol, PhD
Scientist C

Division of In-vivo Models and Testing

Dr. P.R. Umashankar, MVSc
Scientist E & Scientist In Charge

Dr. Sachin J. Shenoy, MVSc
Scientist C

Division Of Laboratory Animal Science

Dr. A.C. Fernandez, PhD
Scientist F & Scientist In Charge(Retired in December 2009)

Dr. Annie John, PhD
Scientist E & Scientist In Charge(Took charge in January 2010)

Dr. V.S.Harikrishnan , BVSc & AH
Scientist B

Engineering Services

Mr. O.S. Neelakantan Nair, B.Sc (Engg)
Engineer G & Scientist In Charge

Mr. K. Rajan, Dip. Electrical Engg
Junior Engineer(Instrumentation)-A

Mr. K.R. Asokakumar, Dip. Civil Engg
Junior Engineer (Water & Sewerage)-A

Mr. C.P. Binu, Dip. Mechanical Engg
Junior Engineer (Incinerator & AC)

Implant Biology

Dr. Mira Mohanty, MD (Pathology)
Scientist G, Head, Division of Implant Biology
& SIC Histopathology Laboratory

Dr. T.V. Kumary, PhD
Scientist G & SIC Tissue Culture Laboratory

Dr. Annie John, PhD
Scientist E & SIC Transmission Electron Microscopy Lab

Dr. A. Sabareeswaran, MVSc
Scientist C

Dr. P. R. Anil Kumar, PhD
Scientist C

Mrs. Sulekha Baby, BSc, MLT
Scientific Assistant

Mrs. Usha Vasudev, BSc, MLT
Scientific Assistant

Instrumentation Laboratory

Dr. Niranjan D. Khambete, MTech, PhD
Engineer F & Scientist In Charge

Division of Microbiology

Dr. A. Maya Nandkumar, PhD
Scientist E & Scientist In Charge

Laboratory for Confocal Microscopy & Experimental Pathology

Dr. T.V. Anil Kumar, PhD
Scientist E & Scientist in charge

Molecular Medicine Laboratory

Dr. Anoopkumar Thekkuveettil, PhD
Scientist F & Scientist In Charge

Polymer Analysis

Dr. K. Sreenivasan, PhD
Scientist G & Scientist In Charge

Mr. P.R. Hari, BSc, AIE
Junior Scientific Officer

Dr. C. Radhakumari, PhD
Scientific Assistant

Polymer Division

Dr. M. Jayabalan, MSc, BEd, PhD, PGDIPRL, D.Sc
Scientist F & Scientist In Charge

Polymer Processing Laboratory

Dr. Roy Joseph, M.Tech, PhD
Scientist E & joint in-charge

Dr. P. Ramesh, M.Tech, PhD
Scientist E & joint in-charge

Dr. M.C. Sunny, PhD
Junior Scientific Officer

Precision Fabrication Facility

Mr. V. Ramesh Babu, M.Tech
Engineer E & Scientist In Charge

Mr. S.Rajalingam, Dip. in Mech.Engg
Foreman-(Tool Room)

Quality Cell

Mr. D.S. Nagesh, M.Tech
Quality Manager

Dr. P. Ramesh, PhD
Scientist E

Technology Business Division

Mr. S. Balram, M.Tech
Scientist F & Scientist In Charge

Mrs. C.G. Sandhya, B.Tech, MBA
Engineer C

Mr. Rajkrishna Rajan, BE, MBA
Engineer C

Technical Co-ordination Cell

Mr. D. Ranjit, BE
Scientist F & Scientist In Charge

Technology Proving Facility

Dr. G.S. Bhuvaneshwar, MS, PhD
Head, BMT Wing

Mr. D.S. Nagesh, M. Tech
Engineer F

Tissue Engineering and Regenerative Technologies

Dr. Prabha D. Nair, PhD
Scientist G & Scientist In Charge

Thrombosis Research Unit

Dr. Lissy K. Krishnan, MSc, PhD
Scientist F & Scientist In Charge

Dr. Anugya Bhatt, MSc, PhD
Scientist C

Mrs. Mary Vasantha Bai, BSc, DMLT
Scientific Assistant

Toxicology

Dr. P.V. Mohanan, MSc, PhD
Scientist E & Scientist In Charge

Mrs. C. S. Geetha, MSc, M.Phil
Scientific Assistant

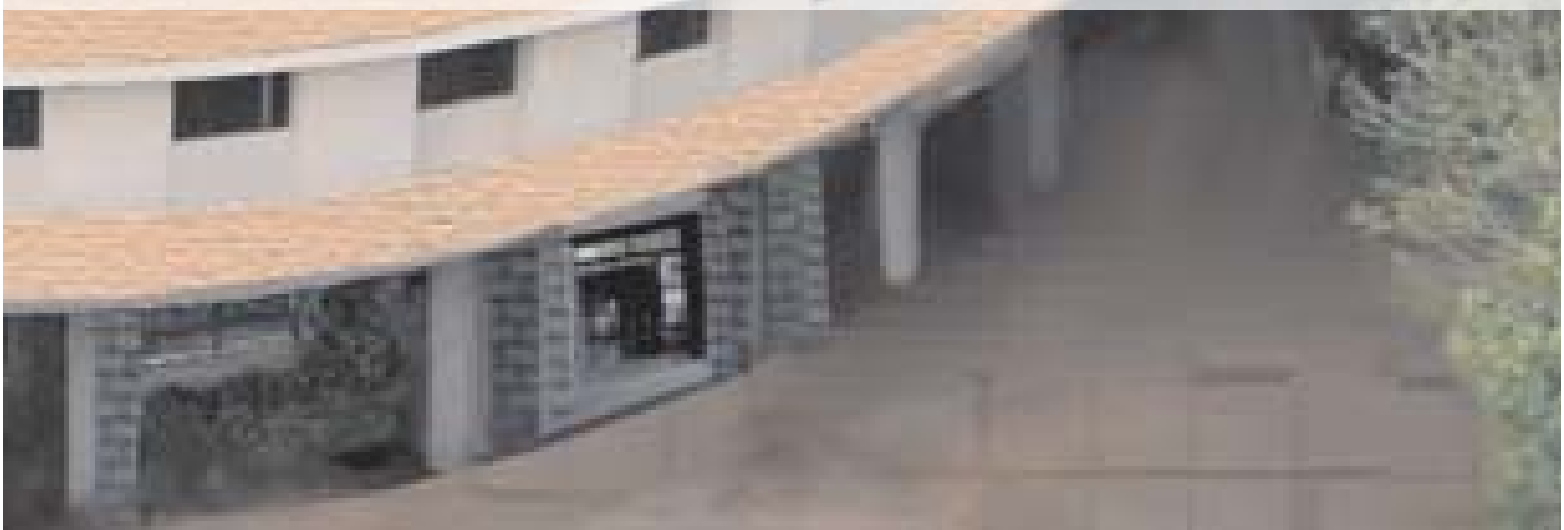
ACHUTHA MENON CENTRE FOR HEALTH SCIENCE STUDIES

MISSION

- To train highly competent and socially committed public health professionals.
- To advocate for policies that promote equity in health
- To undertake quality research on priority health issues of the country
- To offer consultancy services to national and international agencies

VISION

Be a Global Leader in
Health Sciences Studies by 2020



FROM THE DESK OF HEAD, AMCHSS

The Achutha Menon Centre for Health Science Studies (AMCHSS) continued its training of highly competent and socially committed health professionals in the current year also. The PhD program of AMCHSS was started in the year 2003. The first batch of two PhD students completed their program this year and they were awarded the degree: one in chronic disease epidemiology and the other in Health Economics. One of the 2009 batch PhD students was awarded a scholarship from the Bielefeld University Germany to work in their school of public health for three months. Another PhD student was awarded the prestigious EMECW (Erasmus Mundus External Cooperation Window) scholarship from Sweden for her PhD program in our Institute with committed financial and technical support from the Karolinska Institute.

Master of Public Health (MPH) program, the main degree program of AMCHSS, is the only MPH program in the country recognized by the medial council of India. Being the first MPH program three has been continuous demand from several other Indian Universities and universities in the South East Asia region for guidance for initiating new MPH programs. Although all such demands could not be met, we agreed to support a few new programs. Thus, the head of the AMCHSS became a member of the board of studies of Tata Institute of Social Sciences, Mumbai, National Institute of Epidemiology Chennai, Christian Medical College Vellore for their MPH programs and a member of the School Advisory board of the Graduate school of International health development, Nagasaki University, Japan. Fifteen MPH students successfully completed their program this year. In addition 13 MPH students graduated from our off-campus Institute, the National Institute of Epidemiology Chennai. We also started an off campus MPH program in the Christian Medical College Vellore this year. AMCHSS has strong collaboration with various national and international public health schools. Under one such collaboration with the Bielefeld University, Germany, three MPH Students from our Institute are selected for their two months field placement in that University during November-December 2010 fully supported by the German University.

Master of Applied Epidemiology (MAE), a two year degree program focusing on field epidemiology recognized by the medical council of India , is offered from the National Institute of Epidemiology as an off campus program of our Institute. Seventeen MAE students completed their program this year. This is a program to strengthen the public health capacity of various state governments in the country and all the candidates were deputed by various state governments.

Diploma in public health (DPH) has been offered to MBBS doctors with at least three years experience in state government health system. Eleven DPH students completed their program this year from the state of Gujarat. Such training programs need to be expanded to other state governments also.

In addition to degree and diploma programs AMCHSS also offer short courses in public health. Two health

professionals were given four-month training in community based interventions in cardiovascular diseases under the World Health Organization (WHO) Fellowship program. Another short course on "Ethics in Health Research" was offered in collaboration with the SCTIMST institute Ethics Committee during August 24-28, 2009.

The seven core faculty members of AMCHSS published 21 papers in indexed journals averaging three publications per faculty with a mean impact factor of 2.46. In addition, the World Health organization Geneva published a discussion paper which was written by our faculty members. A book chapter was also published by one of the faculty members this year. Faculty members of AMCHSS served as reviewers for prestigious medical and public health journals such as the Lancet, the Bulletin of WHO and several others. The head of AMCHSS was an invited speaker in the prestigious meeting of the Institute of Medicine (IOM) of the United States National Academies on meeting the challenges of preventing the global epidemic of cardiovascular diseases in developing countries at Washington DC in July 2009. The report "Promoting Cardiovascular Health in the Developing World: A critical challenge to achieve global health" was published in early 2010 by the IOM.

AMCHSS was offered two consultancies: one from the national rural health mission (NRHM), government of Kerala to prepare a training manual and a handbook for Gender based violence and the other from the AIDS prevention and control project under the National AIDS control organization of the Government of India for data triangulation of HIV/AIDS in Kerala.

Research in the area of health sciences has been one of the major activities of AMCHSS. We have a National Institute of Health (NIH) USA grant through the University of Arizona on "Building capacity for tobacco cessation in India and Indonesia". One of the activities of this project is on smoke free households. Honorable Minister for Health and Social Welfare, Government of Kerala, Smt. PK Sreemathi Teacher inaugurated the tobacco smoke free household initiative of AMCHSS on February 25th, 2010. We hope to expand this program to the rest of Kerala in the future. Another major research project is the Community Interventions for health which is a pilot project supported by the Oxford Health Alliance, UK. In addition to the Kerala site there are three more pilot sites: China, Mexico and the UK. The major objective of this pilot project is to address the three major risk factors of chronic non-communicable diseases namely tobacco use, unhealthy diet and physical inactivity in community based settings. Two of our junior faculty members will be trained at the London school of Hygiene and Tropical Medicine, UK under the European Commission project on "Partnership for better health". This one year Masters training in infectious diseases and environment health will strengthen these core areas of public health in AMCHSS.

This year's National Science Day celebration was on Gender Equity for prosperity and peace which was conducted on February 27, 2010. Since Gender issues in health is a core module of our MPH program, the national science day celebration was organized by the AMCHSS in collaboration with other related departments of the Institute.

Dr. K. R. Thankappan

September 18, 2010

Achutha Menon Centre for Health Science Studies

Overview

The Achutha Menon Centre for Health Science Studies (AMCHSS) completed 13 years of its activities in training, research and consultancy in health science studies. The 14th batch of MPH students joined in January 2010. The Centre continued its leadership role in public health education in the country. SCTIMST could provide technical and faculty support to many new public health initiatives in India and neighboring countries such as Nepal, Myanmar and Bangladesh.

Over 25 institutions in India started MPH program after the successful experience of SCTIMST. Jawaharlal Nehru University, New Delhi, the National Institute of Epidemiology (NIE), Chennai under the Indian Council of Medical Research (ICMR), Post Graduate Institute for Medical Education and Research, Chandigarh, Tata Institute of Social Sciences, Mumbai and the Christian Medical College (CMC) Vellore, Tamil Nadu are some of them. The MPH program at the NIE and the CMC are off-campus courses of SCTIMST. In addition to the MPH program another masters program (Master of Applied Epidemiology) is also offered from the NIE. Another major public health initiative in India is the establishment of the public health foundation of India (PHFI), a public private partnership launched by the Honorable Prime Minister of India, Dr. Manmohan Singh, on March 28, 2006.

A new course named as Diploma in Epidemiology was approved by the academic committee of the institute this year. This course will be offered in collaboration with the Ministry of Health and Family Welfare, Government of India and nine leading institutions in the country. The national Centre for Disease Control (NCDC) formerly the National Institute of Communicable Diseases (NICD is expected to be the nodal Centre for this course.

Three MPH Students are selected for their two months field placement in Bielefeld University, Germany during November-December 2010. All the expenses for this field placement will be met by the German University under the German Academic Exchange program.

The head of AMCHSS was an invited speaker in the prestigious meeting of the Institute of Medicine of the United States National Academies on meeting the challenges of preventing the global epidemic of cardiovascular diseases in developing countries at Washington DC in July 2009. This year's National Science Day celebration was on Gender Equity for prosperity and peace which was conducted on February 27, 2010. Since Gender issues in health is a core module of the MPH program, the national science day celebration was organized using the women component plan funds of the AMCHSS.

The centre had two consultancies: one from the national rural health mission, government of Kerala to prepare a training manual for Gender based violence and the other from the AIDS prevention and control project under the National AIDS control organization for data triangulation of HIV/AIDS in Kerala. The centre had 23 publications by the seven core faculty with an average of 3.3 publications per faculty. The average impact factor for the 15 publications that had impact factor was 2.779.

RESEARCH PROJECTS

Ongoing Projects

Athiyannur Sree Chitra Action (ASA)

This is the ongoing initiative of SCTIMST in collaboration with Athiyannur Block Panchayat. Detailed socio-demographic details and the GPS coordinates of all households in the block, barring a few locations in Vizhinjam Grama Panchayat (because of social scare of acquisition by the upcoming Port in the area), have been collected and computerized. In this process we have identified, trained around 225 women volunteers in the block: (Athiyannoor (41 volunteers), Kottukal (66 volunteers), Kanjiramkulam (52 volunteers), Karumkulam (40 volunteers), Vizhinjam (25 volunteers). Working contract is already given to a computer firm for creating a GIS interface and installing two multi-touch screens with the community details, one at AMCHSS and the other in the Athiyannur block office.

ASA area was selected as one of the four sites by the National Health System Resource Centre (NHSRC), New Delhi to pilot the ambitious project on Sub-Centre Data Reporting through Mobile handsets. All 26 Junior Public Health Nurses under the CHC Vizhinjam are given mobile handsets under this program and they are being regularly followed up to see its progress. We plan to launch a couple of research initiatives in the area like, exploring the health consequences of use/misuse of household devices by rural women, utility of health informatics in building capacity of women health workers in early identification of NCD risk factors, etc. In addition to a couple of student projects one on dementia among elderly and another on NCD risk profile are also being planned to be conducted in the area.

ASA specialty clinics

Cardiology clinics were conducted on all fourth Saturdays in the designated clinic at Community Health Center (CHC) Vizhinjam. A total of 277 patients (120 new and 157 review cases) referred by the local practitioners had availed the services of our cardiologists at the clinic and of them 75 patients were advised to come to SCTIMST for further check up. Neurology clinics were conducted on every second month on the second Saturday starting from January. A total of six Neurology clinics were conducted and 35 patients (29 new and 6 review cases) referred by the local practitioners availed services of our Neurologists at the clinic. Of them two patients were advised to come to SCTIMST for further check ups. It is expected that the launch of student project on the study of dementia in the locality will bring in more genuine neurology patients to the clinic. We plan to bring in more synergy between the clinics and the field-based research.

Building Capacity for Tobacco Cessation in India and Indonesia

This is a collaborative project between Achutha Menon Center for Health Science Studies of SCTIMST, Gadjah Mada University of Indonesia, and the University of Arizona USA. The overall objective of this project is to strengthen capacity for tobacco cessation training and research in India and Indonesia. The specific objectives of the project are to incorporate tobacco education into undergraduate medical education in selected medical colleges in Kerala and Karnataka. Three medical colleges have been identified as partner medical colleges in Kerala: The Academy of Medical Sciences, Pariyaram Kannur, Amrita Institute of Medical Sciences Kochi and the Government Medical College Alappuzha. Two medical Colleges in Karnataka were also identified as partner medical colleges: Bangalore Medical College and Kasturba Medical College Mangalore. Memorandum of understanding was signed between the SCTIMST and the above five medical colleges. Fifteen modules are being developed for piloting and implementing in different departments of the above medical colleges. In addition to implementing the modules a student and faculty survey on tobacco related issues were also planned in these medical colleges to assess the impact of the tobacco education. Student and Faculty surveys were completed in the Kerala medical colleges and will be completed in the Karnataka Medical Colleges soon. A community and work site was also selected by each of the above medical colleges for tobacco control activities. Tobacco smoke free household initiative is one of the activities under the community project. The state level inauguration of this initiative was done by Smt P K Sreemathi Teacher, honorable minister for health and social welfare, government of Kerala on February 25, 2010.

Tobacco smoke free initiative in Kerala was inaugurated by Smt. PK Sreemathi Teacher, Honorable Minister for Health and Social Welfare, Government of Kerala on February 25th at 3.00 PM at AMC auditorium. Dr K Radhakrishnan Director SCTIMST, Dr K R Thankappan, Professor and Head AMCHSS, Dr Seema Bhaskaran, Secretary Kerala Mahila Samakhya and Dr Ramani Wesly Professor Regional Cancer Centre Trivandrum are the others attended the event.

Capacity building for Safe Motherhood Programs

This is a collaborative initiative to develop evidence based models for Safe Motherhood and Newborn care in India. AMCHSS, SCTIMST's objectives are to examine existing evidence in order to develop publishable material for advocacy through joint publications with Society for Education Welfare and Action (SEWA) Rural and Centre of Study of Ethics and Rights (CSER) and also jointly identifying problems that require further research. Two faculty members from AMCHSS will develop various papers collaboratively with SEWA-Rural and CSER. In addition, one MPH student has completed a dissertation using data from SEWA-Rural's project area. Expected out comes: Four papers have been planned and these are in various stages of completion. The expected date of completion is July 31, 2010 for communicating these papers.

a. The impact of distance and physical access on the utilization of institutional care for child birth in Jhagadia Block, Gujarat (Dr. Mala Ramanathan, Dr.Pankaj Shah, Dr. Dhiren Modi, and. Dr.V.Raman Kutty).

b. The social determinants of infant mortality in Jhagadia Block, Gujarat (Dr.V. Raman Kutty, Dr. Pankaj Shah, Dr. Dhiren Modi, Dr.shobha Sha and Dr. Mala Ramanathan.)

c. The use of welfare schemes to enhance utilization of institutional care for child birth: a tertiary referral hospital experience

d. Barriers to seeking care for Post partum morbidity (PPM) in Jhagadia Block, Gujarat (Mrs. Gayatri Giri, Dr. Mala Ramanathan, Dr. Pankaj Shah and AR Archana). This paper is being developed from the MPH Dissertation of Ms. Gayatri Giri, MPH Student, 2008-09 batch.

Way forward: A very high level of post partum morbidity was identified. A formative research focusing on PPM (with alive babies), births in last three months is planned to identify the possible cultural practices that may contribute to PPM.

Community Interventions for Health

This pilot project was awarded by the Oxford Health Alliance, UK initially for four sites in the world. Three other sites that got this award are Mexico, China, and the United Kingdom. Recently another site in the US in New Haven was also funded. The objective of the project is to find out the feasibility of community based intervention to reduce the three major risk factors of chronic non-communicable diseases namely tobacco use, unhealthy diet and physical inactivity. Two community development blocks are selected, in Trivandrum district: one block is the intervention site and the other control site. A delayed intervention will be provided in the control community in the fourth year of the project. School, work site, hospital and community are the four groups of people where tailor made interventions will be provided. Baseline data collection was completed in the year. After the intervention a repeat survey will be conducted in both the intervention and the control sites. The anticipated outcome is a reduction in the risk factors in the intervention site compared to the control site. Such community based interventions to control non-communicable disease risk factors are rare in developing country settings. If the pilot project is successful this could be implemented in many countries where chronic non-communicable diseases are emerging in epidemic proportions. Data from the baseline data will be analyzed and research articles will be sent for publication next year.

Impact of the 2004 Indian Ocean Tsunami on people in affected regions of India and Sri Lanka: A Longitudinal study of mental and social health outcomes and recovery of individuals, families, and communities

This two-country, three-region population study, in Kerala and Tamil Nadu states of India and Batticaloa in Sri Lanka, has successfully completed its data collection phase. Detailed psychosocial exploration of a randomly selected list of adults (400 persons) and adolescents (300 persons)

were completed this year. The analysis of the collected data has been started in collaboration with the partner institutes. The analysis is getting delayed due to unanticipated difficulties in other sites such as in Sri Lanka.

A no-cost extension of the project has been sanctioned for a year to take up an action research program on alcohol addiction in the community. Under this project we have started collecting detailed information on alcohol addiction in the community in a sample of households (750 in number) identified through GIS based cluster-sampling method. A brief education intervention by way of providing health education classes to the womenfolk would be done . The efficiency of the intervention would be assessed by a second survey towards the end of the project.

Our initial cohort of 15 youth volunteers from the community has been entrusted with the present survey as well. They have been given training on health and social aspects of alcohol use with the help of a psychiatrist prior to this study. Bit notices and flip charts are being prepared for helping them to give education sessions to the women's groups. Our efforts to involve local Panchayat and other community based organizations in this woman's silent initiative against alcoholism is slowly getting footage.

Non-Communicable Disease Risk Factor Survey under the Integrated Disease Surveillance Project

This project is funded and coordinated by Indian Council of Medical Research (ICMR). The overall objective of this project is to conduct a survey of the risk factors of non-communicable diseases in all the states of India in a phased manner. The actual survey was conducted in each state by an implementing agency identified by the state government. Five regional centers are already identified by the ICMR to provide technical support to the states for conducting the survey and to ensure quality of the survey. AMCHSS has been identified as one of the regional centers and was expected to provide technical support to five states namely Kerala, Karnataka, Lakshadweep, Daman and Diu during the project period of three years. During the first phase of the project, during last year, technical support was provided to the survey agency in Kerala (The clinical epidemiology unit of Medical College, Trivandrum). As a data quality check, 250 households surveyed by the state agency were resurveyed to check data quality. Data collection in other states will be undertaken in the future.

Partnership for Better Health

The objective of this project is to strengthen public health capacity of two Asian public health institutions namely the Achutha Menon Centre for Health Science Studies (AMCHSS) of SCTIMST in India and the Bangladesh Rural Advancement Committee (BRAC) School of public Health in Bangladesh. Three institutions in Europe are partnering with this initiative: the London School of Hygiene and Tropical Medicine (LSHTM) UK, The Karolinska Institute Sweden and the University of Amsterdam, The Netherlands. Two faculty members from the BRAC School of public health and one from AMCHSS were identified for PhD training in European Schools. Two faculty members from the BRAC school have already joined for the PhD program. The faculty from AMCHSS could not be sent for PhD training due to various reasons including difficulty in identifying a suitable guide at he LSHTM. Therefore in consultation with the BRAC school of public health and the LSHTM it was decided to send two junior faculty members from AMCHSS for a one year Masters training at the LSHTM in suitable areas where AMCHSS needs capacity strengthening. Faculty from the European institutions have taught health economics course for our MPH students and they will teach next year also. Two senior faculty members were trained at the LSHTM in Pedagogy. Videoconferencing between AMCHSS and BRAC School was also conducted for enhancing communication between the two Asian Schools. The MPH student manual was prepared and distributed to the MPH students under this project.

Prevalence of Type 2 diabetes in a rural Community in Alappuzha District, Kerala: Identification of the Contributing Economic and Socio-cultural Factors

A cross-sectional survey was conducted among 1990 adults (women: 1149; men: 841) in Venmony Panchayat, Alappuzha district, Kerala, India to estimate the prevalence of DM and impaired fasting glycaemia (IFG), and to explore the predictors of hyperglycaemia (DM and/or IFG). The age-adjusted prevalence of DM was 12.5 percent and that of IFG was 4.6 percent. Adjusted for age, sex and family history of

DM, hyperglycaemia was significantly associated with high socioeconomic status [Odds ratio: 1.36 (1.01 – 1.86)], central obesity (waist to hip ratio >= 0.80 for women and >= 0.90 for men) [3.17 (1.73 – 5.79)], high cholesterol (fasting serum cholesterol >= 200 mg/dL) [1.88 (1.43 – 2.46)], and hypertension (blood pressure >= 140/90) [1.52 (1.14 – 2.03)]. (Vijayakumar G, Kutty VR, Arun R, 2008).

In spite of the high prevalence, very few socio-economic determinants have been identified directly in the study and most of the predictors are clinical markers. Central Travancore is characterized by rapid life style changes which could be clear markers for high risk status. The present study is an attempt to identify lifestyle markers of high risk for Type II diabetes. This study proposed to document the perceptions of diabetes in a rural community in Central Travancore and examine the economic and social-cultural determinants of life style modifications over the last 15 years in the same Panchayat.

Qualitative methods were used for this purpose. The perceptions regarding diabetes were obtained using focus group discussions, 4 each among men and women respectively, with appropriate discussion guidelines. The community perceptions of life style changes over the past 15 years were obtained using in depth interviews with about 32 residents of the study area, again using guidelines for the interview.

Stakeholders' perceptions of Institutional Review Boards (IRBs) in India

The mechanisms for oversight of research in India seem to be rather weak, in spite of the existence of the Indian Council of Medical Research (ICMR) guidelines for undertaking biomedical research. It is possible that not all institutions undertaking biomedical research involving human subjects have IRBs and /or that there are IRBs but they are not effective. In developed countries researchers have often tended to view the IRB as being antagonistic to the research process and sometimes IRB members may not be able to resolve the conflict of interest issues. The purpose of the study is to examine the inadequacies involved in using the IRBs as an oversight mechanism for biomedical and other health research involving human subjects in India and suggest changes and/or improvements if there is a felt need for it.

Qualitative research methods using four focus group discussions (FGDs) among potential participants and in-depth interviews with key stakeholders from six institutions, including researchers, IRB members and other experts were done. The findings reveal that concerns about compensation for health costs of participation are a matter of concern for potential participants. Dissemination of the findings of the study in International Ethics Conferences and developing of papers will be done in the near future.

World Health Organization Fellowship Training Program on Community Interventions in Cardio-vascular Diseases

Ministry of Health and Family Welfare (MOHFW), Government of India used to sponsor MPH candidates under the WHO Fellowship Program in earlier years. With the change in WHO fellowship program, MOHFW continue to sponsor fellows for the WHO-Fellowship Training Program (WHO-FTP) on Community based interventions in Cardio-vascular Diseases at AMCHSS, SCTIMST. This year there were two fellows sponsored for this programme. Dr. Basab Gupta from New Delhi a Medical Officer working with Central Government Health Services and Ms. Anney Thomas, a staff nurse from Port Blair, working with Central Government Health Services underwent this training program from January 05, 2009 to May 02, 2009. Both the fellows were posted with our Community Intervention Project team for the community based interventions. They were involved in the intervention groups such as Schools, Industries, and Hospitals. They were given on the job training on the measurements such as, Anthropometry, blood pressure measurements and were introduced to the questionnaire and the biochemical evaluation methods. They were also given specific sessions on research methodology, statistics basics and supportive software.

Consultancy

Development of training tools for health care providers in Kerala to address gender based violence for Kerala State Health Services Department.

In response to a call from the National Rural Health Mission (NRHM), Kerala, one training manual and two handbooks were prepared for health care providers in Kerala to address gender based violence (GBV). We also provided the thematic content for posters to be printed by the

department on gender based violence and design and thematic content for the pamphlets to be printed by the department on PWDV act (Protection of Women from Domestic Violence Act). The training materials developed were piloted in a training of trainer's workshop for medical officers held in two batches on 26th and 27th and 30th and 31st of October at State Health Resource Centre, Thycaud, Trivandrum. A total of 63 senior medical officers from all the districts of Kerala participated in the training. A similar training of trainer's workshop was held for nurses from all the districts of Kerala on November 23rd and 24th 2009 which had 56 participants. The final version of the training materials was printed by the department of Health, Government of Kerala. A CD will be printed by AMCHSS and given to the health department.

Epidemiological profiling of HIV/AIDS situation at the district and sub-districts level using Data triangulation in Kerala

National AIDS Control Organization (NACO) identified AMCHSS, SCTIMST to implement the Data Triangulation exercise for HIV/AIDS in the State of Kerala. AIDS Prevention and Control Project (APAC), Chennai provides financial and technical support for this activity. This exercise was done in collaboration with the Kerala State AIDS Control Society (KSACS). Earlier the resources for HIV prevention, care and support interventions were allocated largely based on data from HIV sentinel surveillance on the prevalence among antenatal clinic attendees during 2004-2006. Now district and sub-district level HIV prevalence among pregnant women and non-pregnant individuals is available through a large number of VCTC and PPTCT centres. Similarly, data on people with HIV, mapping of female sex workers, men having sex with men and injecting drug users are available at the district and sub-district levels. In this context of increased data availability NACO has taken up building the capacity of the state and district program managers and monitoring and evaluation (M & E) persons in data analyses, triangulation and use for program review and planning at district and lower levels. The broad objective of the exercise is to consolidate the district and sub-districts profiles in terms of HIV/AIDS situation. The first state level workshop was organized on 15 and 16 February 2010 with the objective of building capacity among the district program managers and M&E personnel in data analyses, triangulation and use of data for planning and program review and importance of resource and information collection, understanding the epidemic and response gaps in the district and state level. The second state level workshop was organized on 18 and 19 March 2010 to finalise the district tables with the valid data and preparation of district reports.

Participants of the First State Level Workshop on Data Triangulation

STAFF DETAILS

Dr. K R. Thankappan, MD, MPH
Professor and Head

Dr. V Raman Kutty, MD, MPH
Professor

Dr. T K Sundari Ravindran, PhD
Honorary Professor

Dr. P Sankara Sarma, PhD
Additional Professor

Dr. Mala Ramanathan, PhD, MA
Additional Professor

Dr. K Srinivasan PhD
Associate Professor

Dr. Biju Soman, MD, DPH
Associate Professor

Dr. Manju R Nair MBBS MPH
Scientist C

STATUS OF ONGOING/ROUTINE ACTIVITIES:

Ph.D. PROGRAM

PhD awarded in 2009-10

Godwin S K
Health Economics (Guide Dr D Varatharajan)

Pradeepkumar AS
Chronic Disease Epidemiology (Guide Dr K R Thankappan)

PhD Dissertation submitted in 2009-10

Edwin Sam A
Health System Research (Guide Dr D. Varatharajan)

Sailesh Mohan
Chronic Disease Epidemiology (Guide Dr K R Thankappan)

Enrolled in 2005 or earlier

Arun B
Health Economics (Guide: Dr D Varatharajan)

Manickam
Chronic Disease Epidemiology (in NIE, Guide Dr. M D Gupte)

Enrolled in 2006-07

Anu S Nair
Health Policy (Guide: Dr V Raman Kutty)

Enrolled in 2007-08

Joe Varghese
Health Policy (Guide: Dr V Raman Kutty)

Enrolled in 2008-09

N S Rajeev
Health Policy (discontinued)

Sheena Mathew
Health Policy (Dr V Raman Kutty)

Enrolled in 2009-10

Thankachi Yamini Ramachandran
Health Systems (Guide Dr T K Sundari Ravindran)

Rekha M Ravindran
Epidemiology (Dr V Raman Kutty)

Meena Daivadanam
Chronic Disease Epidemiology (Dr K R Thankappan)

Master of Public Health (MPH) PROGRAM

Due to the increasing demand for MPH program the academic committee of the institute has decided to increase the number of MPH student intake from 15 to 25 from 2010 onwards. However due to non-availability of sufficient hostel facilities admission was restricted to 15 students in 2010.

Out of the 15 students of the 2008 batch all of them completed in December 2009.

Diploma in Public Health

11 students who completed DPH in December 2009

Short Courses

The AMCHSS conducted 5 day short course on 'Ethics in Health Research' jointly with the SCTIMST-IEC, August 24-28, 2009. All MPH and DPH Students participated. Faculty from the IEC-SCTIMST and the TAC taught the program.

Faculty:
Amar Jesani
(external IEC member)

GS Bhuvaneshwar

Girish Menon

Anoop Kumar Thekkuveettil
(internal IEC members)

Harikrishnan

Mala Ramanathan
(TAC members)

AMC Seminar Series

An AMC Seminar was held on Tuesday, 7th July 2009 from 2.00 pm onwards at AMC Seminar Hall. Topic of the seminar was "An update on Global Fund to Fight AIDS, Tuberculosis & Malaria (GFATM)". Dr. S.S. Lal, Senior Technical Officer, Strategy Performance and Evaluation, Global Fund Secretariat, GFATM, Geneva, Switzerland made a presentation and talked about the topic.

Prof Mark Nichter from the University of Arizona gave an AMC seminar on the importance of harm reduction to public health on January 11, 2010 at 2.00 PM

Prof Brian Oldenburg, Chair, International public health, Monash University Australia offered the AMC seminar on 'Improving the prevention and management of NCDs - Combining high tech with soft touch' on February 04, 2010.

DIVISION OF ACADEMIC AFFAIRS

FROM THE DEAN'S DESK

The Academic Year 2009-2010 brought in important restructuring of the Academic Division, to make it more responsive to the needs of students and faculty and enhance Institute's goals to promote high quality research and postgraduate training. The Academic Division was expanded with the inclusion of four Associate Deans, with responsibilities to address specific issues related to Curriculum Development and Examinations, PhD Programme, Student welfare and Faculty welfare. This enabled the Academic Division to address issues of updating the curricula, evaluation and examination system, publishing the PhD manual to facilitate the Ph D scholars to chart out their academic activities and also address concerns and suggestions of the students and the faculty. It has been decided to form Board of Studies in various specialties to look into the structure quality and relevance of the existing programmes, to introduce new programmes and periodically review the curricula and evaluation systems, to make the programmes more effective, flexible and relevant to the present day. As a major policy change, the post- doctoral students were designated as Senior Residents, on par with other Institutes of National Importance. This brought in new vigor and enthusiasm amongst the post-doctoral students to and led an overall betterment in patient care and their academic pursuits.

A PhD manual was prepared to help the PhD scholars plan their research work and academic responsibilities without hassle. Modules in basic and advanced statistics with 20 to 25 hours of teaching and interactive sessions spread over 2 weeks, was initiated, to be conducted every 6 months, for the benefit of Senior Residents and PhD scholars. This academic programme, has become very popular and the attendance overwhelming.

The Academic Division initiated moves to streamline recognition of the various Academic programmes by the various Governmental agencies, like Medical council of India, University of Kerala, Kerala University for Medical and Allied sciences, the Govt of Kerala and other bodies empowered to recognize various degrees and diplomas.

The post doctoral student community continues to have an all India representation, enhancing the national character of the Institute, and confirming its national relevance.

Two new academic programmes started during the past 2 years deserve special mention. The Biomedical Technology wing of the Institute initiated the M Phil program in Biomedical Research and Technology with the objective of imparting high quality academic and research training in the Biomedical field, to postgraduates with Physics, Chemical sciences and Biological sciences back ground & this programme has attracted talent from various fields in science.

The Joint programme in Clinical Engineering, a 2 ½ year programme which includes 6 months of project work was initiated as a joint venture by IIT, Madras, Christian Medical College, Vellore and SCTIMST, Trivandrum. This programme also has a provision for the student to pursue PhD in Biomedical Devices and Technology, and has been highly successful, judging by the large number of

aspirants who apply for the programme and the high levels talent of the selected students. The program is expected to address the issues of capacity building in medical device development and servicing and maintenance of the medical equipments.

Travel grants for international conference attendence for Senior Residents and PhD students were introduced. The research grant for Senior Residents was enhanced to Rs. 50,000/- Travel grant for international conference attendance and research grants for faculty were also enhanced.

The Institute has played its role in ensuring high quality off campus programmes at National Institute of Epidemiology (Master of Public Health & Master of applied Epidemiology) and at Christian Medical College, Vellore (MS in Bio-engineering, PhD in Bio-engineering and Master of Public Health) by monitoring the selection process through all India competitive examinations, the structure & conduct of the programmes as well as the evaluation and examination system.

The restructuring of the Academic Division will go a long way in our effort to constantly monitor and improvise the various academic programmes.

Jaganmohan Tharakan

Academic Programmes

The institute currently offers 25 academic (diploma, postgraduate, doctoral and post doctoral) courses in medical sciences, biomedical engineering and technology, basic sciences and public health. All academic programmes continue to attract students in large numbers from all over India and for the MPH course, from other countries as well.

Division of Academic Affairs

Dean : Dr. J.M. Tharakan, Professor & Head, Cardiology

Associate Deans

(a) Students Affairs : Dr. K.G. Shyam Krishnan, Professor, Cardiovascular & Thoracic surgery

(b) PhD Programme : Dr. C.P. Sharma, Scientist G, BMT Wing

(c) Faculty Affairs : Dr. V. Ramankutty, Professor, AMCHSS

(d) Examination & Curriculum Development : Dr. Asha Kishore, Professor, Neurology

Hostel Warden : Dr. K.K. Narayanan Namboodri, Associate Professor, Cardiology

Registrar : Dr. A.V. George

Deputy Registrar : Shri. S. Sundar Jayasingh

Admission of students and evaluation of students registered for various programmes are the primary responsibilities of the division. The division co-ordinates the work of standing Academic Committee of the Institute which makes recommendations to the Governing Body on general supervision over the academic policies of the Institute and method of instruction, teaching, training, evaluation of research and improvement in academic standards.

Programmes – 2010

Post-doctoral	*Post Graduate*	*Diploma*
1. DM Cardiology	14. PhD	17. Cardio Vascular & Thoracic Nursing
2. DM Neurology	15. Master of Public Health (MPH)	18. Neuro Nursing
3. DM Neuroimaging and Interventional Neuroradiology	16. M.Phil	19. Blood Banking Technology
4. DM Cardio Thoracic & Vascular Anaesthesia		20. Cardiac Laboratory Technology
5. DM NeuroAnaesthesia		21. Neuro Technology
6. MCh Cardiovascular & Thoracic Surgery		22. Operation Theatre Technology
7. MCh Vascular surgery		23. Advanced Medical Imaging Technology
8. MCh Neuro Surgery (after M.S)		24. Clinical P erfusion
9. MCh Neuro Surgery (after MBBS and 1 year Residency in General Surgery)		25. Medical Records Science
10. Certificate course in Cardiovascular & Neuro Surgical Anaesthesia		
11. Certificate course in Cardiovascular & Neuro Radiology		
12. Certificate course in Vascular Surgery		
13. Post DM/MCh Fellowship		

Students Enrolment

The student strength for DM/MCh degree, Post-doctoral certificate courses and Post DM/ MCh Fellowships during the year 2010 was 78. The institute enrolled 30 students for MPH programme, 67 students for PhD programme and 65 students for Diploma Programmes. The off-campus courses at the National Institute of Epidemiology have an enrolment of 39 students for the Master of Applied Epidemiology programme and 32 students for the Master of Public Health. The application forms for entrance exams for academic year 2011 were made available online.

Two off-campus prgrammes of two-year duration each are offered at the National Institute of Applied Epidemiology, Chennai (NIE) which is under the Indian Council of Medical Research (ICMR)

1. Master of Applied Epidemiology
2. Master of Public Health
   (Health Services, Development and Research)

Joint Programme by IIT Madras / CMC Vellore / SCTIMST - Trivandrum

The three institutions – IIT Madras, CMC Vellore and SCTIMST Trivandrum, each with its unique strengths and facilities, joined hands to start two new programmes – 'M.Tech in Clinical Engineering' and 'Ph.D in Bio-medical devices and technology' to create manpower and address the issue of capacity building for reducing India's dependence on imports of medical devices. A unique feature of these courses is the clinical attachment to get direct exposure to the clinical environment. This ensures that, at the end of the course, the students will be able to interact effectively with the clinicians and other hospital staffs resulting in the identification of unmet 'clinical needs'. This is also expected to trigger further research leading to development of innovative indigenous healthcare technology.

The second batch of students has registered in July 2009.

MS / Ph.D Bio-engineering courses at CMC Vellore

This off campus post-graduate Bioengineering programme is aimed at meeting the R&D needs of health care in India. Two students were admitted to the programme.

Degrees awarded - 2009

Course Name: DM CARDIOLOGY

Dr. P. Rajesh Muralidharan
Dr. M. Krishna Kumar
Dr. K.J. Premkumar
Dr. Saurabh Kumar Gupta
Dr. Ali Shafeeq

Course Name: DM NEUROLOGY

Dr. Abhijit Das
Dr. Shinde Pranav Dnyaneshwar
Dr. Neeraj Narendrakumar Baheti
Dr. Malini Gopinath

Course Name: M.Ch. Cardio Vascular & Thoracic Surgery

Dr. Thomas Mathew
Dr. Saurabh Jaiswal
Dr. Kirun Gopal
Dr. Ajoy Menon

Course Name: M.Ch. Neurosurgery

Dr. Jinendra Kumar R
Dr. Bimal G
Dr. Rahul Jain
Dr. Nilesh Jain

Course Name: M.Ch. Neurosurgery (5-year course)

Dr. Jayanand Sudhir B.

Course Name: DM Cardio Thoracic & Vascular Anaesthesia

Dr. Aveek Jayant

Course Name: DM Neuro Anaesthesia

Dr. B. Suparna

Course Name: DM Neuroimaging &

Interventional Neuroradiology

Dr. Jitender Saini

Dr. Jolapara Milan Babulal

Dr. Amit Aslam Khan

Course Name: POST DOCTORAL FELLOWSHIP (PDF)

Dr. P. Ragesh
Cardiac Electrophysiology

Dr. V. Haridasan
Adult Cardiology & Interventions

Dr. R. Shiva Kumar
Epilepsy

Dr. Atma Ram
Epilepsy

Dr. Atampreet Singh
Epilepsy

Dr. V. Vikas
Cerebro Vascular Surgery

Course Name: POST DOCTORAL CERTIFICATE COURSE (PDCC)

Cardiovascular & Neurosurgical Anesthesia

1. Dr. Reshmi Liza Jose
2. Dr. Sushanta Panda
3. Dr. Minakshi Vitthal Patil
4. Dr. Dinesh Kumar US

Cardiovascular & Neuroradiology

5. Dr. S. Banu Prakash
6. Dr. K.S. Deepak

Course Name: DIPLOMA COURSES

Cardiac Laboratory Technology

Jishnu K. Nampoothiri

V. Princy

C. Lakshmi

Clinical Perfusion

S. Sujesh

R. Priya Rani

Medical Records Science

G.P. Neethu

G.S. Nisha Gopi

Neuro Technology

R.S. Rejith

Amith Krishnan

Vishnukumary T.

Operation Theatre Technology

S.S. Aruna

N. Renjini

Varghese P. Mathew

S. Santhosh

Blood Banking Technology

S. Shammy

C.S. Meera Sundaram

Advanced Medical Imaging Technology

Z. Sameer

P. Sooryajith

T.R. Abhilash

Cardiovascular and Thoracic Nursing

Joby John

S.S. Sunitha

Sindhu Susan P. Isac

R.P. Lekshmi

Mariamma Philip

S. Salini

Diploma in Neuro Nursing

G.S. Asha Gopi

Short-term training/observership upto period of three months

Candidates sponsored by the Government /Autonomous institutions/ Health sector organizations, approved Medical/Dental/Nursing colleges, paramedical Institutions and Government / Defence services are provided short term training.

This training / observership is arranged in consultation with the respective department / discipline and the time and period of training is decided by the Academic Division in consultation with the head of the department/ division. Around 212 observers from 60 institutions all over the country spent varying periods from two weeks to three months in different departments of the Institute.

List of students who have been awarded PhD Degree (Mar 2009 to April 2010)

Sl. No	Name of the student	Thesis Title
1	Sumi S	Molecular and immunological approaches in the diagnosis of human tuberculosis
2	Anie Y	Isolation and characterization of lipid antigens of mycobacterium tuberculosis and their applications for the immunodiagnosis of human tuberculosis.
3	Manitha B Nair	Bone reconstruction of goat femur segmental defects using tissue engineered bioceramic scaffolds with osteogenically induced
4	Deepa D	Fetal malformations and oxidative stress in women with Epilepsy
5	Vandana Sankar	Delineation of mechanism of action of an ayurvedic antihypertensive formulation and assessment of its efficacy in prevention of cardiac remodeling
6	Sangeetha Mohan	NF-KB plays a role in cardiac fibroblast survival under hypoxia
7	Sumith R Panicker	Regulation of high glucose induced monocyte chemoattractant protein-1 gene in endothelial cells
8	Viji Mary Varghese	Molecular level cytocompatibility evaluation of a thermoresponsive substrate for bioengineering of corneal construct towards ocular surface regeneration.
9	Siddharth Banerjee	Understanding the Jerky gene and its involvement in the molecular pathways associated with seizure
10	Dr. A.S. Pradeep Kumar	Smoking cessation intervention program in primary health centers in Palakkad district, Kerala
11	Godwin.S.K	Financial burden of treating non-fatal road traffic injuries: A decomposition analysis of its causal factors in Kerala
12	Aghila Rani. K.G	Regulatory signal for expansion of human adult cardiac stem cells
13	Sunitha.S.S	Functional and molecular analysis of C2 domains of synaptotagmin

List of students who were awarded MPH degree (Dec 2009)

Sl.No.	Name
1	Dr.Sanjay Sujitranjan Das
2	Dr.Madhu.U
3	Dr.Amritha Geevarghese
4	Dr.Indrani Sharma
5	Ms.Ujjwala Gupta
6	Ms.Gayatri Giri
7	Dr.Chiranjeev Bhattacharjya
8	Dr.Subhasis Bhandari
9	Dr.Tumge Loyi
10	Dr.Jagan Kumar.B
11	Ms.J.Radha
12	Dr.Bency Joseph
13	Dr.B.Mohammed Asheel
14	Dr.Pinaki Sensarma
15	Dr.Anitha.A

List of students who were awarded DPH degree (Dec 2009)

Sl.No.	Name
1	Dr.Bipin Kumar Singh
2	Dr.Shardool Upadhyaya
3	Dr.Chakreshwar Chobisa
4	Dr.Ashwinbhai Kalubhai Taviad
5	Dr.Ghanashyamdan Badridan Gadhvi
6	Dr.Divyesh Bhailalbhai Patel
7	Dr.Ghanshyam Mehta
8	Dr.Pareshkum ar Jagdishchandra Joshi
9	Dr.Dhirendra Kumar Mehta
10	Dr.Arun Kumar Singh
11	Dr.Shah Piyushkumar Yashwantlal

RESEARCH ACTIVITIES

Clinical Research

Biochemistry

I) Two different functional types of human serum anti-a galactoside antibody (anti-Gal) detected.

Affinity purified anti-Gal prepared from about 2 dozen individuals were either agglutinative (T+) or not (T-) towards trypsinized human RBC. T+ anti-Gal agglutinated RBC sugar specifically. This major difference was reflected also in the ability of these antibodies to form immune complex with serum lipoprotein(a) [Lp(a)], thus offering a mechanism for Lp(a) mediated vascular pathology which is implicated in atherosclerosis and stroke. Works are on to correlate anti-Gal Lp(a) immune complex level to vascular pathology.

ii) Dysfunctional HDL and Proatherogenic activity.

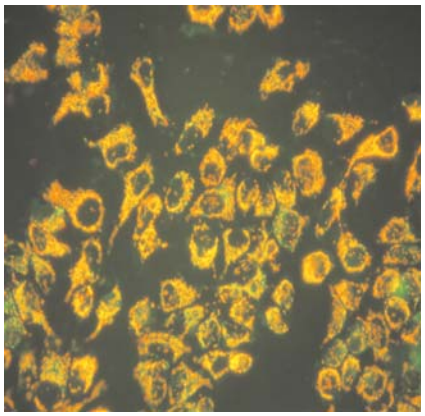
Since dysfunctional HDL has been found to be proatherogenic rather than cardio protective, separation and characterization of various fractions of active and dysfunctional HDL is undertaken to assign the contribution of each towards pro- or anti-inflammatory effect on vessel wall and in preventing LDL oxidation.

iii). Coronary artery disease in the young.

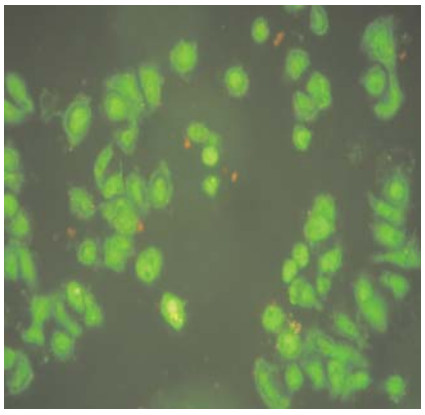
A project is to establish conventional and non-conventional risk factors that may be responsible for the increased prevalence of cardiovascular disorders observed in younger population in Kerala.

iv) Cancer biology mediators and inhibitors.

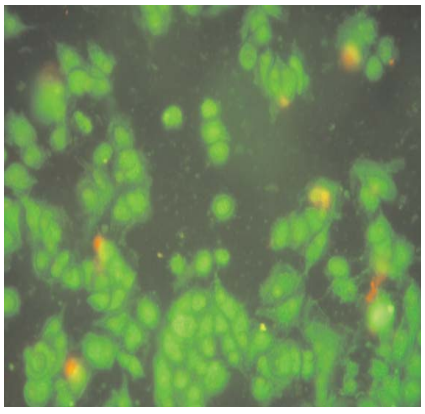
Using colon cancer as model, it was demonstrated that low concentration of the nitric oxide (NO) donor, SNAP increase proliferation, migration and differential expression of matrix metalloproteinase , GTPases and cyclic GMP – dependant proliferation. In vitro studies with anti cancer agent aloe emodin on colon cancer cells reveal that it acted by induction of apoptosis, inhibition of cell migration and down regulation of matrix metalloproteinase. A new anti-tumor drug CT-LC4 was shown to act by induction of apoptosis and autophagy through expression of caspases and PARP.



Control



Emodin



Aloe emodin

Fig Changes in the mitochondrial membrane integrity following emodin and aloe emodin treatment of WiDr cells

Cardiology

- Electroanatomic characterisation of scars-correlation between electroanatomic scar and MRI reconstructed scar: The proposed study is an observational study designed to characterize the electrogram features of substrate scars delineated by 3D Electro-anatomic mapping and MRI in patients of ischemic and non-ischemic cardiomyopathy with documented ventricular tachycardia. The correlation of 3D Electro-anatomic scars with MRI defined scars will also be studied.
- Plaque characterization by virtual histology intravascular ultrasound in patients with chronic stable angina and type 2 diabetes: The study proposes to characterize the atherosclerotic plaques by virtual histology-intravascular ultrasound (VH-IVUS) analysis of the target coronary vessels of patients with chronic stable angina and diabetes who are undergoing percutaneous coronary intervention and to compare the plaque characteristics with patients of chronic stable angina and without diabetes.
- Research into the novel applications of magnetocardiography in the recording of cardiac electromagnetic field, in collaboration with Indira Gandhi Centre for Atomic Research, Kalpakkam, India.

Cardiovascular Thoracic Surgery

1. Clinical outcomes of Tissue Valves and Mechanical Valves in women of child bearing age - 10 year follow up study.
2. Homograft valve Bank project
3. Clopidogral in neonatal BT shunts

Cellular and Molecular Cardiology

Co-ordinated regulation of the cardiac fibroblast cell cycle and the resistance of these cells to apoptosis - The ability to proliferate in response to mitogens, retained throughout adult life, and resistance to programmed cell death are central to the role of cardiac fibroblasts in myocardial remodeling post injury. Surprisingly, however, the mechanisms that govern cell cycle progression and apoptosis resistance in these cells remain unclear. Over the past few years, this laboratory has remained focused on the regulation of the cardiac fibroblast cell cycle and survival strategies in cardiac fibroblasts. Several lines of evidence, generated during the current year, strengthened the earlier finding that NFkB, the stress-related transcription factor, protects cardiac fibroblasts against hypoxic injury and that selective regulation of cIAP2 expression by NF-kB may, at least in part, mediate the pro-survival role of NF-kB during hypoxia. Additionally, it was found that these cells are more resistant than fibroblasts of non-cardiac origin to oxidative stress and that NFkB and cIAP-2 may be involved in a protective role in such a setting as well.

It was shown earlier in this laboratory that hypoxia delays G1⊠S transition in cardiac fibroblasts under hypoxia by a mechanism involving p38 MAPK-dependent induction of p27. Investigations carried out in pursuance of these observations clearly demonstrated a cyclin expression profile and phosphorylation status of the retinoblastoma gene product that were consistent with delayed G1⊠S transition. Importantly, evidence was obtained in support of a link between p38 MAPK, skp2 and p27 induction in hypoxic cardiac fibroblasts.

Determination of genetic component in hypertension and cardiac hypertrophy. The study was aimed at identifying the genetic and environmental factors involved in the development of hypertension and cardiac complications in the local population. Evaluation of the demographic details of the patients registered in the Cardiology Department of the Institute showed that cardiovascular disorders have a familial tendency. An important observation was that hypertension was detected only after the development of cardiac ailments with the mean age at detection being 50 years. Hence healthy blood donors were screened, and 5.1% were found to be hypertensive with a mean age of 35years. This suggests that hypertension remains undetected and untreated for about 15 years leading to pathological cardiac remodeling. Prompt detection and treatment of hypertension can possibly prevent the development of cardiac complications. Among the polymorphic markers screened, the C allele in intron 7 of

peroxisome proliferator receptor alpha (PPARα) showed a positive association with cardiac hypertrophy and dislipidemia. The PPARα 7C allele is associated with reduced expression of the PPARα gene.

Modulation of energy metabolism in the prevention of cardiac remodeling: PPARα is a key regulator of fatty acid metabolism. Cardiac hypertrophy is associated with a shift in energy metabolism from predominantly fatty acid to glucose. Though beneficial initially, in the long run this leads to energy depletion. Hence it was hypothesized that reactivation of PPARα can prevent cardiac remodeling. A study was initiated using spontaneously hypertensive rats to examine the cardiac consequence of reactivation of PPARα.

Autocrine and paracrine mechanisms in human resident cardiac stem cell signaling following hypoxic injury: Stem cell therapy is recognized as an important mechanism of myocardial repair. As stem cell transplantation is associated with a number of problems, the ideal strategy would be to facilitate the resident cardiac stem cells to repair the injured tissue. Understanding the biology of stem cells and their fate following pathologic insults is essential for promoting in situ repair of injured myocardium. A study was therefore designed for delineation of the behavior of cardiac stem cells isolated from atrial biopsies obtained at the time of insertion of catheter for coronary artery bypass graft in patients with coronary artery disease.

Neurology

- Evaluation of patients with medically refractory temporal lobe epilepsy based on MDR 1 polymorphism. In collaboration with Rajiv Gandhi Center for Biotechnology, Trivandrum
- Development of temperature sensor for measuring core body temperature during sleep. In collaboration with National Institute for Technology, Trichy
- Transcranial magnetic stimulation studies in patients with narcolepsy and sleep apnea
- Inching technique and 2nd Lumbrical/interossei latency difference in the diagnosis of Carpal tunnel syndrome.
- Clinical profile of patients with MUSK positive Myasthenia Gravis
- New Clinical studies started in Prion Diseases, and SSPE on Natural History

Completed studies

1. Long-term complications of oral anticoagulation after cardiac valve replacement
2. Acute Stroke – Awareness, Attitude and Practice among general practitioners in Kerala

Ongoing studies

Cervical arterial dissection: clinical, radiological features and long term outcome- retrospective study

Benefit of combined treatment with Transcranial

Magnetic stimulation in addition to routine Physiotherapy in

Post-stroke functional outcome - Prospective study.

An international, randomized, double-blind, two parallel group study comparing terutroban 30 mg o.d. versus aspirin 100 mg o.d. administered orally for a 3-year mean duration (event driven trial). Phase III trial: PERFORM Study (Prevention of cerebrovascular and cardiovascular Events of ischaemic origin with teRutroban in patients with a history of ischaemic stroke or tRansient ischaeMic attack)

Mathuranath Co-Principal investigator, National Institute of Health (NIH), USA, $ 282640. 2008 to 2010. To study the age related motoric, cognitive and other risk factors associated with cognitive decline and dementia

- Setting up a Brain-mapping unit & a neurogenetic laboratory. Expansion Grants. Dr. Mathuranath Principal Investigator. Co-Principal Investigators: Kesavadas C, Kaimal MR, Sreenivas C. State Council for Science Technology and Environment. Rs. 2.74 million / January 2006 to December 2008. As a part of expansion of the Cognition & Behavioural Neurology Center at SCTIMST to: Set up a multi-disciplinary Brain-mapping unit to develop an MRI Atlas for the Indian Brain, to initiate fMRI studies in cognition. Setting up of a basic neurogenetics laboratory for studying neurogenetics of degenerative diseases, with emphasis on dementia.
- Is the inhibitory plasticity of motor cortex different

between the 2 hemispheres in early asymmetric Parkinson's disease and is the plasticity beneficial on the less affected side: study using Transcranial Magnetic Stimulation.

- Evaluation of the role of abnormal motor cortical plasticity in the genesis of motor fluctuations and dyskinesias in Parkinson's disease:study using Transcranial Magnetic Stimulation.
- Project between SCTIMST & Indira Gandhi Centre for Atomic Research (IGCAR) to develop MEMS based wireless glove for tremor analysis & optical tracking system for quantification of involuntary movements.
- Evaluation of non motor symptoms in patients with Parkinson's disease from Kerala using non motor symptoms scale (NMSS)
- Protocol SP921: A multicenter, randomized, double-blind, placebo controlled, 5-arm, parallel-group trial to assess rotigotine transdermal system dose response in subjects with advanced-stage Parkinson's disease.
- Protocol: 28850. Study Title: Open label trial to determine the long term safety of safinamide in Parkinson's disease patients EC 217

Completed projects:

1. Role of multimodality MRI (SWI & DWI) in patients with Parkinson's Disease and Atypical PD
2. LRRK2 mutations in South Indians with Parkinsons disease
3. Long term efficacy and stability of deep brain stimulation of Subthalamic stimulation for Parkinson's disease
4. LTP–like plasticity of Motor cortex in early untreated Parkinson's disease- a TMS study.
5. "A phase III, double-blind, placebo-controlled study to determine the efficacy and safety of a low (50 mg/day) and high (100 mg/day) dose of Safinamide, as add-on therapy, in patients with idiopathic Parkinson's disease with motor fluctuations, treated with a stable dose of levodopa and who may be receiving concomitant treatment with stable doses of dopamine agonist and/or an anticholinergic" NW-1015/016/III/2006.
6. Protocol No: E2007-G000-309: A Multicentre, Randomized, Double-blind, Placebo and Entacapone - controlled, Parallel Group Study of the Efficacy, Safety and Tolerability of E2007 in Levodopa treated Parkinson's disease Patients with Motor Fluctuations.
7. Ref: Protocol No: 191622-090-00: A Multicenter, Double-Blind, Randomized, Placebo-Controlled, Single Treatment Cycle, Parallel Evaluation of the Safety, Efficacy and Immunogenicity of Two Formulations of BOTOX (Botulinum Toxin Type A) Purified Neurotoxin Complex (Formulation Nos.9060X and 9525X), followed by a Blinded Active Treatment Extension of up to Two Additional Treatment Cycles in patients with Cervical Dystonia. (IEC REF No: 183)

Neurosurgery

Multicentric multinational randomised controlled surgical trial in intracerebral haemorrhage (STICH II), sponsored by stroke association and medical research council, University of New Castle,UK.

Status: ongoing

Principal International Investigator: Mr.Mendlow, Professor of Neurosurgery, Regional Neurosciences Centre, New Castle Upon Tyne, UK

- Multinational clinical study to evaluate "Efficacy & Safety of AP 12009 in adult patients with recurrent or refractory anaplastic astrocytoma (WHO Grade 3) as compared to standared treatment with temozolamide or BCNU: A randomized, actively controlled, open label clinical phase III study, AP 12009-G005"

Status: will start in Q 3, 2008, after ethics committee approval

Sponsors: Anti Sense Pharma, GmbH, Regensburg, Germany

- Phase III confirmatory randomised evaluation of convection enhanced delivery of IL 13- PE38QQR compared to standard of care with survival endpoint in glioblastoma multiforme patients at first recurrence.

Status : will start in Q4 2008 after IEC approvalSponsors : Neopharm,Inc, 101 Waukegan Road,Suite 970,Lake Bluff,IL , USA

Imaging Sciences & Interventional Radiology

1. " Development of iron oxide nanoparticle probes for organ specific molecular MR imaging"funded by BRNS was started.
2. Multimodality neuroimaging in presurgical work up of patients with temporal lobe epilepsy (TLE) –Principal Investigator, funded (Rs.4.25 lakhs) by Kerala State Council for Science, Technology and Environment
3. A post-marketing safety study in patients with moderate renal insufficiency who receive OMNISCAN (Gadodiamide Injection) for contrast-enhanced magnetic resonance imaging (MRI) – project report (multimodaly epilepsy imaging) presentation at Kerala state science, technology and environment council. Principal Investigator, Multicenter trial (Sponsored by GE Healthcare)
4. Development of Neurofeedback system using EEG and realtime fMRI Collaborative Project with Scientists & Technologists of Indian Origin Abroad Programme of Department of Science & Technology, Govt. of India
5. Collaborating with the Center of Excellence in Magnetic Resonance Imaging: SWI imaging with Prof.Mark E Haacke, The Magnetic Resonance Institute for Biomedical Research, Detroit, MI, USA 2008-10
6. 'Setting up of a collaborative Brain mapping unit and a Neurogenetic unit'. (Funding Rs.27 lakhs) with Kerala State Council for Science, Technology and Environment).

Pathology

A.Mycobacterial research:

1. During the year, 3 major lipid antigens of Mycobacterium tuberculosis bacilli were isolated and characterized. These include cord factor (Trehalose 6,6' dimycolate), lipoarabinomannan and sulpatides. With these antigens immunoassays such as ELISA were standardized for the diagnosis of tuberculous meningitis, tuberculous pleural effusion, tuberculous lymphadenitis. These assays are extremely useful in culture negative patients with tuberculosis.
2. The role of cord factor in invitro chemotaxis of neutrophils from patients with pulmonary tuberculosis and tuberculous meningitis were evaluated. As an extension of this study, a research project has been recently submitted to DBT for funding.
3. Four recombinant mycobacterial antigens – Esat-6, HspX, Tb8.4 and PlcA were isolated and characterized. A cocktail containing these four recombinant mycobacterial antigens were applied in a immunoassay and it was found to be extremely useful in the serodaignosis of pulmonary tuberculosis
4. With these recombinant mycobacterial antigens we could distinguish patients with latent tuberculosis from those with BCG vaccinated individuals. This observation has great epidemiological application as well as in tuberculosis control programmes.
5. A specific immunohistochemical techniques have been introduced to detect mycobacterial antigens in tuberculous lesions.
6. Nested PCR test is standardized for the diagnosis of tuberculous pleural disease and this assay could distinguish tuberculous pleural effusion from those patients with malignant pleural effusion.

Biomedical Technology Research

a.Newly Initiated Projects

Title	Principal Investigator	Funding Agency
Studies on matrix metaloproteinases (MMP). Gene transcription by nitric oxide ; mechanism of MMP gene induction in human colon cancer cells.	Dr. G. Srinivas	Department of Biotechnology
'Coronary artery disease in the young'	Dr. S. Harikrishnan, Dr. J.M. Tharakan, Dr. N.Jayakumari, Dr. Bhatt	A. KSCSTE, Govt.of Kerala
Economic impact of ACS in household economic well being.	Dr. S. Harikrishnan	Funded by CCDC, ICHealth, NewDelhi and World bank
"Survival mechanisms in cardiac fibroblasts"	Dr. K. Shivakumar	Life Sciences Research Board/DRDO, New Delhi
'Determination of genetic component in hypertension and cardiac hypertrophy.'	Dr. R. Renuka Nair	Kerala State Council for Science Technology and Environment
'Molecular basis of delayed G1-S transition in hypoxic cardiac fibroblasts'	Dr. K. Shivakumar	Department of Biotechnology, New Delhi
Modulation of energy metabolism in prevention of cardiac remodeling: Stimulation of peroxisome proliferator- activated alpha receptor"	Dr. R. Renuka Nair	Life Sciences Research Board/DRDO, New Delhi
A pharmacogenomic inquiry on the association of *ABCB1* C3435T bearing haplotype among patients with medically refractory mesial temporal lobe epilepsy with hippocampal sclerosis (MTLE-HS) from the people of Kerala, South India.	Dr. K. Radhakrishnan	Funded by BRNS
Kerala-Einstein Study: Risk factors for cognitive decline. RO1 grant.	Dr. P.S. Mathuranath	National Institute of Health (NIH), USA

Setting up a Brain-mapping unit & a neurogenetic laboratory. Expansion Grants.	Dr. P.S. Mathuranath Principal Investigator. Co-Principal Investigators: Kesavadas C, Kaimal MR, Sreenivas C.	State Council for Science Technology and Environment
Multicentric multinational randomised controlled surgical trial in intracerebral haemorrhage (STICH II)	Principal International Investigator: Mr.Mendlow, Professor of Neurosurgery, Regional Neurosciences Centre, New Castle Upon Tyne, UK	sponsored by stroke association and medical research council, University of New Castle, UK
" Brain MRI studies of motor and behavioral function in health and disease, with particular emphasis on stroke" Rome, Italy	Indian Collaborator Prof. A.K. Gupta Head, Dept. of Imaging Sciences and Interventional Radiology Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), Italian Collaborator Prof. Marco Fiorelli, Prof and Head, Dept. of Neurology, University of La Sapianza	Indo -Italian Collaborative project approved 2008-2010
" Development of iron oxide nanoparticle probes for organ specific molecular MR imaging"	Dr. Jayasree	Funded by BRNS.
Multimodality neuroimaging in presurgical work up of patients with temporal lobe epilepsy(TLE)	Dr. C. Kesavadas	Kerala State Council for Science, Technology and Environment
Development of Neurofeedback system using EE G and realtime fMRI Collaborative Project with Scientists & Technologists of Indian Origin Abroad		Programme of Department of Science & Technology, Govt. of India
'Setting up of a collaborative Brain mapping unit and a Neurogenetic unit'.	Dr. P.S. Mathuranath	Kerala State Council for Science, Technology and Environment
" Synthesis, characterization and in vivo evaluation of novel iron oxide nano particles for organ specific molecular MR Imaging."	Investigators –Dr. R. Jayasree, Dr. P.R. Harikrishna Varma, Dr. A.K. Gupta,Dr. P.V. Mohanan, Dr. S. Sandhyamani.	Board of Research In Nuclear Sciences (DAE, Govt. of India).

Biomedical Technology Wing

a.Newly Initiated Projects

Title	Principal Investigator	Funding Agency
Pulsed laser Ablation of Bioactive Ceramic Composite on Titanium Bone Implants	Dr.H.K.Varma	Kerala State council for Science Engineering technology & environment.
Quantum dots as drug carriers for cardiovascular disease	Dr. Diksha Painuly - PI Dr. V. Kalliyana Krishnan- Scientist Mentor	Department of Science and Technology,Govt. of India.
Development of hemostatic scaffold using biodegradable polymer and biomimetic extracellular matrix components for healing of chronic dermal wounds	Dr. Lissy Krishnan - PI Dr. V. Kalliyana Krishnan - Co-PI	Council for Scientific an d Industrial Research
To establish Rat Osteoporosis Models for Bone defect repair studies	Dr. Annie John	Department of Biotechnology, Govt. of India
Differentiation of circulating adult stem cells to neurons for regenerative therapy	Dr. Lissy K. Krishnan	SERC, Department of Science & Technology
Medical device retrieval programme.	Dr. Mira Mohanty	Department of Biotechnology, Govt. of India..
Colour atlas of tissue response to biomaterials.	Dr. Mira Mohanty	Department of Science and Technology, Govt. of India..
Development and Feasibility study of Polymeric Scaffolds for Tissue culture under Microgravity	Dr. Anil Kumar PR (Co-investigator)	Indian Institute of Space Science and Technology, Trivandrum
Dispensable and biodegradable polymeric bone cement for minimally invasive treatment of bone diseases – product validation	Dr. M. Jayabalan	Department of Science and Technology, Govt. of India.

b.Ongoing Projects

Title	Principal Investigator	Funding Agency
Facility for micro/nanoparticles based biomat erials for Advanced Drug Delivery Systems (FADDS)	Dr. Chandra P. Sharma	Department of Science and Technology, Govt. of India..
Oral Insulin Delivery	Dr. Chandra P. Sharma	Council for Scientific and Industrial Research under NMITLI New Delhi
Tissue Engineered small diameter vascular graft: Fabrication and Evaluation	Dr. Lissy K. Krishnan	Department of Biotechnology, Govt. of India.
Commercialisation of Centrifugal blood pump for extracorporeal applications	Mr. D. S. Nagesh	SIDD Life Sciences Pvt Ltd/ Technology D evelopment Board (TDB) Govt of India
Development of Left Ventricular Assist Devices (LVAD) VSSC - SCTIMST joint project	Mr.D.S.Nagesh	VSSC, Trivandrum
Development of coronary stent system	Mr. C.V. Muraleedharan	NMITLI, CSIR, GOI
Combination Products of Polymer - Ceramic Nanocomposites with Cells and Growth Factors for Bone Tissue Engineering Applications	Dr. P. Ramesh	Department of Biotechnology, Govt. of India.
'Development of a Dura Substitute by Electrospinning of ε -Caprolactone-Co -Lactide Polymers'	Dr. P. Ramesh	KSCSTE
Evaluation of molecular toxicity of newly developed materials intended for biomedical application	Dr. P.V. Mohanan	Indian Council of Medical Research (ICMR), New Delhi
Development of National GLP Guidelines & Identification and selection of NationalRegulatory Guidelines for Testing and Evaluation of Medical Devices	Dr. PV. Mohanan	National GLP Compliance Monitoring Authority, Dept. of Science and Technology, New Delhi
Development of a Portable Medical Electrical Safety Analyser	Dr. Niranjan D. Khambete	Department of Information Technology(In collaboration with CDAC Trivandrum)
Development of Medical Investigation Camera for Endoscopy	Dr. Niranjan D. Khambete	Department of Information Technology(In collaboration with CDAC, Trivandrum)

Implanted neural interface and control schemes for artificial hand control	Dr. Niranjan D. Khambete	Department of Biotechnology(In collaboration with CMC, Vellore)
Assessment of Electrical Impedance Sp ectroscopy as a Technique for Early Detection of Cervical Cancer in Developing Countries: A pilot Study	Dr. Niranjan D. Khambete	Women's Cancer Initiative, Mumbai (In collaboration with Tata Memorial Hospital, Mumbai, and The University of Sheffield, UK)
Designing molecularly imprinted polymers as substrates for glucose	Dr. K. Sreenivasan	Department of Biotechnology, Govt. of India.
Development of decellularised animal tissue for cardiovascular application'	Dr. S.R. Krishnamanohar	Department of Biotec hnology, Govt. of India.
D ifferentiation of foetal progenitor cells and fabrication of a prototype of bioartificial liver	Dr. T.V. Kumary	Department of Biotechnology, Govt. of India
Bone Tissue Engineering using adipose stromal cells on 3D porous bioactive ceramic scaffolds	Dr. Annie John	Department of Biotechnology(ANCETE), Govt. of India
Cell based tissue engineered fabrication of osteochondral grafts	Dr. Annie John	Department of Biotechnology(ANCETE), Govt. of India
Novel ceramic collagen composites for bone regeneration	Dr. Annie John (Indian side) Dr. Michael Gelinsky (German side) DST- DAAD Project Based Personnel Exchange Programme	DST -DAAD Project Based Personnel Exchange Programme (PPP)
Bioconjugation of nanomaterials and their applications in cancer therapy	Dr. Annie John	Department of Biotechnology, (Nanoscience & Nanotechnology Task Force)
Combination product of polymer - ceramic nanocomposite with cells and growth factors for Bone Tissue Engineering applications	Co –investigator – Dr. Annie John	Department of Biotechnology, (Nanoscience & Nanotechnology Task Force)

Tissue engineered hybrid artificial lung model for testing pollutants and drugs	Dr. A. Maya Nandkumar	Department of Biotechnology, Govt. of India
Epithelial - mesenchymal interactions in Tissue engineered hybrid artificial lung - role of angiogenic factors	Dr. A. Maya Nandkumar	Department of Biotechnology, Govt. of India.
Program support for a Lead program on Centre of excellence in Tissue engineering (COE) program	Dr. Prabha D. Nair – Team Leader & PI	Department of Biotechnology, Govt. of India
Tissue engineering of cartilage using biomimetic scaffolds under dynamic conditions	Dr. Prabha D. Nair - PI	Department of Biotechnology, Govt. of India

c. Completed Projects

Title	**Principal Investigator**	**Funding Agency**
Evaluation of the pro and anti inflammatory profile of cells onto bio - material surface	Dr. Sharma CP in collaboration with Prof. Dr. Herald Renz, Department of Clinical Chemistry and Molecular Diagnostics -Central Laboratory, Philipps - University, Marburg, Germany.	Indo -German (DST - DAAD) Project based Personnel exchange Programme.
Ethical and Procedural Issues in the use of medical devices in India	Dr. Anoopkumar Thekkuveettil and Dr. Girish Menon	National Institute of Health and Harvard University, USA
Synthesis and Characterization of Radiopaque Polyurethanes for Medical Applications	Dr. Roy Joseph	Kerala State council for Science Engineering technology & environment.
Novel microporous polymeric membranes for medical applications	Dr. P. Ramesh	Department of Biotechnology, Govt. of India,
Bioengineered cell sheet for corneal tissue engineering	Dr. T.V. Kumary	Department of Biotechnology, Govt of India
Delineating mechanism of biofilm formation in urinary catheters: characterisation of role of *E.coli* secretory proteins and influence of environmental signals	Dr A. Maya Nandkumar	Kerala State council for Science Engineering technology & environment.
Joint 'Indo - US Joint R&D Networked Stem Cell and Tissue engineering'	Dr. Prabha D Nair (PI) & Project Coordinator	Indo - US Science & Technology Forum (IUSSTF)

Institute Technology Development Funded Projects

a. Newly Initiated projects

Title	Principal Investigator	Duration
Production of drug- loaded nanoporous bioceramic spheres for orthopedic applications	Dr. H.K. Varma	One year
Development of bioactive bone cement based on organically modified ceramic resin	Dr. P.P. Lizymol - PI Dr. V. Kalliyana Krishnan - Co- PI	One year
Pre clinical/efficacy studies of bioengineered cell sheet for ocular surface regeneration	Dr. T.V. Kumary	One year
Clinical application of cryopreserved homograft valves in cardiovascular surgery	Dr. Krishnamanohar	Two years

b. Ongoing projects

Title	Principal Investigator	Duration
Calcium Sulphate Based Bone Filler Cements for Drug Delivery Applications	Dr. Manoj Komath (Co -PI : Dr.H.K.Varma)	One year
Biological Evaluation Of Fluoropassivated and Gel Sealed Vascular Graft	Dr. Roy Joseph	One year
Estimat ion of the in vitro release kinetics of drug eluting stents.	Dr. K. Sreenivasan	One year
Scale -up and Production of Fibrinogen Concentrate, Thrombin and Factor VIII for Clinical Use	Dr. Lissy K. Krishnan	One year

c. Completed projects

Title	Principal Investigator	Duration
Development of Degradable Composites as Bone Substitutes	Dr. P. Ramesh	One year
Development of an In vitro pyrogen test kit: Evaluation of pyrogenicity using human whole blood	Dr. P.V. Mohanan	One year
Scale up production and process standardization of Chitra Polyurethane potting compound	Mr. D.S. Nagesh	One Year

Industry Funded Projects

a.Ongoing projects

Title	Principal Investigator	Funding Agency
Microparticles based Hemostatic chitosan material	Dr. Chandra P. Sharma	India Sea Food Ltd. Cochin
Development of drug releasing intrauterine system	Dr. V. Kalliyana Krishnan	HLL Lifecare Ltd., Trivandrum

Student (M.Tech/ M. phil/ M. Sc) short term Projects

Title	Name of student/ Institution/ course	Supervisor
Development of contrast agents for soft tissue applications in microcomputed tomography	Ms. Meenu Rajendran MPhil (Biomedical Technology, SCTIMST)	Dr. V. Kalliyana Krishnan
CFD Optimisation on Inlet/Outlet of Blood Pump	Ms.Sabna Mohanan, M.Tech (Computer Aided StructuralEngineering, Department of Civil Engineering, M.A., College of Engineering & Technology, Kothamangalam)	Mr. D.S. Nagesh
Effect of different impeller geometry on the performance of blood pump - analysis using computational fluid dynamics	Ms. Praisy Rajan, M.Tech (Biomedical Engineering, Manipal Institute of Technology)	Mr. D.S. Nagesh
Effect of different volute geometry on the performance of blood pump - analysis using computational fluid dynamics	Ms. Greeshma T. Kalyan, M.Tech (Biomedical Engineering, Amrita Vishwa Vidyapeedatham University, Coimbatore)	Mr. D.S. Nagesh
Studies on compatibility and biostability of blend of thermoplastic polycarbonate urethane and polydimethyl siloxane rubber	Mr. Enie Krishna, (M.Tech Rubber Technology, Rubber Technology Center, Indian Institute of Technology, Kharagpur)	Dr. P. Ramesh
Compositions for injectable bone substitutes	Ms. Sreerekha A.S., (M.Tech Polymer Technology,Dept of Polymer Science and Rubber Technology, Cochin University of Science and Technology, Kochi).	D r. P. Ramesh
Cytogenetic effect of UV and X- rays on cultured human peripheral lymphocytes: Preventive effect by prophylactic treatment with melatonin	Liji. P.V (Master of Applied Science in Medical Biochemistry at Mahatma Gandhi University, Kerala)	Dr. P.V. Mohanan
Role of mast cells in determination of fibrous capsule formation around biomaterials.	Ms. Sreelatha Mphil, SCTIMST	Dr. Mira Mohanty
In vitro differentiation of Mesenchymal Stem Cells to corneal keratinocytes for ocular surface reconstruction.	Ms. Soumi Mathews, (MPhil- Biomedical Technology, SCTIMST)	Dr. T.V. Kumary
Optimization of culture conditions and construction of invitro corneal equivalent.	Mr. Karthik N. Ramesh, (MSc - Biotechnology, Annamali University, Cuddalore, Tamil Nadu)	Dr. Anil Kumar P.R.
Adipogenesis on scaffolds using rat adipose tissue- derived stem cells	Balu V. Gopal, M Phil student,SCTIMST	Dr. Annie John
Osteogenesis on bioactive ceramics using rat adipose tissue-derived stem cells	Reeba Jose, (Sam Higginbottom Institute of Agriculture, Technology & Sciences, Allahabad)	Dr. Annie John
Study influence of E.coli biofilm on PBMC cultures.	B.S. SujaLakshmi M Phil SCTIMST	Dr. A. Maya Nandkumar
Study effect of drugs like bleomicin on coculture of alveolar epithelial and fibroblast cells.	Nisha Nair (MSc.Regenerative medicine, Manipal Institute of regenerative medicine/)	Dr. A. Maya Nandkumar
Estimation of shear stresses on formed elements of blood in the vicinity of artificial heart valves using computational fluid dynamics	Anila Reghunath CUSAT, Cochin	Mr. C.V. Muraleedharan
Studies on the sewing ring interface for the load transfer characteristics during the closure of mechanical heart valves	P.V. Radhakrishnan CUSAT, Cochin	Mr. C.V. Muraleedharan
Comparison of FFT, STFT and CWT techniques for analysis of heart valve closing sounds	C.S. Seema Anna University	Mr. C.V. Muraleedharan

Achutha Menon Centre for Health Science Studies

S. No	Principal Investigator/Responsibility	Project Title	Funded By	Total cost	Duration	Status
1	K.R. Thankappan, P.S. Sarma S. Sivasankaran Yamini Thankachi Meena Daivadanam V.C.Bindu	Building Capacity for Tobacco Cessation in India and Indonesia	Fogarty International Centre of the National Institutes of Health	US $ 475,000	Five years Up to 30 June, 2012	Ongoing
2	K.R. Thankappan S. Sivasankaran V. Raman Kutty P.S. Sarma Biju Soman Manju R. Nair Ravi Prasad Varma Rekha M. Ravindran N.S. Rajeev, C.U. Thresia	Community Interventions for Health	Oxford Health Alliance	US $ 690,000	Four Years Up to 30 June 2011	Ongoing
3	K.R. Thankappan Suresh Kumar	Partnership for Better Health	European Commission through the BRAC school of Public Health Bangladesh	Euro 180,455	Three years up to 30October2010	Ongoing
4	V. Raman Kutty Mala Ramanathan	Capacity building for Safe Motherhood Programmes	Centre for Studies in Ethics and Rights, Mumbai	Rs 10 lakhs	Up to July 2010	Ongoing
	V. Raman Kutty Mala Ramanathan	Prevalence of Type II diabetes in a rural Community: Identification of the Contributing Economic and Socio-cultural factors	Women Component Plan	Rs. 1.15 lakhs	Two years until March 2011	Ongoing
5	P.S. Sarma K.R. Thankappan	Non Communicable Disease Risk factor Survey under the Integrated Disease Surveillance Project	ICMR	Rs 25.6 lakhs	Three years up to March 2011	Ongoing
6	Mala Ramanathan	Stakeholders' perceptions of IRBs in India	Harvard School of Public Health ?/NIH	US $ 10,000	Extended up to June 2010	Ongoing
7	Biju Soman K.R. Thankappan P.S. Sarma	A longitudinal study in the tsunami affected areas of Kerala	University of Sanfransisco, USA	Rs. 40 lakhs	Three years up to June 30, 2010	Ongoing
8	Biju Soman	Athiyannoor Sree Chitra Action (ASA) project	Partly funded by Women Component Plan of DST			Ongoing

SCIENTIFIC PUBLICATIONS

JOURNAL ARTICILES

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- Aghila Rani KG, Jayakumar K, Sarma PS, Kartha CC. Clinical Determinants of ckit-Positive Cardiac Cell Yield in Coronary Disease. Asian Cardiovasc Thorac Ann. 2009; 17(2): 139-42.
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- Bahuleyan B, Menon G, Nair S. Immediate postoperative death due to hypothalamic injury following surgery for craniopharyngioma. J Clinl Neurosci 2009; 16: 850–1.
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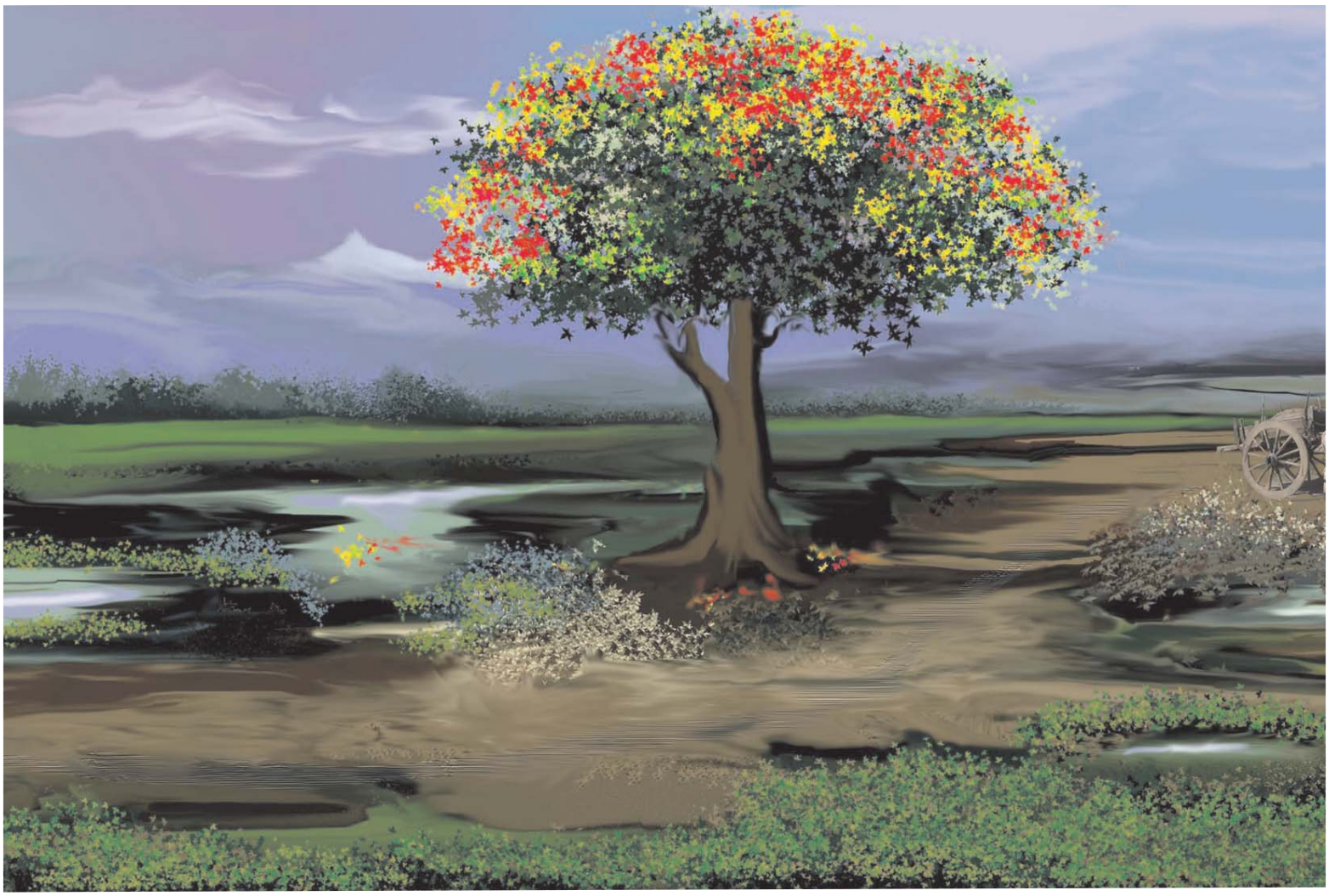

Digital Painting - by Vasanthy S., Sr. Artist, Medical Illustration

HONOURS, AWARDS & VISITORS

Honours and Awards

- V.S.Harikrishnan awarded the Young Scientist Award for the year 2009 (India) from Japanese Association for Laboratory Animal Science (JALAS) and has been invited to receive the award at 57th Annual congress of JALAS scheduled to be conducted at Kyoto, Japan in May 2010.
- M. Jayabalan was awarded D.Sc degree by University of Madras for the thesis "Developments in polymer science and technology towards application in medicine - significant contributions to the advancement of knowledge / technology"
- M. Jayabalan has become Member of the International Editor Board of the Journal of Clinical Rehabilitative Tissue Engineering Research for 2009-2012.
- Sajeev US awarded MAHE award of the SBAIO & STERMI for BEST paper by young scientist for the paper Sajeev US, and Prabha D. Nair - Nano fibrous hybrid structure with controlled hydrophobic- hydrophilic nature for biomedical applications International conference on Biomaterials , Artificial Organs and Regenerative Medicine , SCMS Institute Kochi Feb 28- March 1, 2010
- Prabha D. Nair was invited as member of the Research advisory Council of the NIT Rourkela, Dept. of Biotechnology
- Prabha D. Nair was reviewer of Tissue Engineering, Stem cells, J. of Stem Cells, Biotech & Bioprocess Eng., Biomacromolecules
- Anil Kumar P R secured the DST-IIPA gold medal by achieving the First Position among the participants in the 12 weeks DST sponsored program, 8th foundation training program for scientists and technologists, organized by Indian Institute of Public Administration, New Delhi.
- Rana Raj, Francis B Fernandez and Annie John awarded best poster presentation award – ANCETE Harvesting adult stem cells from New Zealand While Rabbits for Biomedical Research – an easy cell isolation technique. National Symposium on Animal Models in Biomedical Research: Ethical and Welfare Issues at the National Laboratory.Animal Centre - Central Drug Research Institute, Lucknow, India, February 25 – 26, 2009.
- S.Manikandan received Best paper award 1 st prize at Indian society of Neuroanesthesia and Critical care ISNACC-2010 conference held at Kolkota , January 29th-Feb 31st 2010.Title of paper is Foetal echocardiographic evaluation of pregnant patients undergoing elective neurosurgical Procedures.
- G.Srinivas, Scientist D was awarded Indo-US Scientific Research Fellowship by DBT, N-Delhi for pursuing research at Mayo Clinic Rochestor, Minnesota, USA for one year from July 2009.
- Geetha .M, Ph.D student was awarded travel fellowship by Department of Biotechnology, New Delhi to present a paper at the II European Immunology Congress at Berlin, September, 2009.
- Anu Paul, Ph.D student was awarded travel fellowship by Indian Council of Medical Research, New Delhi to present a paper at the II European Immunology Congress at Berlin, September, 2009.
- Suresh Nair nominated as member of World Federation of Neurosurgical Societies (WFNS) Cerebrovascular and Therapy Committee
- Suresh Nair renominated as member of World Federation of Neurosurgical Societies (WFNS) Skull Base Surgery Society
- Suresh Nair nominated as external member of Ph.D committee (Neurosciences) of NIMHANS (Bangalore)
- Suresh Nair was an invited teaching faculty at the WFNS teaching course held at Agra February 12-14th . He delivered a talk tiled " Choosing an approach for petroclival meningiomas
- S Nair was invited as the clinical discussant for Clinicopathologic meeting(CPC) at the All India Institute for Medical Sciences, New Delhi, March 2010
- B Ravi Mohan Rao conducted and endoscopic pituitary surgery workshop at Kasturba Medical College Hospital Mangalore on 2nd April 2009.
- B Ravi Mohan Rao conducted a skull Base Surgery workshop at Goa Medical College on the 11th and 12th of December 2009.
- Amit Dhakoji won the best paper award in the annual conference of the Kerala chapter of the Neurological society of India for his paper titled Focal cortical dysplasias - surgical techniques and outcome.
- Kesavadas. C, Thomas. B, Kapilamoorthy T.R, Menon G, Krishnakumar K, Srinivasan K received the Certificate of Merit for Predicting brain tumor consistency using magnetic resonance imaging parameters, presented at IRIA 2010
- C. Kesavadas awarded National Bioscience Award, 2009 by the Department of Biotechnology, Government of India for the work in Functional Neuroimaging.
- Bejoy Thomas received Clinical Fellowship in Pediatric Neuroradiology, Hospital for Sick Children, Toronto,Canada, July2008 - June2009.
- Hima presented Best Paper Award for Epistaxis – Interventional Management, Oral presentation at Malabar Neurocon (NSI Kerala Chapter), at Calicut, Feb 2010.
- Hima nominated for the best paper award for the Endovascular Treatment of Posterior Circulation Aneurysms

presentation in Xth Congress of World Federation of Therapeutic & Interventional Radiology at Montreal, Canada, July 2009.

- Hima nominated for the best award for the Onyx Embolisation of Cerebral AVMs presentation in Xth Congress of World Federation of Therapeutic & Interventional Radiology at Montreal, Canada, July 2009.
- PV Sulochana, Blood Transfusion Officer was awarded Trophy & Citation for the maximum number of blood donation by a female donor in the State by Kerala State AIDS Control Society on World Blood Donor day 14th June 2009.

Visitors

Biochemistry

- Ms Veena .R , VIT University,Vellore,M.Sc project; Jan-June.,2009.
- Ms Hezlin Marzook M.G. University, M.Sc Project; Mar-July, 2009
- Ms Jaanam Gopalakrishnan,M.G.University, M.Sc Projecr;Mar-July, 2009
- Ms Nandini.R.J, M.G.University , M.Sc project(working)

Microbiology

- Three trainees (observers) underwent training during this period. They were 2 MD Microbiology students and 1 BSc Microbiology graduate.
- Dr.Kavita Raja gave a talk on "Microbiology and Infectious diseases in the UK" based on her Fellowship Programme in Leeds in 2007, to give an idea of the practice of Clinical Microbiology to the staff in the Department. All staff and the ICN attended.

Neurology

- Dr.Ritesh C.Shah, MD (Paediatrics), Fellow in Paediatric Neurology from P.D. Hinduja National hospital, Mumbai visiting the Epilepsy Program as an observer from 04.04.09 to 03.06.09.
- Dr.V. Abdul Gafoor, DM Trainee from Medical College, Calicut visiting the Epilepsy Program as an observer from 15.04.09 to 15.05.09
- Dr. Vikramraj.G, DM (Neurology) postgraduate from Madras Medical College, Chennai visiting the Epilepsy Program as an observer for 15 days from 17.04.2009 to 30.04.2009.
- Dr. R.Chandra Kumar, DM (Neurology) postgraduate from Madras Medical College, Chennai visiting the Epilepsy Program as an observer for 15 days from 17.04.2009 to 30.04.2009
- Dr. T.S. Radhakrishnan and Dr. M.P. Janwadkar, two senior scientists from Indira Gandhi Centre for Atomic Research, Kalpakam, Chennai, visited the Epilepsy Program on 07.05.09.
- Dr. Ramesh Vijay, Assistant Professor, Department of Pediatrics University of Louisville School Medicine, USA visited the Epilepsy Program and gave a talk on "Intermittent hypoxia and sleep fragmentation in murine model of Alzheimers disease: Cholinergic basal forebrain revisited".
- Dr. Mohan Leslie Noone, Consultant Neurologist, Baby Memorial Hospital, Calicut, visited the Epilepsy Program as an observer for 10 days from 12.05.09 to 22.05.09.
- Dr. Jacob Alapatt, Consultant Neurosurgeon, Baby Memorial Hospital, Calicut, visited the Epilepsy Program as an observer for 10 days from 12.05.09 to 22.05.09.
- Dr. Umapathy, Head, Department of Instrumentation and Control Engineering, NIT, Trichy, visited the Epilepsy Program on June 16th.
- Dr.Sridevi.V, Lecturer, Department of Instrumentation and Control Engineering, NIT, Trichy, visited the Epilepsy Program from June 11th and June 12th
- Mr. Rajesh Patel is a Scientific Officer attached to the Squid (MEG) Program of IGCAR, Chennai visited the Epilepsy Program from June 12th to 20th
- Dr. Ravindra Arya, Senior Resident (DM, Pediatric Neurology), Department of Pediatrics, AIIMS, New Delhi, visiting the Epilepsy Program from 01.07.09 to 30.07.09.
- Dr. Jitendra Sahu, Senior Resident (DM, Pediatric Neurology), Department of Pediatrics, AIIMS, New Delhi, visiting the Epilepsy Program from 17.08.09 to 31.08.09.
- Dr. Rehana Dasri, Assistant Professor, Department of Neurology, Dhaka Medical College, visited in epilepsy program as an observer from 24.08.09 to 23.02.2010.
- Dr. Chaya, Completed DM Neurology in NIMS, Hyderabad, visiting the Epilepsy Program from 15.09.09 to 15.12.09.
- Dr. Shalini Bhaskar, working as a Lecturer in medicine, SAINS, Malaysia, visiting the Epilepsy Program from 15.09.09 to 15.12.09.
- Dr. K. Malcolm Jeyaraj, DM Neurology Resident, Govt. Stanley Medical College, Chennai, visited the Epilepsy Program from 01.10.09 to 15.10.09.
- Dr. Ramshekhar N.Menon, Neurologist, Nair Hospital, Bombay, visited the Epilepsy Program from 14.10.09 to 13.01.10.
- Mr. Rupanta Das, Mr. Manabendra Deka, Mr. Nitul Goswami, Ms. Ruminath, EEG Technicians, Guwahati Neurological Research Centre (GNRC), Guwahati, visiting the Epilepsy Program from 24.10.09 to 23.12.09.

- Ms. Pritimoni, Ms. Ranu Nath, Ms. Ajali Das, Ms. Pranati Saika, nurses and Ms. Lovely (Clinical Psychologist) from Guwahati Neurological Research Centre (GNRC), Guwahati, visiting the Epilepsy Program for two months from 28.11.09 to 27.01.10.
- Dr. G.H. Visser, Head of clinical neurophysiology at Erasmus hospital, University Medical center, Rotterdam, Netherlands visited the epilepsy section as a part of Indo-Dutch workshop and discussed about the potential areas of research collaboration.
- Dr. Neelan Pillay, Clinical Professor, University of Calgary, Department of Clinical Neurosciences, Director Adult EEG/Evoked Potentials/ Epilepsy Program, Calgary Health Region, Canada visited the Epilepsy Program on 15.02.10.
- Dr. Krishnan Subramanian,Dentist with expertise in oral appliances delivered a lecture on " Dental sleep medicine"
- Dr. Sasidharan Taravath,Pediatric Neurologist and sleep medicine expert,USA delivered a lecture on "Neurobiology of sleep"
- Prof S.K. Mishra MD, MS, ABMS, FAAN, Professor of Neurology, Keck School of medicine, University of South California visited the department in January 2010. He gave lectures on the following topics
- Pathophysiology of Myotonic Syndromes.
- Recent advances in the Brain Imaging.
- Cardiac abnormalities in Myotonic Dystrophy.
- Dr. G. M. Visser:Prof/ Head Dept of Clinical Neurophysiology Erasmus University, Netherlands- 23-1-10
- Prof: Kottil Ram Mohan: - Professor Of Neurology, Ohio State University School of Medicine Columbus, USA, Expert on Multiple Sclerosis on 20 –01- 2010
- Professor. H. Subramony visited the department on 22/02/2010 and gave lecture on "Cerebellum and Cognition".
- Mr. Stephen von Bandemer, Govt. Official from Research Dept, Germany visited the stroke Unit in February 2010 and spent two days.
- One Post MPT physiotherapist underwent 6 months observership in Stroke Unit.
- 5 students from Manipal and 2 students from Trivandrum completed one-month internship at the Speech Therapy Section.
- Autoimmune neurological syndrome-an update Dr.Saiju Jacob University Hospitals of Birmingham U K Date: 22-10-2009 Time: 8-9am Venue: Class room, I st floor, Sethu Parvathy Bai Block
- Dr Mahapatra, Director SGPGI visited Blood Bank and had discussion on a range of Blood Bank activities including autologous blood trnsfusion in Neurosurgery
- Transfusion Medicine specialists Dr Kabita Chatterjee, AIIMS, New Delhi, Dr Selvaraj Madras Medical College, Dr Manisha Shrivastava Bhopal Memorial Hospital & Research Centre and Dr Rajeev Gopal, Joint Director (Blood Safety),Gujarat State AIDS Control Society

Neurosurgery

- Prof. Kiyoshi Saito, Chairman Department of Neurosurgery, Fukushima Health University, Nagoya,
- Japan, visited our department with two of his junior colleagues – Dr. Tadashi Watanabe and Dr. Tako Sato. They delivered the following three lectures on November 22nd 2009
- Prof. Kiyoshi Saito – Malignant skull base tumours
- Dr. Tadashi Watanabe : Endoscopic neurosurgery
- Dr. Taku Sato : Intraoperative monitoring during aneurysm surgery

Achutha Menon Centre for Health Science Studies

- Dr. D.Prabhakaran executive director, initiative for cardiovascular health in developing countries and adjunct professor (chronic disease epidemiology) public health foundation offered a lecture to the MPH student on May 28, 2009.
- A team of doctors and medical students from the Lund University Sweden visited our institute. AMCHSS offered a two day seminar for them on 18th and 19th of May.
- Dr. Ravi Duggal, health policy consultant, taught "Health Policy Analysis II" for senior batch of MPH students from 1st to 6th June 2009.
- Dr. M Kent Ranson, Technical Officer, Alliance for Health Policy and Systems Research, World Health Organization, Geneva and honorary faculty at the London School of Hygiene and Tropical Medicine & Dr. Lesong Conteh, Lecturer in Health Economics, Health Policy Unit, London School of Hygiene and Tropical Medicine taught Health Economics to MPH students.
- Dr. T Sundararaman, Executive Director, National Health Systems Resource Centre, New Delhi gave a talk on "Public Health Technology Assessment " to the MPH scholars through video-conferencing on 9th June 2009.
- Dr. Jigmi Singay from the Department of Health System Development , Regional office for South-East Asia, WHO, New Delhi visited SCTIMST on 31st July 2009.
- Prof. Mark Nichter of the University of Arizona, USA visited SCTIMST.

ADMINISTRATION

FROM THE DESK OF DEPUTY DIRECTOR (ADMN)

The Administration encompasses organizing and supporting the major activities of the institute, in particular the patient's total medical care in the Hospital Wing as well as overseeing research and technology development programs at the Biomedical Technology Wing. It is responsible for integrating the various functions and services. Therefore, it is a multifaceted organization having the integrated role of a R & D institution, a medical university and hospital and public health study center comprising many departments, types of personnel, and services. A public not-for-profit superspeciality hospital is run by the Institute as envisaged in the SCTIMST Act 1980. A number of departments perform support functions that help with diagnosis and treatment and also technology development work. It requires highly trained employees, efficient systems and controls, necessary supplies, adequate equipment and facilities, and, of course, physicians/surgeons and patients, scientists & engineers and other technical & supporting staff. It is a patient caring, people-oriented research institution and it has a similar structure and hierarchy of authority as any other large public sector medical and research institution.

With a large hospital at the institute, the functional environments in the institute provides innumerable organizational and administrative challenges. These includes staff hiring and coordinating institute support activities including financial functions. The administration is responsible for and oversees each function of the working of the institute. There are doctors, scientists, engineers, research scholars, doctoral and postdoctoral students, scientific and technical staff, nurses, para-medical staff, accounts & administrative staff that all have to work in tandem to make sure that the institute is run as efficiently and smoothly as possible. It is the administration's job to ensure the utmost efficiency in this process and to maintain discipline in the entire organization.

The Administration evaluates the staff on a periodical basis and judge the level of their performance and also develops policies and procedures that facilitate the efficiency of daily operations. These procedures can include how to organize staff work schedules or paperwork. It reviews, implements and analyzes the budget of the institute overall and the budgets of different areas of the Institute to make sure they are realistic and stringently followed. At times, it acts as a moderator for staff complaints and tries to resolve the grievances arising out of patient care services. In addition to a great deal of paperwork and daily administrative tasks, the administration also thinks about the future of the institute and come up with short-range and long-range plans for its growth and development. The administration is always responsible and supports for attaining and maintaining patient care, safety, medical education, research and technology development activities and other service goals. It also ensures that Institute objectives are met through the process of selection, development, organization, motivation, management, evaluation and the promotion of human resources.

The Administration complies with government regulations set out for the Institute and its staff. In an

effort to complete this duty, the administration monitors the organization's service and delivery system at all times to ensure optimal operation. Recruitment of employees, training, functioning, setting the salaries and benefits of employees and managing employee-employer relations, are some of the primary duties of the Administration. Staff requirements for each section of the hospital, such as clinical and diagnostic departments, administration &accounts, equipments & building maintenance, logistics, ambulance, nursing, diagnostic labs, paramedics, and R & D staff for the Biomedical Technology development wing are being timely met with. Recruitment guidelines are drawn up for job applicant screenings, as well as, for the recruiting of junior and senior level positions. The Senior and Junior Staff Selection Committees actively participate in the selection of doctors, surgeons, scientists , engineers and undertakes responsibilities in facilitating the selection process and creates offer letters and employment contracts. During the year 2009-10, Personnel Department has conducted interviews for filling up 75 permanent posts, 270 temporary/leave substitute positions, 72 project appointment positions besides handling the internal promotional cases of 40 employees (both under vacancy oriented and flexible complementing promotion schemes). Service Records/Books of an average of >1200 employees (942 permanent employees and 270 project/temporary staff) are maintained and updated and their requirements are met promptly. Running a superspeciality hospital even without bystanders, the institute is able to maintain nursing and para-medical staff ratio well below the national average. The administrative staff strength is also maintained within 10 percent of the total staff strength of the institute, which is a national record in comparison to similar other institutions.

The fiscal aspect of the Institute is regulated by the Administration and Finance Division under the control of the Director, who maintains financial stability by promoting services produced in a cost-effective manner. This includes procuring cost-efficient products and services for the hospital and the R & D wing. In this way the Institute achieves and maintains the financial health of the institute. The Institute had got a grant of ~ Rs 100 crores during the year 2009-10 from the Central Government and the Institute has generated an income of Rs.43.44 crores from patient care services and royalty of technologies transferred. Against this total receipts, the Institute incurred a total expenditure of Rs.143.44 crores during 2009-10, and the break-up for various major heads are : (i) Non-Plan expenses : Rs. 97.30 crores and (ii) Plan expenses: Rs. 46.14 crores. Accounting is centralized to the Institute's financial activities for both the Hospital and Biomedical Technology Wings. Detailed and sound accounting practices are fundamental to maintaining important organizational statistics for administrative decision-making. The accounting department is responsible for maintaining the general ledger and summarizing all the financial transactions performed by the Institute, particularly at the hospital, preparing and dispensing the payroll, tracking and recording costs to enable appropriate reimbursement for services from creditors, and preparing the capital and operating budgets. The sensitivity and efficiency of this department greatly influence the patient's perception of the quality of care received. Information services and medical record maintenance are core functions of hospital management.

The HR Division also have the ability to train and mentor staff, seek out and schedule staff development trainings and is able to pinpoint specific individualized training needs of the staff. It also possess the ability to act as an impartial evaluator. Evaluation is a significant part of the Institute's HR job, insuring that employees are on target, working to the best of their potential and recognizing specific training and development of an individual. The HR executive of the Institute plans and implements the steps for on-the-job training including periodical orientation/induction training programs.

P.B. Sourabhan, MA, LLB, PGDMM, DCA

Key Administrative Staffs

Dr. K. Radhakrishnan
Director

P.B. Sourabhan, MA, LLB, PGDMM, DCA
Deputy Director (Administration)

P.Radha Devi IA &AS
Financial Advisor

Mahadevan R
Chief Accounts Officer

S. Sasikumar, MA (PA), BGL, LLB, PGDIR,PGDIRPM
Administrative Officer Gr I

R. Sreekumar, BSc. PGDMM MBA (MM)
Purchase Officer Gr I

S. Thankamoni
Internal Audit Officer

B.S. Anil Kumar, BA
Security Officer

K. Prasanna Kumar, B.Com, DEE
Security Officer

ADMINISTRATIVE BODIES

INSTITUTE BODY

Dr. R. Chidambaram (President)
Principal Scientific Advisor to the Government of India
318, Vigyan Bhavan Annexe, New Delhi

Prof. P. J. Kurien
Member of Parliament (Rajya Sabha)
Pallath P.O. Poduthode, Vennikulam, Kerala

Two MPs from Lok Sabha

Dr. T. Ramasami
Secretary to Government of India
Department of Science & Technology, Technology Bhavan, New Delhi.

Secretary to Government of India
Ministry of Health & Family Welfare, Nirman Bhavan, New Delhi.

Secretary to Government of India
Department of Education, Ministry of Education
Ministry of Human Resource Development, New Delhi

Dr. R.K. Srivastava
Director General of Health Services
Ministry of Health & Family Welfare, Nirman Bhavan, New Delhi.

Shri. K. P. Pandian
Joint Secretary and Financial Adviser to the Government of India
Department of Science and Technology, Technology Bhavan, New Delhi

Dr. E.P. Yesodharan
Executive Vice President, Kerala State Council for Science Technology & Environment, Sasthra Bhavan, Thiruvananthapuram.

Dr. Usha Titus
Secretary to the Government of Kerala
Department of Health & Family Welfare, Thiruvanthapuram

Dr. A. Jayakrishnan
Vice Chancellor, University of Kerala, Thiruvanthapuram

Dr. Baldev Raj
Director, Indira Gandhi Centre for Atomic Research (IGCAR)
Kalpakkam, Tamil Nadu.

Dr. K.A. Dinshaw
Former Director, Tata Memorial Hospital and Advanced Centre for Treatment Research & Education in Cancer, E. Borges Marg, Parel, Mumbai

Prof. Ashok Misra
Director, Indian Institute of Technology Bombay, Powai, Mumbai

Dr. Jairup Singh
Vice Chancellor, Guru Nanak Dev University, Amristsar.

Prof. P. Balaram
Director, Indian Institute of Science, Bangalore

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X, ROHINI C H S, Plot No: 29-30, Sector – IX – A, Vashi Nagar, Mumbai

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Dr. G.S. Bhuvaneshwar
Head, Biomedical Technology Wing
Sree Chitra Tirunal Institute for Medical Sciences and Technology
Thiruvananthapuram – 695012

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Secretary to Government of India, Department of Science & Technology
Technology Bhavan, New Delhi

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Director General of Health Services
Ministry of Health & Family Welfare, Nirman Bhavan, New Delhi – 110001

Dr. E.P. Yesodharan
Executive Vice President, Kerala State Council for Science, Technology & Environment, Shasthra Bhavan, Thiruvanthapuram.

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Director, IndiraGandhi Centre for Atomic Research (IGCAR)
Kalpakkam, Tamil Nadu.

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Thiruvananthapuram – 695011

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Head, Biomedical Technology Wing
Sree Chitra Tirunal Institute for Medical Sciences and Technology
Thiruvananthapuram – 695012

Dr. C.P. Sharma
Scientist 'G' (Senior Grade), Biomedical Technology Wing
Sree Chitra Tirunal Institute for Medical Sciences and Technology
Thiruvananthapuram – 695012

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SCTIMST, Thiruvananthapuram

Vice Chancellor
University of Kerala, Thiruvananthapuram

Head, BMT Wing, SCTIMST
Thiruvananthapuram

Dr. J.M. Tharakan
Dean & HOD, Cardiology, SCTIMST

Dr. C.C. Kartha
Professor, Div. of Cellular & Molecular Cardiology, SCTIMST

Dr. Suresh Nair
Professor of Neurosurgery, SCTIMST

Dr. K.R. Thankappan
Professor, AMCHSS, SCTIMST

Dr. C.P. Sharma
Scientist 'G'

Dr. Rupa Sreedhar
Professor of Anaesthesiology, SCTIMST

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Scientist 'G', SCTIMST

Prof. Jayaprakash Muliyil
Professor of Community Medicine, Christian Medical College, Vellore

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Director, Rajiv Gandhi Centre for Biotechnology, Trivandrum

Prof. G. K. Suraishkumar
Professor of Biotechnology, I.I.T. Madras

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Thiruvananthapuram

Shri. Viswas Mehta I A S
Secretary to the Government of Kerala, Health & Family Welfare
Thiruvananthapuram

Shri. K.N. S Nair
Head, Engineering Maintenance Division, VSSC (Retd)
"Deepti", Kazhakuttan, Thiruvananthapuram

Financial Advisor
SCTIMST, Thiruvananthapuram

A member to be co-opted by the
Director as and when necessary

FINANCE COMMITTEE

Director Chairman)
SCTIMST, Thiruvananthapuram

Secretary to the Govt. of India
Ministry of Science and Technology, Technology Bhavan
New Delhi – 110016

Joint Secretary to Govt. of India &Financial Advisor
Department of Science & Technology, New Delhi - 110 016

Head, BMT Wing, SCTIMST

Financial Advisor (Ex-Officio Convenor)
SCTIMST, Thiruvananthapuram

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SCTIMST, Thiruvananthapuram

Head, BMT Wing, SCTIMST
Thiruvananthapuram

Prof. Jayaprakash Muliyil
Professor & Head of Community Medicine
Christian Medical College, Vellore

Nominee of the Secretary,
Department of Science & Technology, Govt. of India, New Delhi - 110 016

A Senior Professor of SCTIMST

An External Expert nominated by the
President of the Institute

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SCTIMST, Thiruvananthapuram

Head, BMT Wing, SCTIMST, Poojappura
Thiruvananthapuram

Deputy Director (Admn)
SCTIMST, Thiruvananthapuram

Nursing Superintendent
SCTIMST, Thiruvananthapuram

Dr. V. Kalliyana Krishnan
Scientist 'G', BMT Wing

Representative of Academic Wing of the
Institute nominated by the Director
of the Institute

ETHICS COMMITTEE

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Judge, (Retd) High Court of Kerala, Kochi

Prof. G. Santhakumari
Former Prof. of Pharmacology & Director of Medical Education
Government of Kerala, R.G. 286, Thriveni
Ulloor, Thiruvananthapuram - 695 011

Smt. J. Lalithambika IAS
"Abhilash" Golf Links Road
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Prof. K.A. Kumar
Professor of Psychiatry
"Koikal", T.C 13/598, Pattom, Thiruvananthapuram

Dr. P.G. Premila
Professor of Pediatrics (Rtd.)
7C, Kowdiar Manor, Kowdiar, Thiruvananthapuram

Dr. Meenu Hariharan
Former D.M.E, Govt. of Kerala

Dr. Amar Jesani
Co ordinator, CSER (Centre for Studies in Ethics and Rights)
Candelar, 4th Floor, 26 St. John Baptist Road
Bandra West, Mumbai 400050, India

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Director (Engineering)
HSCC (India) limited, E-6 (A), Sector - 1, NOIDA (U.P)-201301

Director
SCTIMST, Thiruvananthapuram

Dr. G.S. Bhuvaneshwar
Head, BMT Wing, SCTIMST
Poojappura, Thiruvananthapuram

Dr. T. Anoop Kumar
(Member Secretary IEC) Scientist 'E', Molecular Medicine
SCITMST, BMT Wing, Poojappura, Thiruvananthapuram-12

Dr. Girish Menon
Additional Professor of Neurosurgery
SCTIMST, Trivandrum

Ms. C.S. Sreepriya
Executive Secretary to the Director cum Coordinator, IEC

TECHNOLOGY DEVELOPMENT COMMITTEE

Director (Chairman)
SCTIMST, Thiruvananthapuram

Head, BMT Wing, SCTIMST
Poojappura, Thiruvananthapuram

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Director, Nonferrous Materials Technology Development Centre
Hyderabad

Dr. M. Radhakrishna Pillai
Director, Rajiv Gandhi Centre for Biotechnology
Trivandrum

Dr. K.G. Rajendran
Vice President, USV Ltd., Mumbai

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Department of Engineering Design, I.I.T. Madras

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Scientist - G, Polymer Science & Engineering
National Chemical Laboratory, Pune

Dr. Baldev Raj, (Institute Body)
Director, Indira Gandhi Centre for Atomic Research
(IGCAR), Kalpakkam

Dr. K. Radhakrishnan
Professor of Neurology, SCTIMST

Dr. K. Jayakumar
Professor of Cardio Vascular & Thoracic Surgery, SCTIMST

Dr. V. Kalliyana Krishnan
Scientist 'G', BMT Wing, SCTIMST

OTHER INTERNAL WORKING COMMITTEES

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Head, BMT Wing (Chairman for BMT)

Deputy Director (Admn)

Dr. Asha Kishore, Professor, Neurology

A nominee of Director

Administrative Officer Gr. I (Member Secretary/Convenor)

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Associate Head, BMT Wing(Chairman)

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Dr. Lissy K. Krishnan
Scientist F, Expert – Biological safety, Blood

Dr. Molly Antony
Scientist F, Expert – Microbiology

Dr. Omkumar,
Scientist, Rajiv Gandhi Centre for Biotechnology- External Expert

Dr. Sathish Mundayoor,
Scientist, Rajiv Gandhi Centre for Biotechnology – DBT Nominee

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Biosafety Officer of SCTIMST

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Scientist E, (Secretary & Convener)

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Medical Superintendent and Professor Sr.Grade CVTS (Chairman)

Dr. Jaganmohan Tharakan ,
Professor Sr.Grade & HOD, Dept, of Cardiology

Dr. N. Suresh Nair,
Professor Sr.Grade & HOD, Dept. of Neurosurgery

Dr. R.C. Rathod
Professor Sr.Grade & HOD, Dept. of Anaesthesiology

Dr. M.D. Nair
Prof. & HOD of Neurology

Dr. K. Jayakumar
Professor & HOD, Dept. of CVTS

Dr. S.K. Jawahar,
Administrative Medical Officer (Convener)

Mrs. Vijayamma Harikrishnan
Nursing Superintendent

Mr. N.G. Thampi
Senior Medical Records Officer

Mr. A.K. Gupta
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Professor & HOD, Dept. of CVTS

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Dr. Kavita Raja
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Dr.Jaisy Mathai
Scientist – G, & HOD, Transfusion Medicine

Dr. Sanjeev V. Thomas
Professor, Dept. of Neurology

Dr. Thomas Koshy
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Dr. S. Harikrishnan
Addl. Professor, Dept. of Cardiology

Dr. C. Kesavadas
Addl. Professor, Dept. of IS & IR

Dr. S.K. Jawahar
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Asst. Professor, Dept of CVTS

Dr. K. Krishnakumar
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Engineer, F, Dept.of Clinical Engineering

Smt. Vijayamma Harikrishnan
Nursing Superintendent

Smt. S. Sudhamani Amma
Deputy Nursing Superintendent

Smt. C.D. Elizebeth
Theatre Sister NOT

Smt. Elizabeth P. George
Sr.Theatre Sister COT

Smt. S.S. Padmaja Devi
Sr.Theatre Sister, PSOT

Smt. Gracyamma Bridget
Sr.Staff Nurse, Infection Control Unit

Smt. O.K. Usha
Technical Asst.– Repr: from Construction Wing

Smt. Deepa K. Nair,
Pharmacist Gr.II - Repr: from Pharmacy

Mr. R.P. Hemanth Kumar,
Asst. Security Officer, Repr. from House Keeping

Smt. C. Valsalakumari
Sr.W/S, CSICU

Smt. K. Sudarsa
Sr.W/S, NSICU

Smt. Thresiamma John
Sr.W/S, NMICU

Smt. K.J. Pennamma
Sr.W/S, CHICU

Smt. Aleyamma John
Sr.W/S, CCU

Smt. C. Saraswathy Amma
Sr.W/S CSSD

Smt. A. Saraswathy
Sr.Tech. Asst. (Lab) Dept.of Pathology

Mr. T.A. Thomas
Sr.Tech Asst (Lab) Dept.of Biochemistry

HOSPITAL TRANSFUSION COMMITTEE

Dr. Jaisy Mathai,
Scientist 'G' Dept. of Transfusion Medicine (Chairperson)

Dr. V.G. Shrinivas
Additional Professor, Anaesthesiology

Dr. Vivek V Pillai
Assistant Professor, CVTS

Dr. Krishna Kumar
Assistant Professor, Neurosurgery

Dr. S. Bijulal
Assistant Professor, Cardiology

Dr. Anugya Bhatt
Scientist 'C', Throbosis Research Unit

Smt. Sudhamani Amma
Dy. Nursing Superintendent

Dr. S. Satyabhama,
Scientist 'F', Dept. of Transfusion Medicine (Convener)

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Dr. P.V. Mohanan, Scientist E, Biological Scientist

Dr. Renuka Nair,
Head, Cellular & molecular Cardiology, Biological Scientist

Dr. Annie John, Scientist E, Biological Scientist

Dr. P.R. Umashankar, Scientist E, Veterinarian

Dr. A.C. Fernandez, Scientist F, (Member Secretary IAEC)

Dr. Robin D Culas, CPCSEA Nominee

Dr. K. Haridas, IAEC Member External

Dr. Parameswaran Nair, IAEC Member External

LIBRARY COMMITTEE

Dr. Jaganmohan Tharakan, Dean and HoD, Cardiology (Chairman)
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Dr. Kavita Raja, Professor, Microbiology
Dr. Lissy K. Krishnan, Scientist 'F', BMT Wing
Dr. S. Harikrishnan, Additional Professor, Cardiology
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Dr. K. Srinivasan, Associate Professor, AMCHSS
Dr. S. Venkateshwaran , Sr. Resident, DM Cardiology
Dr. Sohini Banerjee, MPH Student
Ms. Saumya Gopalan, DNN I Year Student
Mr. M.S. Suhesh, DBBT Student
Shri. Jayachandra Das, Librarian-cum-Infmn. Officer(Convener)

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Scientist'F', BMT Wing

Dr. Mala Ramanathan,
Additional Professor, AMCHSS (Member Secretary)

Complaints Committee for redressal of complaints on Sexual harassment of working women

Dr. Rupa Sreedhar
Professor (Chairperson)

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Scientist'G'

Dr. Mala Ramanathan
Addl. Professor

Dr. Lissy K. Krishnan
Scientist'F'

Ms. S. Sudhamani Amma
Deputy Nursing Supdt.

Smt. Nalini Nayak
Secretary, SEWA, Thiruvuananthapuram

RIGHT TO INFORMATION ACT. 2005

(Published as required under section 41(b), Chapter II of Right to Information Act, 2005.)

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VIGILANCE OFFICER

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Satement of Accounts

SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES & TECHNOLOGY, THIRUVANANTHAPURAM
BALANCE SHEET AS AT 31st MARCH 2010

CORPUS/CAPITAL FUND AND LIABILITIES	Schedules	2009-2010 Rs.	2008-2009 Rs.
CAPITAL FUND	1	2815772164.19	2526268149.96
RESERVES & SURPLUS	2	310546070.70	271488083.70
EARMARKED ENDOWMENT FUNDS	3	185502379.09	225164971.53
SECURED LOANS & BORROWINGS	4	0.00	0.00
CURRENT LIABILITIES & PROVISIONS	7	129610816.22	122270153.62
TOTAL		**3441431430.20**	**3145191358.81**
ASSETS			
FIXED ASSETS	8	1212201058.64	1005717447.14
INVESTMENTS FROM EARMARKED ENDOWMENT FUNDS	9	443872589.70	387237833.70
CURRENT ASSETS , LOANS, ADVANCES ETC	11	1785357781.86	1752236077.97
MISCELLANEOUS EXPENDITURE (TO THE EXTENT NOT WRITTEN OFF)			
TOTAL		**3441431430.20**	**3145191358.81**
SIGNIFICANT ACCOUNTING POLICIES	24		
CONTINGENT LIABILITIES AND NOTES ON ACCOUNTS	25		

Sd/-
FINANCIAL ADVISOR

Sd/-
DIRECTOR

Sree Chitra Tirunal Institute for
Medical Science and Technology
Thiruvananthapuram

SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES & TECHNOLOGY, THIRUVANANTHAPURAM

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31st MARCH 2010

INCOME	Schedules	2009-2010	2008-2009
		Rs.	Rs.
Income from Sales / Services	12	292944869.00	283240956.00
Grants Received from Govt of India(Non Plan)	13	253900000.00	229640277.00
Fees/Subscription	14	5099450.00	3938512.00
Income from Investments	15	27895546.00	18375843.80
(Income on Investment from earmarked/endow.Funds transferred to Funds)			
Income from Royalty, Publication etc	16	4649575.00	1915736.00
Interest Earned	17	104013645.96	62650044.89
Other Income	18	2150693.08	10388477.26
Total		**690653779.04**	**610149846.95**
EXPENDITURE			
Establishment Expenses	20	624234687.28	438782799.10
Other Administrative Expenses	21	348437663.17	364599681.66
Bank Charges	23	320839.40	86805.40
Depreciation (Net Total at the year-end-corresponding to Schedule 8)		111658615.15	82609782.25
Total		**1084651805.00**	**886079068.41**
Balance being Excess Expenditure over Income		393998025.96	275929221.46
Add: Transfer to Special Reserve Account		45844996.00	32974258.80
BALANCE BEING DEFICIT CARRIED TO CAPITAL FUND		439843021.96	308903480.26
SIGNIFICANT ACCOUNTING POLICIES	24		
CONTINGENT LIABILITIES AND NOTES ON ACCOUNTS	25		

Sd/-

FINANCIAL ADVISOR

Sd/-

DIRECTOR

Sree Chitra Tirunal Institute for
Medical Science and Technology
Thiruvananthapuram

SCHEDULES

PARTICULARS	2009-2010 [Rs.]	2008-2009 [Rs.]
SCHEDULE 1 - CORPUS/CAPITAL FUND		
Balance as at the beginning of the year	3452174357.21	3029403167.02
Less Depreciation up to the end of the previous year	925938307.06	843328524.81
Net balance at the beginning of the year	**2526236050.15**	**2186074642.21**
Add: Plan Grants received from Government of India	704700000.00	610871299.00
Add: Grants received from Others for Capital Assets(WCP)	27100000.00	38918424.00
Add:Contribution towards Corpus/Capital Fund		
Deduct: Balance of net expenditure transferred from the Income and Expenditure Account	439843021.96	308903480.26
Less:Value of Assets Written off during the year	2420864.00	692735.00
DeductTransfer to BMT/Add Transfer from CHO	0.00	0.00
BALANCE AS AT THE YEAR-END	**2815772164.19**	**2526268149.96**
SCHEDULE 2-RESERVES AND SURPLUS:		
1. Capital Reserve:		
As per last Account	--	--
Addition during the year	--	--
Less:Deduction during the year	--	--
2. Revaluation Reserve:		
As per last Account	--	--
Addition during the year	--	--
Less: Deductions during the year	--	--
3. Special Reserves:		
As per last Account	271488083.70	242356298.90
Addition during the year (Current year transfer+Decrease in provision)	39057987.00	29131784.80
Less: Deductions during the year	--	--
4. General Reserve:		
As per last Account	--	--
Addition during the year	--	--
Less: Deductions during the year	--	--
TOTAL	**310546070.70**	**271488083.70**

PARTICULARS	2009-2010 [Rs.]	2008-2009 [Rs.]
SCHEDULE 3-EARMARKED/ENDOWMENT FUNDS		
a) Opening balance of the funds	--	--
b) Additions to the funds:	--	--
i. Donations/grants	--	--
ii. Income from Investments made on account of funds	--	--
iii. Other additions (Specify nature)	--	--
TOTAL (a+b)	--	--
c) Utilisation / Expenditure towards objective of funds		
i. Capital Expenditure		
- Fixed Assets	--	--
- Others	--	--
Total (Detailed Schedule Attached)	--	--
ii. Revenue Expenditure		
- Salaries, Wages and allowances etc.	185502379.09	225164971.53
- Rent		
- Other Administrative expenses		
Total	185502379.09	225164971.53
TOTAL (c)		
NET BALANCE AS AT THE YEAR-END (a+b+c)	**185502379.09**	**225164971.53**

CODE	NAME OF GRANTEE/PRINCIPAL INVESTIGATOR	FUND-WISE BREAK UP			Rs.
		OPENING BALANCE	ADDITIONS TO FUND GRANTS	OTHER RECEIPTS	TOTAL
SCHEDULE 3-EARMARKED/ENDOWMENT FUNDS					
5000	PROJ-MISCELLANEOUS	1014854.00	3542980.00	0.00	**4557834.00**
5008	DR.C.KESAVADAS	0.00	71500.00	5269.00	**76769.00**
5018	CSIR PROJECT-DR. P.S. APPUKUTTAN	13450.90	0.00	0.00	**13450.90**
5027	DST GOVT. OF KERALA-DR. P.S. APPUKUTTAN	26335.53	0.00	0.00	**26335.53**
5028	DST GOVT. OF KERALA-DR.K RADHAKRISHNAN	3001.00	0.00	0.00	**3001.00**
5029	DST GOVT. OF KERALA- DR.J.SHANMUGHAM	7113.00	0.00	0.00	**7113.00**
5031	PHYSIO-ANTHROPOMATIC STUDY-DR.GUPTA	3871.77	0.00	0.00	**3871.77**
5033	MPH PROGRAMME	101480.00	0.00	0.00	**101480.00**
5034	INDIAN EPILEPSY ASSN.DR.K. RADHAKRISHNAN	3558.00	0.00	0.00	**3558.00**
5036	PROJ/DST KERALA/DR.MURALEEDHARAN	4495.00	0.00	0.00	**4495.00**
5040	PROJ. DR.ASHA VIJAYARAGHAVAN	2130118.70	0.00	0.00	**2130118.70**
5047	IMPROVEMENT OF VOLUNTARY BLOOD DONAR	16094.90	0.00	0.00	**16094.90**
5054	ANTIVIRAL AND ANTIFUNGAL STUDIES ON	1418.30	0.00	0.00	**1418.30**
5055	GRANT/ROCKFELLER FOUNDATION,USA	686120.00	0.00	0.00	**686120.00**
5065	M.D.PHARMA(DR,ASHA)	398586.50	0.00	0.00	**398586.50**
5070	PROJ.INDIAN EPILEPSY ASSTN.JAYACHANDRAN	485.30	0.00	0.00	**485.30**
5077	INDIAN EPILEPSY ASSOCIATION	18111.90	0.00	0.00	**18111.90**
5078	PROJECT GRANT/DR MALA RAMANATHAN	5810.00	0.00	0.00	**5810.00**
5080	GRANT/WHO/DR VARATHARAJAN/AMC/PROJECT	11471.30	0.00	0.00	**11471.30**
5082	T V HEMALATHA/HEALTHAWARENESS PROGRAM	127537.00	0.00	0.00	**127537.00**
5083	PROJECT/DEPT OF NEUROLOGY	1683.00	160000.00	0.00	**161683.00**
5088	DOUBLE BLIND PLACEBO CONT. PARALLEL	63023.00	0.00	0.00	**63023.00**
5091	EURO REG. OF EPILEPSY & PREGNANCY	103087.00	0.00	0.00	**103087.00**
5094	KERALA STATE AIDS CONTROL SOCIETY	884949.00	476000.00	0.00	**1360949.00**
5098	RISK FACTORS FOR EPILEPSY-DR.RADHAKRISHNAN	4562.00	0.00	0.00	**4562.00**
5099	EFFECT OF BLOOD DONATION	1711.00	0.00	0.00	**1711.00**
5100	AMC/MAC ARTHUR FOUNDATION/02-70546	46315.05	0.00	0.00	**46315.05**
5103	CLINICAL TRIAL/QUINTAILSPEC/DR.RADHAKRISHNAN	194668.00	292960.00	14049.00	**501677.00**
5104	ANTIVIRAL PRINCIPLES/MOLLY ANTONY	8878.00	0.00	0.00	**8878.00**
5108	EVAL.SUB-TYPES DEMENTIA/DR.MATHURA	15800.50	0.00	0.00	**15800.50**
5110	TOBACCO CESSATION & RESEARCH / DR.THANKAP	943026.65	3505614.00	1227101.00	**5675741.65**
5111	DIFFUSION WEIGHTED IMAGING/DR.GUPT	-21226.00	0.00	0.00	**-21226.00**
5112	WHO FELLOWSHIP	281642.00	0.00	0.00	**281642.00**
5113	STUDIES ON ANTI-VIRAL/MOLLY ANTONY	448.00	0.00	0.00	**448.00**
5114	IND.PARTICP. IN PUBLIC HEALTH/WORLD	51.00	0.00	0.00	**51.00**
5119	STAKE HOLDER-PERCEPT/INST.REV BO	202715.73	0.00	0.00	**202715.73**
5121	REG.OF.PREG IN WOMEN -EPILEPSY	91158.00	0.00	0.00	**91158.00**
5124	PRO-INFLAMMATORY CYTOKINE/DR. K. SHIVAKUMAR	74618.50	0.00	0.00	**74618.50**
5125	PIOLOT STUDY/HEMOGRAFT HARVEST	23838.00	0.00	643.00	**24481.00**
5126	A MULTI NATIONAL, MULTI-CENTER/SIRO	113597.00	0.00	0.00	**113597.00**
5127	CARDOGUARD TABLET/DST/DR.RENUKA NAIR	7509.00	0.00	0.00	**7509.00**
5128	INDENT. OF MACOBACTERIAL/DST/V.V.RADHAKRISHN	196165.00	0.00	0.00	**196165.00**
5130	TELE-HEALTH & MEDICAL EDUCATION/JAWAHAR	974782.00	250000.00	0.00	**1224782.00**
5132	STUDIES ON MATRIX METALLOPROTEINASE	126979.00	0.00	0.00	**126979.00**
5133	COMMUNITY BASED INTERVENTION/WHO	415059.00	0.00	1375.00	**416434.00**

CAPITAL EXPENDITURE			UTILISATION REVENUE EXPENDITURE					
FIXED ASSETS	OTHERS	TOTAL	SALARIES WAGES	RENT/ CONSUMABLES	OTHER ADM EXP	TOTAL	SUB TOTAL	NET BALANCE
0.00	0.00	**0.00**	3230297.00	84322.00	425175.00	**3739794.00**	**3739794.00**	**818040.00**
0.00	0.00	**0.00**	0.00	0.00	65853.00	**65853.00**	**65853.00**	**10916.00**
0.00	0.00	**0.00**	0.00	0.00	13450.90	**13450.90**	**13450.90**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	26335.53	**26335.53**	**26335.53**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	3001.00	**3001.00**	**3001.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	7113.00	**7113.00**	**7113.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	3871.77	**3871.77**	**3871.77**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	100000.00	**100000.00**	**100000.00**	**1480.00**
0.00	0.00	**0.00**	0.00	0.00	3558.00	**3558.00**	**3558.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	4495.00	**4495.00**	**4495.00**	**0.00**
0.00	0.00	**0.00**	177996.00	0.00	299343.00	**477339.00**	**477339.00**	**1652779.70**
0.00	0.00	**0.00**	0.00	0.00	16094.90	**16094.90**	**16094.90**	**0.00**
0.00	0.00	**0.00**	1418.30	0.00	0.00	**1418.30**	**1418.30**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**686120.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**398586.50**
0.00	0.00	**0.00**	0.00	0.00	485.30	**485.30**	**485.30**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	18111.90	**18111.90**	**18111.90**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**5810.00**
0.00	0.00	**0.00**	0.00	0.00	11471.30	**11471.30**	**11471.30**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**127537.00**
0.00	0.00	**0.00**	0.00	0.00	161683.00	**161683.00**	**161683.00**	**0.00**
0.00	0.00	**0.00**	0.00	0	0.00	**0.00**	**0.00**	**63023.00**
0.00		**0.00**	0.00	0.00	10440.00	**10440.00**	**10440.00**	**92647.00**
0.00	0.00	**0.00**	129573.00	738733.00	760.00	**869066.00**	**869066.00**	**491883.00**
0.00	0.00	**0.00**	0.00	0.00	4562.00	**4562.00**	**4562.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	1711.00	**1711.00**	**1711.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**46315.05**
0.00	0.00	**0.00**	91093.00	0.00	0.00	**91093.00**	**91093.00**	**410584.00**
0.00	0.00	**0.00**	0.00	0.00	8878.00	**8878.00**	**8878.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**15800.50**
0.00	0.00	**0.00**	1656102.00	162005.00	1086040.00	**2904147.00**	**2904147.00**	**2771594.65**
0.00	0.00	**0.00**	0.00	0.00	5000.00	**5000.00**	**5000.00**	**-26226.00**
0.00	0.00	**0.00**	0.00	0.00	281642.00	**281642.00**	**281642.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	448.00	**448.00**	**448.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	51.00	**51.00**	**51.00**	**0.00**
0.00	0.00	**0.00**	0.00	725.00	0.00	**725.00**	**725.00**	**201990.73**
0.00	0.00	**0.00**	0.00	0.00	91158.00	**91158.00**	**91158.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**74618.50**	**74618.50**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	24296.00	**24296.00**	**24296.00**	**185.00**
0.00	0.00	**0.00**	0.00	0.00	2382.00	**2382.00**	**2382.00**	**111215.00**
0.00	0.00	**0.00**	0.00	0.00	7509.00	**7509.00**	**7509.00**	**0.00**
0.00	0.00	**0.00**	0.00	17401.00	42657.00	**60058.00**	**60058.00**	**136107.00**
66757.00	0.00	**66757.00**	99000.00	0.00	48920.00	**147920.00**	**214677.00**	**1010105.00**
0.00	0.00	**0.00**	0.00	102687.00	1113.00	**103800.00**	**103800.00**	**23179.00**
0.00	0.00	**0.00**	0.00	0.00	201375.00	**201375.00**	**201375.00**	**215059.00**

CODE	NAME OF GRANTEE/PRINCIPAL INVESTIGATOR	FUND-WISE BREAK UP			TOTAL
		OPENING BALANCE	ADDITIONS TO FUND GRANTS	OTHER RECEIPTS	
SCHEDULE 3-EARMARKED/ENDOWMENT FUNDS					
5135	A 16-WEEK,DOUBLE BLIND/ASHA KISHORE	1958977.00	0.00	0.00	**1958977.00**
5136	A16 WEEKDOUBLE BLIND STUDY	713.00	0.00	0.00	**713.00**
5137	MECHANISM OF ANTICANCER/DAE, BRS	2761.00	0.00	0.00	**2761.00**
5138	PREVENTION ON NCD'S: TUNING/WHO	98.00	0.00	0.00	**98.00**
5139	A 24 WEEK, MULTICENTER/DR. MATHURANATH	1619512.28	1839412.00	0.00	**3458924.28**
5140	HARVARD SCHOOL OF PUBLIC HEALTH	96580.32	0.00	0.00	**96580.32**
5141	THE TRIVANDRUM STROKE REGISTRY/WHO SEARO	5481.00	0.00	0.00	**5481.00**
5142	BANKING FOR BETTER HEALTH-MEDISAVE	240383.36	0.00	0.00	**240383.36**
5143	MODULATION OF HIGH GLUCOSE/STE/KARTHA	483.00	0.00	0.00	**483.00**
5144	WHO-SEARO/DEV&FIELD TEST/GME	124882.00	0.00	0.00	**124882.00**
5145	ADULT HUMAN RESIDENT/	17341.00	0.00	0.00	**17341.00**
5146	DEVELOPMENT OF SPECT	138671.00	0.00	0.00	**138671.00**
5147	FATHERHOOD INITIATIVES	39137.00	0.00	0.00	**39137.00**
5148	HIV/AIDS/DR.D.VARATHARAJAN	13627.00	0.00	0.00	**13627.00**
5149	REDUCING DEATH RATE	1539.00	0.00	0.00	**1539.00**
5150	PROTOCOL 6002-INT 001	996951.60	0.00	0.00	**996951.60**
5151	DOSE RANGING STUDY:CGHR	137671.00	0.00	0.00	**137671.00**
5153	DEV REF. MANUAL FOR	664052.00	0.00	0.00	**664052.00**
5155	COMM BASED DETECTION	354383.00	0.00	0.00	**354383.00**
5156	TSUNAMI PROJECT	1377363.50	0.00	0.00	**1377363.50**
5158	DETERMINATION OF GENETIC CO(DR.RENUKA NAIR)	195504.00	0.00	0.00	**195504.00**
5159	NCD RISK FACTOR	145793.00	0.00	0.00	**145793.00**
5160	BRAIN MAPING & BASIC NEUROGENETIC/DR.P.S MATHURANATH	5656.00	669113.00	0.00	**674769.00**
5161	DOSE RANGING STUDY:CGHR	2339191.00	390813.00	7500.00	**2737504.00**
5162	MAINTAINING EVENT REGISTRY	7638.00	0.00	0.00	**7638.00**
5163	DR.JAYAKUMAR	3752.00	0.00	0.00	**3752.00**
5164	FCTC PROVISION/DRKRTHANKAPPAN	8138.75	0.00	0.00	**8138.75**
5165	HEALTH SECTOR REFORM	3481.00	0.00	0.00	**3481.00**
5166	PHARMACOGENETIC STUDY/DR.SANJEEV	-130827.00	330000.00	0.00	**199173.00**
5167	PROJ/SURVIVAL MECHANISM	727376.00	0.00	323.00	**727699.00**
5168	PROJ/VERMEER STUDY	1473089.00	0.00	0.00	**1473089.00**
5169	SAFETY OF MELPERONE	359164.00	0.00	0.00	**359164.00**
5170	DR.ASHA KISHORE	2745466.00	0.00	0.00	**2745466.00**
5171	DOSE CONFIRMATION GLIOBLASTOMA…	-35.00	0.00	35.00	**0.00**
5172	C.KESAVADAS	121186.00	0.00	3200.00	**124386.00**
5173	DR.DINESH NAYAK	329882.00	487390.00	0.00	**817272.00**
5174	CHANGES IN SLEEP WAKEFULNESS-Dr.Mohanku.	108765.00	0.00	0.00	**108765.00**
5175	SURGICAL TRAIL IN LOBAR INTRACEREBRAL	39125.27	0.00	0.00	**39125.27**
5176	WOMENT COMPONANT PLAN	1778407.25	0.00	0.00	**1778407.25**
5177	DR.KRISHNAMANOHAR	35898.00	58078.00	0.00	**93976.00**
5180	DR.KANNAN SRINIVASAN	118316.00	428072.00	0.00	**546388.00**
5181	DR.ASHA KISHORE	0.00	0.00	0.00	**0.00**
5182	DR.SANJEEV.V.THOMAS	2931523.00	5100000.00	0.00	**8031523.00**
5183	DR.K.R.THANKAPPAN	6929086.00	13465803.00	0.00	**20394889.00**
5184	DR.JAWAHAR	954536.00	500000.00	0.00	**1454536.00**

CAPITAL EXPENDITURE			UTILISATION REVENUE EXPENDITURE					
FIXED ASSETS	OTHERS	TOTAL	SALARIES WAGES	RENT/ CONSUMABLES	OTHER ADM EXP	TOTAL	SUB TOTAL	NET BALANCE
0.00	0.00	**0.00**	0.00	0.00	215915.00	**215915.00**	**215915.00**	**1743062.00**
0.00	0.00	**0.00**	0.00	0.00	713.00	**713.00**	**713.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**2761.00**
0.00	0.00	**0.00**	0.00	0.00	98.00	**98.00**	**98.00**	**0.00**
37634.00	0.00	**37634.00**	347477.00	87495.00	400182.00	**835154.00**	**872788.00**	**2586136.28**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**96580.32**
0.00	0.00	**0.00**	0.00	0.00	5481.00	**5481.00**	**5481.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**240383.36**
0.00	0.00	**0.00**	0.00	0.00	483.00	**483.00**	**483.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	124882.00	**124882.00**	**124882.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	17341.00	**17341.00**	**17341.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**138671.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**39137.00**
0.00	0.00	**0.00**	0.00	0.00	13627.00	**13627.00**	**13627.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	1539.00	**1539.00**	**1539.00**	**0.00**
0.00	0.00	**0.00**	30000.00	0.00	538155.00	**568155.00**	**568155.00**	**428796.60**
0.00	0.00	**0.00**	0.00	0.00	0.00	**137671.00**	**137671.00**	**0.00**
0.00	0.00	**0.00**	0.00	421358.00	9034.00	**430392.00**	**430392.00**	**233660.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**354383.00**
0.00	0.00	**0.00**	268427.00	25048.00	213315.00	**506790.00**	**506790.00**	**870573.50**
0.00	0.00	**0.00**	0.00	156151.00	39353.00	**195504.00**	**195504.00**	**0.00**
0.00	0.00	**0.00**	72842.00	0.00	1828.00	**74670.00**	**74670.00**	**71123.00**
68832.00	0.00	**68832.00**	0.00	59925.00	100.00	**60025.00**	**128857.00**	**545912.00**
36869.00	0.00	**36869.00**	138065.00	93958.00	312386.00	**544409.00**	**581278.00**	**2156226.00**
0.00	0.00	**0.00**	0.00	0.00	7638.00	**7638.00**	**7638.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	3752.00	**3752.00**	**3752.00**	**0.00**
0.00	0.00	**0.00**	0.00	8138.75	0.00	**8138.75**	**8138.75**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	3481.00	**3481.00**	**3481.00**	**0.00**
0.00	0.00	**0.00**	89544.00	0.00	109629.00	**199173.00**	**199173.00**	**0.00**
0.00	0.00	**0.00**	265548.00	133796.00	119869.00	**519213.00**	**519213.00**	**208486.00**
0.00	0.00	**0.00**	7500.00	0.00	146559.00	**154059.00**	**154059.00**	**1319030.00**
0.00	0.00	**0.00**	0.00	0.00	35916.00	**35916.00**	**35916.00**	**323248.00**
0.00	0.00	**0.00**	0.00	0.00	274547.00	**274547.00**	**274547.00**	**2470919.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
0.00	0.00	**0.00**	44267.00	15600.00	15196.00	**75063.00**	**75063.00**	**49323.00**
65976.00	0.00	**65976.00**	123177.00	36927.00	8034.00	**168138.00**	**234114.00**	**583158.00**
0.00	0.00	**0.00**	84000.00	0.00	5000.00	**89000.00**	**89000.00**	**19765.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**39125.27**
0.00	0.00	**0.00**	0.00	0.00	1632263.00	**1632263.00**	**1632263.00**	**146144.25**
0.00	0.00	**0.00**	24000.00	0.00	3698.00	**27698.00**	**27698.00**	**66278.00**
0.00	0.00	**0.00**	304366.00	0.00	172373.00	**476739.00**	**476739.00**	**69649.00**
0.00	0.00	**0.00**	0.00	14350.00	0.00	**14350.00**	**14350.00**	**-14350.00**
0.00	0.00	**0.00**	0.00	0.00	997794.00	**997794.00**	**997794.00**	**7033729.00**
190889.00	0.00	**190889.00**	2098150.00	711858.00	1741360.00	**4551368.00**	**4742257.00**	**15652632.00**
0.00	0.00	**0.00**	0.00	173887.00	0.00	**173887.00**	**173887.00**	**1280649.00**

CODE	NAME OF GRANTEE/PRINCIPAL INVESTIGATOR	FUND-WISE BREAK UP			TOTAL
		OPENING BALANCE	ADDITIONS TO FUND GRANTS	OTHER RECEIPTS	
SCHEDULE 3-EARMARKED/ENDOWMENT FUNDS					
5185	A MULTICENTRE DOUBLE BLIND..DR.ASHA KISHORE	141207.00	121942.00	0.00	**263149.00**
5187	DR.SANJEEV.V.THOMAS	203932.00	0.00	0.00	**203932.00**
5188	DR.K.RADHAKRISHNAN	208471.00	766700.00	0.00	**975171.00**
5189	DR.HARIKRISHNAN	267947.00	0.00	0.00	**267947.00**
5190	DR.MALARAMANATHAN	95972.00	0.00	0.00	**95972.00**
5191	DR.ASHA KISHORE	1011057.00	0.00	0.00	**1011057.00**
5192	DR.K.R.THANKAPPAN	400242.00	124882.50	0.00	**525124.50**
5193	DR.MALARAMANATHAN	261302.00	350000.00	0.00	**611302.00**
5194	DR.K.R.THANKAPPAN	3670214.00	0.00	0.00	**3670214.00**
5195	DR.ASHA KISHORE	9932.00	0.00	0.00	**9932.00**
5196	DR.SHIVKUMAR	1218871.00	0.00	0.00	**1218871.00**
5198	DR.RENUKA NAIR	0.00	562066.00	0.00	**562066.00**
5199	DR.JAYAKUMAR	0.00	500000.00	10696.00	**510696.00**
5200	DR.KANNAN SRINIVASAN	0.00	38571.00	0.00	**38571.00**
5201	DR.ASHA KISHORE	0.00	1356018.50	0.00	**1356018.50**
5202	DR.JAYASREE	0.00	1593975.00	0.00	**1593975.00**
5205	DR.SURESH NAIR	0.00	225000.00	55150.00	**280150.00**
5206	DR.ASHA KISHORE	0.00	0.00	10000.00	**10000.00**
5207	DR.JAYASREE/A.K.GUPTA	0.00	150000.00	0.00	**150000.00**
5208	DR.K.SRINIVASAN	0.00	1021735.00	0.00	**1021735.00**
5210	DR.K.R.THANKAPPAN	0.00	9200000.00	0.00	**9200000.00**
5212	DR.S.HARIKRISHNAN	0.00	534600.00	0.00	**534600.00**
5214	DR.ASHA GOPINATHAN	0.00	396000.00	0.00	**396000.00**
6054	PROJ/DR RADHAKRISHNAN NEUROLOGY	113667.50	0.00	656847.04	**770514.54**
6055	MOVEMENT/DR. ASHA KISHORE	-169139.00	0.00	0.00	**-169139.00**
6057	PUBLISHING JOURNAL ARTICLE/DR. THANKAPPAN	494330.00	0.00	801.00	**495131.00**
6058	ATHIYANOOR SCT ACTION/DR.K.R.T	21006.00	0.00	0.00	**21006.00**
6060	SILVERLINE PUBLICATION/DR.RADHAKRISHNAN	-62114.00	0.00	62114.00	**0.00**
6064	SPEECH THERAPY	-174300.00	0.00	0.00	**-174300.00**
6065	COMPREHENSIVE CENTRE FOR SLEEP DIS ORD.	-424001.00	0.00	4073542.00	**3649541.00**
7101	ADVANCES TO PI	-85297.00	0.00	1489546.00	**1404249.00**
7102	AMT.PAYABLE TO PROJECT STAFF	8682.00	0.00	105567.00	**114249.00**
2721	ADVANCE FOR SUPPLIES PROJECT	-64387.00	0.00	3111571.00	**3047184.00**
	TOTAL	**45497265.36**	**48509225.00**	**10835329.04**	**104841819.40**
1014	NEW PENSION SCHEME	17265797.00	18554876.00	0.00	**35820673.00**
1301	EMPLOYEES PENSION FUND	75180449.65	105751651.00		**180932100.65**
1075	PATIENT WELFARE FUND	1735073.00	178211.00		**1913284.00**
1076	PWF EXPENSES	1549.35	157593.00		**159142.35**
1077	INSTITUTIONAL ETHICS COMMITTEE FUND	0.00	4099942.00		**4099942.00**
1080	STAFF BENEVOLENT FUND	2189353.25	4114610.00		**6303963.25**
1079	VICE CHANCELLORS CONFERENCE FUND - Hospital	0.00	677133.00		**677133.00**
	TOTAL	**96372222.25**	**133534016.00**	**0.00**	**229906238.25**
	Total (1)	**141869487.61**	**182043241.00**	**10835329.04**	**334748057.65**

CAPITAL EXPENDITURE			UTILISATION REVENUE EXPENDITURE					
FIXED ASSETS	OTHERS	TOTAL	SALARIES WAGES	RENT/ CONSUMABLES	OTHER ADM EXP	TOTAL	SUB TOTAL	NET BALANCE
0.00	0.00	**0.00**	0.00	0.00	26315.00	**26315.00**	**26315.00**	**236834.00**
0.00	0.00	**0.00**	16868.00	0.00	3839.00	**20707.00**	**20707.00**	**183225.00**
0.00	0.00	**0.00**	0.00	50323.00	132922.00	**183245.00**	**183245.00**	**791926.00**
0.00	0.00	**0.00**	38516.00	11924.00	22252.00	**72692.00**	**72692.00**	**195255.00**
0.00	0.00	**0.00**	0.00	0.00	12916.00	**12916.00**	**12916.00**	**83056.00**
0.00	0.00	**0.00**	108560.00	38070.00	87696.00	**234326.00**	**234326.00**	**776731.00**
3957.00	0.00	**3957.00**	0.00	0.00	49958.00	**49958.00**	**53915.00**	**471209.50**
0.00	0.00	**0.00**	156234.00	0.00	182682.00	**338916.00**	**338916.00**	**272386.00**
0.00	0.00	**0.00**	325882.00	0.00	452109.00	**777991.00**	**777991.00**	**2892223.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**9932.00**
0.00	0.00	**0.00**	177291.00	954498.00	42080.00	**1173869.00**	**1173869.00**	**45002.00**
0.00	0.00	**0.00**	158504.00	257443.00	52745.00	**468692.00**	**468692.00**	**93374.00**
0.00	0.00	**0.00**	135549.00	0.00	800.00	**136349.00**	**136349.00**	**374347.00**
0.00	0.00	**0.00**	0.00	38411.00	0.00	**38411.00**	**38411.00**	**160.00**
0.00	0.00	**0.00**	56000.00	0.00	0.00	**56000.00**	**56000.00**	**1300018.50**
931770.00	0.00	**931770.00**	79742.00	0.00	94609.00	**174351.00**	**1106121.00**	**487854.00**
0.00	0.00	**0.00**	0.00	0.00	55987.00	**55987.00**	**55987.00**	**224163.00**
0.00	0.00	**0.00**	0.00	0.00	10000.00	**10000.00**	**10000.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	143308.00	**143308.00**	**143308.00**	**6692.00**
0.00	0.00	**0.00**	163929.00	0.00	538086.00	**702015.00**	**702015.00**	**319720.00**
0.00	0.00	**0.00**	0.00	0.00	345909.00	**345909.00**	**345909.00**	**8854091.00**
0.00	0.00	**0.00**	8000.00	0.00	0.00	**8000.00**	**8000.00**	**526600.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**396000.00**
0.00	0.00	**0.00**	85516.00	0.00	62114.00	**147630.00**	**147630.00**	**622884.54**
0.00	0.00	**0.00**	89274.00	0.00	0.00	**89274.00**	**89274.00**	**-258413.00**
0.00	0.00	**0.00**	81643.00	8251.00	218687.00	**308581.00**	**308581.00**	**186550.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**21006.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
0.00	0.00	**0.00**	217107.00	0.00	0.00	**217107.00**	**217107.00**	**-391407.00**
2434884.00	0.00	**2434884.00**	542406.00	1500.00	52630.00	**596536.00**	**3031420.00**	**618121.00**
0.00	0.00	**0.00**	0.00	0.00	1484546.00	**1484546.00**	**1484546.00**	**-80297.00**
0.00	0.00	**0.00**	0.00	0.00	112096.00	**112096.00**	**112096.00**	**2153.00**
0.00	0.00	**0.00**	0.00	0.00	3110896.00	**3110896.00**	**3110896.00**	**-63712.00**
3837568.00	**0.00**	**3837568.00**	**11723863.30**	**4404784.75**	**14334811.60**	**33786645.15**	**37624213.15**	**67217606.25**
0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**35820673.00**
			153346561.00			153346561.00	**153346561.00**	**27585539.65**
						0.00	**0.00**	**1913284.00**
					179193.00	179193.00	**179193.00**	**-20050.65**
					158577.00	158577.00	**158577.00**	**3941365.00**
					4188446.00	4188446.00	**4188446.00**	**2115517.25**
					409708.00	409708.00	**409708.00**	**267425.00**
0.00	**0.00**	**0.00**	**153346561.00**	**0.00**	**4935924.00**	**158282485.00**	**158282485.00**	**71623753.25**
3837568.00	**0.00**	**3837568.00**	**165070424.30**	**4404784.75**	**19270735.60**	**192069130.15**	**195906698.15**	**138841359.50**

CODE	NAME OF GRANTEE/PRINCIPAL INVESTIGATOR	FUND-WISE BREAK UP			TOTAL
		OPENING BALANCE	ADDITIONS TO FUND GRANTS	OTHER RECEIPTS	
SCHEDULE 3-EARMARKED/ENDOWMENT FUNDS					
5000	PROJECT SUSPENSE	603099	274963	-	878062
5057	DYNAMIC ORTHOPAEDIC PVT LTD, HYDROXY	36028.55	0	0	36028.55
5089	DETEC & TREAT OF CANCER BY LASER	3959	0		3959
7000	MISCELLENEOUS PROJECT	30944.09	0		30944.09
7001	PRO;SAHAJANAND VASCU;DR.AURTHUR	3854257.75	799200		4653457.75
7002	Dr.TOMS LABORATORY, Dr. K.KRISHNAN	23151	0		23151
7003	PROJ:D.S.T. DR.P.V. MOHANAN	2537.4	0		2537.4
7004	PROJ:ATMRF:DR LISSY KRISHNAN	551.25	0		551.25
7005	PROJECT:DYNAMIC ORTHOPAEDICS	13656	0		13656
7006	PROJ: D.S.T. D.S.NAGESH	360912	0		360912
7008	NMITLI, PROJECT C.S.I.R	410465.9	0		410465.9
7009	CHITOSAN BASED WAINED DRESSING	20938.75	0		20938.75
7011	DST-FAB: CLINICALLY/SIG:SHAPE OF HEVA	187497	190000	7206	384703
7014	AUROLAB,ARAVIND EYE HOSPITAL	13674	0		13674
7015	TTK.HEALTHCARE.DEVELOPMENT OF VALV	47988	0		47988
7016	INDO-GERMAN COMMITTEE MEETING-DST	6484	0		6484
7017	HINDUSTAN LATEX.EVALU:BLOOD BAG	544234.5	955844		1500078.5
7018	ALL INDIA COUNCIL FOR TECHNI:EDU:SH	162303	0	0	162303
7019	DST.NIRANJAN	69847	0		69847
7020	IFCPAR-DR.JAYAKRISHNAN	188	0	0	188
7022	DST-LBFDPSBC-DR.SHARMA	79385	0		79385
7023	DEV: HYDRO-CEPHALUS-HINDUSTAN LATEX	45510	0		45510
7026	DEV.HEART VALVE-DST.MURALEE	811	0		811
7027	STED-DR T V KUMARY-INVITRO	5089	0		5089
7029	DONERG/LIFE SCIENCE BOARD	6876	0	0	6876
7031	DBT/DR P V MOHAN/DEV INVITROPYRO	80564	0		80564
7032	DST. DR. ANNINE/BONE REGENERATION	29166	0	0	29166
7033	BIOFUNCTIONAL EVALUATION DR. UMASANKER	72581	0		72581
7034	DST. DR. NIRMALA RACHEL	14664	0		14664
	DST-H.K.VARMA	95433	0		95433
7036	INVITRO HEMO CAMPABILITY/ DR. LISSY	337424	0		337424
7037	INVIVO EVALUATION/ STED/DR. LISSY	6205	0		6205
7039	JNC/ASR/DR. MOHANAN'STUDY OF ACCUTE… ..	44684	0		44684
7040	BIOMED/ C.V. MURALEEDHARAN	44000	0		44000
7041	CSIR-GRANT-ASHA S MATHEW,PHD STUDENT	179799	318405		498204
7042	CSIR-GRANT-BERNADETTE K. MADATHIL,PHD	25870	0		25870
7043	CSIR-GRANT-SAILAJA.G.S.SRF	9067	0		9067
7044	LISI NO TRIAL TRIAL MERIND	20611.65	230000		250611.65
7045	NIRMALA RACHEL, CSIR	14063	0		14063
7047	U.G.C. GRANT- RESEARCH FELLOW	80254	271171		351425
7048	CSIR GRANT- JOSENA JOSEPH	27714	213200		240914
7049	CSIR GRANT - MARY VARGHESE	30856	129267		160123
7051	CSIR GRANT - MANITHA B NAIR	9475	97242		106717
7052	DBT/DR.PRABHA/DEV. OF TEMP - RES - CO-OPLY	-229010.25	0		-229010.25
7053	DR.SREENIVASAN/DEVEL.OF TEMP.RES.CO-OPLY	222756	0		222756
7054	DST-DR.ANOOP-DIFF:EXPR :RAT BRAIN……	44434	0		44434

CAPITAL EXPENDITURE			UTILISATION REVENUE EXPENDITURE					
FIXED ASSETS	OTHERS	TOTAL	SALARIES WAGES	RENT/ CONSUMABLES	OTHER ADM EXP	TOTAL	SUB TOTAL	NET BALANCE
-	-	0	422074		-	422074	422074	455988
		0	0		837	837	837	35191.55
		0	0		0	0	0	3959
		0			0	0	0	30944.09
		0	319476		325655	645131	645131	4008326.75
		0	9000		275	9275	9275	13876.00
		0				0	0	2537.4
		0			0	0	0	551.25
		0			0	0	0	13656
		0			106904	106904	106904	254008
0		0	20984		20778	41762	41762	368703.9
		0			0	0	0	20938.75
		0			244675	244675	244675	140028
		0				0	0	13674
		0			0	0	0	47988
		0			1077	1077	1077	5407
		0	40607		337501	378108	378108	1121970.5
		0			0	0	0	162303
		0			0	0	0	69847
		0	0	0	0	0	0	188
		0	0	0	0	0	0	79385
		0			0	0	0	45510
0		0	0		0	0	0	811
		0			0	0	0	5089
		0	0		0	0	0	6876
		0	0		0	0	0	80564
		0	0	0	0	0	0	29166
		0			0	0	0	72581
0		0	0		0	0	0	14664
		0				0	0	95433
		0	.		103791	103791	103791	233633
		0				0	0	6205
		0	0		0	0	0	44684
		0				0	0	44000
		0	377259	0	39115	416374	416374	81830
		0	0		0	0	0	25870
		0	0	0	0	0	0	9067
		0	210000	0	13939	223939	223939	26672.65
		0	0	0	0	0	0	14063
		0	271740	0	29445	301185	301185	50240
		0	193200		241	193441	193441	47473
		0	0	0	7770	7770	7770	152353
		0	84000	0	6735	90735	90735	15982
		0	0		0	0	0	-229010.25
		0	0		200137	200137	200137	22619
		0	0		0	0	0	44434

CODE	NAME OF GRANTEE/PRINCIPAL INVESTIGATOR	FUND-WISE BREAK UP			TOTAL
		OPENING BALANCE	ADDITIONS TO FUND GRANTS	OTHER RECEIPTS	
SCHEDULE 3-EARMARKED/ENDOWMENT FUNDS					
7055	CSIR-NMITLI SCHEME-C.V.MURALEEDHARAN	10345646	0		10345646
7056	D.S.T.ROYJOSEPH, BONE GRAFT SUB:SPINAL	110047	0		110047
7057	DST - PROJECT.DR.JAYABALAN	16071	0		16071
7059	DBT-DR. PRABHA D NAIR, ISLET IMMUN…...	109232	0		109232
7060	ICMR PROJECT/ SUDHAKAR MUTHALEE	131800	495754	69000	696554
7061	DR. UMASANKAR/PRELIMI:EVALU:BIODEGRADABLE	708178	0		708178
7062	DR. LIZY-SAHAJA:EVA "STENT "INVITRO…..	162117	583577		745694
7063	DR.P.V.MOHAN, SHAJANAD	214696	0		214696
7065	DR.T.V.KUMARI, DBT.BIOGENE	-421480	0		-421480
7066	DR.B.S.GEETHA.PDF,STED	15321	0		15321
7067	DBT.DR.JAYABALAN ,DEV:&STUDIES….	-27459	0		-27459
7068	STED .DR.JAYAKRISHNAN .SYNTHESIS… ..	-6030	124804		118774
7069	VSSC - PROJECT. D.S. NAGESH	359473	0		359473
7070	CHO PROJECT - 5146 JAYASREE	-872	0		-872
7071	STEC-PROJECT: DR.MAYA NANDKUMAR	-73954	136167		62213
7072	SAHAJANAND MED.TECH. C.V.MURALIDHARAN	76292	0		76292
7073	STUDY PROJECT:DR.P.V.MOHANAN	125553	0	59491	185044
7074	STUDY PROJECT: CLRI- DR.MOHAN	289303	0		289303
7075	STUDY PROJECT - BIOSYNC SCI	11935	0		11935
7076	ARROW INTERNATIONAL : DR.UMASHANKAR	399773	0		399773
7077	UMHOU SENEMBYU:DR.UMASHANKAR	603714	0		603714
7079	DBT- DR.SREENIVASAN	339399	0		339399
7080	DBT-DR.MAYA- TISSUE ENGINEERING HYBRID	367248	0		367248
7081	USV LTD. MUMBAI - DR.MOHAN	88349	0		88349
7082	INDO-US JOINT PROJECT	735206	0	16330	751536
7083	ARROW HAEMO DIALYSIS	30882	0		30882
7085	DR.R.V.THAMPAN - CSIR	26381	0		26381
7086	HORMONE RELEASING INTRA DEVICES	413929	521063		934992
7087	CSIR - KALADHAR - BST	39103	0		39103
7088	FEASIBILITY STUDY	1000000	0		1000000
7089	PROJ/7089/DEV.PORTABLE SAFETY	1291450	0		1291450
7090	PROJ/7090/TISSUE ENGINEERS VASCULAR	2449179	2606000		5055179
7091	PROJ/7091/NOVEL MICROPHORES	-15272	0		-15272
7092	PROJ/7092/SEA FOOD	151088	0		151088
7093	PROJ/7093/CSIR GRANT-LPA	120952	257068		378020
7094	PROJ/7094/CSIR GRANT-GIJU	29942	0		29942
7095	PROJ/7095/CSIR GRANT-VIOLA.B.MORRIS	6002	0		6002
7096	PROJ/7096/CSIR GRANT-DEVI	148261	0		148261
7097	PROJ/7097/ACCELERATED AGEING	489264	241148		730412
7098	PROJ/7098/EVALN OF NTU DRUG	1355655	0		1355655
7099	PROJ/7099/BCL	182053	0		182053
7100	PROJ/7100/ITR PROGRAMME	0	125000		125000
7101	PROJ/7101/CSIR/SONIA.T.A	20000	221600		241600
7102	PROJ/7102/CSIR/LYNDA THOMAS	16666	221600		238266
7103	PROJ/7103/CSIR/VIDYARAJ	13426	110800		124226
7104	PROJ/7104/CSIR/RENJITH.P.NAIR	14222	192800		207022

CAPITAL EXPENDITURE			UTILISATION REVENUE EXPENDITURE					
FIXED ASSETS	OTHERS	TOTAL	SALARIES WAGES	RENT/ CONSUMABLES	OTHER ADM EXP	TOTAL	SUB TOTAL	NET BALANCE
0		0	369955		1527543	1897498	1897498	8448148
		0	0	0	0	0	0	110047
		0	0		0	0	0	16071
0		0	0		36362	36362	36362	72870
		0	529568		67857	597425	597425	99129
		0	0		0	155101	155101	553077
		0	107553		182207	289760	289760	455934
	0	0	10651		204045	214696	214696	0
		0	0		270	270	270	-421750
		0	0		0	0	0	15321
		0	0		0	0	0	-27459
		0	34610		84164	118774	118774	0
		0	294861		184235	479096	479096	-119623
		0	0		0	0	0	-872
		0	30000		25986	55986	55986	6227
		0	0		0	0	0	76292
	0	0	188430		0	188430	188430	-3386
		0	0		0	0	0	289303
		0	0		0	0	0	11935
		0	0		0	0	0	399773
		0	0		0	0	0	603714
0		0	16000		70098	86098	86098	253301
0		0	278626		1033921	1312547	1312547	-945299
		0				0	0	88349
		0	0		750658	750658	750658	878
		0	0	0	0	0	0	30882
		0	0		0	0	0	26381
0		0	420907		284187	705094	705094	229898
		0	0		0	0	0	39103
		0				0	0	1000000
	0	0			5000	5000	5000	1286450
		0	697300		1287999	1985299	1985299	3069880
		0	96600		190859	287459	287459	-302731
		0	0		4609	4609	4609	146479
		0	230400		77891	308291	308291	69729
		0	0			29942	29942	0
		0	0			0	0	6002
		0	0		148261	148261	148261	0
		0	217586		70733	288319	288319	442093
		0	0		0	0	0	1355655
		0	43230		116877	160107	160107	21946
			65000		0	65000	65000	60000
		0	201600		15564	217164	217164	24436
		0	134400		0	134400	134400	103866
		0	77894		11200	89094	89094	35132
		0	172800		333	173133	173133	33889

CODE	NAME OF GRANTEE/PRINCIPAL INVESTIGATOR	FUND-WISE BREAK UP			TOTAL
		OPENING BALANCE	ADDITIONS TO FUND GRANTS	OTHER RECEIPTS	
SCHEDULE 3-EARMARKED/ENDOWMENT FUNDS					
7105	PROJ/7105/CSIR/ARJUN NAMBOODIRI	6560	221600		228160
7106	PROJ/7106/CSIR/NITHYA JOSEPH	0	263190		263190
7107	PROJ/7107/CSIR/NEENA & 2 FELLOWS	0	235632		235632
7108	PROJ/7108/CSIR/FRANCIS.B.FERNANDEZ	0	238336		238336
7109	PROJ/7109/CSIR/TARA.S	0	147822		147822
7110	PROJ/7110/CSIR/DEEPA.R	0	126438		126438
7111	PROJ/7111/CSIR/SHEEJA LIZA EASO	0	64230		64230
7200	JOINT PROGRAME/M.TECH	10746175	0		10746175
8001	PROJ/8001/PROGRAM SUPPORT &TISSUE	14147736	1845000		15992736
8002	PROJ/8002/PROGRAM SUPPORT & TISSUE	-1073006	1513000	30000	469994
8003	PROJ/8003/PROGRAM SUPPORT & TISSUE	79652	1215000		1294652
8004	PROJ/8004/PROGRAM SUPPORT & TISSUE	172822	495000	200	668022
8005	PROJ/8005/PROGRAM SUPPORT & TISSUE	-418170	747000	600	329430
8006	PROJ/8006/BIOCONJUGATION NANO MAT.	140824	335000		475824
8007	PROJ/8007/PRODUCTS OF POLYMER	1300147	445000		1745147
8008	PROJ/8008/CSIR GRANT-PADMAJA.P.NAMBI	9712	235728		245440
8009	PROJ /8009/DBT/DR.T.V.ANILKUMAR/DE…TISSUE	-65433	760800		695367
8010	PROJ /8010/DBT/DR.NIRANJAN/IMPLATED….CONTROL	76050	0		76050
8011	PROJ/8011/NANOFRONT/DR.NIRANJAN/INTRAMAS	139900	0		139900
8012	PROJ/8012/VSSC/DR.NIRANJAN/DESIGN STUDIES	1465935	0		1465935
8013	PROJ/8013/DST/DR.C.P.SHARMA/ FADDS	23622774	6310000	1003824	30936598
8014	PROJ /8014/DBT/DR.ROY JOSEPH /DEV….V.GRAFT	479910	0		479910
8015	PROJ /8015/DR.ANOOPKUMAR/PROGRAMME…	82337	0		82337
8016	PROJ /8016/DBT/DR.UMASHANKAR/DEVE….APPLN.	1094540	1969000	10385	3073925
8017	PROJ/8017/AYUTECH/DR.UMASANKAR	365300			365300
8018	PROJ/8018/ICMR/DR.P.V.MOHANAN	367584	292514		660098
8019	PROJ/8019/STEC/DR.P.RAMESH	440000	0		440000
8020	PROJ/8020/CSIR/DR.LISSY KRISHNAN	0	1033000		1033000
8021	PROJ/8021/ANGIOGENESIS EXP/DR.UMASHANKAR	0	1000000		1000000
8022	PROJ/8022/AIR POLLUTION/SUJESH SREEDHAR	0	266000		266000
8023	PROJ/8023/KSCSTE/DR.H.K.VARMA	0	237600		237600
8024	PROJ/8024/IIT/DR.P.R.ANILKUMAR	0	463944		463944
8025	PROJ/8025/	0	2805700		2805700
8026	PROJ/8026/	0	100000		100000
8027	PROJ/8027/DR.P.V.MOHANAN	0	950000		950000
8028	PROJ/8028/DR.DIKSHA PAINULY	0	576000		576000
8029	PROJ/8029/INDO-JAPAN	0	200000		200000
8030	PROJ/STUDY/DR.UMASHANKAR	0	1162350		1162350
8031	PROJ/8031	0	1450000		1450000
6034	INDO-DUTCH WORKSHOP-MEDICAL DEVICE	0	636212		636212
6035	INDO-DUTCH WORKSHOP - LIFE SCIENCE	0	636171		636171
	Total (2)	**83335087.59**	**38293940**	**1197036.00**	**122826063.60**

CAPITAL EXPENDITURE			UTILISATION REVENUE EXPENDITURE					
FIXED ASSETS	OTHERS	TOTAL	SALARIES WAGES	RENT/ CONSUMABLES	OTHER ADM EXP	TOTAL	SUB TOTAL	NET BALANCE
		0	201600		7000	208600	208600	19560
			157590		8342	165932	165932	97258
		0	211084		0	211084	211084	24548
		0	213678		0	213678	213678	24658
		0	132480		0	132480	132480	15342
		0	113341		0	113341	113341	13097
		0	57600		0	57600	57600	6630
		0	701684		2019728	2721412	2721412	8024763
0		0	977180		14066322	15043502	15043502	949234
0		0	427186		564065	991251	991251	-521257
0		0	244039		736281	980320	980320	314332
0		0	46150		197938	244088	244088	423934
0		0	171319		107253	278572	278572	50858
		0	165600		240921	406521	406521	69303
0		0	240310		1016869	1257179	1257179	487968
		0	225728		14139	239867	239867	5573
0		0	165600		1026662	1192262	1192262	-496895
0		0	72271		76467	148738	148738	-72688
		0				0	0	139900
		0	41400		61621	103021	103021	1362914
0		0	1796614		28946655	30743269	30743269	193329
0		0	9213		487760	496973	496973	-17063
		0	0		77771	77771	77771	4566
0		0	372507		2596796	2969303	2969303	104622
		0				0	0	365300
		0	205960		269066	475026	475026	185072
			69677		101155	170832	170832	269168
			150220		191251	341471	341471	691529
			0		268058	268058	268058	731942
			0		0	0	0	266000
			56000		2646	58646	58646	178954
			76377		245488	321865	321865	142079
			43781		19839	63620	63620	2742080
			0		8600	8600	8600	91400
			0		0	0	0	950000
			42581		2400	44981	44981	531019
			0		6000	6000	6000	194000
			0		0	0	0	1162350
			119458		0	119458	119458	1330542
					574298	574298	574298	61914
					544337	544337	544337	91834
0.00	**0**	**0.00**	**13186122.00**	**0**	**62305462.00**	**75491584.00**	**76165044.00**	**46661019.59**

Grand Total Schedule 3 - (1) + (2) **185502379.09**

PARTICULARS	2009-2010 [Rs.]	2008-2009 [Rs.]
SCHEDULE 4-SECURED LOANS AND BORROWINGS:		
1. Central Government	--	--
2. State Government (Specify)	--	--
3. Financial Institutions	--	--
a) Term Loans	--	--
b) Interest accured and due	--	--
4. Banks:	--	--
a) Term Loans-Interest accured and due	--	--
b)Other Loans(specify)- Interest accured and due-Over draft	--	--
5. Other Institutions and Agencies	--	--
6. Debentures and Bonds	--	--
7. Others(Specify)	--	--
Against OD facility- cheques issued	--	--
TOTAL		

	2009-2010	2008-2009
SCHEDULE 5-UNSECURED LOANS AND BORROWINGS	[Rs.]	[Rs.]
1. Central Government	--	--
2. State Government (Specify)	--	--
3. Financial Institutions	--	--
4. Banks:	--	--
a) Term Loans	--	--
b)Other Loans(specify)	--	--
5. Other Institutions and Agencies	--	--
6. Debentures and Bonds	--	--
7. Fixed Deposits	--	--
8. Others(Specify)	--	--
TOTAL		

PARTICULARS	2009-2010 [Rs.]	2008-2009 [Rs.]
SCHEDULE 6-DEFERRED CREDIT LIABILITIES:		
a) Acceptances secured by hypothecation of capital equipment and other assets	--	--
b) Others	--	--
TOTAL	--	--
SCHEDULE 7-CURRENT LIABILITIES AND PROVISIONS		
A. CURRENT LIABILITIES		
1. Acceptances		
2. Sundry Creditors:		
a) For Goods	49719088.00	48612935.00
b) Others	3510117.00	2752338.00
3. Advances Received	30533245.93	36985002.93
4. Interest accured but not due on:	0.00	0.00
a) Secured Loans / borrowings	0.00	0.00
b) Unsecured Loans / borrowings	0.00	0.00
5. Statutory Liabilities:	0.00	0.00
a) Overdue	3859160.85	6719141.25
b) Others	27511343.44	19509884.44
6. Other current Liabilities	0.00	0.00
TOTAL(A)	115132955.22	114579301.62
B.PROVISIONS		
1. For Taxation	--	--
2. Gratuity	--	--
3. Total Project Fund	--	--
4. Accumulated Leave Encashment	--	--
5. Trade Warranties/Claims	--	--
6. Others(Specify) Audit fee	--	--
Sinking fund contribution to invest	14477861.00	7690852.00
TOTAL(B)	14477861.00	7690852.00
TOTAL(A+B)	**129610816.22**	**122270153.62**

SCHEDULE 8- FIXED ASSETS

PARTICULARS	GROSS BLOCK		
	Cost/valuation as at the beginning of the year (01.04.2009)	**Additions during the year 2009-10**	**Deductions during the year 2009-10**
A. FIXED ASSETS:			
1. LAND:			
a) Freehold	1600169.51	0.00	0.00
b) Leasehold			
2.BUILDINGS:			
a) On Freehold Land	40710721.88	685262.00	0.00
b) On Leasehold Land			
c) Ownership Flats/Premises			
d) Superstructures on Land not belonging to the entity	121528378.88	650196.00	
3. PLANT MACHINERY & EQUIPMENT	1078581027.73	245338688.43	2420864.00
4. VEHICLES	4293791.74	2843215.00	76740.00
5. FURNITURE,FIXTURES	35557686.61	4522818.00	
6. OFFICE EQUIPMENT	955928.54	2550.00	
7. COMPUTER/PERIPHERALS			
8. ELECTRIC INSTALLATIONS	15278683.67	14242246.00	
9. LIBRARY BOOKS	115257380.57	4139803.00	
10. TUBEWELLS & W.SUPPLY	174615.00	0.00	
11. OTHER FIXED ASSETS			
a)OXYGEN CYLINDERS	234319.42	0.00	
b)AIR CONDITIONERS	22224837.91	1657698.00	
c)TELEPHONE INSTALLATIONS	2067254.94	74067.00	
d) COLD ROOM INSTALLATION	341700.00		
e) WATER COOLERS	62866.50		
f) LIFT INSTALLATION	9314942.10	1936000.00	
g) KITCHEN EQUIPMENTS	1405978.22		
h)CANTEEN EQUIPMENTS	151482.59		
I) PAINTINGS	382715.63		
k) LIVESTOCK	31848.00		
l) GAS PLANT INSTALLATIONS			
m) AMC AIR CONDITIONERS			
Total for the year (Total -A)	**1450156329.44**	**276092543.43**	**2497604.00**
Total for the previous year	1316029831.44	134924232.75	797735.00
Captial Work in Progress (B)	**481499425.00**	**44547287.00**	**0.00**
Total for the year (A+B)	**1931655754.44**	**320639830.43**	**2497604.00**

* Depreciation/value for Buildings on lease hold land included.

		Depreciation		NET BLOCK	
Cost/valuation at the year end (31.03.2010)	Depreciation as at the beginning of the year (01.04.2009)	During the year 2009-10	Total up to the year end (31.03.2010)	As at the end of current year end (31.03.2010)	As at the previous year end (31.03.2009)
1600169.51	0.00	0.00	0.00	1600169.51	1600169.51
41395983.88	0.00	0.00	0.00		
122178574.88	83794987.26	3988978.58	87783965.83	75790592.93	78444113.50
1321498852.16	699000539.28	93374746.93	792375286.21	529123565.95	379605488.22
7060266.74	2967197.78	818613.79	3785811.57	3274455.17	1326593.96
40080504.61	23311225.21	2515391.91	25826617.12	14253887.49	12246461.4
958478.54	864800.65	14051.68	878852.33	79626.21	91127.89
29520929.67	12896858.50	2493610.68	15390469.18	14130460.49	2356825.17
119397183.57	77662231.06	6260242.88	83922473.93	35474709.64	37595149.51
174615.00	153503.09	3166.79	156669.87	17945.13	21111.91
234319.42	214479.28	2976.02	217455.30	16864.12	19840.14
23882535.91	17357492.49	978756.51	18336249.00	5546286.91	4867345.42
2141321.94	1803858.46	50619.52	1854477.98	286843.96	263396.48
341700.00	338522.26	476.66	338998.92	2701.08	3177.74
62866.50	62569.52	44.55	62614.07	252.43	296.98
11250942.10	4397552.41	1028008.45	5425560.86	5825381.24	4917389.69
1405978.22	642047.83	114589.56	756637.39	649340.83	763930.39
151482.59	111566.03	5987.48	117553.52	33929.07	39916.56
382715.63	331853.82	7629.27	339483.09	43232.54	50861.81
31848.00	27022.14	723.88	27746.02	4101.98	4825.86
1723751268.87	**925938307.05**	**111658615.15**	**1037596922.19**	**686154346.68**	**524218022.14**
1450156329.19	843329524.80	82609782.25	925938307.05	524218022.14	472701306.64
526046712.00	**0.00**	**0.00**	**0.00**	**526046712.00**	**481499425.00**
2249797980.87	**925938307.05**	**111658615.15**	**1037596922.19**	**1212201058.68**	**1005717447.14**

PARTICULARS	2009-2010 [Rs.]	2008-2009 [Rs.]
SCHEDULE 9 - INVESTMENTS FROM EARMARKED/ENDOWMENT FUNDS		
1. In Government Securities	78218349.00	62051451.00
2. Other approved Securities	5685391.00	5685391.00
3. Shares	0.00	0.00
4. Debentures and Bonds	0.00	0.00
5. Subsidiaries and Joint Ventures	0.00	0.00
6. Others (to be specified) Sinking Fund Investments	262760819.00	230762235.00
Technology Fund	47785251.70	40725848.70
Pension & staff funds	49422779.00	48012908.00
TOTAL	**443872589.70**	**387237833.70**
SCHEDULE 10-INVESTMENTS-OTHERS		
1. In Government Securities	--	--
2. Other approved Securities	--	--
3. Shares	--	--
4. Debentures and Bonds	--	--
5. Subsidiaries and Joint Ventures	--	--
6. Others (to be specified)	--	--
TOTAL	--	--

PARTICULARS	2009-2010 [Rs.]	2008-2009 [Rs.]
SCHEDULE 11-CURRENT ASSETS,LOANS,ADVANCES ETC		
A. CURRENT ASSETS		
1. Inventories:		
a) Stores and Spares	218394920.13	117825583.13
b) Loose Tools	4532543.00	2905956.00
c) Stock-in trade		
Finished Goods	--	--
Work-in-progress	--	--
Medicine	9097021.00	6106035.84

	2009-2010 [Rs.]	2008-2009 [Rs.]
2. Sundry Debtors:		
a) Debts Outstanding for a period exceeding six months		
b) Others	33603646.00	45918894.00
3. Cash balances in hand(including cheques/drafts and imprest)	602186.38	979541.58
4. Bank Balances:		
a) With Scheduled Banks:		
-On Current Account	1.15	1.15
-On Deposit Accounts(L.C. margin & Commitment deposit)	999816436.00	1103000000.00
-On Savings Accounts	196847544.57	185689524.74
b) With non-Scheduled Banks:	--	--
-On Current Account		
-On Deposit Accounts		
-On Savings Accounts		
5. Post-Office-Savings Accounts		
TOTAL(A)	**1462894298.23**	**1462425536.44**
B.LOANS, ADVANCES AND OTHER ASSETS	--	--
1. Loans:		
a) Staff	13349823.00	9696251.00
b) Other Entities engaged in activities/objectives similar to that of the Entity		
c) Other(specify)	--	--
2. Advances and other amounts recoverable in cash or in kind or for value to be received:		
a) On Capital Account	228107766.35	196253335.00
b) Prepayments	81005894.28	83860955.53
c) Others	--	--
3. Income Accured:	--	--
a) On Investments from Earmarked/endowment Funds		
b) On Investments-Others		
c) On Loans and Advances	--	--
d) Others		
(includes income due unrealised Rs)		
4. Claims Receivable		
From Govt of India on Plan Funds		
TOTAL(B)	**322463483.63**	**289810541.53**
TOTAL(A+B)	**1785357781.86**	**1752236077.97**

PARTICULARS	2009-2010 [Rs.]	2008-2009 [Rs.]
SCHEDULE 12- INCOME FROM SALES/SERVICES		
1. Income from Sales		
a) Sale of Finished Goods	--	--
b) Sale of Raw Material	--	--
c) Sale of Scraps	--	--
2. Income from Services		
a) Labour and processing charges	--	--
b) Professional/Consultancy Services	--	--
c) Agency Commission and Brokerage	--	--
d) Maintenance Services	--	--
e) Others (Specify)		
From Hospital Services-Gross Income Rs.477027423	289157210.00	276848871.00
Less concession to poor Patients Rs.187870213	0.00	0.00
From Projects	490889.00	2659779.00
Testing & Facility charges received	3296770.00	3732306.00
TOTAL	**292944869.00**	**283240956.00**
SCHEDULE 13- GRANTS/SUBSIDIES		
(Irrevocable Grants & Subsidies Received)		
1. Central Government	253900000.00	229640277.00
2. State Government(s)	--	--
3. Government Agencies	--	--
4. Institution/Welfare Bodies	--	--
5. International Organisations	--	--
6. Others(Specify)	--	--
TOTAL	**253900000.00**	**229640277.00**
SCHEDULE 14-FEES/SUBSCRIPTIONS		
1. Entrance Fees	874550.00	1486320.00
2. Annual Fees/ Subscriptions	3877500.00	1424600.00
3. Seminar/Program Fees	0.00	0.00
4. Consultancy Fees	0.00	0.00
5. Others(Specify) Examination Fees	347400.00	1027592.00
TOTAL	**5099450.00**	**3938512.00**

SCHEDULE 15- INCOME FROM INVESTMENTS		
(Income on Invest.from Earmarked/Endowment Funds transferred to Funds)		
1) Interest		
a) On Govt. Securities	--	--
b) Other Bonds/Debentures	--	--
2) Dividends:		
a) On Shares	--	--
b) On Mutual Fund Securities	--	--
3) Rents	766069.00	1482901.00
4) Others(Specify) On Sinking Fund	24327732.00	13876337.00
On Technology Fund	2801745.00	3016605.80
TOTAL	**27895546.00**	**18375843.80**
TRANSFERRED TO EARMARKED/ENDOWMENT FUNDS		

PARTICULARS	**2009-2010 [Rs.]**	**2008-2009 [Rs.]**
SCHEDULE 16- INCOME FROM ROYALITY,PUBLICATION ETC		
1) Income from Royalty	4649575.00	1915736.00
2) Income from Publications	--	--
3)Others(Specify)	--	--
TOTAL	**4649575.00**	**1915736.00**
SCHEDULE 17- INTEREST EARNED		
1) On Term Deposit		
a) With Scheduled Banks	102266814.00	59416322.87
b) With non-scheduled banks	--	--
c) With Institutions	--	--
d) Others	--	--
2) On Savings Account		
a) With Scheduled Banks	337526.96	1660401.02
b) With non-scheduled banks	--	--
c) Post Office Savings Account	--	--
d) Others		
3) On Loans		
a) Employees/Staff	1409305.00	1573321.00
b) Others		
4) Interest on Debtors and other Receivables	--	--
TOTAL	**104013645.96**	**62650044.89**

SCHEDULE 18- OTHER INCOME		
1. Profit on Sale/disposal of Assets:		
a) Owned assets	--	--
b) Assets acquired out of grants, or received free of cost	--	--
2. Export Incentives realized	--	--
3. Fees for Miscellaneous Services	--	--
4. Miscellaneous Income (income from Projects)	613918.00	8111631.00
Other Income	1536775.08	2276846.26
TOTAL	**2150693.08**	**10388477.26**
SCHEDULE 20-ESTABLISHMENT EXPENSES		
a) Salaries and Wages	495202933.00	347741972.80
b) Allowances and Bonus	2259497.00	1211061.50
c) Contribution to Provident Fund	0.00	24282.00
d) Contribution to other fund(specify)	0.00	0.00
e) Staff Welfare Expenses	10927478.28	10364926.80
f) Expenses on Employee's Retirement and Terminal Benefits	34751024.00	28392518.00
g) Others(Specify) PG Training & Accademic payments	81093755.00	51048038.00
TOTAL	**624234687.28**	**438782799.10**

PARTICULARS	2009-2010 [Rs.]	2008-2009 [Rs.]
SCHEDULES 21- ADMINISTRATIVE EXPENSES		
a) Purchases	250477960.84	272360981.16
b) Labour and processing expenses	0.00	0.00
c) Cartage and Carriage Inwards	165298.00	173553.00
d) Electricity and power	28666972.00	32608545.00
e) Water charges	1712398.00	3929919.00
f) Insurance	552.00	1124.00
g) Repairs and maintenance	34056603.00	21397829.00
h) Excise duty	0.00	0.00
i) Rent,Rates and Taxes	972059.00	476842.00
j) Vehicles Running and Maintenance	718442.00	460457.00
k) Postage,Telephone and Communication Charges	1947694.00	2449906.00
l) Printing and Stationary	2374991.00	2463169.00
m) Travelling and Conveyence Expenses	930803.00	1651873.50
n) Expenses on Seminar/Workshop	3467387.00	2531270.00
o) Subscription Expenses	104000.00	27810.00
p) Expenses on Fees	0.00	0.00
q) Auditors Renumeration	0.00	11236.00
r) Hospitality Expenses	0.00	0.00
s) Professional Charges	0.00	0.00
t) Provision for Bad and Doubtful Debts/Advances	0.00	0.00
u) Irrecoverable Balances Written-off	0.00	0.00
v) Packing Charges	0.00	0.00
w) Freight and Forwarding Expenses	0.00	0.00
x) Distribution Expenses	0.00	0.00
y) Advertisement and Publicity	3656452.00	4980664.00
z) Others(specify)	19186051.33	19074503.00
TOTAL	**348437663.17**	**364599681.66**
SCHEDULE 23-INTEREST		
a) On Fixed Loans	--	--
b) Bank Charges)	320839.40	86805.40
c) Others(specify)	--	--
TOTAL	**320839.40**	**86805.40**

RECEIPTS & PAYMENTS ACCOUNTS FOR THE PERIOD FROM 01-04-2009 TO 31-03-2010

RECEIPTS	2009-10 Rs.	2008-09 Rs.
I Opening Balances		
a) Cash In Hand	**979541.58**	895160.13
b) Bank Balances		
I) In Current Account	**1.15**	1.15
ii)In deposit Account		
iii)Savings Account	**185640331.36**	137902894.46
II Grant Received		
From Government of India		
Under Plan scheme	**813000000.00**	723000000.00
Plan recurring	**0.00**	0.00
Non-Plan scheme	**67700000.00**	61430000.00
Women Comp. Plan	**105000000.00**	95000000.00
III Receipts against Earmarked Funds		
a) Earmarked funds	**94355433.00**	16569813.00
b)Own funds		
IV Interest Received		
a) On Bank deposits	**88537871.96**	59897075.99
b) Loans Advances etc	**52841.00**	356470.00
V Receipts from services		
Receipts from Patient services	**361291362.95**	341892132.93
Other receipts including Royalty	**18239180.80**	24995468.65
VI Other receipts		
Grant received for Projects	**97161601.50**	91779313.03
Refund of Deposits(LC Margin)		
Other Deposit received	**274039839.60**	101401797.71
Total	**2105998004.90**	**1655120127.05**

PAYMENTS	2009-10 Rs.	2008-09 Rs.
I Expenses		
a) Establishment expenses	**716349013.18**	513101014.30
b) Administrative Expenses		
For Purchases	**503897465.60**	368538762.00
Other expenses	**150084948.00**	191348387.00
II Payments made against funds for various Projects		
As Per schedule	**103842682.00**	48789260.43
III Investments & Deposits made		
a) Out of Earmarked funds	**11691573.00**	17078476.00
b) Out of own funds	**0.00**	15500000.00
IV Expenditure on Fixed Assets & Capital work -in- progress		
a) Purchase of Fixed Assets	**98875678.00**	65080453.00
b)Capital work-in-progress		
V Refund of Loans		
VI Finance Charges(Bank charges)	**273387.40**	59675.40
VII Other Payments		
To Funds/Deposit- refunds	**323582734.00**	248956699.00
VIII Closing Balance		
a) Cash in hand	**602186.38**	979541.58
b) Bank Balances		
I) In current Account	**1.15**	1.15
ii) In Deposit Account		
iii) Savings Account	**196798336.19**	185687857.19
Total	**2105998004.90**	**1655120127.05**

PROVIDENT FUND ACCOUNT FOR THE YEAR ENDED 31-03-2010

Particulars	2009-2010 [Rupees]	2008-2009 [Rupees]
LIABILITIES		
MEMBERS BALANCE	205642088.00	191150022.00
MEMBERS CREDITS (FOR MARCH 2009)	3165180.00	3532833.00
BALANCE DUE TO MEMBERS		
NOT IN SERVICE		
Under EPF scheme	7144466.00	6602266.00
„ GPF „	532055.00	532055.00
PENSION FUND DUES	43868457.00	40618942.00
RESERVES&SURPLUS-INTEREST	0.00	0.00
TOTAL	**260352246.00**	**242436118.00**
ASSETS		
INVESTMENT AT COST	224114739.00	204867803.00
DUES TO PF ACCOUNT		
FROM INSTITUTE	3165180.00	1132833.00
FROM PF COMMISSIONER	12969487.00	15035709.00
Transfer	0.00	0.00
INTEREST ACCRUED NOT DUE	1000280.00	1000280.00
BALANCE WITH BANKS		
SBT -GPF A/C	4877573.39	12371352.39
INTEREST ACCRUED	14224986.61	8028140.61
TOTAL	**260352246.00**	**242436118.00**

GPF Account - Trial Balance as on 31.03.2010

GL code	Particulars	Debit	Credit
1001	SCTIMST	3165180.00	
1005	Dues form PF Commissioner	12969487.00	
1010	Members Balance		290048172.00
1011	Other receipts not credited to Members		3165180.00
1012	Old members EPF scheme		7144466.00
1013	Old members GPF		532055.00
1015	Dues to Pension Fund		43868457.00
1030	Loan payment	61157369.00	
1040	Interest	14224986.61	
1050	Investments	224114739.00	
1090	Final Settlement	23248715.00	
1100	Transfer		
1120	Interest Accrued not due	1000280.00	
18	Bank Balance	4877573.39	
	TOTAL	**344758330.00**	**344758330.00**

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31-03-2010

SCHEDULE 24- SIGNIFICANT ACCOUNTING POLICIES

1. ACCOUNTING CONVENTION
Financial Statements are prepared on the basis of historical cost convention unless otherwise stated and on the accrual method of accounting.

2. INVENTORY VALUATION
Stores and spares including machinery spares are valued at cost.

3. INVESTMENTS
Investment including long term investments are carried at cost.

4. FIXED ASSETS
Fixed assets are stated at cost of acquisition inclusive of inward freight, duties and taxes incidental and direct expenses related to acquisition.

5. DEPRECIATION
Depreciation is provided on reducing balance method at the rates specified by the Income Tax Act 1961.In respect of additions to/deductions from fixed assets, during the year depreciation is provided for full year.

6. GOVERNMENT GRANTS/SUBSIDIES
Government Grant from Plan fund are treated as additions to Capital fund of Institute. Grants in respect of specific fixed assets acquired are shown as deduction from the cost of the related asset. Government Grants/subsidies are accounted on Grant release order basis.

7. FOREIGN CURRENCY TRANSACTIONS
Transactions denominated in foreign currency are accounted at exchange rate prevailing at the date of transactions.

8. RETIREMENT BENEFITS
An amount equal to one month salary every year is transferred to Pension Fund Account to meet liability on account of Pension payments. An amount of Rs.4 lakh is transferred every year to above fund for meeting liabilities on account of Gratuity payments. Leave encashment eligible at the time of retirement/reliving is accounted on actual payment basis.

9. PROVIDENT FUND
Liabilities and assets of Provident fund account were separated from Balance sheet of Institute and shown as separate statement.

10. EMERGENCY RESERVE FUND
An amount equal to Five percent of receipts from patient are transferred to a Fund for meeting unexpected requirements for Fixed assets.

11. TECHONOLOGY DEVELOPMENT FUND
Receipts against technology developed by the Institute are transferred to the above fund for meeting additional expenses on Improvement of technologies already developed.

SCHEDULE 25- CONTINGENT LIABILITIES AND NOTES ON ACCOUNTS

1. CONTINGENT LIABILITIES

	Rs. In lakhs	
	2009-10	2008-09
Claims against the Institute not acknowledged as debts	NIL	Nil
Bank Guarantee given by Institute	17.75	21.75
Letters of credit opened on behalf of Institute	1123.30	943.62
Disputed demands on Income tax etc	Nil	Nil
In respect of claims from parties for non- execution of orders	Nil	Nil

2. UNEXPIRED CAPITAL COMMITMENTS

	Rs. In lakhs	
	2009-10	2008-09
Estimated value of orders remaining to be executed on Capital Account including Construction under vision 2020	2750.86	3984.26
Lease obligation for rentals for Plant & Machinery	Nil	Nil

3. CURRENT ASSETS, LOANS & ADVANCES

The aggregate amount shown in the Balance sheet for the Current assets, Loans and Advances, have the value which is realisable in the ordinary course of business.

4. Provisions

Provision for Income tax not made since there is no taxable income for Institute under Income tax Act 1961, during the year.

5. FOREIGN CURRENCY TRANSACTIONS:

		Rs. In lakhs	
		2009-10	2008-09
5.1 Value of Imports			
Capital Goods		657.41	1812.73
Stores Spare & Consumables		355.30	318.13
5.2 Expenditure in foreign currency Travel Expenses	USD	14500	Nil
	Euro	1360	300
	Pound	500	575
	Aus $	Nil	200
5.3 Earnings:			
Value of Exports		Nil	Nil

6. Other items :

6.1 Transfer to Emergency Reserve Fund & Technology Development Fund

During the year an amount of Rs.387.86 lakhs (previous year Rs. 277.72 lakhs) and Rs.70.59 lakhs (previous year Rs.52.53 lakhs) was transferred to Emergency Reserve Fund & Technology Development Fund. During the year an amount of Rs.NIL lakhs (previous year Rs.10.56 lakhs) was spent from Technology Development Fund.

6.2 Depreciation :

Institute has been consistently applying the depreciation to fixed assets based on the rates specified in the Income Tax Act, 1961. Eventhough the rates were revised during the financial year 2002-03 & 2005-06, Institute has been charging depreciation at the pre revised rates since it was found to be appropriate. Hence these rates were also applied during the year 2009-10.

7. Corresponding figures for previous years have been regrouped, where ever necessary.

Schedules 1 to 25 are annexed to and form integral part of the Balance Sheet as at 31-03-2010, and Income & Expenditure Account for the year ended on that date.

Financial Adviser *Director*

Separated Audit Report of the Comptroller & Auditor General of India of the Accounts of Sree Chitra Tirunal institute for Medical Sciences and Technology (SCTIMST), Thiruvananthapuram for the year ended 31 March 2010.

We have audited the attached Balance Sheet of Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), Thiruvananthapuram as at 31 March 2010, the Income & Expenditure Account and the Receipts & payment Account for the year ended on that date under Section 19(2) of the Comptroller & Auditor General's (Duties, Power & Conditions of Service) Act, 1971 read with section 18(2) of the SCTIMST Act, 1980. These financial statements include the accounts of Bio Medical Technology (BMT) wing of the SCTIMST. These financial statements are the responsibility of the SCTIMST's management. Our responsibility is to express an opinion on these financial statements based on our audit.

2. This Separate Audit Report contains the comments of the Comptroller & Auditor General of India (CAG) on the accounting treatment only with regard to classification, conformity with the best accounting practices, accounting standards and disclosure norms, etc. Audit observations on financial transactions with regard to compliance with the Law, Rules & Regulations (Propriety and Regularity) and efficiency-cum-performance aspects, etc., if any, are reported through Inspection Reports/CAG's Audit Reports separately.

3. We have conducted our audit in accordance with auditing standards generally accepted in India. These standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatements. And audit includes examining, on a test basis, evidences supporting the amounts and disclosure in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluation the overall presentation of financial statements. We believe that out audit provides a reasonable basis for our opinion.

4. Based on our audit, we report that:

i. We have obtained all the information and explanations, which to the best of our knowledge and belief were necessary for the purpose of our audit;

ii The Balance sheet, Income & Expenditure Account and Receipt & Payment Account dealt with by this report have been drawn up in the format approved by the Government of India, Ministry of Finance.

iii In our opinion, proper books of accounts and other relevant records have been maintained by the SCTIMST as required under Section 18 (1) of SCTIMST Act, 1980 in so far as it appears from our examination of such books subject to observations made under.

iv. We further report that:

5. Comments of Accounts

5.1. Income and Expenditure Account

5.1.1. Depreciation

The accounting policy of SCTIMST stipulated that depreciation was provided on reducing balance methods at the rates specified by the Income Tax Act, 1961. However, vide note no.6.2 of Notes on Accounts (Schedule 25) it has been stated that the institute has

been charging depreciation at the pre-revised rates since it was found to be appropriate. Due to difference in rates applied from assessment year 2003-04 onwards, the accumulated depreciation was understated by Rs. 43.66 crore and assets were overstated by the same amount.

6. General

6.1. Acutarial valuation

SCTIMST neither obtained actuarial valuation for ascertaining liability on account of gratuity, pension, leave salary payments nor provided the same in the accounts.

7. Grants in aid

Out of Grant in Aid of Rs. 100.00 crore received during the year the organization utilized the entire sum.

8. Management letter:

Deficiencies which have not been included in the Audit Report have been brought to the notice of the SCTIMST through a management letter issued separately for remedial/corrective action.

Subject to our observations in the preceding paragraphs, we report that the Balance Sheet and Income & Expenditure Account/Receipts & payment Account dealt with by this report are in agreement with the books of accounts.

In our opinion and to the best of our information and according to the explanations given to us, the said financial statements read together with the Accounting Policies and Notes on Accounts, and subject to the significant matters stated above and other matters mentioned in Annexure-I to this Audit Report give a true and fair view in conformity with accounting principles generally accepted in India:

a. In so far as it relates to the Balance Sheet, of the state of affairs of the Sree Chitra Tirunal Institute for Medical Sciences & Technology, Trivandrum as at 31 March 2010 and

b. In so far as it relates to Income & Expenditure Account of the deficit for the year ended on the date.

Sd/-

Principal Director of Audit

Annexure I to Audit Report

1. Internal control

The internal audit division is functioning under and Internal Audit Officer assisted by one UDC of the institute for regular periodical audit of Hospital wing and BMT wing. Though the purchase order and works bills above Rs. 10 lakh are pre-audited by the internal audit wing, the observation are not converted into a report format and hence lacks transparent system of communication. The internal audit team my be strengthened to evaluate the effectiveness of the internal control system and contribute to the ongoing activities.

Institute replied in September 2010 that steps would be taken to further strengthen the system.

2. Non-maintenance of broadsheets/registers:

Broadsheet containing details of previous year transactions were to be maintained and a certificate of re-conciliation of the balances of broadsheets with that of ledger balances recorded on the broadsheet/Registers. The broadsheets/Registers were not maintained for (i) technology development fund (ii) sinking fund reserve (iii) Project Registers/Broadsheets of Hospital wing and BMT wing were not furnished to Audit (iv) Registers of new pension Scheme (GL Code 1014) (v) Patient Welfare fund (GL Code 1075) (vi) PWF Expenses (GL Code 1076) (vii) Institute Ethics Committee Fund (GL code 1077) (viii) Staff benevolent funds (GL Code 1080) (ix) Employee Pension Fund (GLCode 1301) (x) Sundry creditors (xi) Advances received (xii) Statutory liabilities (xiii) other current liabilities (xiv) Land (xv) Building (xvi) plant & machinery (xvii) vehicles (xviii) furniture & fixtures (xix) office equipment (xx) computer peripherals (xxi) electric installations (xxii) library books (xxiii) tube wells & water supply (xxiv) other fixed assets (xxv) capital work-in-progress (xxvi) Investment register of BMT wing (xxvii) Sundry Debtors (xxviii) Loans to staff (xxix) Recoverable advance.

SCTIMST replied in September 2010 that it was working in a fully computerized environment hence necessity of maintenance of manual registers were not felt. However observation is noted for future guidance.

3. Physical verification of assets and inventories

Physical stock verification for the year 2007-08 was conducted in 42 departments/sections of the Hospital wing. Physical verification for the remaining departments/sections were however not conducted for the year 2007-08. Physical Stock Verification of BMT Wing was conducted up to 2008-09. Though discrepancies were noticed in canteen and recommended to recover the amount, the actual amount recovered from the canteen contractor were not made available. SCTMST did not furnish the following details/information.

i) Latest physical verification report in connection with stock of medicines.

ii) Latest physical verification of Assets of Rs. 68.62 crore (Schedule-8 appended to the Annual Accounts for the year 2009-10)

SCTIMST replied in September 2010 that steps would be taken to conduct physical verification of assets during 2010-11 and verification report submitted to Audit.

4. Bank Reconciliation

Scrutiny of bank reconciliation statement as on 31 March 2010 revealed that the following amounts were pending reconciliation:

(Rs. In lakh)

S.No.	Particulars	Balance In BRS	Amount More than one year old	Month of oldest item
(i)	Cheques issued but not present for payment	420.19	13.95	October 2004
(ii)	Debited by bank but not in Bank book	165.20	17.96	June 2005
(iii)	Credited by bank but not in Bank book	2005.23	10.32	August 2005
(iv)	Credited in bank book but not in pass book	98.49	8.85	April 2006

It was observed that:

* The institute was not having timely reconciliation and there remained substantial old outstanding items.

* Outstanding cheques of more than six months were to be cancelled. But cheques for Rs. 13.95 lakh issued prior to 1 April 2009 were however outstanding. The oldest item pertained to the period as back as October 2004.

* Deposits of Rs. 17.96 lakh given by bank and credit Rs. 10.32 lakh afforded by bank prior to 1 April 2009 were yet to be identified. Some of the unidentified debits/credits pertained to the period as back as of June 2005 and August 2005 respectively.

* A sum of Rs. 8.85 lakh deposited by the institute on various occasions prior to 1 April 2009 was yet to be credited by bank. The oldest of such outstanding credit pertained to April 2006.

Institute stated (September 2010) that efforts were on to get clarifications from banks and to make necessary entries in the bank book.

Sd/-

Dy. Director (Inspection-II)

OFFICE OF THE PRINCIPAL DIRECTOR OF AUDIT
SCIENTIFIC DEPARTMENTS,
A.G.C.R. BUILDING, I.P. ESTATE,
NEW DELHI 110 002

कार्यालय प्रधान निदेशक लेखापरीक्षा
वैज्ञानिक विभाग,
ए. जी. सी. आर. भवन, इन्द्रप्रस्थ ऐस्टेट
नई दिल्ली - 110 002

No. Pr. DA(SD)/Insp.II/SAR/SCTIMST/2009-10/725

Dated: 28-10-2010

To

The Director,

Sree chitra Tirunal Institute for Medical Sciences and Technology,

Thiruvananthapuram

Sub: Management letter on the accounts of SCTIMST. Thiruvananthapuram for 2009-10.

Sir,

Based on audit of accounts of your institute by this office, the following points are brought to you notice for corrective action:

1. Understatement of capital fund

The net opening balance of capital fund for the year ending March 2010 was understated by Rs. 32099.81. An amount of Rs. 25262.36 lakh was shown against the previous year balance of Rs. 25262.68 lakh. Thus, the capital fund of the institute for the year did not depict the correct position. SCTIMST noted the observation.

2. Overstatement of earmarked fund by Rs. 3752/-

Under earmarked fund, Schedule-3, there was a difference of Rs. 3752/- in the opening balance of project account code bearing GL code 5163 of hospital wing Earmarked fund, therefore, was overstated by Rs. 3752/-. Institute replied that the wrong debit balance as on 31.03.09 was nullified and corrected during 2009-10 through proper JV and balance brought to zero as on 31.03.10. However, no supporting documents in this connection were furnished. Thus, earmarked fund of the

institute for the year did not depict a true and fair view.

3. Debit balances under project account

The project accounts under Schedule-3 on the liability side of the balance sheet should normally have a credit balance. Debit balance of Rs. 38.48 lakh was noticed in 16 project 1 ledger balances. Institute replied that expenses were adjusted in subsequent years. This may be expedited. Institute replied that till revenue realization debit balance would continue.

4. Sundry Creditors

An amount of Rs. 4.97 crore was outstanding towards sundry creditors for goods supplied and Rs. 35.10 lakh for expenses as on 31 March 2010. Sundry creditors account was to be adjusted by making payment to the creditors. In this connection detail outstanding of Sundry Creditors for more than one year may be worked out and furnished to Audit and shown under Sundry Creditors account as outstanding till such time creditors are adjusted. Institute replied that accounting procedure consistently followed for the last several years. However no such detail outstanding of Sundry Creditors were furnished to Audit.

5. Advances received

A huge sum of Rs. 3.05 crore is available as advance received from patients and other creditors in seven heads of accounts as detailed below:-

Rs. In lakhs

1315	INPATIENT DEPOSIT	28.96
1316	ESI RECEIVABLE	112.88
1317	AMT RECEIVABLE FROM PMF	46.09
1318	TREATMENT CHARGES RECEIVABLE	89.16
2407	ADVANCE FROM PATIEANTS -CASH	5.54
2708	ADVANCE FOR TRAINING GRANT/EXPENSES	19.94
2780	SUSPENSE	2.85
	Total	**305.32**

Audit observed that:

- The broadsheet containing outstanding payables of more than one year old was not available with the institute, since it did not maintain a broadsheet containing previous year's transactions. Institute, thus eventually did not have a mechanism to ensure prompt clearance of these advances received.

Institute noted the audit observation for future guidance,

6. Other liabilities

And amount of Rs. 2.75 crore was booked under other current liabilities. The broadsheet containing outstanding other liabilities pending for more than one year was not available with the institute. Institute, thus was not able to ensure prompt discharge to other liabilities. Institute accepted the audit observation for future guidance.

7. Sundry Debtors

A huge sum of Rs. 3.36 crore and Rs. 6.02 lakh is receivable from debtors. The categories of sundry debtors outstanding as on 31 March 2010 are as follows:

Rs. In lakh

1319	AMT RECEIVABLE FROM CGHS	37.27
1322	INPATIENT DUES -GENERAL	189.28
1323	EX SERVICE CONT HS	109.48
	Total	**336.03**

Audit observed that the broadsheet containing outstanding debtors of more than one year old was not available with the institute, since it did not maintain a broadsheet containing previous year's transactions. Institute, thus did not have a mechanism to ensure timely collection of outstanding debtors, review of its old balances and action taken thereon, calling for of confirmations from debtors, settlement of discrepancies in debtors account, policies to reduce debtors such as discounts etc. institute replied that efforts are being taken for clearance of outstanding debtors.

8. Advances paid

A huge sum of Rs. 32. 25 crore is paid as advances which were recoverable in cash or kind or value to be received. The details of the items booked under the category are as follows:

1 Gl. Codes 7052.7065.7067.7069.7070.7073.7080.7091.8002.8009.8010.8014 of BTI wing and Gl code 5111.5181.6055.6064 of Hospital wing.

Rs. In lakh

GL Codes	Description	Hospital	BMT	Total
	Staff advance bearing GL codes 2725, 2730, 2740, 2745, 2748, 2710, 2711, 2715	129.18	4.31	133.49
2701	Advances to suppliers-foreign	1588.37	483.12	2071.49
2702	Advances to suppliers-Indigenous	170.05	0.00	170.05
	Total Advances to suppliers	1758.42	483.12	2241.54
2601	Telephone and Telex Deposit	1.53	0.00	1.53
2605	Other Deposits	27.92	5.30	33.22
2750	Other Advances	759.68	0.00	759.68
2705	Adv For Custom Duty	37.49	2.04	39.53
2317	Payment to contractors	0	15.63	15.63
1266	Recovery Deputes	0.01	0	0.01
	Total Pre-Payments	826.63	22.97	849.60
	Total			3224.63
	Total advances			3224.63

Institute replied that effort were being taken to settle those advances.

9. Outstanding advances paid to suppliers

A sum of 22.42 crore paid as advance to supplies were pending as on March 2010. The details of the outstanding advances paid to suppliers which were pending for more than one year were not available with the institute, since it did not maintain a broadsheet containing previous year transactions. Institute, thus did not have a mechanism to watch of equipments and ensure adjustment of its outstanding advances paid suppliers.

10. Outstanding advances paid for services

A sum of Rs. 7.59 crore paid as other advances paid for various services were also outstanding as on March 2010. The details of outstanding advances paid to suppliers for services which were pending for more than one year were not available with the institute. Institute was not able to watch receipt of services and ensure adjustment of it outstanding advances for services.

11. Investment from earmarked fund/endowment funds

Ministry of Finance, Department of Economic Affairs, New Delhi in September 2007 revised the investment pattern to be followed by non-Government Provident Funds, Superannuation Funds and Gratuity Funds. According to the investment pastern, 35 per cent were to be invested in central Government securities, 25 per cent in other approved securities, 30 per cent in both of these instruments 2 and balance 10 per cent in shares of companies that have an investment grade credit rating from at least one credit rating agency/shares of companies figuring in BSE sensex, NSE NIFTY and in equity linked schemes of mutual funds regulated by SEBI. Audit scrutiny, however, revealed that SCTIMST invested its entire funds in Nationalized Banks, RBE Bonds, IDBI Bonds, Government of India Bonds. The guidelines if Ministry of Finance regarding investments will be adopted after evaluating the merits and security of the mode of investments.

Though the provident fund account shows an amount of Rs.2241 lakh as investments at cost actual investment made was Rs. 2243 lakh. And the provident fund account was understated by Rs. 2 lakh. Institute further replied that Rs. 2 lakh pertains to pension fund and would be adjusted during the year 2010-11

12. Prior period expenditure

As a result of implementation of recommendations of VI pay commission second installment of sixth pay commission arrears of 60 per cent was paid to the staff in October 2009 for the period 1 January 2006 to 31 August 2008. The expenditure on account of arrears paid was included in pay and allowances, pay of establishment, dearness allowances etc in 2009-10 instead of treating it as Prior period expenditure and exhibiting it separately in the Income & Expenditure Account. Institute replied that the Audit point is noted for future guidance.

13. Technology development fund

Accounting policies of SCTIMST stipulated to credit revenue due to technology transfers to a technology transfer fund for meeting additional expenditure for improvement of technologies. An amount of Rs. 4.77 crore balance was available with the technology development fund at the end of March 2010. Audit observed that utilization from the fund was neither budgeted nor expenditure incurred from the fund where substantial balance of Rs. 4.77 crore was available with the fund. Institute replied that the amount available in the funds is invested fruitfully and utilized for the purposes approved by Governing Body. The fact, however, remained that substantial funds were blocked under this fund.

14. Provident fund account

According to accounting policy of SCTIMST, liabilities and assets of provident fund account were separated from

2 Central Government Securities and other approved securities

its balance sheet and shown as a separate statement.

Prior to 1989, provident fund account was maintained by the Regional Provident Fund Commissioner, Thiruvananthapuram. The provident fund account showed an amount of Rs. 1.30 crore as receivable from Employees Provident Fund Commissioner, including interest (worked out at 8.5 percent per annum on the balances of each previous year). The balances were yet to be confirmed by the Regional Provident Fund Commissioner. Despite being pointed out by Audit in previous Separate Audit Reports, the Management did not get confirmation of balances receivable from the Regional Provident Fund Commissioner and therefore correctness of this balance could not be vouchsafed.

15. Understatement of Savings account

The net closing balances of savings account for the year ending 31 March 2009 was Rs. 1856.88 lakh. SThe opening balance of the savings account as on 1 April 2009 was, however, shown as Rs.1856.40 lakh. The savings account of previous year (2008-09) was reduced by Rs. 47525.84 resulting understatement of savings account by the same amount in Receipts & Payments Account.

16. Difference of closing balance of bank account

The Receipt & Payment account shown an amount of Rs. 1967.98 lakh as closing balance of bank balance in savings account, but the savings bank account under Schedule-11 Current assets, loans and advances was having a closing balance of Rs. 1968.47 lakh resulting a difference of Rs. 0.49 lakh.

17. Sinking fund

Notwithstaning the fact that Government of India is providing plan grant every year to support the plan programmes of the institute including patient care, audit observed that SCTIMST accounting policy stipulated constitution of a sinking fund reserve being five percent of receipts from patient to meet unexpected requirements for fixed assets. An amount of Rs. 26.27 crore is available with the sinking fund reserve as on March 2010 audit however observed that though substantial balance of Rs. 26.27 crore, its utilization was neither budgeted nor expenditure incurred from the fund resulting blockage of funds.

Institute replied that it would ensure that as and when need arises fund will be utilized only for approved purposes cited above particularly for unforeseen and emergency capital expenditure which was not budgeted/planned.

18. Suspense Account

Scrutiny of Trial balance/ledger account of CHO revealed a credit balance of Rs. 285042/- as suspense. Reasons for maintaining a suspense account was not intimated to Audit

19. Revenue recognition

According to Indian Accounting Standard 1, going concern, consistency and accrual are fundamental accounting assumptions. The accrual basis of accounting for revenue in each financial period means that income is recognized when it is due and not when it is received.

Though, accounting policy of the institute stipulate accrual basis of accounting , revenue recognition of the institute from various income such as a) hospital services b) projects c) testing charges d) facility utilization charges e) fees/subscriptions f) interest earned, etc., were accounted on cash basis and not on accrual basis. Income receivable, income accrued and claims receivable, etc., were not accounted (monetary impact of these could not be quantified in audit). Institute accepted the audit observation and noted for future guidance.

20. Current Assets. Loans Advances etc. – (Schedule-11)

Audit observed that inventories issued from general store/pharmacy to various departments and divisions was treated as consumed in inventory account whereas the inventories were laying in the departments/divisions. Thus, value of inventories under Schedule 11:'A' Current asset was understated. Since divisional stock registers of the inventories were not maintained, Audit was not able to quantify the amount understated. The Institute stated (September 2010) that the audit comments has been noted for future guidance.

Yours faithfully,

Sd/-

Principal Director of Audit (SD)

Satement of Accounts

SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES & TECHNOLOGY, THIRUVANANTHAPURAM
BALANCE SHEET AS AT 31st MARCH 2010

CORPUS/CAPITAL FUND AND LIABILITIES	Schedules	2009-2010 Rs.	2008-2009 Rs.
CAPITAL FUND	1	2815772164.19	2526268149.96
RESERVES & SURPLUS	2	310546070.70	271488083.70
EARMARKED ENDOWMENT FUNDS	3	185502379.09	225164971.53
SECURED LOANS & BORROWINGS	4	0.00	0.00
CURRENT LIABILITIES & PROVISIONS	7	129610816.22	122270153.62
TOTAL		**3441431430.20**	**3145191358.81**
ASSETS			
FIXED ASSETS	8	1212201058.64	1005717447.14
INVESTMENTS FROM EARMARKED ENDOWMENT FUNDS	9	443872589.70	387237833.70
CURRENT ASSETS , LOANS, ADVANCES ETC	11	1785357781.86	1752236077.97
MISCELLANEOUS EXPENDITURE (TO THE EXTENT NOT WRITTEN OFF)			
TOTAL		**3441431430.20**	**3145191358.81**
SIGNIFICANT ACCOUNTING POLICIES	24		
CONTINGENT LIABILITIES AND NOTES ON ACCOUNTS	25		

Sd/-
FINANCIAL ADVISOR

Sd/-
DIRECTOR

Sree Chitra Tirunal Institute for
Medical Science and Technology
Thiruvananthapuram

SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES & TECHNOLOGY, THIRUVANANTHAPURAM

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31st MARCH 2010

INCOME	Schedules	2009-2010	2008-2009
		Rs.	Rs.
Income from Sales / Services	12	292944869.00	283240956.00
Grants Received from Govt of India(Non Plan)	13	253900000.00	229640277.00
Fees/Subscription	14	5099450.00	3938512.00
Income from Investments	15	27895546.00	18375843.80
(Income on Investment from earmarked/endow.Funds transferred to Funds)			
Income from Royalty, Publication etc	16	4649575.00	1915736.00
Interest Earned	17	104013645.96	62650044.89
Other Income	18	2150693.08	10388477.26
Total		**690653779.04**	**610149846.95**
EXPENDITURE			
Establishment Expenses	20	624234687.28	438782799.10
Other Administrative Expenses	21	348437663.17	364599681.66
Bank Charges	23	320839.40	86805.40
Depreciation (Net Total at the year-end-corresponding to Schedule 8)		111658615.15	82609782.25
Total		**1084651805.00**	**886079068.41**
Balance being Excess Expenditure over Income		393998025.96	275929221.46
Add: Transfer to Special Reserve Account		45844996.00	32974258.80
BALANCE BEING DEFICIT CARRIED TO CAPITAL FUND		439843021.96	308903480.26
SIGNIFICANT ACCOUNTING POLICIES	24		
CONTINGENT LIABILITIES AND NOTES ON ACCOUNTS	25		

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SCHEDULES

PARTICULARS	2009-2010 [Rs.]	2008-2009 [Rs.]
SCHEDULE 1 - CORPUS/CAPITAL FUND		
Balance as at the beginning of the year	3452174357.21	3029403167.02
Less Depreciation up to the end of the previous year	925938307.06	843328524.81
Net balance at the beginning of the year	**2526236050.15**	**2186074642.21**
Add: Plan Grants received from Government of India	704700000.00	610871299.00
Add: Grants received from Others for Capital Assets(WCP)	27100000.00	38918424.00
Add:Contribution towards Corpus/Capital Fund		
Deduct: Balance of net expenditure transferred from the Income and Expenditure Account	439843021.96	308903480.26
Less:Value of Assets Written off during the year	2420864.00	692735.00
DeductTransfer to BMT/Add Transfer from CHO	0.00	0.00
BALANCE AS AT THE YEAR-END	**2815772164.19**	**2526268149.96**
SCHEDULE 2-RESERVES AND SURPLUS:		
1. Capital Reserve:		
As per last Account	--	--
Addition during the year	--	--
Less:Deduction during the year	--	--
2. Revaluation Reserve:		
As per last Account	--	--
Addition during the year	--	--
Less: Deductions during the year	--	--
3. Special Reserves:		
As per last Account	271488083.70	242356298.90
Addition during the year (Current year transfer+Decrease in provision)	39057987.00	29131784.80
Less: Deductions during the year	--	--
4. General Reserve:		
As per last Account	--	--
Addition during the year	--	--
Less: Deductions during the year	--	--
TOTAL	**310546070.70**	**271488083.70**

PARTICULARS	2009-2010 [Rs.]	2008-2009 [Rs.]
SCHEDULE 3-EARMARKED/ENDOWMENT FUNDS		
a) Opening balance of the funds	--	--
b) Additions to the funds:	--	--
i. Donations/grants	--	--
ii. Income from Investments made on account of funds	--	--
iii. Other additions (Specify nature)	--	--
TOTAL (a+b)	--	--
c) Utilisation / Expenditure towards objective of funds		
i. Capital Expenditure		
- Fixed Assets	--	--
- Others	--	--
Total (Detailed Schedule Attached)	--	--
ii. Revenue Expenditure		
- Salaries, Wages and allowances etc.	185502379.09	225164971.53
- Rent		
- Other Administrative expenses		
Total	185502379.09	225164971.53
TOTAL (c)		
NET BALANCE AS AT THE YEAR-END (a+b+c)	**185502379.09**	**225164971.53**

CODE	NAME OF GRANTEE/PRINCIPAL INVESTIGATOR	FUND-WISE BREAK UP OPENING BALANCE	ADDITIONS TO FUND GRANTS	OTHER RECEIPTS	Rs. TOTAL
SCHEDULE 3-EARMARKED/ENDOWMENT FUNDS					
5000	PROJ-MISCELLANEOUS	1014854.00	3542980.00	0.00	**4557834.00**
5008	DR.C.KESAVADAS	0.00	71500.00	5269.00	**76769.00**
5018	CSIR PROJECT-DR. P.S. APPUKUTTAN	13450.90	0.00	0.00	**13450.90**
5027	DST GOVT. OF KERALA-DR. P.S. APPUKUTTAN	26335.53	0.00	0.00	**26335.53**
5028	DST GOVT. OF KERALA-DR.K RADHAKRISHNAN	3001.00	0.00	0.00	**3001.00**
5029	DST GOVT. OF KERALA- DR.J.SHANMUGHAM	7113.00	0.00	0.00	**7113.00**
5031	PHYSIO-ANTHROPOMATIC STUDY-DR.GUPTA	3871.77	0.00	0.00	**3871.77**
5033	MPH PROGRAMME	101480.00	0.00	0.00	**101480.00**
5034	INDIAN EPILEPSY ASSN.DR.K. RADHAKRISHNAN	3558.00	0.00	0.00	**3558.00**
5036	PROJ/DST KERALA/DR.MURALEEDHARAN	4495.00	0.00	0.00	**4495.00**
5040	PROJ. DR.ASHA VIJAYARAGHAVAN	2130118.70	0.00	0.00	**2130118.70**
5047	IMPROVEMENT OF VOLUNTARY BLOOD DONAR	16094.90	0.00	0.00	**16094.90**
5054	ANTIVIRAL AND ANTIFUNGAL STUDIES ON	1418.30	0.00	0.00	**1418.30**
5055	GRANT/ROCKFELLER FOUNDATION,USA	686120.00	0.00	0.00	**686120.00**
5065	M.D.PHARMA(DR,ASHA)	398586.50	0.00	0.00	**398586.50**
5070	PROJ.INDIAN EPILEPSY ASSTN.JAYACHANDRAN	485.30	0.00	0.00	**485.30**
5077	INDIAN EPILEPSY ASSOCIATION	18111.90	0.00	0.00	**18111.90**
5078	PROJECT GRANT/DR MALA RAMANATHAN	5810.00	0.00	0.00	**5810.00**
5080	GRANT/WHO/DR VARATHARAJAN/AMC/PROJECT	11471.30	0.00	0.00	**11471.30**
5082	T V HEMALATHA/HEALTHAWARENESS PROGRAM	127537.00	0.00	0.00	**127537.00**
5083	PROJECT/DEPT OF NEUROLOGY	1683.00	160000.00	0.00	**161683.00**
5088	DOUBLE BLIND PLACEBO CONT. PARALLEL	63023.00	0.00	0.00	**63023.00**
5091	EURO REG. OF EPILEPSY & PREGNANCY	103087.00	0.00	0.00	**103087.00**
5094	KERALA STATE AIDS CONTROL SOCIETY	884949.00	476000.00	0.00	**1360949.00**
5098	RISK FACTORS FOR EPILEPSY-DR.RADHAKRISHNAN	4562.00	0.00	0.00	**4562.00**
5099	EFFECT OF BLOOD DONATION	1711.00	0.00	0.00	**1711.00**
5100	AMC/MAC ARTHUR FOUNDATION/02-70546	46315.05	0.00	0.00	**46315.05**
5103	CLINICAL TRIAL/QUINTAILSPEC/DR.RADHAKRISHNAN	194668.00	292960.00	14049.00	**501677.00**
5104	ANTIVIRAL PRINCIPLES/MOLLY ANTONY	8878.00	0.00	0.00	**8878.00**
5108	EVAL.SUB-TYPES DEMENTIA/DR.MATHURA	15800.50	0.00	0.00	**15800.50**
5110	TOBACCO CESSATION & RESEARCH / DR.THANKAP	943026.65	3505614.00	1227101.00	**5675741.65**
5111	DIFFUSION WEIGHTED IMAGING/DR.GUPT	-21226.00	0.00	0.00	**-21226.00**
5112	WHO FELLOWSHIP	281642.00	0.00	0.00	**281642.00**
5113	STUDIES ON ANTI-VIRAL/MOLLY ANTONY	448.00	0.00	0.00	**448.00**
5114	IND.PARTICP. IN PUBLIC HEALTH/WORLD	51.00	0.00	0.00	**51.00**
5119	STAKE HOLDER-PERCEPT/INST.REV BO	202715.73	0.00	0.00	**202715.73**
5121	REG.OF.PREG IN WOMEN -EPILEPSY	91158.00	0.00	0.00	**91158.00**
5124	PRO-INFLAMMATORY CYTOKINE/DR. K. SHIVAKUMAR	74618.50	0.00	0.00	**74618.50**
5125	PIOLOT STUDY/HEMOGRAFT HARVEST	23838.00	0.00	643.00	**24481.00**
5126	A MULTI NATIONAL, MULTI-CENTER/SIRO	113597.00	0.00	0.00	**113597.00**
5127	CARDOGUARD TABLET/DST/DR.RENUKA NAIR	7509.00	0.00	0.00	**7509.00**
5128	INDENT. OF MACOBACTERIAL/DST/V.V.RADHAKRISHN	196165.00	0.00	0.00	**196165.00**
5130	TELE-HEALTH & MEDICAL EDUCATION/JAWAHAR	974782.00	250000.00	0.00	**1224782.00**
5132	STUDIES ON MATRIX METALLOPROTEINASE	126979.00	0.00	0.00	**126979.00**
5133	COMMUNITY BASED INTERVENTION/WHO	415059.00	0.00	1375.00	**416434.00**

CAPITAL EXPENDITURE			UTILISATION REVENUE EXPENDITURE					
FIXED ASSETS	OTHERS	TOTAL	SALARIES WAGES	RENT/ CONSUMABLES	OTHER ADM EXP	TOTAL	SUB TOTAL	NET BALANCE
0.00	0.00	**0.00**	3230297.00	84322.00	425175.00	**3739794.00**	**3739794.00**	**818040.00**
0.00	0.00	**0.00**	0.00	0.00	65853.00	**65853.00**	**65853.00**	**10916.00**
0.00	0.00	**0.00**	0.00	0.00	13450.90	**13450.90**	**13450.90**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	26335.53	**26335.53**	**26335.53**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	3001.00	**3001.00**	**3001.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	7113.00	**7113.00**	**7113.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	3871.77	**3871.77**	**3871.77**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	100000.00	**100000.00**	**100000.00**	**1480.00**
0.00	0.00	**0.00**	0.00	0.00	3558.00	**3558.00**	**3558.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	4495.00	**4495.00**	**4495.00**	**0.00**
0.00	0.00	**0.00**	177996.00	0.00	299343.00	**477339.00**	**477339.00**	**1652779.70**
0.00	0.00	**0.00**	0.00	0.00	16094.90	**16094.90**	**16094.90**	**0.00**
0.00	0.00	**0.00**	1418.30	0.00	0.00	**1418.30**	**1418.30**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**686120.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**398586.50**
0.00	0.00	**0.00**	0.00	0.00	485.30	**485.30**	**485.30**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	18111.90	**18111.90**	**18111.90**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**5810.00**
0.00	0.00	**0.00**	0.00	0.00	11471.30	**11471.30**	**11471.30**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**127537.00**
0.00	0.00	**0.00**	0.00	0.00	161683.00	**161683.00**	**161683.00**	**0.00**
0.00	0.00	**0.00**	0.00	0	0.00	**0.00**	**0.00**	**63023.00**
0.00		**0.00**	0.00	0.00	10440.00	**10440.00**	**10440.00**	**92647.00**
0.00	0.00	**0.00**	129573.00	738733.00	760.00	**869066.00**	**869066.00**	**491883.00**
0.00	0.00	**0.00**	0.00	0.00	4562.00	**4562.00**	**4562.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	1711.00	**1711.00**	**1711.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**46315.05**
0.00	0.00	**0.00**	91093.00	0.00	0.00	**91093.00**	**91093.00**	**410584.00**
0.00	0.00	**0.00**	0.00	0.00	8878.00	**8878.00**	**8878.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**15800.50**
0.00	0.00	**0.00**	1656102.00	162005.00	1086040.00	**2904147.00**	**2904147.00**	**2771594.65**
0.00	0.00	**0.00**	0.00	0.00	5000.00	**5000.00**	**5000.00**	**-26226.00**
0.00	0.00	**0.00**	0.00	0.00	281642.00	**281642.00**	**281642.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	448.00	**448.00**	**448.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	51.00	**51.00**	**51.00**	**0.00**
0.00	0.00	**0.00**	0.00	725.00	0.00	**725.00**	**725.00**	**201990.73**
0.00	0.00	**0.00**	0.00	0.00	91158.00	**91158.00**	**91158.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**74618.50**	**74618.50**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	24296.00	**24296.00**	**24296.00**	**185.00**
0.00	0.00	**0.00**	0.00	0.00	2382.00	**2382.00**	**2382.00**	**111215.00**
0.00	0.00	**0.00**	0.00	0.00	7509.00	**7509.00**	**7509.00**	**0.00**
0.00	0.00	**0.00**	0.00	17401.00	42657.00	**60058.00**	**60058.00**	**136107.00**
66757.00	0.00	**66757.00**	99000.00	0.00	48920.00	**147920.00**	**214677.00**	**1010105.00**
0.00	0.00	**0.00**	0.00	102687.00	1113.00	**103800.00**	**103800.00**	**23179.00**
0.00	0.00	**0.00**	0.00	0.00	201375.00	**201375.00**	**201375.00**	**215059.00**

CODE	NAME OF GRANTEE/PRINCIPAL INVESTIGATOR	FUND-WISE BREAK UP			TOTAL
		OPENING BALANCE	ADDITIONS TO FUND GRANTS	OTHER RECEIPTS	
SCHEDULE 3-EARMARKED/ENDOWMENT FUNDS					
5135	A 16-WEEK,DOUBLE BLIND/ASHA KISHORE	1958977.00	0.00	0.00	**1958977.00**
5136	A16 WEEKDOUBLE BLIND STUDY	713.00	0.00	0.00	**713.00**
5137	MECHANISM OF ANTICANCER/DAE, BRS	2761.00	0.00	0.00	**2761.00**
5138	PREVENTION ON NCD'S: TUNING/WHO	98.00	0.00	0.00	**98.00**
5139	A 24 WEEK, MULTICENTER/DR. MATHURANATH	1619512.28	1839412.00	0.00	**3458924.28**
5140	HARVARD SCHOOL OF PUBLIC HEALTH	96580.32	0.00	0.00	**96580.32**
5141	THE TRIVANDRUM STROKE REGISTRY/WHO SEARO	5481.00	0.00	0.00	**5481.00**
5142	BANKING FOR BETTER HEALTH-MEDISAVE	240383.36	0.00	0.00	**240383.36**
5143	MODULATION OF HIGH GLUCOSE/STE/KARTHA	483.00	0.00	0.00	**483.00**
5144	WHO-SEARO/DEV&FIELD TEST/GME	124882.00	0.00	0.00	**124882.00**
5145	ADULT HUMAN RESIDENT/	17341.00	0.00	0.00	**17341.00**
5146	DEVELOPMENT OF SPECT	138671.00	0.00	0.00	**138671.00**
5147	FATHERHOOD INITIATIVES	39137.00	0.00	0.00	**39137.00**
5148	HIV/AIDS/DR.D.VARATHARAJAN	13627.00	0.00	0.00	**13627.00**
5149	REDUCING DEATH RATE	1539.00	0.00	0.00	**1539.00**
5150	PROTOCOL 6002-INT 001	996951.60	0.00	0.00	**996951.60**
5151	DOSE RANGING STUDY:CGHR	137671.00	0.00	0.00	**137671.00**
5153	DEV REF. MANUAL FOR	664052.00	0.00	0.00	**664052.00**
5155	COMM BASED DETECTION	354383.00	0.00	0.00	**354383.00**
5156	TSUNAMI PROJECT	1377363.50	0.00	0.00	**1377363.50**
5158	DETERMINATION OF GENETIC CO(DR.RENUKA NAIR)	195504.00	0.00	0.00	**195504.00**
5159	NCD RISK FACTOR	145793.00	0.00	0.00	**145793.00**
5160	BRAIN MAPING & BASIC NEUROGENETIC/DR.P.S MATHURANATH	5656.00	669113.00	0.00	**674769.00**
5161	DOSE RANGING STUDY:CGHR	2339191.00	390813.00	7500.00	**2737504.00**
5162	MAINTAINING EVENT REGISTRY	7638.00	0.00	0.00	**7638.00**
5163	DR.JAYAKUMAR	3752.00	0.00	0.00	**3752.00**
5164	FCTC PROVISION/DRKRTHANKAPPAN	8138.75	0.00	0.00	**8138.75**
5165	HEALTH SECTOR REFORM	3481.00	0.00	0.00	**3481.00**
5166	PHARMACOGENETIC STUDY/DR.SANJEEV	-130827.00	330000.00	0.00	**199173.00**
5167	PROJ/SURVIVAL MECHANISM	727376.00	0.00	323.00	**727699.00**
5168	PROJ/VERMEER STUDY	1473089.00	0.00	0.00	**1473089.00**
5169	SAFETY OF MELPERONE	359164.00	0.00	0.00	**359164.00**
5170	DR.ASHA KISHORE	2745466.00	0.00	0.00	**2745466.00**
5171	DOSE CONFIRMATION GLIOBLASTOMA…	-35.00	0.00	35.00	**0.00**
5172	C.KESAVADAS	121186.00	0.00	3200.00	**124386.00**
5173	DR.DINESH NAYAK	329882.00	487390.00	0.00	**817272.00**
5174	CHANGES IN SLEEP WAKEFULNESS-Dr.Mohanku.	108765.00	0.00	0.00	**108765.00**
5175	SURGICAL TRAIL IN LOBAR INTRACEREBRAL	39125.27	0.00	0.00	**39125.27**
5176	WOMENT COMPONANT PLAN	1778407.25	0.00	0.00	**1778407.25**
5177	DR.KRISHNAMANOHAR	35898.00	58078.00	0.00	**93976.00**
5180	DR.KANNAN SRINIVASAN	118316.00	428072.00	0.00	**546388.00**
5181	DR.ASHA KISHORE	0.00	0.00	0.00	**0.00**
5182	DR.SANJEEV.V.THOMAS	2931523.00	5100000.00	0.00	**8031523.00**
5183	DR.K.R.THANKAPPAN	6929086.00	13465803.00	0.00	**20394889.00**
5184	DR.JAWAHAR	954536.00	500000.00	0.00	**1454536.00**

CAPITAL EXPENDITURE			UTILISATION REVENUE EXPENDITURE					
FIXED ASSETS	OTHERS	TOTAL	SALARIES WAGES	RENT/ CONSUMABLES	OTHER ADM EXP	TOTAL	SUB TOTAL	NET BALANCE
0.00	0.00	**0.00**	0.00	0.00	215915.00	**215915.00**	**215915.00**	**1743062.00**
0.00	0.00	**0.00**	0.00	0.00	713.00	**713.00**	**713.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**2761.00**
0.00	0.00	**0.00**	0.00	0.00	98.00	**98.00**	**98.00**	**0.00**
37634.00	0.00	**37634.00**	347477.00	87495.00	400182.00	**835154.00**	**872788.00**	**2586136.28**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**96580.32**
0.00	0.00	**0.00**	0.00	0.00	5481.00	**5481.00**	**5481.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**240383.36**
0.00	0.00	**0.00**	0.00	0.00	483.00	**483.00**	**483.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	124882.00	**124882.00**	**124882.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	17341.00	**17341.00**	**17341.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**138671.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**39137.00**
0.00	0.00	**0.00**	0.00	0.00	13627.00	**13627.00**	**13627.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	1539.00	**1539.00**	**1539.00**	**0.00**
0.00	0.00	**0.00**	30000.00	0.00	538155.00	**568155.00**	**568155.00**	**428796.60**
0.00	0.00	**0.00**	0.00	0.00	0.00	**137671.00**	**137671.00**	**0.00**
0.00	0.00	**0.00**	0.00	421358.00	9034.00	**430392.00**	**430392.00**	**233660.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**354383.00**
0.00	0.00	**0.00**	268427.00	25048.00	213315.00	**506790.00**	**506790.00**	**870573.50**
0.00	0.00	**0.00**	0.00	156151.00	39353.00	**195504.00**	**195504.00**	**0.00**
0.00	0.00	**0.00**	72842.00	0.00	1828.00	**74670.00**	**74670.00**	**71123.00**
68832.00	0.00	**68832.00**	0.00	59925.00	100.00	**60025.00**	**128857.00**	**545912.00**
36869.00	0.00	**36869.00**	138065.00	93958.00	312386.00	**544409.00**	**581278.00**	**2156226.00**
0.00	0.00	**0.00**	0.00	0.00	7638.00	**7638.00**	**7638.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	3752.00	**3752.00**	**3752.00**	**0.00**
0.00	0.00	**0.00**	0.00	8138.75	0.00	**8138.75**	**8138.75**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	3481.00	**3481.00**	**3481.00**	**0.00**
0.00	0.00	**0.00**	89544.00	0.00	109629.00	**199173.00**	**199173.00**	**0.00**
0.00	0.00	**0.00**	265548.00	133796.00	119869.00	**519213.00**	**519213.00**	**208486.00**
0.00	0.00	**0.00**	7500.00	0.00	146559.00	**154059.00**	**154059.00**	**1319030.00**
0.00	0.00	**0.00**	0.00	0.00	35916.00	**35916.00**	**35916.00**	**323248.00**
0.00	0.00	**0.00**	0.00	0.00	274547.00	**274547.00**	**274547.00**	**2470919.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
0.00	0.00	**0.00**	44267.00	15600.00	15196.00	**75063.00**	**75063.00**	**49323.00**
65976.00	0.00	**65976.00**	123177.00	36927.00	8034.00	**168138.00**	**234114.00**	**583158.00**
0.00	0.00	**0.00**	84000.00	0.00	5000.00	**89000.00**	**89000.00**	**19765.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**39125.27**
0.00	0.00	**0.00**	0.00	0.00	1632263.00	**1632263.00**	**1632263.00**	**146144.25**
0.00	0.00	**0.00**	24000.00	0.00	3698.00	**27698.00**	**27698.00**	**66278.00**
0.00	0.00	**0.00**	304366.00	0.00	172373.00	**476739.00**	**476739.00**	**69649.00**
0.00	0.00	**0.00**	0.00	14350.00	0.00	**14350.00**	**14350.00**	**-14350.00**
0.00	0.00	**0.00**	0.00	0.00	997794.00	**997794.00**	**997794.00**	**7033729.00**
190889.00	0.00	**190889.00**	2098150.00	711858.00	1741360.00	**4551368.00**	**4742257.00**	**15652632.00**
0.00	0.00	**0.00**	0.00	173887.00	0.00	**173887.00**	**173887.00**	**1280649.00**

CODE	NAME OF GRANTEE/PRINCIPAL INVESTIGATOR	FUND-WISE BREAK UP			TOTAL
		OPENING BALANCE	ADDITIONS TO FUND GRANTS	OTHER RECEIPTS	
SCHEDULE 3-EARMARKED/ENDOWMENT FUNDS					
5185	A MULTICENTRE DOUBLE BLIND..DR.ASHA KISHORE	141207.00	121942.00	0.00	**263149.00**
5187	DR.SANJEEV.V.THOMAS	203932.00	0.00	0.00	**203932.00**
5188	DR.K.RADHAKRISHNAN	208471.00	766700.00	0.00	**975171.00**
5189	DR.HARIKRISHNAN	267947.00	0.00	0.00	**267947.00**
5190	DR.MALARAMANATHAN	95972.00	0.00	0.00	**95972.00**
5191	DR.ASHA KISHORE	1011057.00	0.00	0.00	**1011057.00**
5192	DR.K.R.THANKAPPAN	400242.00	124882.50	0.00	**525124.50**
5193	DR.MALARAMANATHAN	261302.00	350000.00	0.00	**611302.00**
5194	DR.K.R.THANKAPPAN	3670214.00	0.00	0.00	**3670214.00**
5195	DR.ASHA KISHORE	9932.00	0.00	0.00	**9932.00**
5196	DR.SHIVKUMAR	1218871.00	0.00	0.00	**1218871.00**
5198	DR.RENUKA NAIR	0.00	562066.00	0.00	**562066.00**
5199	DR.JAYAKUMAR	0.00	500000.00	10696.00	**510696.00**
5200	DR.KANNAN SRINIVASAN	0.00	38571.00	0.00	**38571.00**
5201	DR.ASHA KISHORE	0.00	1356018.50	0.00	**1356018.50**
5202	DR.JAYASREE	0.00	1593975.00	0.00	**1593975.00**
5205	DR.SURESH NAIR	0.00	225000.00	55150.00	**280150.00**
5206	DR.ASHA KISHORE	0.00	0.00	10000.00	**10000.00**
5207	DR.JAYASREE/A.K.GUPTA	0.00	150000.00	0.00	**150000.00**
5208	DR.K.SRINIVASAN	0.00	1021735.00	0.00	**1021735.00**
5210	DR.K.R.THANKAPPAN	0.00	9200000.00	0.00	**9200000.00**
5212	DR.S.HARIKRISHNAN	0.00	534600.00	0.00	**534600.00**
5214	DR.ASHA GOPINATHAN	0.00	396000.00	0.00	**396000.00**
6054	PROJ/DR RADHAKRISHNAN NEUROLOGY	113667.50	0.00	656847.04	**770514.54**
6055	MOVEMENT/DR. ASHA KISHORE	-169139.00	0.00	0.00	**-169139.00**
6057	PUBLISHING JOURNAL ARTICLE/DR. THANKAPPAN	494330.00	0.00	801.00	**495131.00**
6058	ATHIYANOOR SCT ACTION/DR.K.R.T	21006.00	0.00	0.00	**21006.00**
6060	SILVERLINE PUBLICATION/DR.RADHAKRISHNAN	-62114.00	0.00	62114.00	**0.00**
6064	SPEECH THERAPY	-174300.00	0.00	0.00	**-174300.00**
6065	COMPREHENSIVE CENTRE FOR SLEEP DIS ORD.	-424001.00	0.00	4073542.00	**3649541.00**
7101	ADVANCES TO PI	-85297.00	0.00	1489546.00	**1404249.00**
7102	AMT.PAYABLE TO PROJECT STAFF	8682.00	0.00	105567.00	**114249.00**
2721	ADVANCE FOR SUPPLIES PROJECT	-64387.00	0.00	3111571.00	**3047184.00**
	TOTAL	**45497265.36**	**48509225.00**	**10835329.04**	**104841819.40**
1014	NEW PENSION SCHEME	17265797.00	18554876.00	0.00	**35820673.00**
1301	EMPLOYEES PENSION FUND	75180449.65	105751651.00		**180932100.65**
1075	PATIENT WELFARE FUND	1735073.00	178211.00		**1913284.00**
1076	PWF EXPENSES	1549.35	157593.00		**159142.35**
1077	INSTITUTIONAL ETHICS COMMITTEE FUND	0.00	4099942.00		**4099942.00**
1080	STAFF BENEVOLENT FUND	2189353.25	4114610.00		**6303963.25**
1079	VICE CHANCELLORS CONFERENCE FUND - Hospital	0.00	677133.00		**677133.00**
	TOTAL	**96372222.25**	**133534016.00**	**0.00**	**229906238.25**
	Total (1)	**141869487.61**	**182043241.00**	**10835329.04**	**334748057.65**

CAPITAL EXPENDITURE			UTILISATION REVENUE EXPENDITURE					
FIXED ASSETS	OTHERS	TOTAL	SALARIES WAGES	RENT/ CONSUMABLES	OTHER ADM EXP	TOTAL	SUB TOTAL	NET BALANCE
0.00	0.00	**0.00**	0.00	0.00	26315.00	**26315.00**	**26315.00**	**236834.00**
0.00	0.00	**0.00**	16868.00	0.00	3839.00	**20707.00**	**20707.00**	**183225.00**
0.00	0.00	**0.00**	0.00	50323.00	132922.00	**183245.00**	**183245.00**	**791926.00**
0.00	0.00	**0.00**	38516.00	11924.00	22252.00	**72692.00**	**72692.00**	**195255.00**
0.00	0.00	**0.00**	0.00	0.00	12916.00	**12916.00**	**12916.00**	**83056.00**
0.00	0.00	**0.00**	108560.00	38070.00	87696.00	**234326.00**	**234326.00**	**776731.00**
3957.00	0.00	**3957.00**	0.00	0.00	49958.00	**49958.00**	**53915.00**	**471209.50**
0.00	0.00	**0.00**	156234.00	0.00	182682.00	**338916.00**	**338916.00**	**272386.00**
0.00	0.00	**0.00**	325882.00	0.00	452109.00	**777991.00**	**777991.00**	**2892223.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**9932.00**
0.00	0.00	**0.00**	177291.00	954498.00	42080.00	**1173869.00**	**1173869.00**	**45002.00**
0.00	0.00	**0.00**	158504.00	257443.00	52745.00	**468692.00**	**468692.00**	**93374.00**
0.00	0.00	**0.00**	135549.00	0.00	800.00	**136349.00**	**136349.00**	**374347.00**
0.00	0.00	**0.00**	0.00	38411.00	0.00	**38411.00**	**38411.00**	**160.00**
0.00	0.00	**0.00**	56000.00	0.00	0.00	**56000.00**	**56000.00**	**1300018.50**
931770.00	0.00	**931770.00**	79742.00	0.00	94609.00	**174351.00**	**1106121.00**	**487854.00**
0.00	0.00	**0.00**	0.00	0.00	55987.00	**55987.00**	**55987.00**	**224163.00**
0.00	0.00	**0.00**	0.00	0.00	10000.00	**10000.00**	**10000.00**	**0.00**
0.00	0.00	**0.00**	0.00	0.00	143308.00	**143308.00**	**143308.00**	**6692.00**
0.00	0.00	**0.00**	163929.00	0.00	538086.00	**702015.00**	**702015.00**	**319720.00**
0.00	0.00	**0.00**	0.00	0.00	345909.00	**345909.00**	**345909.00**	**8854091.00**
0.00	0.00	**0.00**	8000.00	0.00	0.00	**8000.00**	**8000.00**	**526600.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**396000.00**
0.00	0.00	**0.00**	85516.00	0.00	62114.00	**147630.00**	**147630.00**	**622884.54**
0.00	0.00	**0.00**	89274.00	0.00	0.00	**89274.00**	**89274.00**	**-258413.00**
0.00	0.00	**0.00**	81643.00	8251.00	218687.00	**308581.00**	**308581.00**	**186550.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**21006.00**
0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
0.00	0.00	**0.00**	217107.00	0.00	0.00	**217107.00**	**217107.00**	**-391407.00**
2434884.00	0.00	**2434884.00**	542406.00	1500.00	52630.00	**596536.00**	**3031420.00**	**618121.00**
0.00	0.00	**0.00**	0.00	0.00	1484546.00	**1484546.00**	**1484546.00**	**-80297.00**
0.00	0.00	**0.00**	0.00	0.00	112096.00	**112096.00**	**112096.00**	**2153.00**
0.00	0.00	**0.00**	0.00	0.00	3110896.00	**3110896.00**	**3110896.00**	**-63712.00**
3837568.00	**0.00**	**3837568.00**	**11723863.30**	**4404784.75**	**14334811.60**	**33786645.15**	**37624213.15**	**67217606.25**
0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**35820673.00**
			153346561.00			153346561.00	**153346561.00**	**27585539.65**
						0.00	**0.00**	**1913284.00**
					179193.00	179193.00	**179193.00**	**-20050.65**
					158577.00	158577.00	**158577.00**	**3941365.00**
					4188446.00	4188446.00	**4188446.00**	**2115517.25**
					409708.00	409708.00	**409708.00**	**267425.00**
0.00	**0.00**	**0.00**	**153346561.00**	**0.00**	**4935924.00**	**158282485.00**	**158282485.00**	**71623753.25**
3837568.00	**0.00**	**3837568.00**	**165070424.30**	**4404784.75**	**19270735.60**	**192069130.15**	**195906698.15**	**138841359.50**

CODE	NAME OF GRANTEE/PRINCIPAL INVESTIGATOR	FUND-WISE BREAK UP			TOTAL
		OPENING BALANCE	ADDITIONS TO FUND GRANTS	OTHER RECEIPTS	
SCHEDULE 3-EARMARKED/ENDOWMENT FUNDS					
5000	PROJECT SUSPENSE	603099	274963	-	878062
5057	DYNAMIC ORTHOPAEDIC PVT LTD, HYDROXY	36028.55	0	0	36028.55
5089	DETEC & TREAT OF CANCER BY LASER	3959	0		3959
7000	MISCELLENEOUS PROJECT	30944.09	0		30944.09
7001	PRO;SAHAJANAND VASCU;DR.AURTHUR	3854257.75	799200		4653457.75
7002	Dr.TOMS LABORATORY, Dr. K.KRISHNAN	23151	0		23151
7003	PROJ:D.S.T. DR.P.V. MOHANAN	2537.4	0		2537.4
7004	PROJ:ATMRF:DR LISSY KRISHNAN	551.25	0		551.25
7005	PROJECT:DYNAMIC ORTHOPAEDICS	13656	0		13656
7006	PROJ: D.S.T. D.S.NAGESH	360912	0		360912
7008	NMITLI, PROJECT C.S.I.R	410465.9	0		410465.9
7009	CHITOSAN BASED WAINED DRESSING	20938.75	0		20938.75
7011	DST-FAB: CLINICALLY/SIG:SHAPE OF HEVA	187497	190000	7206	384703
7014	AUROLAB,ARAVIND EYE HOSPITAL	13674	0		13674
7015	TTK.HEALTHCARE.DEVELOPMENT OF VALV	47988	0		47988
7016	INDO-GERMAN COMMITTEE MEETING-DST	6484	0		6484
7017	HINDUSTAN LATEX.EVALU:BLOOD BAG	544234.5	955844		1500078.5
7018	ALL INDIA COUNCIL FOR TECHNI:EDU:SH	162303	0	0	162303
7019	DST.NIRANJAN	69847	0		69847
7020	IFCPAR-DR.JAYAKRISHNAN	188	0	0	188
7022	DST-LBFDPSBC-DR.SHARMA	79385	0		79385
7023	DEV: HYDRO-CEPHALUS-HINDUSTAN LATEX	45510	0		45510
7026	DEV.HEART VALVE-DST.MURALEE	811	0		811
7027	STED-DR T V KUMARY-INVITRO	5089	0		5089
7029	DONERG/LIFE SCIENCE BOARD	6876	0	0	6876
7031	DBT/DR P V MOHAN/DEV INVITROPYRO	80564	0		80564
7032	DST. DR. ANNINE/BONE REGENERATION	29166	0	0	29166
7033	BIOFUNCTIONAL EVALUATION DR. UMASANKER	72581	0		72581
7034	DST. DR. NIRMALA RACHEL	14664	0		14664
	DST-H.K.VARMA	95433	0		95433
7036	INVITRO HEMO CAMPABILITY/ DR. LISSY	337424	0		337424
7037	INVIVO EVALUATION/ STED/DR. LISSY	6205	0		6205
7039	JNC/ASR/DR. MOHANAN'STUDY OF ACCUTE… ..	44684	0		44684
7040	BIOMED/ C.V. MURALEEDHARAN	44000	0		44000
7041	CSIR-GRANT-ASHA S MATHEW,PHD STUDENT	179799	318405		498204
7042	CSIR-GRANT-BERNADETTE K. MADATHIL,PHD	25870	0		25870
7043	CSIR-GRANT-SAILAJA.G.S.SRF	9067	0		9067
7044	LISI NO TRIAL TRIAL MERIND	20611.65	230000		250611.65
7045	NIRMALA RACHEL, CSIR	14063	0		14063
7047	U.G.C. GRANT- RESEARCH FELLOW	80254	271171		351425
7048	CSIR GRANT- JOSENA JOSEPH	27714	213200		240914
7049	CSIR GRANT - MARY VARGHESE	30856	129267		160123
7051	CSIR GRANT - MANITHA B NAIR	9475	97242		106717
7052	DBT/DR.PRABHA/DEV. OF TEMP - RES - CO-OPLY	-229010.25	0		-229010.25
7053	DR.SREENIVASAN/DEVEL.OF TEMP.RES.CO-OPLY	222756	0		222756
7054	DST-DR.ANOOP-DIFF:EXPR :RAT BRAIN……	44434	0		44434

CAPITAL EXPENDITURE			UTILISATION REVENUE EXPENDITURE					
FIXED ASSETS	OTHERS	TOTAL	SALARIES WAGES	RENT/ CONSUMABLES	OTHER ADM EXP	TOTAL	SUB TOTAL	NET BALANCE
-	-	0	422074		-	422074	422074	455988
		0	0		837	837	837	35191.55
		0	0		0	0	0	3959
		0			0	0	0	30944.09
		0	319476		325655	645131	645131	4008326.75
		0	9000		275	9275	9275	13876.00
		0				0	0	2537.4
		0			0	0	0	551.25
		0			0	0	0	13656
		0			106904	106904	106904	254008
0		0	20984		20778	41762	41762	368703.9
		0			0	0	0	20938.75
		0			244675	244675	244675	140028
		0				0	0	13674
		0			0	0	0	47988
		0			1077	1077	1077	5407
		0	40607		337501	378108	378108	1121970.5
		0			0	0	0	162303
		0			0	0	0	69847
		0	0	0	0	0	0	188
		0	0	0	0	0	0	79385
		0			0	0	0	45510
0		0	0		0	0	0	811
		0			0	0	0	5089
		0	0		0	0	0	6876
		0	0		0	0	0	80564
		0	0	0	0	0	0	29166
		0			0	0	0	72581
0		0	0		0	0	0	14664
		0				0	0	95433
		0	.		103791	103791	103791	233633
		0				0	0	6205
		0	0		0	0	0	44684
		0				0	0	44000
		0	377259	0	39115	416374	416374	81830
		0	0		0	0	0	25870
		0	0	0	0	0	0	9067
		0	210000	0	13939	223939	223939	26672.65
		0	0	0	0	0	0	14063
		0	271740	0	29445	301185	301185	50240
		0	193200		241	193441	193441	47473
		0	0	0	7770	7770	7770	152353
		0	84000	0	6735	90735	90735	15982
		0	0		0	0	0	-229010.25
		0	0		200137	200137	200137	22619
		0	0		0	0	0	44434

CODE	NAME OF GRANTEE/PRINCIPAL INVESTIGATOR	FUND-WISE BREAK UP			TOTAL
		OPENING BALANCE	ADDITIONS TO FUND GRANTS	OTHER RECEIPTS	
SCHEDULE 3-EARMARKED/ENDOWMENT FUNDS					
7055	CSIR-NMITLI SCHEME-C.V.MURALEEDHARAN	10345646	0		10345646
7056	D.S.T.ROYJOSEPH, BONE GRAFT SUB:SPINAL	110047	0		110047
7057	DST - PROJECT.DR.JAYABALAN	16071	0		16071
7059	DBT-DR. PRABHA D NAIR, ISLET IMMUN…...	109232	0		109232
7060	ICMR PROJECT/ SUDHAKAR MUTHALEE	131800	495754	69000	696554
7061	DR. UMASANKAR/PRELIMI:EVALU:BIODEGRADABLE	708178	0		708178
7062	DR. LIZY-SAHAJA:EVA "STENT "INVITRO…..	162117	583577		745694
7063	DR.P.V.MOHAN, SHAJANAD	214696	0		214696
7065	DR.T.V.KUMARI, DBT.BIOGENE	-421480	0		-421480
7066	DR.B.S.GEETHA.PDF,STED	15321	0		15321
7067	DBT.DR.JAYABALAN ,DEV:&STUDIES….	-27459	0		-27459
7068	STED .DR.JAYAKRISHNAN .SYNTHESIS… ..	-6030	124804		118774
7069	VSSC - PROJECT. D.S. NAGESH	359473	0		359473
7070	CHO PROJECT - 5146 JAYASREE	-872	0		-872
7071	STEC-PROJECT: DR.MAYA NANDKUMAR	-73954	136167		62213
7072	SAHAJANAND MED.TECH. C.V.MURALIDHARAN	76292	0		76292
7073	STUDY PROJECT:DR.P.V.MOHANAN	125553	0	59491	185044
7074	STUDY PROJECT: CLRI- DR.MOHAN	289303	0		289303
7075	STUDY PROJECT - BIOSYNC SCI	11935	0		11935
7076	ARROW INTERNATIONAL : DR.UMASHANKAR	399773	0		399773
7077	UMHOU SENEMBYU:DR.UMASHANKAR	603714	0		603714
7079	DBT- DR.SREENIVASAN	339399	0		339399
7080	DBT-DR.MAYA- TISSUE ENGINEERING HYBRID	367248	0		367248
7081	USV LTD. MUMBAI - DR.MOHAN	88349	0		88349
7082	INDO-US JOINT PROJECT	735206	0	16330	751536
7083	ARROW HAEMO DIALYSIS	30882	0		30882
7085	DR.R.V.THAMPAN - CSIR	26381	0		26381
7086	HORMONE RELEASING INTRA DEVICES	413929	521063		934992
7087	CSIR - KALADHAR - BST	39103	0		39103
7088	FEASIBILITY STUDY	1000000	0		1000000
7089	PROJ/7089/DEV.PORTABLE SAFETY	1291450	0		1291450
7090	PROJ/7090/TISSUE ENGINEERS VASCULAR	2449179	2606000		5055179
7091	PROJ/7091/NOVEL MICROPHORES	-15272	0		-15272
7092	PROJ/7092/SEA FOOD	151088	0		151088
7093	PROJ/7093/CSIR GRANT-LPA	120952	257068		378020
7094	PROJ/7094/CSIR GRANT-GIJU	29942	0		29942
7095	PROJ/7095/CSIR GRANT-VIOLA.B.MORRIS	6002	0		6002
7096	PROJ/7096/CSIR GRANT-DEVI	148261	0		148261
7097	PROJ/7097/ACCELERATED AGEING	489264	241148		730412
7098	PROJ/7098/EVALN OF NTU DRUG	1355655	0		1355655
7099	PROJ/7099/BCL	182053	0		182053
7100	PROJ/7100/ITR PROGRAMME	0	125000		125000
7101	PROJ/7101/CSIR/SONIA.T.A	20000	221600		241600
7102	PROJ/7102/CSIR/LYNDA THOMAS	16666	221600		238266
7103	PROJ/7103/CSIR/VIDYARAJ	13426	110800		124226
7104	PROJ/7104/CSIR/RENJITH.P.NAIR	14222	192800		207022

CAPITAL EXPENDITURE			UTILISATION REVENUE EXPENDITURE					
FIXED ASSETS	OTHERS	TOTAL	SALARIES WAGES	RENT/ CONSUMABLES	OTHER ADM EXP	TOTAL	SUB TOTAL	NET BALANCE
0		0	369955		1527543	1897498	1897498	8448148
		0	0	0	0	0	0	110047
		0	0		0	0	0	16071
0		0	0		36362	36362	36362	72870
		0	529568		67857	597425	597425	99129
		0	0		0	155101	155101	553077
		0	107553		182207	289760	289760	455934
	0	0	10651		204045	214696	214696	0
		0	0		270	270	270	-421750
		0	0		0	0	0	15321
		0	0		0	0	0	-27459
		0	34610		84164	118774	118774	0
		0	294861		184235	479096	479096	-119623
		0	0		0	0	0	-872
		0	30000		25986	55986	55986	6227
		0	0		0	0	0	76292
	0	0	188430		0	188430	188430	-3386
		0	0		0	0	0	289303
		0	0		0	0	0	11935
		0	0		0	0	0	399773
		0	0		0	0	0	603714
0		0	16000		70098	86098	86098	253301
0		0	278626		1033921	1312547	1312547	-945299
		0				0	0	88349
		0	0		750658	750658	750658	878
		0	0	0	0	0	0	30882
		0	0		0	0	0	26381
0		0	420907		284187	705094	705094	229898
		0	0		0	0	0	39103
		0				0	0	1000000
	0	0			5000	5000	5000	1286450
		0	697300		1287999	1985299	1985299	3069880
		0	96600		190859	287459	287459	-302731
		0	0		4609	4609	4609	146479
		0	230400		77891	308291	308291	69729
		0	0			29942	29942	0
		0	0			0	0	6002
		0	0		148261	148261	148261	0
		0	217586		70733	288319	288319	442093
		0	0		0	0	0	1355655
		0	43230		116877	160107	160107	21946
			65000		0	65000	65000	60000
		0	201600		15564	217164	217164	24436
		0	134400		0	134400	134400	103866
		0	77894		11200	89094	89094	35132
		0	172800		333	173133	173133	33889

CODE	NAME OF GRANTEE/PRINCIPAL INVESTIGATOR	FUND-WISE BREAK UP			TOTAL
		OPENING BALANCE	ADDITIONS TO FUND GRANTS	OTHER RECEIPTS	
SCHEDULE 3-EARMARKED/ENDOWMENT FUNDS					
7105	PROJ/7105/CSIR/ARJUN NAMBOODIRI	6560	221600		228160
7106	PROJ/7106/CSIR/NITHYA JOSEPH	0	263190		263190
7107	PROJ/7107/CSIR/NEENA & 2 FELLOWS	0	235632		235632
7108	PROJ/7108/CSIR/FRANCIS.B.FERNANDEZ	0	238336		238336
7109	PROJ/7109/CSIR/TARA.S	0	147822		147822
7110	PROJ/7110/CSIR/DEEPA.R	0	126438		126438
7111	PROJ/7111/CSIR/SHEEJA LIZA EASO	0	64230		64230
7200	JOINT PROGRAME/M.TECH	10746175	0		10746175
8001	PROJ/8001/PROGRAM SUPPORT &TISSUE	14147736	1845000		15992736
8002	PROJ/8002/PROGRAM SUPPORT & TISSUE	-1073006	1513000	30000	469994
8003	PROJ/8003/PROGRAM SUPPORT & TISSUE	79652	1215000		1294652
8004	PROJ/8004/PROGRAM SUPPORT & TISSUE	172822	495000	200	668022
8005	PROJ/8005/PROGRAM SUPPORT & TISSUE	-418170	747000	600	329430
8006	PROJ/8006/BIOCONJUGATION NANO MAT.	140824	335000		475824
8007	PROJ/8007/PRODUCTS OF POLYMER	1300147	445000		1745147
8008	PROJ/8008/CSIR GRANT-PADMAJA.P.NAMBI	9712	235728		245440
8009	PROJ /8009/DBT/DR.T.V.ANILKUMAR/DE…TISSUE	-65433	760800		695367
8010	PROJ /8010/DBT/DR.NIRANJAN/IMPLATED….CONTROL	76050	0		76050
8011	PROJ/8011/NANOFRONT/DR.NIRANJAN/INTRAMAS	139900	0		139900
8012	PROJ/8012/VSSC/DR.NIRANJAN/DESIGN STUDIES	1465935	0		1465935
8013	PROJ/8013/DST/DR.C.P.SHARMA/ FADDS	23622774	6310000	1003824	30936598
8014	PROJ /8014/DBT/DR.ROY JOSEPH /DEV….V.GRAFT	479910	0		479910
8015	PROJ /8015/DR.ANOOPKUMAR/PROGRAMME…	82337	0		82337
8016	PROJ /8016/DBT/DR.UMASHANKAR/DEVE….APPLN.	1094540	1969000	10385	3073925
8017	PROJ/8017/AYUTECH/DR.UMASANKAR	365300			365300
8018	PROJ/8018/ICMR/DR.P.V.MOHANAN	367584	292514		660098
8019	PROJ/8019/STEC/DR.P.RAMESH	440000	0		440000
8020	PROJ/8020/CSIR/DR.LISSY KRISHNAN	0	1033000		1033000
8021	PROJ/8021/ANGIOGENESIS EXP/DR.UMASHANKAR	0	1000000		1000000
8022	PROJ/8022/AIR POLLUTION/SUJESH SREEDHAR	0	266000		266000
8023	PROJ/8023/KSCSTE/DR.H.K.VARMA	0	237600		237600
8024	PROJ/8024/IIT/DR.P.R.ANILKUMAR	0	463944		463944
8025	PROJ/8025/	0	2805700		2805700
8026	PROJ/8026/	0	100000		100000
8027	PROJ/8027/DR.P.V.MOHANAN	0	950000		950000
8028	PROJ/8028/DR.DIKSHA PAINULY	0	576000		576000
8029	PROJ/8029/INDO-JAPAN	0	200000		200000
8030	PROJ/STUDY/DR.UMASHANKAR	0	1162350		1162350
8031	PROJ/8031	0	1450000		1450000
6034	INDO-DUTCH WORKSHOP-MEDICAL DEVICE	0	636212		636212
6035	INDO-DUTCH WORKSHOP - LIFE SCIENCE	0	636171		636171
	Total (2)	**83335087.59**	**38293940**	**1197036.00**	**122826063.60**

CAPITAL EXPENDITURE			UTILISATION REVENUE EXPENDITURE					
FIXED ASSETS	OTHERS	TOTAL	SALARIES WAGES	RENT/ CONSUMABLES	OTHER ADM EXP	TOTAL	SUB TOTAL	NET BALANCE
		0	201600		7000	208600	208600	19560
			157590		8342	165932	165932	97258
		0	211084		0	211084	211084	24548
		0	213678		0	213678	213678	24658
		0	132480		0	132480	132480	15342
		0	113341		0	113341	113341	13097
		0	57600		0	57600	57600	6630
		0	701684		2019728	2721412	2721412	8024763
0		0	977180		14066322	15043502	15043502	949234
0		0	427186		564065	991251	991251	-521257
0		0	244039		736281	980320	980320	314332
0		0	46150		197938	244088	244088	423934
0		0	171319		107253	278572	278572	50858
		0	165600		240921	406521	406521	69303
0		0	240310		1016869	1257179	1257179	487968
		0	225728		14139	239867	239867	5573
0		0	165600		1026662	1192262	1192262	-496895
0		0	72271		76467	148738	148738	-72688
		0				0	0	139900
		0	41400		61621	103021	103021	1362914
0		0	1796614		28946655	30743269	30743269	193329
0		0	9213		487760	496973	496973	-17063
		0	0		77771	77771	77771	4566
0		0	372507		2596796	2969303	2969303	104622
		0				0	0	365300
		0	205960		269066	475026	475026	185072
			69677		101155	170832	170832	269168
			150220		191251	341471	341471	691529
			0		268058	268058	268058	731942
			0		0	0	0	266000
			56000		2646	58646	58646	178954
			76377		245488	321865	321865	142079
			43781		19839	63620	63620	2742080
			0		8600	8600	8600	91400
			0		0	0	0	950000
			42581		2400	44981	44981	531019
			0		6000	6000	6000	194000
			0		0	0	0	1162350
			119458		0	119458	119458	1330542
					574298	574298	574298	61914
					544337	544337	544337	91834
0.00	**0**	**0.00**	**13186122.00**	**0**	**62305462.00**	**75491584.00**	**76165044.00**	**46661019.59**

Grand Total Schedule 3 - (1) + (2) **185502379.09**

PARTICULARS	2009-2010 [Rs.]	2008-2009 [Rs.]
SCHEDULE 4-SECURED LOANS AND BORROWINGS:		
1. Central Government	--	--
2. State Government (Specify)	--	--
3. Financial Institutions	--	--
a) Term Loans	--	--
b) Interest accured and due	--	--
4. Banks:	--	--
a) Term Loans-Interest accured and due	--	--
b)Other Loans(specify)- Interest accured and due-Over draft	--	--
5. Other Institutions and Agencies	--	--
6. Debentures and Bonds	--	--
7. Others(Specify)	--	--
Against OD facility- cheques issued	--	--
TOTAL		

	2009-2010	2008-2009
SCHEDULE 5-UNSECURED LOANS AND BORROWINGS	[Rs.]	[Rs.]
1. Central Government	--	--
2. State Government (Specify)	--	--
3. Financial Institutions	--	--
4. Banks:	--	--
a) Term Loans	--	--
b)Other Loans(specify)	--	--
5. Other Institutions and Agencies	--	--
6. Debentures and Bonds	--	--
7. Fixed Deposits	--	--
8. Others(Specify)	--	--
TOTAL		

PARTICULARS	2009-2010 [Rs.]	2008-2009 [Rs.]
SCHEDULE 6-DEFERRED CREDIT LIABILITIES:		
a) Acceptances secured by hypothecation of capital equipment and other assets	--	--
b) Others	--	--
TOTAL	--	--
SCHEDULE 7-CURRENT LIABILITIES AND PROVISIONS		
A. CURRENT LIABILITIES		
1. Acceptances		
2. Sundry Creditors:		
a) For Goods	49719088.00	48612935.00
b) Others	3510117.00	2752338.00
3. Advances Received	30533245.93	36985002.93
4. Interest accured but not due on:	0.00	0.00
a) Secured Loans / borrowings	0.00	0.00
b) Unsecured Loans / borrowings	0.00	0.00
5. Statutory Liabilities:	0.00	0.00
a) Overdue	3859160.85	6719141.25
b) Others	27511343.44	19509884.44
6. Other current Liabilities	0.00	0.00
TOTAL(A)	115132955.22	114579301.62
B.PROVISIONS		
1. For Taxation	--	--
2. Gratuity	--	--
3. Total Project Fund	--	--
4. Accumulated Leave Encashment	--	--
5. Trade Warranties/Claims	--	--
6. Others(Specify) Audit fee	--	--
Sinking fund contribution to invest	14477861.00	7690852.00
TOTAL(B)	14477861.00	7690852.00
TOTAL(A+B)	**129610816.22**	**122270153.62**

SCHEDULE 8- FIXED ASSETS

PARTICULARS	GROSS BLOCK		
	Cost/valuation as at the beginning of the year (01.04.2009)	**Additions during the year 2009-10**	**Deductions during the year 2009-10**
A. FIXED ASSETS:			
1. LAND:			
a) Freehold	1600169.51	0.00	0.00
b) Leasehold			
2.BUILDINGS:			
a) On Freehold Land	40710721.88	685262.00	0.00
b) On Leasehold Land			
c) Ownership Flats/Premises			
d) Superstructures on Land not belonging to the entity	121528378.88	650196.00	
3. PLANT MACHINERY & EQUIPMENT	1078581027.73	245338688.43	2420864.00
4. VEHICLES	4293791.74	2843215.00	76740.00
5. FURNITURE,FIXTURES	35557686.61	4522818.00	
6. OFFICE EQUIPMENT	955928.54	2550.00	
7. COMPUTER/PERIPHERALS			
8. ELECTRIC INSTALLATIONS	15278683.67	14242246.00	
9. LIBRARY BOOKS	115257380.57	4139803.00	
10. TUBEWELLS & W.SUPPLY	174615.00	0.00	
11. OTHER FIXED ASSETS			
a)OXYGEN CYLINDERS	234319.42	0.00	
b)AIR CONDITIONERS	22224837.91	1657698.00	
c)TELEPHONE INSTALLATIONS	2067254.94	74067.00	
d) COLD ROOM INSTALLATION	341700.00		
e) WATER COOLERS	62866.50		
f) LIFT INSTALLATION	9314942.10	1936000.00	
g) KITCHEN EQUIPMENTS	1405978.22		
h)CANTEEN EQUIPMENTS	151482.59		
I) PAINTINGS	382715.63		
k) LIVESTOCK	31848.00		
l) GAS PLANT INSTALLATIONS			
m) AMC AIR CONDITIONERS			
Total for the year (Total -A)	**1450156329.44**	**276092543.43**	**2497604.00**
Total for the previous year	1316029831.44	134924232.75	797735.00
Captial Work in Progress (B)	**481499425.00**	**44547287.00**	**0.00**
Total for the year (A+B)	**1931655754.44**	**320639830.43**	**2497604.00**

* Depreciation/value for Buildings on lease hold land included.

		Depreciation		NET BLOCK	
Cost/valuation at the year end (31.03.2010)	Depreciation as at the beginning of the year (01.04.2009)	During the year 2009-10	Total up to the year end (31.03.2010)	As at the end of current year end (31.03.2010)	As at the previous year end (31.03.2009)
1600169.51	0.00	0.00	0.00	1600169.51	1600169.51
41395983.88	0.00	0.00	0.00		
122178574.88	83794987.26	3988978.58	87783965.83	75790592.93	78444113.50
1321498852.16	699000539.28	93374746.93	792375286.21	529123565.95	379605488.22
7060266.74	2967197.78	818613.79	3785811.57	3274455.17	1326593.96
40080504.61	23311225.21	2515391.91	25826617.12	14253887.49	12246461.4
958478.54	864800.65	14051.68	878852.33	79626.21	91127.89
29520929.67	12896858.50	2493610.68	15390469.18	14130460.49	2356825.17
119397183.57	77662231.06	6260242.88	83922473.93	35474709.64	37595149.51
174615.00	153503.09	3166.79	156669.87	17945.13	21111.91
234319.42	214479.28	2976.02	217455.30	16864.12	19840.14
23882535.91	17357492.49	978756.51	18336249.00	5546286.91	4867345.42
2141321.94	1803858.46	50619.52	1854477.98	286843.96	263396.48
341700.00	338522.26	476.66	338998.92	2701.08	3177.74
62866.50	62569.52	44.55	62614.07	252.43	296.98
11250942.10	4397552.41	1028008.45	5425560.86	5825381.24	4917389.69
1405978.22	642047.83	114589.56	756637.39	649340.83	763930.39
151482.59	111566.03	5987.48	117553.52	33929.07	39916.56
382715.63	331853.82	7629.27	339483.09	43232.54	50861.81
31848.00	27022.14	723.88	27746.02	4101.98	4825.86
1723751268.87	**925938307.05**	**111658615.15**	**1037596922.19**	**686154346.68**	**524218022.14**
1450156329.19	843329524.80	82609782.25	925938307.05	524218022.14	472701306.64
526046712.00	**0.00**	**0.00**	**0.00**	**526046712.00**	**481499425.00**
2249797980.87	**925938307.05**	**111658615.15**	**1037596922.19**	**1212201058.68**	**1005717447.14**

PARTICULARS	2009-2010 [Rs.]	2008-2009 [Rs.]
SCHEDULE 9 - INVESTMENTS FROM EARMARKED/ENDOWMENT FUNDS		
1. In Government Securities	78218349.00	62051451.00
2. Other approved Securities	5685391.00	5685391.00
3. Shares	0.00	0.00
4. Debentures and Bonds	0.00	0.00
5. Subsidiaries and Joint Ventures	0.00	0.00
6. Others (to be specified) Sinking Fund Investments	262760819.00	230762235.00
Technology Fund	47785251.70	40725848.70
Pension & staff funds	49422779.00	48012908.00
TOTAL	**443872589.70**	**387237833.70**
SCHEDULE 10-INVESTMENTS-OTHERS		
1. In Government Securities	--	--
2. Other approved Securities	--	--
3. Shares	--	--
4. Debentures and Bonds	--	--
5. Subsidiaries and Joint Ventures	--	--
6. Others (to be specified)	--	--
TOTAL	--	--

PARTICULARS	2009-2010 [Rs.]	2008-2009 [Rs.]
SCHEDULE 11-CURRENT ASSETS,LOANS,ADVANCES ETC		
A. CURRENT ASSETS		
1. Inventories:		
a) Stores and Spares	218394920.13	117825583.13
b) Loose Tools	4532543.00	2905956.00
c) Stock-in trade		
Finished Goods	--	--
Work-in-progress	--	--
Medicine	9097021.00	6106035.84

	2009-2010 [Rs.]	2008-2009 [Rs.]
2. Sundry Debtors:		
a) Debts Outstanding for a period exceeding six months		
b) Others	33603646.00	45918894.00
3. Cash balances in hand(including cheques/drafts and imprest)	602186.38	979541.58
4. Bank Balances:		
a) With Scheduled Banks:		
-On Current Account	1.15	1.15
-On Deposit Accounts(L.C. margin & Commitment deposit)	999816436.00	1103000000.00
-On Savings Accounts	196847544.57	185689524.74
b) With non-Scheduled Banks:	--	--
-On Current Account		
-On Deposit Accounts		
-On Savings Accounts		
5. Post-Office-Savings Accounts		
TOTAL(A)	**1462894298.23**	**1462425536.44**
B.LOANS, ADVANCES AND OTHER ASSETS	--	--
1. Loans:		
a) Staff	13349823.00	9696251.00
b) Other Entities engaged in activities/objectives similar to that of the Entity		
c) Other(specify)	--	--
2. Advances and other amounts recoverable in cash or in kind or for value to be received:		
a) On Capital Account	228107766.35	196253335.00
b) Prepayments	81005894.28	83860955.53
c) Others	--	--
3. Income Accured:	--	--
a) On Investments from Earmarked/endowment Funds		
b) On Investments-Others		
c) On Loans and Advances	--	--
d) Others		
(includes income due unrealised Rs)		
4. Claims Receivable		
From Govt of India on Plan Funds		
TOTAL(B)	**322463483.63**	**289810541.53**
TOTAL(A+B)	**1785357781.86**	**1752236077.97**

PARTICULARS	2009-2010 [Rs.]	2008-2009 [Rs.]
SCHEDULE 12- INCOME FROM SALES/SERVICES		
1. Income from Sales		
a) Sale of Finished Goods	--	--
b) Sale of Raw Material	--	--
c) Sale of Scraps	--	--
2. Income from Services		
a) Labour and processing charges	--	--
b) Professional/Consultancy Services	--	--
c) Agency Commission and Brokerage	--	--
d) Maintenance Services	--	--
e) Others (Specify)		
From Hospital Services-Gross Income Rs.477027423	289157210.00	276848871.00
Less concession to poor Patients Rs.187870213	0.00	0.00
From Projects	490889.00	2659779.00
Testing & Facility charges received	3296770.00	3732306.00
TOTAL	**292944869.00**	**283240956.00**
SCHEDULE 13- GRANTS/SUBSIDIES		
(Irrevocable Grants & Subsidies Received)		
1. Central Government	253900000.00	229640277.00
2. State Government(s)	--	--
3. Government Agencies	--	--
4. Institution/Welfare Bodies	--	--
5. International Organisations	--	--
6. Others(Specify)	--	--
TOTAL	**253900000.00**	**229640277.00**
SCHEDULE 14-FEES/SUBSCRIPTIONS		
1. Entrance Fees	874550.00	1486320.00
2. Annual Fees/ Subscriptions	3877500.00	1424600.00
3. Seminar/Program Fees	0.00	0.00
4. Consultancy Fees	0.00	0.00
5. Others(Specify) Examination Fees	347400.00	1027592.00
TOTAL	**5099450.00**	**3938512.00**

SCHEDULE 15- INCOME FROM INVESTMENTS		
(Income on Invest.from Earmarked/Endowment Funds transferred to Funds)		
1) Interest		
a) On Govt. Securities	--	--
b) Other Bonds/Debentures	--	--
2) Dividends:		
a) On Shares	--	--
b) On Mutual Fund Securities	--	--
3) Rents	766069.00	1482901.00
4) Others(Specify) On Sinking Fund	24327732.00	13876337.00
On Technology Fund	2801745.00	3016605.80
TOTAL	**27895546.00**	**18375843.80**
TRANSFERRED TO EARMARKED/ENDOWMENT FUNDS		

PARTICULARS	**2009-2010 [Rs.]**	**2008-2009 [Rs.]**
SCHEDULE 16- INCOME FROM ROYALITY,PUBLICATION ETC		
1) Income from Royalty	4649575.00	1915736.00
2) Income from Publications	--	--
3)Others(Specify)	--	--
TOTAL	**4649575.00**	**1915736.00**
SCHEDULE 17- INTEREST EARNED		
1) On Term Deposit		
a) With Scheduled Banks	102266814.00	59416322.87
b) With non-scheduled banks	--	--
c) With Institutions	--	--
d) Others	--	--
2) On Savings Account		
a) With Scheduled Banks	337526.96	1660401.02
b) With non-scheduled banks	--	--
c) Post Office Savings Account	--	--
d) Others		
3) On Loans		
a) Employees/Staff	1409305.00	1573321.00
b) Others		
4) Interest on Debtors and other Receivables	--	--
TOTAL	**104013645.96**	**62650044.89**

SCHEDULE 18- OTHER INCOME		
1. Profit on Sale/disposal of Assets:		
a) Owned assets	--	--
b) Assets acquired out of grants, or received free of cost	--	--
2. Export Incentives realized	--	--
3. Fees for Miscellaneous Services	--	--
4. Miscellaneous Income (income from Projects)	613918.00	8111631.00
Other Income	1536775.08	2276846.26
TOTAL	**2150693.08**	**10388477.26**
SCHEDULE 20-ESTABLISHMENT EXPENSES		
a) Salaries and Wages	495202933.00	347741972.80
b) Allowances and Bonus	2259497.00	1211061.50
c) Contribution to Provident Fund	0.00	24282.00
d) Contribution to other fund(specify)	0.00	0.00
e) Staff Welfare Expenses	10927478.28	10364926.80
f) Expenses on Employee's Retirement and Terminal Benefits	34751024.00	28392518.00
g) Others(Specify) PG Training & Accademic payments	81093755.00	51048038.00
TOTAL	**624234687.28**	**438782799.10**

PARTICULARS	2009-2010 [Rs.]	2008-2009 [Rs.]
SCHEDULES 21- ADMINISTRATIVE EXPENSES		
a) Purchases	250477960.84	272360981.16
b) Labour and processing expenses	0.00	0.00
c) Cartage and Carriage Inwards	165298.00	173553.00
d) Electricity and power	28666972.00	32608545.00
e) Water charges	1712398.00	3929919.00
f) Insurance	552.00	1124.00
g) Repairs and maintenance	34056603.00	21397829.00
h) Excise duty	0.00	0.00
i) Rent,Rates and Taxes	972059.00	476842.00
j) Vehicles Running and Maintenance	718442.00	460457.00
k) Postage,Telephone and Communication Charges	1947694.00	2449906.00
l) Printing and Stationary	2374991.00	2463169.00
m) Travelling and Conveyence Expenses	930803.00	1651873.50
n) Expenses on Seminar/Workshop	3467387.00	2531270.00
o) Subscription Expenses	104000.00	27810.00
p) Expenses on Fees	0.00	0.00
q) Auditors Renumeration	0.00	11236.00
r) Hospitality Expenses	0.00	0.00
s) Professional Charges	0.00	0.00
t) Provision for Bad and Doubtful Debts/Advances	0.00	0.00
u) Irrecoverable Balances Written-off	0.00	0.00
v) Packing Charges	0.00	0.00
w) Freight and Forwarding Expenses	0.00	0.00
x) Distribution Expenses	0.00	0.00
y) Advertisement and Publicity	3656452.00	4980664.00
z) Others(specify)	19186051.33	19074503.00
TOTAL	**348437663.17**	**364599681.66**
SCHEDULE 23-INTEREST		
a) On Fixed Loans	--	--
b) Bank Charges)	320839.40	86805.40
c) Others(specify)	--	--
TOTAL	**320839.40**	**86805.40**

RECEIPTS & PAYMENTS ACCOUNTS FOR THE PERIOD FROM 01-04-2009 TO 31-03-2010

RECEIPTS	2009-10 Rs.	2008-09 Rs.
I Opening Balances		
a) Cash In Hand	**979541.58**	895160.13
b) Bank Balances		
I) In Current Account	**1.15**	1.15
ii)In deposit Account		
iii)Savings Account	**185640331.36**	137902894.46
II Grant Received		
From Government of India		
Under Plan scheme	**813000000.00**	723000000.00
Plan recurring	**0.00**	0.00
Non-Plan scheme	**67700000.00**	61430000.00
Women Comp. Plan	**105000000.00**	95000000.00
III Receipts against Earmarked Funds		
a) Earmarked funds	**94355433.00**	16569813.00
b)Own funds		
IV Interest Received		
a) On Bank deposits	**88537871.96**	59897075.99
b) Loans Advances etc	**52841.00**	356470.00
V Receipts from services		
Receipts from Patient services	**361291362.95**	341892132.93
Other receipts including Royalty	**18239180.80**	24995468.65
VI Other receipts		
Grant received for Projects	**97161601.50**	91779313.03
Refund of Deposits(LC Margin)		
Other Deposit received	**274039839.60**	101401797.71
Total	**2105998004.90**	**1655120127.05**

PAYMENTS	2009-10 Rs.	2008-09 Rs.
I Expenses		
a) Establishment expenses	**716349013.18**	513101014.30
b) Administrative Expenses		
For Purchases	**503897465.60**	368538762.00
Other expenses	**150084948.00**	191348387.00
II Payments made against funds for various Projects		
As Per schedule	**103842682.00**	48789260.43
III Investments & Deposits made		
a) Out of Earmarked funds	**11691573.00**	17078476.00
b) Out of own funds	**0.00**	15500000.00
IV Expenditure on Fixed Assets & Capital work -in- progress		
a) Purchase of Fixed Assets	**98875678.00**	65080453.00
b)Capital work-in-progress		
V Refund of Loans		
VI Finance Charges(Bank charges)	**273387.40**	59675.40
VII Other Payments		
To Funds/Deposit- refunds	**323582734.00**	248956699.00
VIII Closing Balance		
a) Cash in hand	**602186.38**	979541.58
b) Bank Balances		
I) In current Account	**1.15**	1.15
ii) In Deposit Account		
iii) Savings Account	**196798336.19**	185687857.19
Total	**2105998004.90**	**1655120127.05**

PROVIDENT FUND ACCOUNT FOR THE YEAR ENDED 31-03-2010

Particulars	2009-2010 [Rupees]	2008-2009 [Rupees]
LIABILITIES		
MEMBERS BALANCE	205642088.00	191150022.00
MEMBERS CREDITS (FOR MARCH 2009)	3165180.00	3532833.00
BALANCE DUE TO MEMBERS		
NOT IN SERVICE		
Under EPF scheme	7144466.00	6602266.00
„ GPF „	532055.00	532055.00
PENSION FUND DUES	43868457.00	40618942.00
RESERVES&SURPLUS-INTEREST	0.00	0.00
TOTAL	**260352246.00**	**242436118.00**
ASSETS		
INVESTMENT AT COST	224114739.00	204867803.00
DUES TO PF ACCOUNT		
FROM INSTITUTE	3165180.00	1132833.00
FROM PF COMMISSIONER	12969487.00	15035709.00
Transfer	0.00	0.00
INTEREST ACCRUED NOT DUE	1000280.00	1000280.00
BALANCE WITH BANKS		
SBT -GPF A/C	4877573.39	12371352.39
INTEREST ACCRUED	14224986.61	8028140.61
TOTAL	**260352246.00**	**242436118.00**

GPF Account - Trial Balance as on 31.03.2010

GL code	Particulars	Debit	Credit
1001	SCTIMST	3165180.00	
1005	Dues form PF Commissioner	12969487.00	
1010	Members Balance		290048172.00
1011	Other receipts not credited to Members		3165180.00
1012	Old members EPF scheme		7144466.00
1013	Old members GPF		532055.00
1015	Dues to Pension Fund		43868457.00
1030	Loan payment	61157369.00	
1040	Interest	14224986.61	
1050	Investments	224114739.00	
1090	Final Settlement	23248715.00	
1100	Transfer		
1120	Interest Accrued not due	1000280.00	
18	Bank Balance	4877573.39	
	TOTAL	**344758330.00**	**344758330.00**

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31-03-2010

SCHEDULE 24- SIGNIFICANT ACCOUNTING POLICIES

1. ACCOUNTING CONVENTION
Financial Statements are prepared on the basis of historical cost convention unless otherwise stated and on the accrual method of accounting.

2. INVENTORY VALUATION
Stores and spares including machinery spares are valued at cost.

3. INVESTMENTS
Investment including long term investments are carried at cost.

4. FIXED ASSETS
Fixed assets are stated at cost of acquisition inclusive of inward freight, duties and taxes incidental and direct expenses related to acquisition.

5. DEPRECIATION
Depreciation is provided on reducing balance method at the rates specified by the Income Tax Act 1961.In respect of additions to/deductions from fixed assets, during the year depreciation is provided for full year.

6. GOVERNMENT GRANTS/SUBSIDIES
Government Grant from Plan fund are treated as additions to Capital fund of Institute. Grants in respect of specific fixed assets acquired are shown as deduction from the cost of the related asset. Government Grants/subsidies are accounted on Grant release order basis.

7. FOREIGN CURRENCY TRANSACTIONS
Transactions denominated in foreign currency are accounted at exchange rate prevailing at the date of transactions.

8. RETIREMENT BENEFITS
An amount equal to one month salary every year is transferred to Pension Fund Account to meet liability on account of Pension payments. An amount of Rs.4 lakh is transferred every year to above fund for meeting liabilities on account of Gratuity payments. Leave encashment eligible at the time of retirement/reliving is accounted on actual payment basis.

9. PROVIDENT FUND
Liabilities and assets of Provident fund account were separated from Balance sheet of Institute and shown as separate statement.

10. EMERGENCY RESERVE FUND
An amount equal to Five percent of receipts from patient are transferred to a Fund for meeting unexpected requirements for Fixed assets.

11. TECHONOLOGY DEVELOPMENT FUND
Receipts against technology developed by the Institute are transferred to the above fund for meeting additional expenses on Improvement of technologies already developed.

SCHEDULE 25- CONTINGENT LIABILITIES AND NOTES ON ACCOUNTS

1. CONTINGENT LIABILITIES

	Rs. In lakhs	
	2009-10	2008-09
Claims against the Institute not acknowledged as debts	NIL	Nil
Bank Guarantee given by Institute	17.75	21.75
Letters of credit opened on behalf of Institute	1123.30	943.62
Disputed demands on Income tax etc	Nil	Nil
In respect of claims from parties for non- execution of orders	Nil	Nil

2. UNEXPIRED CAPITAL COMMITMENTS

	Rs. In lakhs	
	2009-10	2008-09
Estimated value of orders remaining to be executed on Capital Account including Construction under vision 2020	2750.86	3984.26
Lease obligation for rentals for Plant & Machinery	Nil	Nil

3. CURRENT ASSETS, LOANS & ADVANCES

The aggregate amount shown in the Balance sheet for the Current assets, Loans and Advances, have the value which is realisable in the ordinary course of business.

4. Provisions

Provision for Income tax not made since there is no taxable income for Institute under Income tax Act 1961, during the year.

5. FOREIGN CURRENCY TRANSACTIONS:

		Rs. In lakhs	
		2009-10	2008-09
5.1 Value of Imports			
Capital Goods		657.41	1812.73
Stores Spare & Consumables		355.30	318.13
5.2 Expenditure in foreign currency Travel Expenses	USD	14500	Nil
	Euro	1360	300
	Pound	500	575
	Aus $	Nil	200
5.3 Earnings:			
Value of Exports		Nil	Nil

6. Other items :

6.1 Transfer to Emergency Reserve Fund & Technology Development Fund

During the year an amount of Rs.387.86 lakhs (previous year Rs. 277.72 lakhs) and Rs.70.59 lakhs (previous year Rs.52.53 lakhs) was transferred to Emergency Reserve Fund & Technology Development Fund. During the year an amount of Rs.NIL lakhs (previous year Rs.10.56 lakhs) was spent from Technology Development Fund.

6.2 Depreciation :

Institute has been consistently applying the depreciation to fixed assets based on the rates specified in the Income Tax Act, 1961. Eventhough the rates were revised during the financial year 2002-03 & 2005-06, Institute has been charging depreciation at the pre revised rates since it was found to be appropriate. Hence these rates were also applied during the year 2009-10.

7. Corresponding figures for previous years have been regrouped, where ever necessary.

Schedules 1 to 25 are annexed to and form integral part of the Balance Sheet as at 31-03-2010, and Income & Expenditure Account for the year ended on that date.

Financial Adviser *Director*

Separated Audit Report of the Comptroller & Auditor General of India of the Accounts of Sree Chitra Tirunal institute for Medical Sciences and Technology (SCTIMST), Thiruvananthapuram for the year ended 31 March 2010.

We have audited the attached Balance Sheet of Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), Thiruvananthapuram as at 31 March 2010, the Income & Expenditure Account and the Receipts & payment Account for the year ended on that date under Section 19(2) of the Comptroller & Auditor General's (Duties, Power & Conditions of Service) Act, 1971 read with section 18(2) of the SCTIMST Act, 1980. These financial statements include the accounts of Bio Medical Technology (BMT) wing of the SCTIMST. These financial statements are the responsibility of the SCTIMST's management. Our responsibility is to express an opinion on these financial statements based on our audit.

2. This Separate Audit Report contains the comments of the Comptroller & Auditor General of India (CAG) on the accounting treatment only with regard to classification, conformity with the best accounting practices, accounting standards and disclosure norms, etc. Audit observations on financial transactions with regard to compliance with the Law, Rules & Regulations (Propriety and Regularity) and efficiency-cum-performance aspects, etc., if any, are reported through Inspection Reports/CAG's Audit Reports separately.

3. We have conducted our audit in accordance with auditing standards generally accepted in India. These standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatements. And audit includes examining, on a test basis, evidences supporting the amounts and disclosure in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluation the overall presentation of financial statements. We believe that out audit provides a reasonable basis for our opinion.

4. Based on our audit, we report that:

i. We have obtained all the information and explanations, which to the best of our knowledge and belief were necessary for the purpose of our audit;

ii The Balance sheet, Income & Expenditure Account and Receipt & Payment Account dealt with by this report have been drawn up in the format approved by the Government of India, Ministry of Finance.

iii In our opinion, proper books of accounts and other relevant records have been maintained by the SCTIMST as required under Section 18 (1) of SCTIMST Act, 1980 in so far as it appears from our examination of such books subject to observations made under.

iv. We further report that:

5. Comments of Accounts

5.1. Income and Expenditure Account

5.1.1. Depreciation

The accounting policy of SCTIMST stipulated that depreciation was provided on reducing balance methods at the rates specified by the Income Tax Act, 1961. However, vide note no.6.2 of Notes on Accounts (Schedule 25) it has been stated that the institute has

been charging depreciation at the pre-revised rates since it was found to be appropriate. Due to difference in rates applied from assessment year 2003-04 onwards, the accumulated depreciation was understated by Rs. 43.66 crore and assets were overstated by the same amount.

6. General

6.1. Actuarial valuation

SCTIMST neither obtained actuarial valuation for ascertaining liability on account of gratuity, pension, leave salary payments nor provided the same in the accounts.

7. Grants in aid

Out of Grant in Aid of Rs. 100.00 crore received during the year the organization utilized the entire sum.

8. Management letter:

Deficiencies which have not been included in the Audit Report have been brought to the notice of the SCTIMST through a management letter issued separately for remedial/corrective action.

Subject to our observations in the preceding paragraphs, we report that the Balance Sheet and Income & Expenditure Account/Receipts & payment Account dealt with by this report are in agreement with the books of accounts.

In our opinion and to the best of our information and according to the explanations given to us, the said financial statements read together with the Accounting Policies and Notes on Accounts, and subject to the significant matters stated above and other matters mentioned in Annexure-I to this Audit Report give a true and fair view in conformity with accounting principles generally accepted in India:

a. In so far as it relates to the Balance Sheet, of the state of affairs of the Sree Chitra Tirunal Institute for Medical Sciences & Technology, Trivandrum as at 31 March 2010 and

b. In so far as it relates to Income & Expenditure Account of the deficit for the year ended on the date.

Sd/-

Principal Director of Audit

REPLY OF THE INSTITUTE

Para No.	Reply of SCTIMST
5. Comments of accounts 5.1 Income and Expenditure account 5.1.1 Deprecation	As pointed out by audit in the year 2008-09 we applied the rates applicable as per Section 32 of Income Tax Act, 1961 and found that the assets value gets depleted to a large extent and some assets will have negative balance. In the above circumstances Institute decided to follow the existing rates consistently during the year 2009-10 also. However, Institute will make a study to fix new rates of depreciation during the year 2010-11 and obtain approval of the competent authority.
6. General 6.1 Actuarial valuation	Actuarial valuation were done and the liability on pension, leave salary and gratuity are as follows : Pension : Rs.119 crores Gratuity : Rs.19.92 crores Leave salary : Rs.19.70 crores
7. Grant in aid	The utilization certificate was forwarded as and when the funds were utilized.

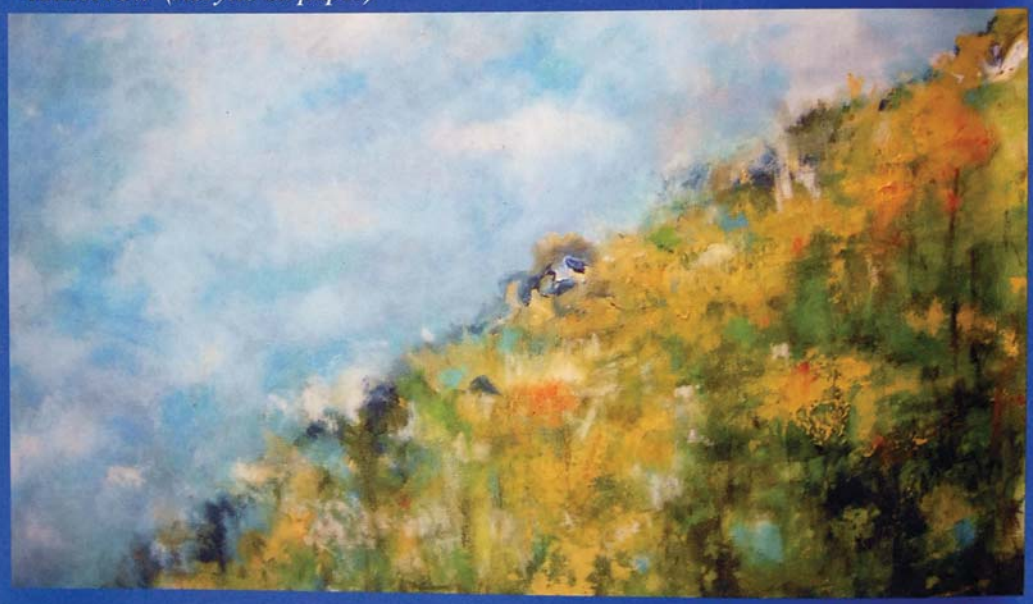
Sd/-

Director

"Hope" *(Acrylic on paper)*

by **Raman Kutty**

"Tomorrow"*(Acrylic on paper)*



by **Pragati Chattopadhyay**