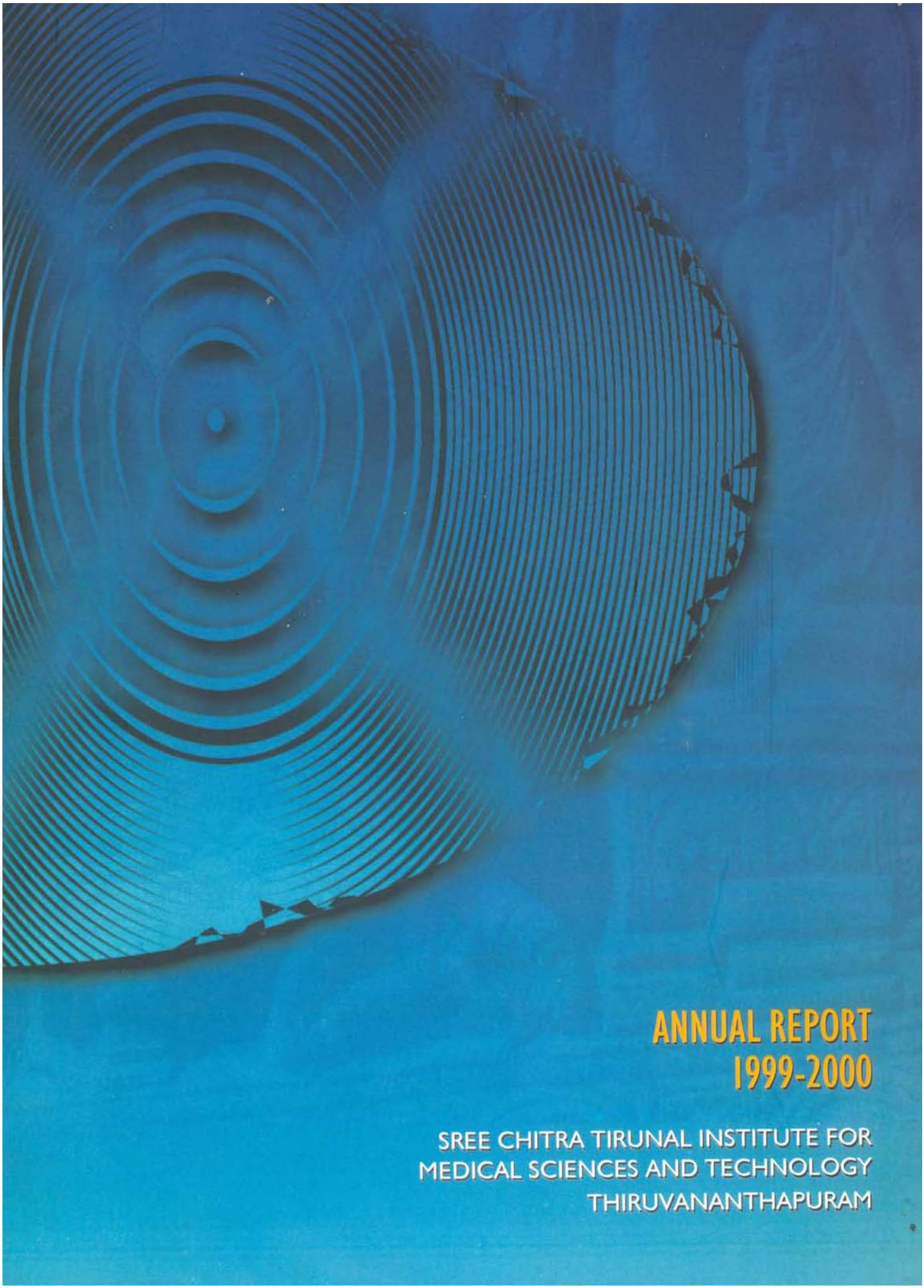

ANNUAL REPORT 1999-2000

SREE CHITRA TIRUNAL INSTITUTE FOR
MEDICAL SCIENCES AND TECHNOLOGY
THIRUVANANTHAPURAM

Annual Report
1999-2000

SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY
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COVER : Striving to be Unique

Designed by : Vijay

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Contents

Highlights of the year

1. The Achutha Menon Centre for Health Science Studies was dedicated to the nation by Shri. Murli Manohar Joshi, Hon. Minister for Science and Technology & HRD
2. Prof. V.S.Ramamurthy, Secretary, Department of Science and Technology, initiated quality system implementation by releasing the Quality Manual
3. Four technologies transferred for commercial production
4. Agreement signed with South India Drugs and Devices Limited, Chennai, for collaborative development of haemoconcentrator
5. Hosted international network meeting of Public Health Schools Without Walls (PHSWOW)
6. Achutha Menon Centre designated as coordinating centre of the PHSWOW network
7. Deep Brain Stimulation for management of movement disorders initiated
8. Neuroendoscopic and endoscope-assisted microneurosurgery started

Origins

The origins of the Institute reach back to 1973 when the Royal Family of Travancore gifted a multi-storeyed building for the people and the Government of Kerala resolved to develop the gift as the Sree Chitra Tirunal Medical Centre for medical specialities.

The Medical Centre was inaugurated by Sri. P. N. Haksar in 1976 and the growth of a Biomedical Engineering and Technology Centre followed quickly at the Satelmond Palace, Thiruvananthapuram.

The concept and achievement of uniting technology and medical sciences within a single institutional framework was regarded sufficiently important by the Government of India to declare it as an Institute of National Importance by an Act of Parliament in 1980. The Act lays down the objectives of the Institute to be the promotion of biomedical engineering and technology, demonstration of high standards of patient care and the development of post-graduate training programmes of the highest quality in advanced medical specialities and biomedical engineering and technology.

Overview

The emergence of the Institute into the 21st century was marked by new initiatives in health care technology and public health, and significant advances in patient care and academics.

A major programme to implement quality systems at the biomedical technology wing was begun with the objective of accrediting the wing as a test laboratory for the evaluation of biomaterials and medical devices. Accreditation to international agencies as per ISO/IEC 17025 will ensure global acceptance of the quality of the Institute's R&D programmes besides enabling its industrial partners to market their products internationally. Four technologies were transferred for commercial production while four others were completing clinical evaluation and awaiting transfer. One more agreement for collaborative development of a medical device was signed with South India Drugs and Devices Limited even as the membrane oxygenator developed with the company's support was undergoing functional evaluation. Ten patent applications and one design registration were filed during the year. A PCR-based technique for diagnosis of Duchenne muscular dystrophy was standardised.

The Achutha Menon Centre for Health Science Studies was dedicated to the nation by Shri. Murli Manohar Joshi, Hon. Minister for Science and Technology & HRD. The Centre organised the global conference of PHSWOW – an international network of public health training institutions -and was made the nodal Centre for the network. It also played host to a WHO Conference on Ethical Issues in Health Resource Allocation. The Institute, along with Harvard School of Public Health, University of Natal and the National School of Public health of Mexico, received a grant from the National Institutes of Health to conduct seminars and workshops on ethical guidelines in international health research.

Endoscopic neurosurgery, endoscope-assisted microneurosurgery, and a state-of-the-art facility for the treatment of cardiac rhythm disorders were initiated during the current year. The advanced technique of Deep Brain Stimulation (DBS) and a novel techqnique of bilateral simultaneous subthalamotomy further marked the progress of the movement disorders programme. The quantities of interventional radiological procedures and neurosurgical operations registered substantial increase.

A number of international and national conferences and seminars and community health awareness programmes were organised during the year under review, in addition to the regular academic programmes of the Institute. The library services were further automated and updated.

The activities and progress of the Institute during the year indicated the ability of the Institute to change with the times.

Patient Care

Dr. P. R. N. MENON MS
Medical Superintendent

Dr. P. VELAYUDHAN PILLAI M.S. MCh
(from 1-9-1999)
Medical Superintendent

Dr. S. K. JAWAHAR MBBS
Assistant Administrative Medical Officer

The Institute provided tertiary care services of the highest quality during the year. During this period, every department involved in patient care made positive effort to update the standard of services. The beneficiaries of the services included patients from other states and a good number from other countries.

During the year, Neuroradiology out-patient department was inaugurated in the surgical out-patient block. The operation theatre in the epilepsy complex was equipped and surgery for epilepsy started in this Complex. Working hours of MRI and CT Scan facilities were extended to 8 p.m. to reduce the wait period.

The facility to have online information about in-patients was made available at the hospital reception. Structural modifications were made in the Central Sterilization Department to transform it into an environment-friendly modern C.S.S.D. Complex.

Training Programmes

Observer trainees were admitted to the Dietary and Physiotherapy Departments. Apprentice training programme was started for aspirants with Social Science background in medico-social work. Five students in Hospital Management from M.G. University were given orientation and guidance in fulfilling their project requirements. Studies were conducted by these students on

Hospital Finance Management
Purchase Scenario, and
Nursing Services

Medico-social Work

Medico-social workers continued to play a vital role in the counselling of patients, assessment of the income of patients, registration of out-patients, motivation of blood donors and in establishing liaison with patients and various departments. They also helped in arranging financial assistance, food and accommodation for poor patients.

Other activities

An essay competition was conducted for the employees of the Institute on 'SCTIMST - Vision for the New Millennium' and the best essay was awarded a prize.

Medical Records

Sri. P. KRISHNAMOORTHIA PILLAI, MA
Senior Medical Records Officer

Sri. N. G. THAMPI, MA, BMRSC
Medical Records Officer

Out of 300,000 medical records preserved in the MRD, 87,989 charts were retrieved during the year for academic and administrative purposes. There was an increase of 23% in utility rate over the previous year. MRD provided statistical and other information to other departments. The bed strength of the hospital was enhanced to 222 with an addition of 5 beds in NSW. 22,829 charts not used for a long time were filed separately by the PGDMRS students and MG University Medical Documentation students. Monthly statistical bulletin was issued to all Heads of Departments and the SMRO presented the important data before the Hospital Management Committee.

5 Medical Documentation students of MG University, Kottayam, undertook different projects on medical records management in the Computerised MRD under the guidance of the SMRO.

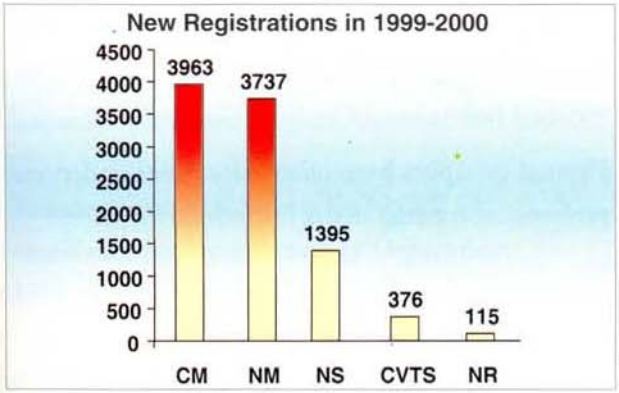
The SMRO issued 2,600 certificates to patients for financial assistance, attendance of patients, estimate of expenditure and railway concession and treatment.

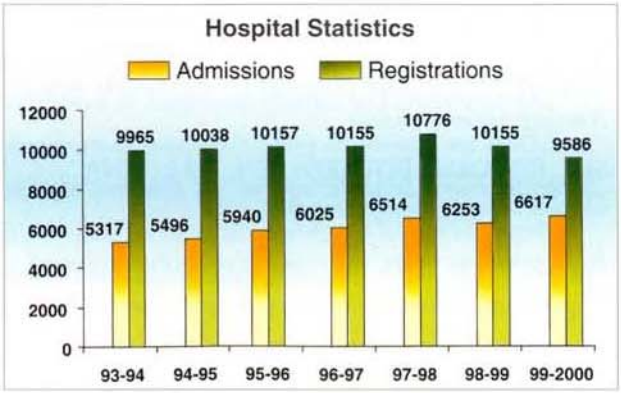
NUMBER OF CHARTS RETRIEVED

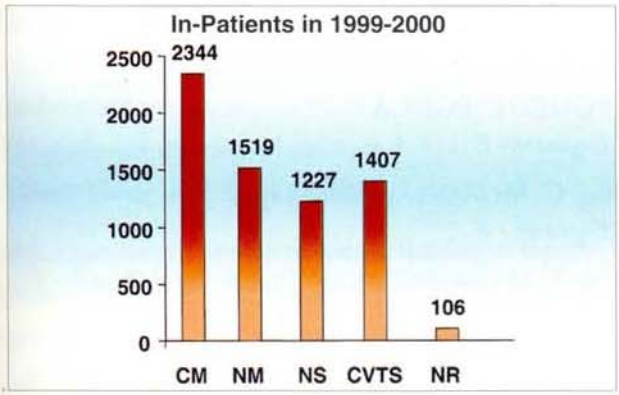
Follow up in Special clinic	47,650
Correspondence of patients	10,586
Analytical studies	6,824
Pruning of charts	22,829
Internal audit	100
Total	87,989

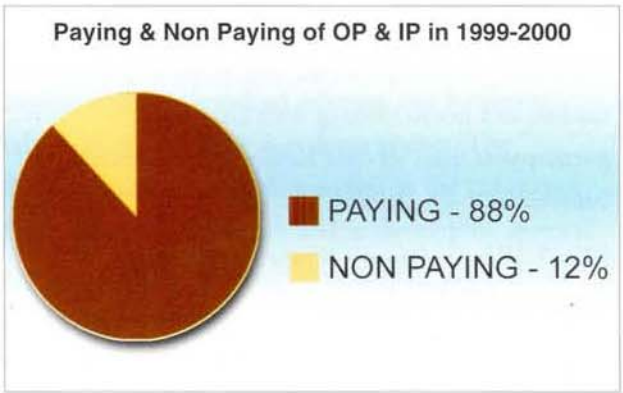
IMPORTANT STATISTICS

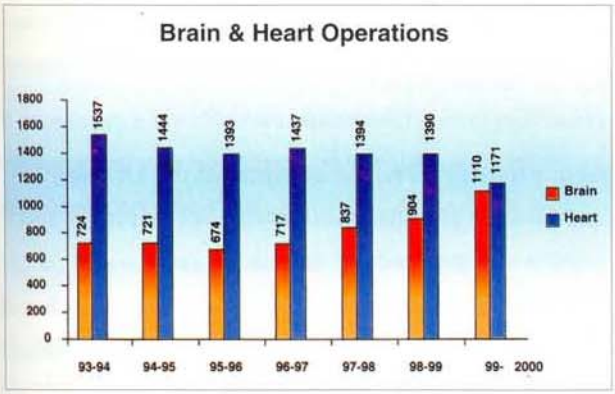
Number of beds	222
Cardiac Surgery	1,171
Perfusion	731
Neuro Surgery	1,110
New Registration	9,586
Repeat cases	47,650
Admissions	6,617
Discharges	6,603
Deaths	210
Average length of stay	09
Bed turn out rate	30
Mortality rate percentage	03
Operation Mortality rate percentage	05
Autopsy rate percentage	03
Lab Investigations	5,59,899
X-Ray	19,416
Physiotherapy	24,023
ECG	22,271
Echocardiography	22,509
Pacemaker Implantation	62
Trans Esophageal Echocardiography	525
Tread Mill Test	1,362
Holter Monitoring	305
Coronary angiogram	911
Cardiac catheterization & Angiography	401
Percutaneous Transluminal Coronary Angioplasty (PTCA)	73
PTCA +_Stent Implantation	49
Electro-physiological studies	17
Balloon mitral valvotomy	251
Balloon pulmonary valvotomy	24
Balloon aortic valvotomy	20
Balloon dilation of coartation of aorta	12
Balloon atrial septostomy	19
Radio Freuency Ablation	35
Patent DuctusArterioses & coil embolisation	21
Atrial Septal Defect Device closure	09
Aortogram	210
Bronchoscopy	50
Ultra sound Scan	1,200
CT Scan	3,453
MRI Scan	2,716
Electro Encephalography (EEG)	2,585
Video EEG	263
Electro Myography (EMG)	756
Thombolysis	05
Digital Subtraction Angioplasty	57
Spinal Angiography	09
Radio Angioplasty	12
Embolisation	88
Visual Evoked Potential	94

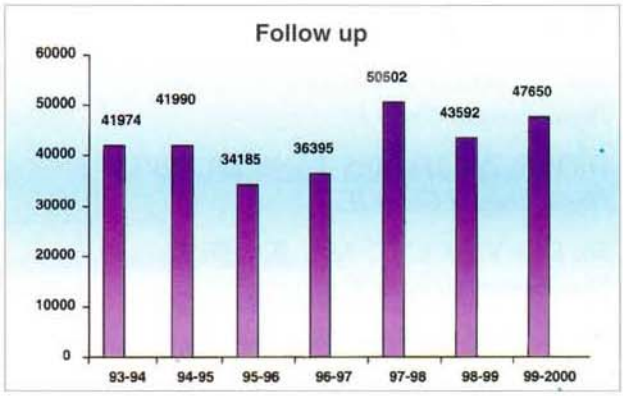

New Registrations in 1999-2000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
3963
3737
1395
376
115
CM
NM
NS
CVTS
NR

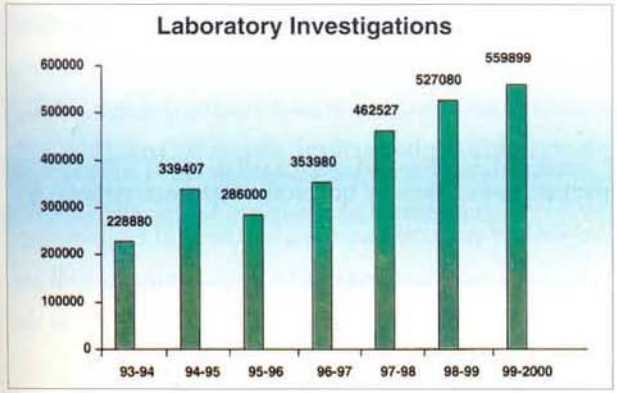

Hospital Statistics
Admissions
Registrations
12000
10000
8000
6000
4000
2000
0
5317
9965
5496
10038
5940
10157
6025
10155
6514
10776
6253
10155
6617
9586
93-94
94-95
95-96
96-97
97-98
98-99
99-2000


In-Patients in 1999-2000
2500
2000
1500
1000
500
0
2344
1519
1227
1407
106
CM
NM
NS
CVTS
NR


Paying & Non Paying of OP & IP in 1999-2000
PAYING - 88%
NON PAYING - 12%


Brain & Heart Operations
1800
1600
1400
1200
1000
800
600
400
200
0
724
1537
721
1444
674
1393
717
1437
837
1394
904
1390
1110
1171
Brain
Heart
93-94
94-95
95-96
96-97
97-98
98-99
99- 2000


Follow up
60000
50000
40000
30000
20000
10000
0
41974
41990
34185
36395
50502
43592
47650
93-94
94-95
95-96
96-97
97-98
98-99
99-2000


Laboratory Investigations
600000
500000
400000
300000
200000
100000
0
228880
339407
286000
353980
462527
527080
559899
93-94
94-95
95-96
96-97
97-98
98-99
99-2000

Nursing Services

Smt.VIJAYAMMA HARIKRISHNAN RN, RM, BSc(N)
Nursing Superintendent

Smt. ROSAMMA EDWARDS RN, RM, DNA
Deputy Nursing Superintendent

As in previous years, the nursing services continued to provide quality care to the patients. In-service education on various themes was conducted by nursing supervisors, ward sisters and staff nurses periodically. Monthly review meetings of ward sisters were held. A state level two-day Workshop on cardiac and neuro nursing with sixty eight participants from all over Kerala was conducted on September 4 – 5, 1999.

Mrs. Sudhamaniamma. S, ward sister, successfully completed M.Sc. Nursing.

Physiotherapy

Smt. M. MEENAKUMARI, BSc, DPT
Physiotherapist Grade I

Sri. P. T. ZACHARIAS PANIKER, DPT
Physiotherapist Grade II

Sri. P. C. VINCENT, MA, BT, DPT
Physiotherapist Grade II

Smt. DEEPA G. NAIR, BPT
Physiotherapist Grade II

Department-wise break-up of patients referred for physical therapy:-

Cardiology and Cardiac Surgery	:	9,537
Thoracic Surgery	:	4,025
Neuro Surgery	:	3,189
Neurology	:	7,272
Grand Total	:	24,023

Physical therapy was administered also to patients who underwent percutaneous laser ablation of inter-vertebral disc.

Physical therapists from other institutions underwent professional training in the Division.

Clinical Engineering

Sri. K. VIJAYAKUMAR, BSc, BSc (Engg)
Biomedical Engineer

Sri. KORUTHU P. VARUGHESE, BSc (Engg) PGDEDT, PGDCA
Engineer - E

Sri. G. MOHANLAL, BSc (Engg)
Engineer - E

Sri. B. MADHUSUDANAN PILLAI, BSc (Engg) PGDCA, MBA
Scientist/Engineer

Smt. DEEPA MATHEWS BTech (till Feb 2000)
Engineer - B

Sri. N. SIVANANDAN
Junior Engineer (Electrical)

As in previous years, the activities of the Division included the routine maintenance of equipment and utilities and minimising their down time. Considering the national demand for trained personnel in biomedical engineering, facilities for training in biomedical engineering were expanded. In addition to the sixteen regular trainees in various disciplines, a few requests for training faculty members and students of engineering colleges, and observership for biomedical engineers and technicians of various hospitals were entertained. A number of projects based on biomedical engineering principles were undertaken by engineering as well as diploma students from institutions in and outside the state, all of which was well- appreciated.

Major installations during the year were as follows:

3 imported theatre lights for Cardiac Surgery
1 imported Ultrasonic Surgical Aspirator for Neuro O.T
1 Endoscope Surgical System for N.O.T
3 ventillators for Anaesthesiology Department.
1 High pressure injector for Cath lab
1 'C' arm with image intensifier and accessories for full fledged electro physiological studies in the Department of Cardiology.
1 Elisa reader and 1 spectrofluorometer for Biochemistry
2 High frequency surgical units, and
1 Defibrillator with ECG monitor

Major modifications toward modernization of the Central Sterile Supply Department (CSSD) were carried out in order to ensure efficient sterilization and energy conservation. The Department designed and implemented a water recycling system to improve energy efficiency.

A programme for effective inventory control and management was implemented with the support of the Computer Division.

Mr. K. Vijayakumar continued to be Member of the Board of Studies and Faculty of Engineering in Cochin University and the Kerala State Council for Vocational Training. He was nominated to represent the Institute at the Electromedical Equipment Sectional Committee MHD - 19 of the Bureau of Indian Standards, New Delhi.

Mr. Koruthu P. Varughese served as technical expert in the installation of multi-media computers in government schools all over Kerala and for selection of equipments for KHRWS, and as a referee of the Institution of Engineers (India) in Electronics and Telecommunication Division to guide their AMIE students' projects. In recognition and appreciation of his services, he was awarded the 'Third Millennium Medal' from the IEEE, USA.

Computer Division

Smt. G. GEETHA, MTech (Computer Science)
Scientist

Routine activities involved software and hardware maintenance for all the user departments. The Division made remarkable progress in the expansion of the Local Area Network and in developing systems support software for duty roster entry, payment of arrears, reception automation, annual indent processing and WEB hosting.

New Installations

Two Pentium II servers were installed for the hospital service.

Three PC for Achutha Menon Centre for Health Science Studies
Scanner at Medical Illustration
CD Writer at main computer room, and
Five 80 column printers at MRD
New Software Developed

Continuous efforts were made to familiarize the faculty and staff with optimal use of the machine and the softwares. Computer awareness class on Windows 95 & MS Office was conducted at the campus for office staff.

Division of Academic Affairs

Dr. V. V. RADHAKRISHNAN, MD
Dean

Sri. A. V. GEORGE, MA, BEd, MPhil
Registrar

Sri. SUNDAR JAYASINGH, MA, MBA, DLL
Assistant Registrar

Student Enrolment

The student strength for DM/MCh degrees and Post Doctoral Certificate Courses during the year was 50.

The Master of Public Health degree programme had 17 scholars including 3 from Bangladesh.

The Institute has, as of now, 16 scholars for the Ph.D programme, 19 scholars enrolled for the Post Basic Nursing Certificate programme and 24 scholars for the various diploma programmes.

List of candidates enrolled currently for DM/ MCh/PDCC/PhD and MPH programmes

DM (Cardiology)

Dr. M. Ravichandra, MD
Dr. R. Padmakumar, MD
Dr. M.D. Syamkumar, MD
Dr. T.G. Jayakumar, MD
Dr. Santoshkumar Dora, MD
Dr. K.G. Rajeev, MD
Dr. Rakesh. P. Gopal, MD
Dr. B.R. J. Kannan, MD
Dr. K. Krishnakumar, MD
Dr. Anand Srinivasan. K, MD
Dr. Sonny P. Jacob, MD
Dr. Krishnakumar Nair, MD

DM (Neurology)

Dr. M.A. Joy, MD
Dr. K.V. Hari Prasad, MD
Dr. Robert Mathew, MD
Dr. N. V. Ahsan Moosa, MD
Dr. P. Mahalakshmi, MD
Dr. M. Bobby Varkey, MD
Dr. R. Rajesh, MD
Dr. Anu Jacob, MD
Dr. Asha Latha. R
Dr. Jyotsna Rajeswary
Dr. Sanjeev. V.K
Dr. Vinayan. K.P

DM (Neuro Radiology)

Dr. Krishnamoorthy, MD
Dr. Venkatramu, MD

MCh (Cardiovascular and Thoracic Surgery)

Dr. Kalpesh.S.Malik, MS
Dr. Praveen Varma.P.K, MS
Dr. Raja Joshi, MS
Dr. Sameer.S.Divale, MS
Dr. Vishnu.K.R.Deka, MS
Dr. Girish Warrier, MS
Dr. Amit Misra, MS
Dr. Ambarasu.M, MS
Dr. Paresh.P.Shah, MS
Dr. Baiju.S.Dharan, MS
Dr. Anand.K.T, MS

MCh (Neruo surgery)

Dr. Irfan Siddique	MS
Dr. Rakesh Goyal	MS
Dr. Anudath K	MS
Dr. Rajesh B J	MS
Dr. Easwar H V	MBBS
Dr. Sanjeev Kumar	MS
Dr. Mathew Abraham	MS
Dr. Muthurethnam	MS
Dr. Sudish Karunakaran	MBBS

PDCC Anaesthesia

Dr. Ramakrishnan.S	MD
Dr. Kalla Amit Dharnidhar	MD
Dr. Jairam Paniker	MD
Dr. Asha .R	MD
Dr. Hema Chandrasekharan Nair	MD
Dr. Shivakumar. H	MD

PDCC Radiology

Dr. Bimal Kumar.P MD

PDCC Vascular Surgery

Dr.Hemanth Kumar MS

Dr.Pandhar Purkar MS

PhD candidates

Sri. Balu. K. Chacko

Smt. S.R. Sangeetha

Smt. S. Rajasree

Smt. Preetha Nair

Smt. Preeta R

Sri. Kumaran C

Smt. Indira Adiga

Smt. Manju L

Smt. Sumi Mary George

Sri. Suneesh Kumar

Smt. Sheela George

Sri. Abhiraman

Sri. Santhosh Kumar TR

Sri. Vijai J

Sr. Vinoy Thomas

Smt. Shiny Velayudhan

Smt. Resmi KR

Master of Public Health (MPH)

Shetye Mrunal Subash

Varkey Abraham K.

Shiney C. Alex

Abraham Pavooreth George

Anuradha R.

Jayakrishnan R.

Anjan Kumar Nag

Md. Iftekhar Quasem

Manu G. Zachariah

K. Hemachandran

Saiju Hameed

Betty Susan Ninan

Deepa Mathew

Joe Varghese

Roy N.

Biju Gopinath

Md. Shafiul Islam

Candidates awarded Ph.D. Degree

Scholar's Name	Thesis title	Guide
S. Rajasree	Role of Vitamin D in Arterial Calcification	Dr. C.C. Kartha
S. Lakshmi	Surface modification of plasticized poly (vinyl chloride) to retard lasticizer migration and enhance biocompatibility	Dr. A. Jayakrishnan
Preetha Nair	Functional response of cardio- myocytes to sub-optimal concentration of magnesium.	Dr. R. Renuka Nair

List of successful candidates for DM/MCh

Name of Candidates	Degree	Speciality
G. JUSTIN PAUL	DM	Cardiology
K. SIVAKUMAR	DM	,,
K.P. BALAKRISHNAN	DM	,,
MAHESH KRISHNAKUMAR	DM	,,
MOHAMED CHOLAKKAL	DM	,,
JACOB GEORGE	DM	Neurology
P. SUJATHA	DM	,,
JEYARAJ DURAIPANDIAN	DM	,,
V. BEENA	DM	,,
S. PARAMESWARAN	MCh	Neurosurgery
P. JAIN GEORGE	MCh	,,
SATHYENDRA KUMAR	MCh	,,
P.S. ANANTHA BABU	MCh	,,
N.S. DEVANANDA	MCh	CVTS
JACOB JAMESRAJ	MCh	,,
APURBA KUMAR SARMA	MCh	,,

List of successful candidates - Post Doctoral Certificate Program

Name of Candidates	Speciality
RIJIL DEEPAK. A	Anaesthesiology
JIJU JOHN	,,
VIJAYAKUMAR L. SHETTY	,,
NEERAJ B. SHARMA	,,
AJOY S. PANDIT	,,
ASHISH B. PATHAK	,,

H.N. RAVEESHA	Radiology
BINNI JOHN	Vascular Surgery

List of successful candidates for Master of Public Health (MPH)

C. Ibraheem Kutty
C. V. Sowmini
R. Suresh
P. Vinod Kumar
A. S. Pradeep Kumar

List of successful candidates for Post Basic Certificate Programme

Name of Candidates	Speciality
LIBINY ELIZABETH EAPEN	Cardiac Nursing
BIMEL. K. B	,,
REGI. P. V.	,,
DEEPA. P. G	,,
BIJI JOSEPH	,,
SINDHU. N. R	,,
SUMY MARY MICHAEL	,,
SHEEJA T. BABY	,,
SABITHA. P	,,
JYOTHI. K	,,
ROSMY THOMAS	Neuro Nursing
MARY. K. O	,,
MEERA LAKSHMI. G	,,
MINIMOL. M. G	,,
JOBIN GEORGE	,,
SIJI. K. ANTONY	,,
NIMMI VARGHESE	,,
SANGEETHA JOHN	,,

List of successful candidates - Diploma and Certificate

Name of Candidate	Speciality
BINOOB. G. NATH	Cardiac Lab Technology
SEEMA. V.S	,,
MALLADI ANJANEYA PRASAD	Neuro Technology
ANJU. R. NAIR	,,
ZAINUDEEN. K.P	Advanced Medical Imaging Technology
VIKAS. K.N	,,
MANJITH. A.S	Operation Theatre Technology
MANOJ KUMAR. K.J	,,
AMBILY. T	Blood Banking Technology
SURESH. V	,,

National Science Day

The Division organised Saturday lectures by eminent persons on a variety of subjects.

The Institute held an Open day in the hospital complex and the Biomedical Technology Wing for the students of the Government Vocational Higher Secondary School and the Nursing College, Thiruvananthapuram, on the National Science Day. The exposure to the service and research programmes and facilities of the Institute was greatly appreciated by the young visitors and the faculty.

Library

Smt. R. PRASANNA KUMARI, MA, MLISc
Librarian cum Documentation Officer

Smt. S. JAYAPRABHA, BA, MLISc
Librarian cum Documentation Officer Gr. II

Sri. JAYACHANDRA DAS, BSc, MLISc
Librarian cum Documentation Officer Gr. II

The library maintained high standards in all major spheres of its activities and services, introduced state-of- the-art concepts and brought in new initiatives during the current year.

Additions

During the year, the library acquired 504 books and added 847 bound journals to its collection, bringing the total collection to 19,281 books and 17,216 bound journals. The library subscribed to 243 journals and received 17 journals as gratis.

Information services

The library introduced BARCODE solution to the library documents and membership to facilitate quick and error-free services. The access to important databases and journal sites through

INTERNET provided unlimited source of information to the library members. The faculty and students of the Institute were provided online access to scientific journals subscribed to by the library. EMBASE on Neurological sciences and Cardiac sciences in CD ROM, current contents on Diskette on three subjects. Engineering and Technology, Life Sciences, and Physical, Chemical and Earth Sciences were the major secondary sources of information searched by the library members during the year. Library continued MEDLINE service to the members and others from neighboring Institutes.

During the year, the library became a member of the Delhi Library Network (DELNET) to provide document delivery service to the members. This service provides access to the full text of documents not available locally.

Nursing Education

Smt. P. P. SARAMMA, P.P. M.N.
Instructor in Nursing

The twelfth batch of cardiovascular and thoracic nursing, and the eighth batch of neuronursing students successfully completed their programme in December, 1999. There were 19 graduates this year adding up to the total number of 159 over the past 12 years. Currently, 20 students are undergoing training in these two programmes.

Nursing students from other institutions were provided clinical experience for periods varying from two weeks to one month. Thirty postgraduate students from 4 Institutions and 71 graduate students from three institutions utilised the Institute's facilities for their clinical training. Nursing students from Sweden visited the Institute twice during the current year.

Table : 11

Institution	Programme	Duration	No. of Students
1. P.G.I. Chandigarh	MSc (N)	2 weeks	4
2. Fr. Mullers College of Nursing, Mangalore	MSc (N)	4 weeks	2
3. Sacred Heart College of Nursing, Madurai	MSc (N)	One day	7
4. College of Nursing Thiruvananthapuram	MSc (N)	Two weeks	4
5. College of Nursing Thiruvananthapuram	MSc (N)	One day	13
6. College of Nursing Kottayam	BSc (N)	Two weeks	34
7. College of Nursing Kozhikode	BSc (N)	Two weeks	19
8. IG NOU	BSc (N)	One day	18
	Midwifery students	One day	19
Total			120

Three neuronursing students attended the Indian Neuroscience Nursing Conference held at Hyderabad in December 1999 and retained the Rolling Shield for the best scientific paper, in addition to bagging first prize for neurology quiz and second prize for poster presentation.

In-service education through Quiz proved to be successful and popular. 23 quiz competitions were conducted between January and December 1999. 92% of the nursing staff and students participated in it. The computer terminals installed in each unit were found to be of great help in conducting the quiz.

Public Relations

Smt. T. V. HEMALATHA, MA, LLB, PGDJ
Public Relations Officer

Public relations section continued to be responsible for media coverage of the conferences, seminars and other functions organized by the Institute, publication of the in-house magazine and health education series, as well as official language

implementation activities. Hindi fortnight celebration, jointly organized with Town Official Language Implementation Committee (TOLIC), was inaugurated by Dr. Neela Lohita Dasan Nadar, Hon. Minister for Transport, Forest and Devaswom, Government of Kerala, on December 3, 1999.

Medical Illustration

Sri. G. LIJIKUMAR
Chief Technician

The Medical Illustration personnel worked with the academic staff & students in developing their ideas and concepts for visual presentation in the form of computer graphics, audio visual presentation, animation, medical photography, digital scanning & image manipulation. Graphics were created for 35 mm slides, prints and multi-media presentation.

Achutha Menon Centre for Health Science Studies

Dr.T. K. SUNDARI, PhD
Honorary Professor

Dr. K. R. THANKAPPAN, MD, MPH
Associate Professor

Dr. P. SANKARA SARMA, PhD
Assistant Professor

Dr. MALA RAMANATHAN, PhD
Assistant Professor

Dr. D. VARATHARAJAN, PhD
Assistant Professor

Routine activities:

The major daily activity centred around running the Master of Public Health (MPH) degree programme. During the month of June 1999, five students of the second batch of MPH scholars completed the course successfully. In January of 2000, the fourth batch of 8 MPH students joined the programme. The third batch of students started their field-based research as early as December, 1999, and are expected to complete their course in June, 2000. The faculty-guided student research covered the following topics.

Hypertension and its correlates in the elderly.

Periodontal diseases and its association with tobacco use.

Menstrual Hygiene practices and Reproductive Morbidity.

Community integration among post-stroke patients.

Solid waste management in Thiruvananthapuram city.

Visiting Faculty:

Prof. Robert Beaglehole from the University of Auckland, New Zealand, conducted the course on 'Introduction to Epidemiology' during February, 2000.

Prof. Richard Cash from the Harvard School of Public Health, USA, conducted a course on 'Epidemiology of Infectious diseases', during February/March, 2000.

Prof. Arthur Reingold from the University of California at Berkeley, USA, conducted a course on 'Advanced Epidemiology' during June, 1999.

Prof. Yessudian from the Tata Institute of Social Sciences conducted a course on 'Management in Public Health' during May, 1999.

Prof. William Reinke from the Johns Hopkins University, USA, conducted a course on 'Health Management' during August/September, 1999.

Prof. Mark Nichter from the University of Arizona, USA, conducted a course on 'Anthropological Perspectives of Health' during June/July, 1999.

Exchange visitors:

Two scholars Ms. Heidi Arendsen and Carola Koornneef from the University of Maastricht, Netherlands, were at the Centre for internship training under the guidance of Dr. Mala Ramanathan, for 5 months from September, 1999.

Other visitors:

Prof. Rosalind Petchesky, Professor of Political Science and Women's Studies at Hunter College of the City University of New York, USA, visited the Center and presented a paper on 'The findings of the Multicentre Study on Negotiating Reproductive Rights, Women's Perspectives Across Countries and

Cultures', a study undertaken by the International Reproductive Rights Research Action Group (IRRAG) on 15th March, 2000.

A team from the European Commission visited the Center in February, 2000, to discuss institutional collaboration between Achutha Menon Centre for Health Science Studies and the Public Health Institutions in Europe.

Dr. Munro Procter from the Department of International Health, School of Public Health, Boston University, USA, visited the Center in October, 1999.

Dr. Paul Wise from the Department of Paedicatrics, Boston University, USA, visited the Center in April, 1999. He gave two lectures, one on "Infant mortality and policy implications' and another on 'Birth weight issues'.

Training programme:

A one-day training programme on "Participatory Management in Social Development and Developmental Planning" was conducted in the Centre for the Welfare officers of the Tata Tea Limited, Munnar, on 25th March, 2000. Fifteen welfare officers from Tata Tea Ltd. participated in the training programme.

Departmental Reports

Department of Anaesthesiology

Dr. K. MOHANDAS, MD
Professor & Director of the Institute

Dr. R. C. RATHOD, MD
Professor & Head

Dr. (MRS) RUPA SRINIVAS, MD, Dip. NB
Additional Professor

Dr. G. SURESH, MD
Associate Professor (on leave)

Dr. THOMAS A. KOSHY, MD
Assistant Professor

Dr. SHRINIVAS V. GANHDINHLAJKAR, MD
Assistant Professor

Dr. PRASANTH KUMAR DASH, MD
Assistant Professor

Dr. RAGHUNATH SREEDHAR NALGIRKAR, MD
Assistant Professor

Dr. P. K. NEEMA, MD
Assistant Professor

Dr. RATHAN GUPTA, MD, Dip. NB
Assistant Professor

Dr. K. GANDHIMATI, MD, FRCA
Assistant Professor (Till 10-3-000)

Dr. SUJATHA P, MD
Consultant (Ad-hoc)

Sri. GANAPATHY POTTI
Scientific Assistant

Anaesthetic support given during the year

Procedures	Number
Cardiovascular and thoracic surgery	1105
Neurosurgery	987
Investigational & Interventional Radiological and Cardiac Procedures	478

Dr. (Mrs.) Jayawickramma from Sri Lanka successfully completed one year post M.D training in the Department on 11.3.2000.

Post-graduate students in Anaesthesiology from Goa and Ambajogai (Maharashtra) underwent short-term training in the Department.

Anaesthesiologists from Vadodara and Bhilai spent short periods in the Department as observers.

Division of Biochemistry

Dr. K. SUBRAMONIA IYER, PhD
Professor and Head

Dr. P. S. APPUKUTTAN, PhD
Additional Professor

Dr. N. JAYAKUMARI, PhD
Additional Professor

Smt. SHANTA A. GEORGE, MSc
Scientist

Smt. K. I. ANNAMMA, BSc
Junior Scientific Officer

Sri. B. SASIKUMAR, MSc
Scientific Assistant

The Central Clinical Laboratory functioned round the clock providing investigative support in clinical chemistry, hematology and clinical pathology. The total number of procedures touched 4.35 lakhs which included not only routine tests but also therapeutic drug monitoring and assay of enzymes like aryl sulfatase A and hexosaminidases (A & B)

Research Activities

Serum anti-T antibody, purified by affinity chromatography, was found to recognise jacalin binding plasma glycoproteins (mostly IgA) upon desialylation of the latter. Since desialylation accompanies bacterial infections, this phenomenon may account for immune complex-mediated damage

consequent to infections. Human heart galactose-binding lectin (galectin) was found to be specific towards a - galactose and galactose b 1 ® 3 galactosamine, in contrast to lactosamine groups. Since the former sugar groups are characteristic of infections and metastatic cells, the result suggested a role for galectin in pathology. A glucose/dextran binding human IgG which has been reported to be produced only upon active immunisation was detected in all normal human plasma samples examined, and purified from out-dated plasma. This antibody strongly bound Klebsiella polysaccharides in contrast to E.coli and streptococcal polysaccharides.

In another study, plasma levels of Lp (a) were found to be distributed over a wide range with no significant differences between about hundred patients with coronary artery disease and age- and sex-matched controls. Further, Lp(a) fraction from plasma was subjected to compositional analysis for Lp(a) - cholesterol, Lp(a) triglycerides and Lp(a) - total protein. Since apo(a) levels in Lp(a) did not show any correlation with the incidence of CAD, effort was directed toward identifying the size of the apo (a) in isolated Lp(a).

A project entitled "Coconut oil and the incidence of CAD in Kerala" was initiated in collaboration with the Department of Cardiology.

Equipment added

Spectrofluorometer FP-750 IRM from Jasco International Co. was installed with funds provided by the Coconut Development Board.

Division of Blood Transfusion Services

Dr. JAISY MATHAI, MBBS, DCP
Chief Blood Transfusion Officer

Dr. P. V. SULOCHANA, MBBS
Blood Transfusion Officer

Dr. S. SATHYABHAMA, MBBS
Blood Transfusion Officer

Round-the-clock transfusion support was provided for surgical cases and other invasive procedures. Blood component support was extended to different hospitals in the city. Cell separator for selective on-line removal of blood components was introduced. Expanded cell panel was prepared in-house for the identification of atypical antibodies causing incompatibility/transfusion reactions.

A standard operating procedure manual was prepared for the laboratory. Hospital Transfusion Committee meetings fostered better interaction with the users.

Research activity in the Division included:

(i) *Prevalence and concentration of immune anti A and anti B and their correlation with haemolytic activity in our donor population.*

(ii) *Survey and analysis of post-operative blood usage.*

(iii) *Evaluation of three different ELISA kits for HCV antibodies.*

3. **Equipment procured**

- *ABX Micros 60 cell counter.*
- *Cell separator CS 3000 pl*

Joint collaborative research activity :-

Collaborative research on platelet activation and tissue sealant with Thrombosis Research Unit was in progress.

Trainees from other Institutes :-

Dr. Meena D, Blood Bank, Medical College, Alapuzha, spent 3 months as an observer.

Other Information :-

- Second phase of externally-funded project 'Participatory approach to voluntary blood donation in the community' was nearing completion. Ms. Usha Kandaswamy, MSW, is the Principal Investigator.
- Dr. Mohandas K, our regular blood donor and organisor from University Centre, Kariavattom, was the recipient of the AN Kastyap Award 1999 for motivators in voluntary blood donation programmes instituted by Indian Society of Blood Transfusion and Immunohaematology (ISBT&I).
- For community Blood Donor Forum convenors, two leadership workshops were arranged.
- Regular awareness and blood grouping camps were conducted monthly, and knowledge and expertise were shared for the formation of local voluntary blood donor fora.

Department of Cardiology

Dr. JAGAN MOHAN A. THARAKAN, MD, DM
Professor & Head

Dr. THOMAS TITUS, MD, MNAMS, DM
Additional Professor

Dr. V. AJITH KUMAR, MD, DM
Associate Professor

Dr. ANIL BHATT, MD, DM
Associate Professor

Dr. S. SIVASANKARAN, MD, DM, Dip. NB (Card)
Assistant Professor

Dr. BIMAL FRANCIS, MD, DM
Assistant Professor

Dr. KRISHNA MOORTHY, MD, DM
Assistant Professor (joined in March 2000)

Dr. K. JAMES, MD, DM
Adhoc Consultant (Till Jan. 2000)

Dr. NAGESWARA RAO, MD, DM
Adhoc Consultant (Till Dec. 1999)

During the year, 3963 new patients were registered in the Department. 2344 patients were treated as inpatients. The non-invasive cardiac laboratory performed 1362 Treadmill Exercise ECG, 305 Holter analysis and 525 Transesophageal Echo studies. The following invasive or interventional procedures were performed in the cardiac catheterisation laboratory.

Coronary Angiogram	911
Cardiac Catheterisation	401
PTCA & Stenting	122
Balloon mitral valvotomy	251
Balloon pulmonary valvotomy	24
Balloon aortic valvotomy	20
Coarctation of aorta dilatation	12
Balloon atrial septostomy	19
PDA coil occlusion	21
ASD device closure	9
Electrophysiology studies	17
RF ablation for tachyarrhythmia	35
Pacemaker Implants	66
	1,687

Following the visit of Prof. Alain Cribier from the Charles Nicolle University Hospital, France, the percutaneous mitral valvotomy programme using the Cribier's device was further augmented. A randomised trial comparing conventional balloon and the metal valvulotome in 100 consecutive patients was initiated and was nearing completion.

With the addition of a portable C-arm image intensifier, the Department set up a facility catering entirely to cardiac electrophysiological studies and pacing. It is excepted to provide state-of-the-art treatment for patients with various forms of cardiac dysrrhythmias.

The faculty and DM residents presented 6 research papers and 2 invited talks at the annual conference of the Cardiological Society of India in Delhi.

Department of Cardio-Thoracic Surgery

DR. M. P. MOHANSINGH, FRCS (ENG), FRCS (EDIN), FIACS
Professor and Head

Dr. K.S. NEELAKANDAN (on leave)
Professor

Dr. R. SHANKAR KUMAR, MS, M.Ch
Additional Professor

Dr. K.G. SHYAMKRISHNAN, MS, MCh
Additional Professor

Dr. M. UNNIKRISHNAN,MS, MCh
Additional Professor

Dr. S.R. KRISHNA MANOHAR, MS, MCh
Associate Professor

Dr. S.K. NAIR, MS, MCH (Until May, 1999)
Associate Professor

Dr. AVINASH DAL, MS, MCh (until May, 1999)
Assistant Professor

Dr. APURVA K. SHARMA, MS, MCh
Assistant Professor (Ad-hoc)

760 open heart procedures were carried out during this period. The details are given below:

Coronary Bypass Surgery	208
Valve Replacements	107
Vascular Procedures (under CPB)	17
Atrial Septal Defects	11
Congenital Cases	311

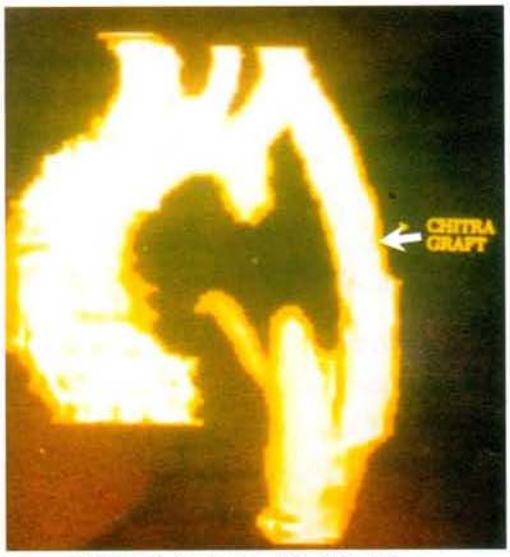
Out of these, 37 cases were of complicated nature such as, Sennings, TCPCs and Multiple lesions.

Closed Cases:

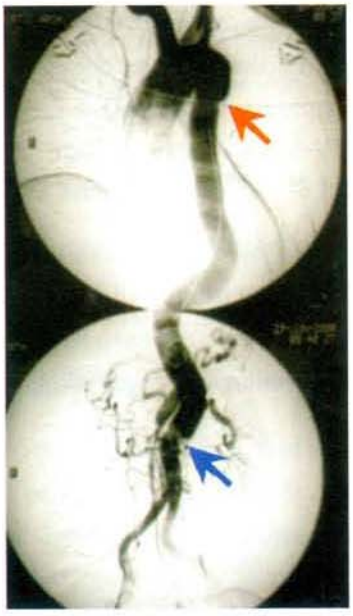
346 closed cases were carried out:

Pulmonary and General Thoracic	96
Vascular	112
Closed Mitral Valvotomy	40
P.D.A	53
Miscellaneous	45
	346

Phase I Controlled Clinical Trial of Large Diameter Chitra Vascular Graft prosthesis in the prescribed protocol was completed in 10 patients. These patients were being followed up ranging from 3 months to 16 months. CT scan and DSA showed good functioning grafts in all.



CHITRA VASCULAR GRAFT
for repair of coarctation of aorta



Extensive type II

Thoraco abdominal aortic aneurysm-DSA 1 year POST-OP the graft extending from post-subclavian thoracic aorta (red arrow) to just above abdominal aortic bifurcation (blue arrow)

Division of Cellular and Molecular Cardiology

Dr.C. C. KARTHA, MD, FASC, FNASC
Professor & Head

Dr.R. RENUKA NAIR, Ph.D, MAMS
Scientist

Dr.K. SHIVAKUMAR, Ph.D
Scientist

Dr. JOHN T. EAPEN, Ph.D
Scientist

Aetiology and pathogenetic mechanisms of cardiovascular disorders formed the basis of the investigations in the Division.

Cardiac fibrosis occurs as a reactive or reparative phenomenon following injury and inflammation but the biological mediators of the fibro-proliferative response remain poorly defined. Substance P, a neuropeptide, was shown to promote free radical generation in cardiac fibroblasts isolated from adult rats. The neuropeptide was also shown to elicit a fibroproliferative response. These observations indicated that Substance P may exert direct effects on cardiac fibroblasts and play a role in myocardial injury and inflammation. Further studies were initiated to test the hypothesis that Substance P may trigger cardiac muscle damage in magnesium deficiency.

Superoxide anions, generated by xanthine oxidase in the presence of xanthine, stimulated proliferation of cardiac fibroblasts from new-born rats. The rare earth metal cerium (a component of monazite sand) was earlier shown to promote superoxide anion generation and stimulate fibroblast proliferation. Tissue-dependent variation in the response of fibroblasts to cerium was observed, the mitogenic effect on lung fibroblasts being relatively lower than that on cardiac and skeletal muscle fibroblasts. This differential response was directly related to intracellular superoxide anion production; and the tissue-dependent variation was abolished on supplementing with superoxide anions. These observations emphasized the role of oxygen radicals in the stimulation of cardiac fibroblast proliferation. Studies on the influence of superoxide anions in the induction of cardiac myocyte hypertrophy were initiated.

The work on the immunopathology of abdominal aortic aneurysm was continued in collaboration with the Department of Thoracic Surgery. Animal experiments and analysis of blood samples of patients had earlier revealed the role of vitamin D_3 in the development of atherosclerotic coronary artery disease and aortic aneurysm.

Mr. Joseph Woodring from United States was a guest researcher in the Division for two months (October and November-1999). He initiated studies on levels of vitamin D derivatives in tapioca and the effect of drying tapioca in sunlight on vitamin D levels.

Equipment added

Thermal cycler, electro-transfer unit, UV Transilluminator

Division of Microbiology

Dr. J. SHANMUGAM, MSc. Ph.D
Professor and Head (on leave)

Smt. MOLLY ANTONY, MSc., DMV
Assistant Professor

Dr. MURALIDHAR K. KATTI, MSc., Ph.D
Assistant Professor

Sri. M. RAVINDRANATH, BSc.
Junior Scientific Officer

Smt. K. NASEEMA, MSc-MLT
Scientific Assistant

Routine microbiological investigations were carried out in Bacteriology, Virology, and Immunology.

A project entitled "**Anti Viral and Anti fungal studies on some indigenous medicinal plants of Western Ghats**" of three years duration sponsored by the Science, Technology and Environment Committee, Government of Kerala, was initiated. The Division was involved in a study entitled "A randomized, open label. comparative multi-center study of voriconazole versus conventional Amphotericin B followed by Fluconazole in the treatment of Candidiemia in Non-Neutropenic subjects", sponsored by Pfizer.

Mr. Aji AT, a research scholar from the Department of Environmental Sciences, University of Kerala, Kariavattom, Thiruvananthapuram, underwent training for a period of three months in Water Analysis.

Mrs. Molly Antony took part in the RNTCP programme at the TB Research Centre, Chetput, Chennai, from 20-03-2000 to 24-03-2000.

Department of Neurology

Dr. K. RADHAKRISHNAN, MD, DM, FAMS
Professor and Head of the Department (on leave)

Dr. C. SARADA, MD, DM
Additional Professor

Dr. M. D. NAIR, MD, DM
Additional Professor

Dr. SANJEEV V. THOMAS, MD, DM, DIp. NB
Associate Professor

Dr. ASHA KISHORE, MD, DM
Associate Professor

Dr. P. A. SURESH, MD, DM
Associate Professor

Dr. ABRAHAM KURUVILLA, MD, DIP.NB, DABN, DABN(CL.NPH)
Assistant Professor

Dr. P. JOSEPH CHERIAN, MD, DM,
Assistant Professor

Dr. P. N. SYLAJA, MD, DM
Assistant Professor (Ad hoc)

The Department of Neurology continued to render patient care services through various sub-specialities. The number of outpatients and inpatients increased significantly during the year.

OPD Services	3737 (1999)	3619 (1998)
Inpatients	1519 (1999)	1344 (1998)

Special Programmes

Epilepsy Programme

265 patients were registered under this programme. 71 patients were operated for intractable epilepsy and 265 video EEG performed during the period.

Under public health initiatives, the annual conference of epilepsy self-help group was held in August 8, 1999. National Epi1lepsy Day was organized by the centre on November 17, 1999. Also held were an epilepsy clinic and public education programme on August 23, 1999 in Kozhencherry and epilepsy public education program in Vavvakkavu, Kollam. A thirty minute program on Epilepsy and Pregnancy and twenty five minute program on medical and psychosocial aspects of epilepsy were telecast on Doordarshan. Comprehensive epilepsy care workshop for 50 post graduate students in Social Work was organised in Loyola College of Social Sciences in February, 2000. General awareness and training programmes on epilepsy were conducted in different parts of the state for patients and social science students.

Dr. P. Joseph Cherian, Assistant Professor, Department of Neurology, got the best research paper award in the Kerala Chapter of NSI in March, 2000, for his paper on "Significance of Corpora Amylacea in Hippocampus of Temporal Lobe Epilepsy Patients".

Movement Disorder Programme

The Comprehensive Care Programme for Movement Disorders expanded its range of activities in the current year. 1135 patients attended the Movement Disorder Clinic. 42 patients received Botulinum toxin treatment in the Botox clinic. 30 cases of medically intractable patients of Parkinson's disease were selected from the Movement Disorder Clinic. They were extensively evaluated in the programme and subjected to surgery. The advanced technique of Deep Brain Stimulation (DBS) for the management of movement disorders was initiated in June, 1999. A novel technique of bilateral simultaneous sub-thalamotomy was introduced from January, 2000. All patients were under systematic follow-up in this programme with periodic assessments using international research protocols in order to study the efficacy and long-term effects of these procedures. The medical and surgical faculty of the section presented 2 papers at the 3rd National Conference of the Indian Society for Stereotactic and Functional Surgery and 4 papers at the annual conference of the Neurological Society of India.

Neuromuscular Services

The section initiated genetic studies in SMA in collaboration with the Centre for DNA Finger printing at Hyderabad. 697 nerve conduction studies, 455 EMG studies and 95 VEP studies were undertaken.

Stroke service

4 carotid endarterectomy procedures for carotid artery stenosis were conducted in collaboration with the Thoracic and Vascular Surgery Department.

Department of Neurosurgery

Dr. R. N. BHATTACHARYA, MS, MCh
Professor & Head

Dr. SURESH NAIR, MCh
Professor

Dr. DILIP PANIKAR, MS, MCh
Associate Professor

Dr. MALLA BHASKARA RAO, Dip NB
Associate Professor

Dr. RAJNEESH KACHHARA, MS , MCh
Assistant Professor

Dr. RAVI MOHAN RAO, MS, MCh, Dip NB
Assistant Professor

Dr. R. GIRISH MENON, MCh, DipNB
Assistant Professor

Dr. S. PARAMESWARAN, MCh
Assistant Professor

There was a substantial increase in indoor admissions and operative work compared to previous years . The total number of surgeries crossed eleven hundred during the last one year. Introduction of intra-operative angiography facility enabled us to improve the surgical outcome of vascular procedures. With the acquisition of the neuroendoscope, endoscopic surgeries and endoscope-assisted microneurosurgery were done regularly. Considering the increase of clinical and surgical work, five beds in the general ward were increased. The operation theatre attached to the comprehensive epilepsy programme was inaugurated during the year.

Vascular	136
CP angle	50
Sellar/suprasellar	74
Skull base	47
Epilepsy	63
Surgery for movement disorders	31
Stereotactic procedures	38
Endoscopy	25
Posterior fossa tumours	36
Spine	171
CV junction	48
Intraventricular tumours	30
Others	361
TOTAL	1110

Studies initiated included:

i) *immunocytochemical characterisation of pituitary tumors and*

ii) *role of mucoid vasculopathy in the etiopathogenesis of cerebral aneurysms in collaboration with the Division of Pathology, and*

iii) *comparison of spiral CT angiography and conventional angiography in the diagnosis of intacranial vascular lesions.*

Clinical trials on patients in the use of indigenously prepared fibrin glue in preventing CSF leak were initiated in collaboration with the Thrombosis Group and Vivarium.

Important additions to the Department included:

1. Existing mobile C - arm image intensifier upgraded to have facility to do intra-operative DSA
2. Moller Wedel microscope having potentiality to be upgraded for image guided surgery.
3. Neuroendoscope, and
4. Ultrasonic surgical aspirator

Trainees from other Institutes:

MCh (Neurosurgery) trainees from NIMHANS (Bangalore), KMC, Manipal and MCH, Kottayam, spent short periods in the Department as observers.

Dr. M. Bhaskara Rao, Associate Professor was presented the "Award for Young Investigators" for "Outstanding Contribution to Scientific and Clinical Research" at the 23rd International Epilepsy Congress at Prague.

Division of Pathology

Dr. V. V. RADHAKRISHNAN, MD
Professor and Head

Dr. S. SANDHYAMANI, MD
Additional Professor

Dr. ELIZABETH JOSEPH, MD, Dip NB
Assistant Professor (Ad hoc)

Dr. ANNAMMA MATHAI, Ph.D.
Junior Scientific Officer

Routine Activities

During the year, 1100 surgical and medical pathology specimens from neuro and cardiothoracic patients were subjected to histopathological studies. Intra - operative frozen section diagnosis was carried out in 305 cases, immunopathological investigations in over 4000 patients and muscle biopsies in 55 patients. Immunohistochemical staining for dystrophin and dystrophin-related protein were introduced during the year for classifying dystrophinopathies. Immunohistochemical staining for tumour markers such as GFAP, Synaptophysin, S-100, EMA, Cytokeratins, p-53, Growth hormone, ACTH, FSH, Prolactin, were introduced and these helped in making an accurate histopathological diagnosis in tumors of CNS and lung.

As a part of the training programme for DM and MCh students, the Division conducted regular clinicopathological conferences (CPC) and case demonstrations. The Division also participated in the research protocol assigned to post-graduate students in cardiovascular and neurological sciences.

Department of Radiology

Dr. A. K. GUPTA, MD
Professor and Head

Dr. SANTHOSH JOSEPH, DMRD, MD
Additional Professor

Dr. T.R.KAPILAMOORTHY, MD
Associate Professor

Dr. C. KESAVADAS, MD
Associate Professor

Dr. SHAMA RAO
Assistant Professor

Dr. P. V. SANTHOSH
Consultant (Ad hoc)

Dr. BEJOY THOMAS
Consultant (Ad hoc)

Research activity

A collaborative study on "Anthropometric measurement of lower limb", funded by the Government of India, was in progress.

Investigations and Procedures done:

Procedures	Number
Plain X-rays	19416
CT Scans	3167
MRI	2488
Ultrasound	1471
Invasive Diagnostic Procedures:	
Cerebral Angiogram	439
Spinal angiogram	16
Aortogram/Peripheral Angiogram	140
Aortogram and CAG	78
Sinogram/Venogram	4
Interventional Procedures:	
Cerebral AVM Embolization	68
Spinal AVM Embolization	8
Balloon embolization/Trapping	12
Balloon angioplasty	40
Vascular Stenting	0

Cerebral Thrombolysis	6
Carotid Stenting	9
Peripheral Vascular Stenting	0
Wada Test	29
Percutaneous Transhepatic Biliary Drainage	5
Tracheal Stenting	3
Barium Studies	10
IVDSA	15
Percutaneous Laser Disc Decompression	2
CT/Fluroscopic Guided Procedures	34

Biomedical Technology Wing

Overview:

Dr. R. SIVAKUMAR
Head, BMT Wing (till Oct., 1999)

Dr. G.S. BHUVANESHWAR
Head (in-charge from Oct., 1999)

A major programme for the implementation of a Quality System at the Biomedical Technology Wing was initiated this year. The objective of the programme is to accredit the Wing as a TEST LABORATORY for the evaluation of biomaterials and medical devices to an international agency. The quality system will conform to the latest standard ISO/IEC 17025, which was approved in December, 1999.

Establishment and maintenance of integrity and high standards of scientific development has become essential in the current scenario of globalisation. Being a premier institute that is engaged in the research and development of biomaterials and medical devices, such accreditation would be a major step forward for the country as a whole. The advantages of having a quality system and accreditation are: -

a) Assurance of a high level of quality in the R & D programmes

b) Attract international consultancy and testing and,

c) Enable the institute's industrial partners to market their products internationally.

Dr. V.S. Ramamurthy, Secretary to the Government of India, Department of Science Technology, inaugurated the quality system implementation on 18th December 1999 with the formal release of the

Quality Manual. The implementation is being carried out under special funding by DST with overall co-ordination and monitoring by the Indo-French Centre for Promotion of Advanced Research, New Delhi, with a tight 16-month schedule.

Focus on the development and conversion of R&D work on biomaterials and medical devices into commercial technologies continued. The following Table summarises the R&D status of the important programmes: -

Product / Process	Status
1 Dental Composite (Restorative Material).	• MoU under negotiation with Dynamic Orthopaedics Pvt. Ltd., Alwaye, for scale-up. • The technology package includes chemical curing, light curing and radio-opaque dental composites.
2 Hydroxyapatite (Bone graft material)	• Scale-up and technology transfer in progress Clinical evaluation for dental applications are continuing.
3 Membrane Oxygenator (Artificial lung for open heart surgery)	• Final evaluation of the product commenced.
4 Fibrin Glue (Surgical Hemostatic agent).	• Clinical evaluation completed. • Identification of industrial partner completed and MoU for scale-up in progress.
5 Development of diamond-like carbon Coatings for medical a pplications.	• The Indo-French project progressed smoothly. In vitro and in vivo evaluation for tissue and blood compatibility continued.
6 Vascular graft (Artificial large diameter blood vessel).	• Phase I clinical evaluation completed. • Identification of industrial partner and commencement of multi-centre evaluation was in progress (in collaboration with South India Textile Research Association [SITRA], Coimbatore)
7 Hydrogel for Therapeutic Embolization.	• Technology transfer agreement was under negotiation with Cadila Pharmaceuticals Ltd., Ahmedabad.

The technology transfer of the concentric needle electrode was completed and the industry, South India Drugs & Devices Ltd., Chennai successfully produced and marketed over 1000 electrodes during the year.. An agreement for the collaborative development of a Hemoconcentrator (used for the removal of water and concentration of blood in the heart-lung bypass circuit after surgery, for re-infusion to the patient) was signed with the same company. A MoU was signed with Dynamic Orthopaedics Pvt. Ltd., Alwaye, for the scale-up and subsequent transfer of the hydroxyapatite bone graft material.

During the year, ten patent applications and one design registration were filed. Three patents filed earlier were sealed successfully.

Artificial Internal Organs

Dr. G.S. BHUVANESHWAR, M.S., Ph.D.
Biomedical Engineer & Leader

MURALEEDHARAN C.V., M.Tech.
Engineer

MURALEEDHARAN C.V., Diploma in Mech.Engg.
Scientific Assistant

Research activity

Membrane Oxygenator

a) The development of a hollow fibre membrane oxygenator in collaboration with SPIC Pharma Ltd. Chennai, made considerable progress during the year. The final components were moulded to our specifications and a series of in vitro

evaluation studies completed on this final model. The product is expected to go for Institute Ethics Committee clearance during the second quarter of 2000 and clinical usage is expected to commence during the third quarter of 2000.

b) The Indo-French collaborative project, "Development of diamond-like coatings for medical and other applications" progressed smoothly. The project aims at qualifying a special diamond-like coating (DLC), which can be applied on both metallic and polymer materials, for various biomedical applications, especially blood contacting.

Routine activities

Support for personal computer selection, usage and related data processing activities was given to other divisions. Regular running and maintenance of the Local Area Network of the BMT Wing [BMTLAN] was carried out. The INTERNET access through the GIAS services of VSNL that the Division helped to set up in the library was extensively used for web surfing, information retrieval and e-mail communication.

Equipments added during the year included

1. *Stereo Zoom Microscope*

2. Accelerated Durability Test System for Heart Valves (10 stations)

Biomaterials

Dr. R. SIVAKUMAR, Ph.D.
Leader (till Oct., 1999)

Dr. K. SREENIVASAN, Ph.D.
Scientist

Dr. PRABHA D. NAIR, Ph.D.
Scientist

Dr. T. RAMACHANDRAN, Ph.D.
Scientist (on leave)

Dr. P.R. HARIKRISHNA VARMA, Ph.D.
Scientist

Sri. NIRANJAN D. KHAMBETTE, M.Tech.
Scientist (on leave)

Dr. ANNIE JOHN, Ph.D.
Scientist (on leave)

Dr. MANOJ KOMATH, Ph.D.
Scientist

Sri. R. SREEKUMAR, B.Sc.
Junior Scientific Officer

Sri. S. VIJAYAN, M.Sc.
Junior Scientific Officer

Sri. P.R. HARI, B.Sc., AIE.
Scientific Assistant

Smt. C. RADHAKUMARI, M.Sc.
Scientific Assistant

Equipment added during the year

A Cary 100 Bio UV-Visible Spectrophotometer

R & D Programmes

Bioceramics And Glasses

A one-year pilot scale production of porous hydroxyapatite granules for periodontal and orthopaedic applications was in progress in the laboratory. The product under the brand name "PERIOBONE - G*" was successfully introduced into the market by M/s.Dynamic Orthopaedics Pvt. Ltd. Aluva. A bioactive glass- based composite developed in the laboratory showed promising results in bone implantation studies in an animal model. This new generation compound is a promising bone filler material for dental and orthopaedic applications. Other activities included development of a new calcium phosphate cement formulation.

Molecular Imprinting

The laboratory continued its efforts on molecular imprinting. Monomers with multiple functionalities were synthesized to prepare molecularly imprinted polymers with enhanced affinity towards printed molecules. A rapidly polymerising two component system was used in the preparation of molecularly imprinted polymers. This system is useful in the synthesis of molecularly imprinted polymers containing affinity sites for heat/ radiation sensitive entities like proteins.

Simple and elegant techniques were developed to synthesize polymers containing cyclodextrins, phosphoethanolamine etc. The feasibility of using these polymers as highly selective matrices in solid phase extractions, directed synthesis, sensing elements etc., were underway.

The anti-bacterial urinary catheter developed by the group was being tested in animals.

Polymeric Membranes

a) The development of polymeric membrane for immuno-isolation programme made further progress. The relative viability of islet cells on different polymeric membranes could be assessed and found to be dependent on physiochemical properties of the polymers. Implantation of islet cells, encapsulated in one of the novel membranes, into diabetes-induced rats and mice showed encouraging results.

b) Anti-bacterial GTR membranes were synthesised and characterised for osseous tissue regeneration. The results of in vivo studies of a porous GTR in a canine model were promising.

c) In another study, polymethacrylate polymers with differential swelling characteristics were prepared for potential ophthalmic and other applications.

Testing and Evaluation:

Analytical Laboratory

The services of the analytical facility consisting of HPLC, GC and Universal Testing Machine of our group were extended to internal and external laboratories.

Analytical characterization of materials was done using FTIR and UV-Visible spectroscopy and Thermal methods such as DSC, DTA, TGA. These facilities were also extended to external organizations on payment basis.

Microscopy

The Scanning Electron Microscope facility was extensively used for the analysis of various biological and material samples. The newly installed Energy Dispersive Analysis (EDS) attachment was

commissioned. More than 200 samples from the Institute and another 160 external samples from various universities, Government R&D institutions and private companies were analyzed during the year.

The Transmission Electron Microscope facility was used to examine different biological tissues. This included identification of structural variations in the hippocampus of epileptic patients.

Biosurface Technology

Dr. CHANDRA P. SHARMA, M.Tech., M.S.,Sc.D.,M.E.B.E.,
Scientist & Leader.

Further progress was made on the optimization of alginate-chitosan microspheres to achieve better anti-diabetic activity. Remote loading of cyclodextrin-complexed insulin was standardised and the results of in vivo experiments were quite encouraging.

Insulin was loaded in porous hydroxyapatite microspheres and coated with ethylene vinyl acetate copolymer to make it a sustained release formulation. Studies on rats were promising and this prompted attempts to increase its loading for higher activity.

Chitosan-PEG-alginate-based wound dressing samples were loaded with an antibiotic, ciproflaxacin. Sterilized samples were tested for antibiotic activity.

Engineering Services

O.S. NEELAKANTAN NAIR, B.Sc.,(Engg.)
Engineer & Leader

RAMESH BABU, B.E.
Engineer

Sri. K. P. R. BHAS, Dip. Electl. Engg.
Junior Engineer

MOHANRAJ E. B., Dip. Mech. Engg.
Foreman

Fabrication of different fixtures and machining of components were executed in the tool room for various internal and external projects. The notable ones were:

- Development of the machining process and machining of one set of artificial limb components for M/S Dynamic Orthopaedica Ltd., Aluva, for their assessment.
- Fabrication of Needle Tip Grinding fixture for the Concentric Needle Electrode project. SIDD technician was trained for the electrode tip grinding as part of the technology transfer to SIDD.
- Machining of nozzles for the imported spray drier unit for the drying of bioceramic powders like hydroxyapatite.
- Machining of components to repair the sternum saw unit of the hospital wing.
- Machining of miniature stainless steel bearing pins for blood pump development.
- Fabrication of aluminium glass slides holder.
- Extended the machine shop facility for machining different components related to membrane oxygenator.
- Designed and developed one set of artificial limb components for evaluation by M/s.Dynamic Orthopaedics Ltd.
- In addition to the above, the Division also carried out the infrastructure developmental work in Thrombosis Research Unit for NABL activity.
- Further, routine operation and maintenance of electrical system, refrigeration and air conditioning, plumbing and sanitation system, attendance data collection system, incinerator,

panbit, telephone exchange and faculty hostel maintenance were carried out.

Equipments added during the year include

1. A diesel generator with a capacity of 160 KVA
2. A new gamma radiation source Cobalt 60 with a capacity of 85 kci

Microbiology

Dr. MAYA NANDAKUMAR M.Sc., Ph.D.
Scientist (On leave)

Dr. ARTHUR VIJAYAN LAL, B.V.Sc.
Scientist (In charge from 20-03-2000)

Routine activities of this Division included standard microbiological investigations for diagnosis and treatment, monitoring the environment for microbial presence (air sampling) and detection and analysis / identification of microbial contamination in samples and initial microbiological screening of materials.

Work on the project titled "Development and evaluation of antimicrobial silver oxide coated latex material for use as urinary catheter" made progress with mixed results.

Equipments procured during the year included :

1. Table Top steriliser - sterile masc, steriliser without printer.
2. Basic pH/mV/Temp meter
3. Binocular microscope - Leica model - Biomed.
4. Ultrasonic VCX-400 microprocessor
5. High speed refrigerated table top centrifuge - Biofuge strators
6. Peristaltic pump
7. Trinocular Research Microscope Leica - DMRHC
8. Incubator table top shaker
9. Ultrasonic cleaner
10. Vertical Laminar Flow Biological Safety Cabinet - Type-II
11. Digital Water bath circulator - Insert

Molecular Medicine

Dr. T. ANOOPKUMAR, Ph.D.
Scientist and Leader

Dr. MAYA DEVI, Ph.D.
Postdoctoral Fellow

A PCR-based technique for diagnosis of Duchenne muscular dystrophy was standardised. The multiplex PCR-based technique was developed on international standards for PCR diagnosis of the disease and the test will be extended to identify the carrier status of the mother. Standardisation of the diagnosis of other genetic diseases like Ataxia was in progress.

As part of the ongoing efforts to comprehend the reasons for hyperactivation of neurons in seizure disorders, one of the candidate genes was analysed for its sequence variations. The repeat region in the 3'UTR region of the gene had deletions in a few patients. More experiments were designed to understand the extent of deletion and its functional significance.

To understand the expression profile of the genes in epileptic hippocampus, a differential display technique was standardized. More than 30 primers were synthesized to cover more than 80% of the expressed genes.

Pathophysiology

Dr. MIRA MOHANTY, M.D.,
Scientist & Leader

Dr. T. V. KUMARI, Ph.D.
Scientist

Dr. T. V. ANILKUMAR, M.V.Sc, Ph.D.
Scientist

The Division addressed two major issues in the development of materials and devices for use in the biological system, namely cytocompatibility and tissue compatibility. Initial screening tests for cytocompatibility of several materials were carried out in the tissue culture facility as per International Standards using different cell lines. Isolation and culture of primary cells like endothelial cells from human umbilical cord and osteoblasts from neonatal rat calvarium were also carried out for subsequent functional and morphological evaluation, when in contact with specific materials, depending on their end use.

Histological evaluation of tissue response around implants in small animals was carried out for UHMWPE and polyurethane. Studies on specific tissue response to materials implanted in specific sites like jaw, long bones and urethra of large animals, were also carried out with membranes, fibrin glue, silver coated urinary catheters and ceramics. Special processing, embedding and cutting techniques were used to preserve material and tissue architecture, particularly for porous materials. Histological evaluation of various organs of rats and rabbits for sub chronic and chronic toxicity evaluation of an anti-cholesterol drug was another major work undertaken during the current year.

The focus of research continued to be cell-material and tissue -material interactions. An in vitro study on the osteogenic potential of biomaterials was initiated. Cytocompatibility, functional and morphological studies on materials coated with diamond like carbon were undertaken as part of an Indo-French project. The biocompatibility as well as osteoconductive- osteoinductive properties of ceramics prepared by scientists in the ceramics laboratory was investigated in soft tissue and bone.

Work was initiated for updating the laboratory for accreditation as per ISO/IEC 17025.

Polymer

Dr. M. JAYABALAN Ph.D.
Scientist & Head

A novel aliphatic polyurethane-urea elastomer with hydrophobicity, low elastic modulus, virtual crosslinking, biocompatibility, biostability and long-term flexing endurance was developed for potential use in the fabrication of polyurethane heart valve, as part of a DBT- funded project. The material was subjected to various tests for biostability, accelerated flexural fatigue, cytotoxicity, blood compatibility and toxicology. The results were encouraging, indicating the possibility of developing a polyurethane leaflet valve which may obviate the need for anticoagulant therapy.

An injectable and biodegradable polymer (propylene fumarate) was synthesized for potential application in bone repair. The injectable formulation sets rapidly to a hard mass with low exotherm and attains the required mechanical strength for bone repair. The degradation products were bioassimilable, thus making it a good candidate for use as scaffolds and grafts for guided bone regeneration and to fill defects of treabecular bone.

Polymer Chemistry

Dr. A. JAYAKRISHNAN, Ph.D
Scientist

Work on a rapidly gelling polymer system based on gelatin and alginic acid dialdehyde was continued. Work on surfactant-modified polymer surfaces to resist protein and platelet adhesion was continued with Tween-20 as a surfactant on surfaces such as cellulose and poly (ethylene terephthalate). PVC surfaces substituted with various nucleophiles with the aim of producing an anti-bacterial surface were also investigated.

Cadila Laboratories, Ahmedabad, evinced keen interest in acquiring the technology for the "Hydrogel Microspheres" developed and evaluated by the Division in collaboration with the Department of Radiology.

Polymer Processing Group

Dr. V. KALLIYANAKRISHNAN, Ph.D.
Scientist

Sri. ROY JOSEPH, M.Sc. M.Tech.
Scientist (On leave)

Dr. P. RAMESH, M.Tech, Ph.D.
Scientist

Dr. P. P. LIZZYMOL, Ph.D.
Scientific Assistant

Sri. M. C. SUNNY, B.Sc., AIC.
Scientific Assistant

The polyurethane tetramethacrylate resin-based dental composites successfully passed the toxicological and histopathological evaluation meeting international standards. The material was ready for pulp and dentine tests.

Two new urethane dimethacrylic-based resins to be used as resin binders in dental composites were synthesised and characterised the year. The first one was successfully used as a binder in dentine bonding agents in combination with BIS-GMA with good bond strength to metallic and dentine surfaces. The second resin was an alternative for BIS-GMA being used in the older dental composites. The purification of the resin was simple and the resin had the advantage of low viscosity and easy blendability with other resin constituents.

Two antibiotics (ampicillin and tetracycline) were incorporated into acrylic cement for possible use in orthopaedic surgery. Studies were carried out to determine their elution rate into physiological media and changes in working and setting times of the polymer. The results were promising and further work was in progress.

A DST research project on hydroxyapatite (HAP)-ethylene vinyl acetate co-polymer (EVA) composites for bone substitute applications was started. EVA-HAP composites with varying volume percentages of HAP could be prepared using the torque rheometer. The mechanical properties of these composites with respect to HAP loading were evaluated.

Research on various approaches to reduce the friction of natural rubber latex materials was continued with a view to get durable lubricious coatings on urinary catheters.

Dr. V. Kalliyanakrishnan was awarded the SPE Excellence Award (Society for Plastic Engineers) during the National Seminar on Plastics in Medicine held on August 6, 1999, in New Delhi.

Quality Cell

Sri. D. S. NAGESH, M.Tech.
Quality Manager

S. BALRAM, B.Tech.
Engineer

As part of the Implementation of the Quality System, a Quality Cell was formed which has the responsibility to ensure that the quality system, as defined in the Quality Manual, is implemented and maintained.

The Quality System implementation was initiated in August, 1999, with a training programme for 20 Academic/Technical staff on Quality Systems conducted by senior faculty of NABL. Two more similar training programmes were also conducted in-house, in November, 1999, for the rest of the staff. Three scientists were sent for training on internal audit conducted by NABL in Bombay, in October, 1999.

Quality Manual is the apex document stating the Quality Policy, defining the Quality System and Quality Practices. The first version of the Quality Manual was prepared and released by Prof. V.S. Ramamoorthy, Secretary, DST, on 18th December, 1999. The revision of the Quality Manual as per the new ISO 17025 (which replaced ISO Guide 25 in December, 1999) was in progress.

The current implementation plan calls for a basic quality platform in all Divisions and laboratories of the Wing to bring about a major change in work culture which would be object-oriented and system-based. As part of the implementation, a number of improvements and changes are needed in the infrastructure and other facilities. All these tasks were identified and a planned implementation initiated.

Technical Co-ordination Cell

Dr. RANJIT, B.E.
Engineer

The Intellectual Property Rights of the Institute, particularly related to patent activities, are handled here. The current status of the Institute's patents and designs is as follows;

Patents held (sealed)	= 35
Patents filed and pending	= 39
Designs held (sealed)	= 13

This year, 10 patent applications and 1 design registration were filed. Three patents filed earlier were successfully sealed.

The Technology profile of the Institute was put up for display at the hospital wing during the visit of Dr. Murli Manohar Joshi, Hon. Minister for Science & Technology and HRD. It covered the Biomedical Technologies developed and transferred, as well as the current efforts to obtain accreditation by adopting International Quality standards.

Technology Proving Facility

Dr. G.S. BHUVANESHWAR, M.S. Ph.D.
Biomedical Engineer

Sri. D.S. NAGESH, M.TECH.
Engineer

Routine maintenance of the clean areas was carried out regularly and the facilities made available to users.

The Division worked with the Division of Artificial Internal Organs on the project for the development of a hollow fibre-based Membrane Blood Oxygenator. The major responsibility was the fabrication and assembly of prototype units.

A centrifugal potting system was developed for potting the hollow fibre and heat exchanger ends.

Technology Transfer Cell

Dr. RANJIT, B.E.
Engineer - In charge

The technology transfer activities of the Institute were handled by this group. Efforts were on for identifying the right entrepreneurs for the commercially viable technologies developed at the BMT Wing.

The technologies transferred and licensed for commercialisation were ;

(1) Hydroxyapatite granules for orthopaedic application and the

(2) Concentric needle electrode.

Efforts were on for identifying industrial partners for

(1) Dental composites

(2) Fibrin glue and haemostatic fibrin sheet, and

(3) Hydrogel microspheres for embolization therapy.

Thrombosis Research Unit

Dr. LISSY K. KRISHNAN, M.Sc. Ph.D.
Scientist & Leader

MS. NISSEY VARGHESE, M.Sc.
Project Assistant.

Routine work involved haematological analysis of blood samples for cell consumption during the in vitro testing of membrane oxygenator. Analyses of lipid profile, kidney and liver functions were also done in atherosclerosis rabbit models. The therapeutic effects of herbal formulae were also evaluated.

Fibrin glue was supplied for clinical trials in the cardiac, thoracic and neurosurgery units of the Institute. Dental application of the glue was tried successfully in experimental dog models. Antibiotic incorporated fibrin sheets were prepared and the release kinetics of the drug from the sheet was studied. Biodegradation and tissue compatibility of fibrin-gelatin sheets and fibrin sheets fabricated in the unit were studied and the former was found to be more biocompatible.

Tissue engineering techniques were standardized to get vascular endothelial cell (EC) monolayer using a composite of fibrin, gelatin and growth factors as an adhesive matrix. In vitro experiments showed the increased non-thrombogenic nature of EC grown on artificial materials and the cells grown on fibrin-composite resisted shear stress due to blood flow.

A project, funded by DST, Government of India, to develop monoclonal antibodies was completed. Monoclonal antibodies against B -Thromboglobulin were obtained and an ELISA was stardardized to detect its level in plasma.

The blood compatibility evaluation of diamond-like carbon (DLC)-coated titanium was initiated. A radio-isotope labelling laboratory was set up with the approval of BARC. An instant imager (Bio-rad) to localize and quantitate radioactivity deposited on materials was installed. This will enable use of labelled platelets or proteins to detect thrombogenecity of materials.

The neutralizing effect of antivenom antibodies raised in chicken and purified from egg yolk was tested in animal models. The LD50 of the venom was detected and injection with purified antibodies

was found to have a neutralisation effect which reflected on LD50 of the venom.

The laboratory was modified to dedicate an area to blood-material interaction studies. Thirty five work procedures for accreditation of tests were prepared.

Toxicology

Dr. K. RATHINAM, M.Sc., Ph.D
Scientist and Leader

Dr. A. C. FERNANDEZ, M.Sc. Ph.D.
Scientist

Dr. P. V. MOHANAN, M.Sc. Ph.D.
Scientist

The main activity of the Division was providing support to various programmes with the following tests.

1) Toxicological/biocompatibility tests such as systemic toxicity, intracutaneous irritation, haemolysis, sensitization, intramuscular implantation and subcutaneous implantation studies of different candidate materials for use in various medical devices

2) Mandatory biological studies such as pyrogen and sterility tests on finished devices

Additionally, in vivo chromosomal aberration and micronucleus studies were carried out for the rubber accelerator, ZMBT.

The group also managed the small animal facility, which is registered under the Committee for the purpose of Control and Supervision of Experiments in Animals (CPCSEA), Government of India.

An externally-funded project entitled "Toxicity evaluation of an anti-atherosclerosis plant drug" sponsored by the Cybele Herbal Laboratories, Kochi, was completed.

Vivarium

Dr. ARTHUR VIJAYAN LAL, B.V.Sc.
Veterinary Scientist & Leader

Dr. P. R. UMASHANAKAR, B.V.Sc & AH.
Veterinary Surgeon

The Division was responsible for maintaining high standards of laboratory animal care for large animals like sheep, goat, dogs, pigs and calf. It has a well-eqipped large animal operation theatre for carrying out various surgical procedures in the field of cardio vascular, thoracic and neurosurgery, including evaluation of life saving devices like heart valves and oxygenators under cardiopulmonary bypass.

Important studies carried out in the Division during the year were:-

1) Osteocompatibility evaluation in rabbits of hydroxyapatite, bioglass and its combinations.

2) Evaluation of large size granules and sticks of hydroxyapatite, bioglass and its combinations.

3) In vivo evaluation of silver oxide-coated latex urinary catheter in sheep.

4) Evaluation of GTR membrane for dental applications and fibrin glue by mucoperiosteal flap surgery for orthopaedic applications, in dog models.

Important additions of equipment included:

1. Heart care India, Dan heart lung machine

2. Dan Hypo-hyper thermal unit

Joint collaborative research in progress

Biosurface Technology

1) The Division collaborated with Dr.Sarada, Neurology Division, Dr. Arthur V. Lal, Vivarium Division, Dr. Lissy K. Krishnan, Thrombosis

Research Unit and Dr. Mira Mohanty, Pathology Division, on the "Hemoperfusion column project".

Polymer Processing

2) A joint collaborative research program was carried out this year between Prosthodontic Department of Yenepoya Dental College, Mangalore and SCTIMST. Dr.Joe Mathre, MDS student, carried out a study on retentive forces of new indigenous glass ionomer and composite cements developed in the laboratory and compared it with the values for imported controls.

Toxicology

3) Investigations on the effect of photo-sensitizer along with laser on wound healing in rats and chemical carcinogenicity in mice was completed. The solid tumour studies of photosensitizer and photosensitizer along with laser, using DLA and EA cell lines were also completed, in collaboration with the Department of Radiology.

Biomaterials

4) A joint collaborative research programme of our Group with some scientists of the National Centre of Cell Sciences (NCCS) to evaluate the potential candidate polymeric matrices for tissue engineering of various cell and organ types was ongoing.

Artificial Internal Organs

5) The Indo-French collaborative project proposal for "Development of diamond-like coatings for medical and other applications" was sanctioned in August 1998. Most of the sample preparation for titanium samples was completed and various bridge evaluation studies on the coating progressed smoothly during the period.

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Patents Granted/Filed

1. **"A process for the preparation of immunoabsorbent matrix for hemoperfusion"**, C.P.Sharma, P.R.Hari, W.Paul, patent under process in USA., Japan and India filed by DBT, New Delhi.
2. **"A method for reducing the calcification of biological tissues using polymer of a dihydric alcohol and diisocynate"**, C.P.Sharma.
3. **"Covalent binding of heparin onto pericardium"**, L.R.Moses, C.P. Sharma.
4. **"Oral drug delivery system for therapeutic peptides"**, C.P.Sharma, L.R.Moses.
5. **"A process for immobilization of heparin on polyolefin surfaces"**, L.R.Moses, C.P.Sharma.
6. **"Preparation of a Composite Bioceramic Material for Biomedical Applications"**, H.K.Varma and S.Suresh Babu.

7. **"Apatite Bone Cement Composite with Bioactive Glass"**, Manoj Komath & H.K.Varma.

8. **"A method of coating polymeric materials with growth factor incorporated bioadhesives."** Lissy kalliyanakrishnan.

9. **"Membrane Oxygenator"**, G.S. Bhuvaneshwar, D.S. Nagesh, C.V.Muraleedharan, H.Vijayakumar (CEO., SIDD., Chennai).

10. **"Venous reservoir with integral cardiotomy reservoir"**, G.S. Bhuvaneshwar, D.S. Nagesh, C.V.Muraleedharan, H.Vijayakumar (CEO., SIDD., Chennai).

11. **"A Blood Oxygenator"** G.S.Bhuvaneshwar, D.S.Nagesh, C.V.Muraleedharan, H.Vijayakumar (CEO, SIDD, Chennai)

12. **"Porous calcium phosphate compound-coated chitin/chitosan composite material and its synthesis"**, H.K.Varma and Y.Yokogawa, Japanese patent No.3030432, dated 2000.2.10.

13. **"A method for preparation of Biostable Polyurethane"**, M. Jayabalan, Indian Pat. No.182366 dated 06-02-1995

14. **"Improved humidifier for air/oxygen or other gases"**, G.S.Bhuvaneshwar, C.V.Muralidharan, R.Sreekumar, L.Rowsen Moses, Indian Patent No.180294

15. **"Epidural sensor for use in intracranial pressure monitoring systems"**, G.S.Bhuvaneshwar and C.V.Muralidharan Indian Patent No:180298

Externally-funded Research Projects:

Development and evaluation of antimicrobial silver oxide-coated latex material for use as urinary catheter

Principal Investigator	:	Dr. Maya Nandakumar
Duration	:	One year
Funded by	:	TDC, SCTIMST
Status	:	Ongoing.

Process optimization and development of high flex-life polyurethane for use in cardiovascular devices

Principal Investigator	:	Dr. M. Jayabalan
Funded by	:	DBT
Duration	:	4 Years
Status	:	Completed.

Identification of molecular basis of temporal lobe epilepsy

Principal Investigator	:	Dr.Annie John (on leave)
Principal Co-investigators	:	Dr. Anoop Kumar. T
Funded by	:	STEC, Kerala
Duration	:	3 Years
Status	:	Ongoing

Osteogenic potential of biomaterials - an in vitro study

Principal Investigator	:	Dr. T. V. Kumary
Funded by	:	TDC, SCTIMST
Duration	:	Years
Status	:	Ongoing

Hydroxyapatite - ethylene vinyl acetate co-polymer composites for bone substitute applications

Principal Investigator : Dr.P.Ramesh
Duration : 3 Years
Funded by : DST
Status : Ongoing

Monoclonal antibodies against BTG and GMP-140 to detect clinical platelet activation

Principal Investigator : Dr.Lissy.K.Krishnan
Duration : 3 Years
Funded by : DST
Status : Completed

Toxicity evaluation of an anti-atherosclerosis plant drug

Principal Investigator : Dr.P.V.Mohanan
Duration : 1 Year
Funded by : Cybele Herbal Laboratories
Status : Completed

Development of Non-toxic Latex Formulation for Biomedical Applications

Principal Investigator : Dr.P.V.Mohanan
Duration : 3 Years
Funded by : DST
Status : Sanctioned

Development of pharmacological method to detect 5-Hydroxy tryptamine (5-HT) released from platelets

Principal Investigator : Dr.K.Rathinam
Duration : 3 Years
Funded by : STEC, Kerala
Status : Sanctioned

Development of a hollow fibre based membrane oxygenator

Principal Investigator : Dr.G.S.Bhuvaneshv
Duration : 2.5 Years - Extende till July 2000
Funded by : SPIC Pharma Ltd., Madras
Status : Ongoing

Development of diamond-like coatings for medical and other applications

Principal Investigator : Dr.G.S.Bhuvaneshw
Duration : 3 Years
Funded by : IFCPAR
Status : Ongoing

Surgical treatment for intractable complex partial epilepsy
Principal Investigator: Dr. K. Radhakrishnan
Duration: 2 years
Funded by: The Science, Technology and Environment Committee, Govt. of Kerala
Status: Ongoing

An open-label study on the safety and efficacy of long-term Tiagabine administration in patients with epilepsy unsatisfactorily controlled with other anti-epileptic medication
Principal Investigator: Dr. K. Radhakrishnan
Duration : 2 years
Funded by : Novo Nordisk

Seizure; an artificial intelligence programme for diagnosis of epilepsy
Principal Investigator: Dr. Sanjeev V. Thomas
Duration: 2 years
Funded by: Department of Electronics, Govt. of India

Kerala registry of epilepsy and pregnancy
Principal Investigator: Dr. Sanjeev V. Thomas
Duration: 2 years
Funded by: The Science, Technology and Environment Committee, Govt. of Kerala

Role of cytokines in the prognosis of Guillain Barre Syndrome
Principal Investigator: Dr. V.V. Radhakrishnan
Duration: 3 years
Funded by: Department of Biotechnology, NewDelhi
Status: Ongoing

Development of immunodiagnostic system for Tuberculous meningitis suitable for laboratories in developing countries.
Principal Investigator: Dr. V.V. Radhakrishnan
Duration: 3 years
Funded by: Department of Science and Technology, New Delhi
Status: Completed

Studies on mucoid vasculopathy in Kerala
Principal Investigator: Dr. S. Sandhyamani
Duration: 3 years
Funded by: Department of Science and Technology, New Delhi
Status: Ongoing

Investigation of serum and urinary mucopolysaccharides in patients with coronary artery and cerebrovascular disease
Principal Investigator: Dr. S. Sandhyamani
Duration: 3 years
Funded by: Science, Technology and Environment Committee
Status: Ongoing

Diarrhoea morbidity among underfive children: A comparative study of two villages each in Kerala and Tamil Nadu States.
Principal Investigator: Dr. K.R.Thankappan
Funded by: Kerala Research Programme for Local Development. Duration 1°years.
Status: Completed.

Comprehensive care programme for Parkinson's disease.
Principal Investigator: Dr. Asha Kishore
Funded by: Kerala Transport Development Finance Corporation
Duration: 3 years
Status: Ongoing

Efficacy and long-term outcome of Pallidotomy for Parkinson's disease
Principal Investigator: Dr. Asha Kishore
Funded by: Kerala State Financial Enterprises
Duration: 3 years
Status: Ongoing

Coconut oil and incidence of Coronary Artery Disease in Kerala.
Invesigators : Dr. K. Subramonia Iyer, Dr. N. Jayakumari, Dr. Jaganmohan Tharakan, Dr. P. Sankara Sarma
Funded by : The Coconut Development Board, Ministry of Agriculture, New Delhi.
Duration : 3 years
Status : Ongoing

Stimulation of cardiac fibroblast proliferation by lanthanides: A superoxide anion-mediated response.
Principal Investigator : Dr. R. Renuka Nair
Funded by : Indian Council of Medical Research, New Delhi
Duration : Four years
Status : Completed 31.12.1999

Mechanism of cardiac fibrogenesis in experimental magnesium deficiency

Principal Investigator : Dr. K. Shivakumar
Funded by : Department of Science and Technology, New Delhi
Duration: Three years
Status: Ongoing

Modulation of myocardial contraction by suboptimal levels of extracellular magnesium in free radical stress

Principal Investigator : Dr. R. Renuka Nair
Funded by : Department of Science and Technology, New Delhi
Duration: 3 years
Status: Ongoing

Lasers in Medicine
Principal investigator: Dr. A.K.Gupta
Funded by: Department of Atomic Energy, Government of India
Duration: 4 years
Status: completed

Conferences, Workshops and Training Programmes

A brainstorming session on "Ethical issues in medical research in India' was organized inassociation with the U.S. National Institutes of Health, the Harvard School of Public Health, USA on 9th July, 1999. The venue for this international meeting was the India International Centre, New Delhi.

An International network meeting of the Public Health Schools Without Walls (PHSWOW) was organized at AMCHSS during February 8-10, 2000. The Centre became an active member of this network that emphasize collaboration in Public Health training among the various institutions in the developing countries. The meeting was sponsored by the Rockefeller Foundation.

Another international meeting on "Ethical issues in health resource allocation: Fairness and Goodness", was organized at AMCHSS during March 12-14, 2000. This WHO sponsored meeting was to discuss health equity issues at a philosophical level to come out with a publication in that area.

The Department of Cardiology organised a national Workshop on cardiac electrophysiology and arrythmias management in December, 1999. The Workshop was conducted by Prof.Nadir Saudi, Rouen University Hospital, France, and Professor Mohan Nair of G.B.Pant Hospital, New Delhi. 7 patients with different tachyarrythmias underwent successful RF ablation procedure during the Workshop.

A National Workshop on Neuroendoscope was organised by the Department of Neurosurgery in September, 1999. Prof. A Grotenhuis from the University of Nijmejen conducted the Workshop and demonstrated the use of the endosope in patients.

A regional conference on "Emerging trends in the management of movement disorders" in June 1999. The conference was inaugurated by Dr.R.M.Varma. The chief guest at the conference was Dr.Laszlo Tamas, Director, Pacific Neuroscience Institute, California.

A Workshop on Doppler Ultrasound was held at the Institute on 5th February, 2000.

Trainees from other Institutes :

The following students carried out dissertation/ project work.

1. Kala.L., - M.Tech. (Electronics Engineering) student of the Departmet of Digital Systems and Communication Engineering, REC., Calicut, on "**Spectral signature analysis of artificial heart valves**"
2. Lavina Mathew and Sheeba Zachariah,- MCA Students, Dept. of Computer applications, TKM College of Engineering, Kollam, on "**Imaging Processing (Generation of Thumbnails for bitmap images)**".
3. Aruma G. Muthoot, Bijish.R., Sudhir.R. and Vignesh.B., - B.Tech. (Electrical and Electronics Engineering) students of College of Engineering, Trivandrum, on "**A Real time data processing interface**"
4. Lekshmi Suresh Babu , B.Tech student from Dept. of Polymer Engineering, M.G. University, on "**Synthesis, characterisation and antibiotic release studies from aliphatic polyurethane**".
5. Jojan.V.L., B.Tech student from School of Technology and Applied Science, M.G. University, on " **Polymethylmethacrylate copolymers for ophthalmic application**".

6. Dr. Ushus, MDS student from Yeenapoya Dental College, Karnataka, on " **Clinical evaluation of polymeric GTR membrane in canine models** "

7. Jerry N - (M.Pharm.) College of Pharmaceutical Sciences, Trivandrum, **Study on oral and implantable insulin –delivery systems** " .

8. Dr. Usha -(MDS), Dental College, Trivandrum, "**Study on the changes of surface properties on titanium dental implants by different sterilisation procedures**".

9. Susan Mathew - Dental College, Mangalore, MDS thesis related to "**Glow discharge treatment on elastomeric dental impression material**".

10. Alice P J (M. Pharm) - College of Pharmaceutical Sciences, Trivandrum. "**Oral delivery system based on alginate / chitosan/ liposome composite microcapsules for insulin**".

11. Bindu S.Nair,- M.Sc. student from School of Chemical Sciences, Mahatma Gandhi University, on "**Studies on hydrophilic lubricious coating for Foleys Catheters**".

12. Remya Haridevan, - B.Tech. (Polymer Engineering) student from College of Engineering,Thodupuzha, Mahatma Gandhi University, on "**Studies on hydrophilic lubricious coating on polyvinyl chloride substrates intended for biomedical applications**".

13. Jacob Abraham, - B.Tech. (Polymer Engineering) Project Report, April 1999 "**Synthesis and characterisation of a urethane dimethacrylate resin for dental applications**".

14. Dr. Joe Mathew, - MDS. (Prosthodontic Project Report, October 1999. "**Evaluatio crown adhesive strengths using five adhes cements**".

15. Bobby, - M.Sc. (Chemistry) Project Repo March 2000, "**Antibiotics impregnated acrylic bone cement: changes in migratio characteristics and strength with time**".

16. Shalima P.Anand, - B.Tech. (Polymer Engineering), Project Report, March 2000 "**Synthesis and characterisation studies of urethane dimethacrylate resin based on 2-hydroxyethyl methacrylate and isophorone diisocyanate**".

17. Sreelatha.P.K., M.Sc (Polymer Chemistry) Project "**Studies on the effect of polyethylen glycol on the properties of polypropylene fumarate bone cement**", School of Chemical Sciences, M.G.University, Kottayam.

18. Shaheena Rahuman, M.Sc. (Polymer Chemistry) - School of Chemical Sciences, M.G. University, Kottayam, "**Studies on the effect of titanium dioxide on photodegradation of polyvinyl chloride / polyurethane blend**".

19. Suma George, B.Tech (Polymer Engineering) Project thesis "**Comparison of bovine casein and bovine serum albumin as a carrier matrix for controlled delivery of the drug progesterone**", July 1999

20. **Sapna. P. M., B.Tech (Polymer Engineering) Project thesis " Algenic dialdehyde cross linked gelatin hydrogel**", June 1999.

Visits by academic staff abroad and within India

Dr. K. Shivakumar visited the National Institute on Aging, NIH, Baltimore, USA, for three months from February, 2000.

Dr. K.R. Thankappan participated in the Asian Health Research Forum meeting in Manila, Philippines in February, 17-19, 2000.

Dr. D. Varatharajan went to Harvard School of Public Health, USA on a six-month post-doctoral fellowship from 1st July to 31st December 1999. The trip was jointly sponsored by SCTIMST (Mac Arthur Grant) and Harvard University (Merck Foundation).

Dr. Asha Kishore underwent one month training in the neurological techniques of deep brain stimulation and programming at the Pacific Neurosciences Institute, and University of California San Francisco, California.

Dr. Asha Kishore presented a scientific paper at the 13th international symposium on Parkinson's disease at Vancouver, Canada.

Prof. K.Radhakrishnan proceeded on a one year sabbatical to the Mayo Clinic Rochester, USA to study invasive monitoring in Epilepsy patients.

Dr.RN.Bhattacharya and Dr. Suresh Nair attended the hands on work-shop on "key-hole concept in neurosurgery" held at Aesculap Akademie,Tuttlingen and Johannes-Gutenberg University, Mainz, Germany in July, 1999. They also visited the Department of Neurosurgery at Hannover School of Medicine, Nordstadt, Hannover.

Dr. Suresh Nair was an invited speaker at the 4th annual meeting of the Japanese Congress for brain tumour surgery at Nagoya in September, 1999. He also gave a guest lecture at the Keio University School of Medicine, Tokyo, where he was a visiting faculty.

Dr. Rajneesh Kachhara went as a visiting faculty to Mount Sinai Hospital, New York, for three months from June to August,1999.

Dr. M Bhaskara Rao attended the International Congress of Epliepsy held at Prague, Czechoslovakia where he was awarded the young Scientist award by Jerome Engel.

Dr. P. Ramesh and Sri. M.C.Sunny visited Gebruder Haake GmbH, Karisruhe, Germany, for application training on Poly Lab torque rheometer system during Nov., 2-5 1999.

Dr. A. Maya Nandkumar went on JSPS Post-doctoral Fellowship to Tokyo Women's Medical University, Japan.

Dr.G.S.Bhuvaneshar visited France in connection with the Indo-French Project in Sept. '99 for 2 weeks for discussion with the French Collaborators.

Dr.Prabha D.Nair attended the 45th meeting of American Society of Artificial. Internal Organs at San Diego, California, USA during June 2-5th 1999 and presented a paper in the Biomaterials session. She received an INSA travel fellowship to attend the meeting.

Dr.Prabha D.Nair participated in the workshop on Thermoanalytical techniques conducted by TA Instruments Inc. in June 1999 at Philadelphia, USA.

Dr.M.D.Nair, Additional Professor of Neurology presented a paper in the 11th International Congress of EMG and Clinical Neurophysiology at Prague, Czech Republic, in September 1999.

Dr. A. Jayakrishnan visited Cadila Pharmaceuticals Ltd., Ahmedabad during 27-01-2000 to 01-02-2000 to discuss about the modalities of Technology Transfer of Hydrogel Microsphers developed in the laboratory.

Dr. T. V. Kumari visited the National Centre for Cell Sciences at Pune for one week in January 2000.

Dr.V. Kalliyanakrishnan and G.S.Bhuvaneshwar visited Dynamic Orthopaedic in Alwaye to discuss the modalities of technology transfer of dental composites in March 2000.

Dr.Sylaja presented a scientific paper at the International Heart Health Conference in developing countries; New Delhi, December 1999 and participated in the workshop on modalities of starting a stroke registry in India.

Dr.Prabha.D.Nair visited NCCS, Pune, in Jan.2000, in connection with the collaborative research programme on tissue engineering materials.

Mrs. Radhakumary attended the Workshop on "Thermal Analysis for the Next Millennium" conducted by the Regional Sophisticated Instrumentation Centre, IIT., Madras from 21-10-99 to 23-10- 99.

Dr. Sharma attended Home Grown Technology project entitled "Commercialisation of Bioadhesives ISO Amyl 2 Cyno Acrylate" with M/s.Concord Drugs Ltd., Hyderabad, Sept.3rd 1999 under Technology Information Forcasting and Assessment Committee.

Mr. L. Rowsen Moses presented a paper on "Chemically modified polypropylene hollow fibres for oxygenators", Rowsen Moses.L. and Chandra.P.Sharma at the 11th Annual General meeting of MRSI held at Vadodara, Feb.3-5, 2000.

Dr. K. Rathinam participated in the GLP Symposium held at Hyderabad.

Dr.P.V.Mohanan underwent the NABL internal audit training programme organised by the DST Mumbai.

Dr. K. Rathinam attended at the International Congress on Frontiers in Pharmacology and Therapeutics in 21st Century at New Delhi, 1999.

Dr. K. Rathinam delivered an invited lecture on ne drug development / animal studies and toxicity test: of herbal medicine at Nagarjuna Research Foundation, Thodupuzha.

Dr. G. S. Bhuvaneshwar gave an invited talk on "IMPLANTABLE/ DISPOSABLE MEDICAL DEVICE - An Indian Perspective" at Technology Summit and Technology Platform, Confederation of Indian Industries - India and Federal Ministry of Education and Research BMBF-Germany, Hyderabad , October, 1999.

Dr. Mala Ramanathan attended the UNICEF and ICMR's 'Regional Consultation on Priorities in Research in RCH and Nutrition' between 11-12, Oct, 1999 in Bangalore, India.

Dr. Mala Ramanathan participated in the Technical Advisory Committee of the National Abortion Assessment Project, January 17-18, 2000; New Delhi, India.

Dr. Mala Ramanathan presented a paper entitled "Reproductive Health Situation in Kerala" at the Natioanl Seminar on Women's Movement and Women's Studies, Assumption College, Chenganacherry, Kerala, January 27, 2000.

Dr. Mala Ramanathan presented a paper entitled " Providers' Perspective on quality of Services in the

Indian Family Welfare Progrmme: Some Lessons for the Reproductive and Child Health Programme" at the Millennium Conference on Population, Development and Environmental Nexus and the XXIII Annual Confernence of the Indian Association for the Study of Population, 14-16 February, 2000, New Delhi, India (jointly with U.S.Mishra and T.R.Dilip)

Dr. Mala Ramanathan presented a paper entitled " Infertiltiy in India: Some Evidence form the NFHS, India 1992-'93" at the Millennium Conference on Population, Development and Environmental Nexus and the XXIII Annual Confernence of the Indian Association for the Study of Population, 14-16 February, 2000, New Delhi, India (jointly with U.S.Mishra)

Dr. Mala Ramanathan participated as Discussant for the Orissa section at a Seminar on "Macroeconomic Adjustment Policies, Health Sector Reforms, and Access to, Utilisation and Qualtiy fo Health Care" conducted jointly by the Centre for Developmental Studies, Trivandrum, and the Nabakrushna Choudhury Centre for Development Studies, Bhubaneshwar, March 17-18, 2000, Bhubaneshwar, India.

Dr. M. Jayabalan has delivered an invited talk "Plastic waste management and development of ecofriendly plastics" at the Seminar on Chemistry for Man at S.T.Hindu College, Nagercoil, on March 15, 2000.

Dr.M. Jayabalan presented a paper "Studies on biodegradable polymers of phloroglucinol triglycydil acrylates" at the National Seminar on Polymers for the new millennium, Madras, March 25-26, 1999.

Dr. M. Jayabalan presented a paper on "Cytotoxicity of unsaturated poly ester poly (propylene fumarate) composite" at the 18th Annual Conference of the Society of Toxicology, India, Namakkal, November 11-13, 1999.

Dr. A. Jayakrishnan delivered an invited lecture at the Fourth National Conference of the Indian Society of Chemists and Biologists, CDRI, Lucknow, 28-01-2000 to 30-01-2000, on "Therapeutic and Prophylactic Opportunities Using Polymeric Microspheres"

Dr. P. Ramesh gave an invited talk at Dept. of Polymer Science and Rubber Technology, Cochin University of Science and Technology, Kochi, on "Biomedical Applications of Polymers" on 30th March 2000.

Sheela George presented a paper entitled "Novel Polyurethane materials for islet cell immunoisolation" at the XII Kerala Science Congress held at Kumali in Jan.2000 and she was awarded the "Young Scientist" award for the best presentation.

P. Krishnamoorthia Pillai, SMRO, presented a paper on "Space Management in Medical Records" at the National Conference on Medical Records Management organised by the Federation of Hospital Administration at Madurai on 27-11-1999.

Dr. Jaisy Mathai & Mrs. Philomina Augustine participated in the Workshop on Quality Control & Quality Assurance in Blood Banking, conducted by WHO, in Bangalore.

Dr. Jaisy Mathai participated in the Workshop on HIV/AIDS Counselling at CMC, Vellore, from March 13th to 18th 2000.

Important visitors

Dr.Y.Yokogawa, Head, Bioceramic Laboratory, National Industrial Research Institute of Nagoya (NIRIN), Japan, had visited BMT Wing from 8th - 12th Feb.2000, for discussions on the INDO-JAPAN Scientific Collaborative programme funded by DST, Government of India and STA, Government of Japan, on biomimetic processing of bioceramic composites.

Dr. R. Suryanarayanan of Laboratoire de Chimie des Solides University of Paris-sud, France, visited the laboratories in Dec. 1999 for discussions on various aspects of implementation of the Indo-French Collaborative Project "Development of Diamond Like Coatings (DLC) for Biomedical and Other Applications".

Prof. S.Mohan, Dept. of ILU., IISc., Bangalore visited the Artificial Internal Organs Laboratory during April 1999 for monitoring the progress of the project on DLC.

Dr. Prasanna N. Kumar, Professor of Pathology, PSG Medical College, Coimbatore, delivered a lecture on 'Principles of Platelet Transfusion Therapy' on May 15th , 1999.

Dr. Ambika Nanu, Head, Department of Transfusion Medicine, AIIMS, New Delhi gave a talk on 'Organized Blood Transfusion Services towards Blood Safety' on March 22nd 2000.

Dr. Zarine Bharucho, Head, Department of Transfusion Medicine, Tata Memorial Hospital, Mumbai on March 16th 2000.

Dr. Anjali Kale, Blood Bank & Laboratory Services, AIMS, Cochin.

Prof. Alain Cribier from the Charles Nicolle University Hospital, France.

Prof.Nadir Saudi, Rouen University Hospital, France.

Professor Mohan Nair of G.B.Pant Hospital, New Delhi.

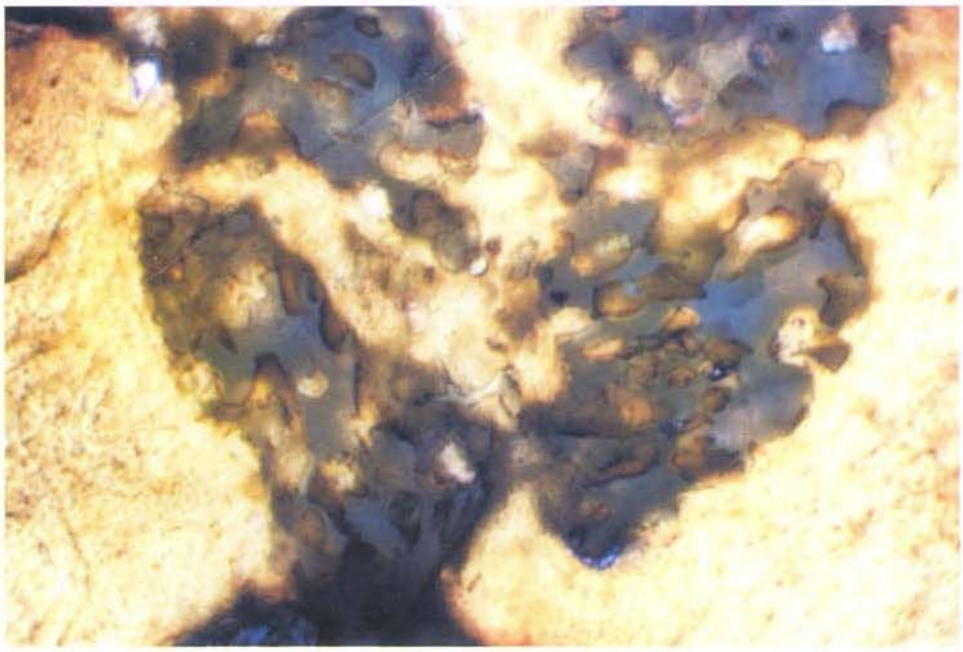
Professor Timothy. A. Pedley, MD, Professor and Chairman of Department of Neurology, Neurological Institute of New York, Columbia - Presbyterian Centre, New York, visited the Department on 23rd and 24th February, 2000, and conducted useful bedside case discussion, ward rounds and subject seminars in Neurology.

Dr. Grotenhuis, Professor of Neurosurgery, University of Nijmejen, Netherlands visited Neurosurgery department and conducted the neuroendoscope workshop in September 1999.

Prof. Graham Teasdale Professor of Neurosurgery, Glasgow, visited the Department in October 1999

Prof. K V Mathai Retd. Professor of Neurosurgery, CMC, Vellore, visted the Department in August, 1999.

POROUS HYDROXY APATITE GRANULES
(FOR ORTHOPAEDIC AND DENTAL BONE FILLING APPLICATIONS)



HISTOLOGICAL SECTION SHOWING NEW BONE (YELLOW)
IN GROWTH INTO THE PORES OF HAP GRANULES (GREY)

Prof. V. S. Ramamurthy, Secretary, Department of Science and Technology, Government of India, initiates quality system implementation by releasing the Quality Manual

Dr. Murli Manohar Joshi, Hon. Minister for Science & Technology and HRD, Government of India, dedicates the Achutha Menon Centre for Health Science Studies to the nation

MOU Signing - Haemoconcentractor SCTIMST & SPIC

Sri. V. C. Kabeer, Health Minister, Govt. of Kerala, inaugurating the
Public Health Schools Without Walls Meeting after dedication of the Achutha Menon Centre for Health Science Studies to the nation

Statement of Accounts
1999-2000

Contents

Balance Sheet As at 31st March 2000

Figures for the previous year	GENERAL FUND AND LIABILITIES	Amount
Rs Ps		Rs Ps
	GENERAL FUND :	
853729666.24	Balance as per last Balance Sheet	991429666.24
	Additions out of	
	(a) Grant from Govt. of India for	
136700000.00	Plan Expenditure	110000000.00
	(b) Donations for Specific purposes	
1000000.00	utilised during the year	3674858.00
991429666.24		1105104524.24
986549.96	Less : Capital Assets written off	986549.96
	Less : Excess of Expenditure over Income	
215737059.91	adjusted out of General Fund upto 31.03.1998	288629770.62
72892710.71	Less : Excess of Expenditure over Income for the current year	64210146.20
	Less : Reserve for Depreciation for Fixed assets till 31-03-2000	358525824.99
701813345.66		392752232.47
41232711.00	Sinking Fund	54854546.00
11861869.00	Technology Development Fund	12447972.00
10656017.01	Unutilised Grants for Research Projects	15936150.26
123275091.05	Employee's Benefit Funds	150511290.49
	Current Liabilities & Provisions	
7018712.52	Sundry Creditors for expenses	9210570.72
15414325.98	Other Liabilities	13242791.89
911272072.22	**Total**	**648955553.83**

Note: Changes suggested by the audit were incorporated in the above statement.

sd/
Financial Adviser &
Chief Accounts Officer

Figures for the previous year	ASSETS	Amount	
Rs Ps		Rs Ps	Rs Ps
668418838.72	**FIXED ASSETS**	726185994.45	
986549.96	Less : Assets written off	986549.96	
	Less : Depreciaion provided till 31-03-2000	358525824.99	
667432288.76			366673619.50
	Current Assets		
12138056.17	General Stores	13706876.65	
1678228.87	Tools	2579146.42	
3960464.91	Instruments	8428201.13	
1022327.11	Glasswares	833519.28	
4349141.91	Medicines	4790575.68	
2000.00	Investment in shares of Employees co-operative Society	2000.00	
			30340319.16
1534298.28	**Deposits**		1640995.28
	Deposit with Banks		
122863374.96	For Staff Benefits		149476858.45
65370395.08	For Specific Purposes		80162793.08
	Loans and Advances		
	Advances Recoverable in Cash or in kind or for Value to be recovered		
	Unsecured considered good		
12101501.60	For purchases	2730774.00	
12338328.56	To staff	13579887.32	
2460013.63	Other Advances	2496447.00	
0.00	Grant receivable from Govt. of India	0.00	
1178221.61	Amount receivable from sponsers of Projects	1296854.42	
			20103962.74
	Cash & Bank Balances		
251435.65	Cash and stamps in hand	363697.75	
2591995.12	Balance with Banks	193307.87	
			557005.62
911272072.22	**Total**		**648955553.83**

sd/
Director

Income and Expenditure Statement Account for the year ended 31st March 2000

Figures for the previous year	EXPENDITURE	Amount
Rs Ps		Rs Ps
	Excess of Expenditure over Income	
113164086.41	Hospital Wing	**131100217.84**
18181611.99	Bio Medical Technology Wing	24024075.76
301630.00	Expenses for Committee Meetings	443059.00
58720.00	Legal Expenses	57417.00
404835.00	Travelling Expenses	92844.60
10802355.28	Expenses for Academic Programmes	11205198.50
779978.00	Travelling expenses for Seminars and Conferences	904763.00
193482.00	Expenses of Achutha Menon Centre	260054.00
143886698.68	**Total**	**168087629.70**

sd/
Financial Adviser &
Chief Accounts Officer

Figures for the previous year	INCOME	Amount
Rs Ps		Rs Ps
68266000.00	Grant received from Govt. of India	100000000.00
238630.00	Rent	291826.00
618868.95	General Receipts	882337.50
0.00	Fees collected-AMC	
944269.00	Interest received	1610777.00
884220.02	Application & Examination fee from P G Students	901945.00
42000.00	Income from Sale of Assets	0.00
	Income from Projects- AMC	190598.00
72892710.71	Excess of expenditure over income transferred to General Fund Account	64210146.20
143886698.68	**Total**	**168087629.70**

sd/
Director

Income and Expenditure Account for the year ended 31st March 2000 Hospital Wing

Figures for the previous year Rs Ps	EXPENDITURE	Amount Rs Ps
19527373.40	Medicines	19199982,23
2282471.73	Chemicals	435720.35
3163586.25	Medical Gases	3046094.50
2090122.90	Films & Chemicals for Radiology Dept.	2713615.55
552011.04	Uniforms & Hospital linen	1341011.55
63707352.13	Hospital Items	51105342.14
1116314.10	Hospital Expenses	978734.40
2386767.96	Inpatient Diet expenses	2425638.10
2403921.95	Laboratory Expenses	5427929.10
89978138.45	Salaries & Allowances	127130560.85
161394.00	Honorarium to Visiting Faculty	168219.00
2665709.60	Medical benefit to staff	3018361.00
443377.00	Contribution to Provident Fund	885273.00
295573.00	Travelling Expenses	14960.00
37210.00	Expenses for visiting faculty	0.00
325886.00	Home travel & Leave travel concession	443403.00
904823.10	Postage, Telephone and Telegrams	823077.50
1390595.80	Printing & Stationery	1217361.75
499165.00	Advertisements	208198.00
299473.00	Recruitment Expenses	47986.00
9544205.00	Electricity & Water Charges	10715754.00
270042.25	Freight, Insurance & Handling charges	269831.72
389215.34	Vehicle Maintenance Expenses	403908.30
1047628.59	Bank charges and commission	115486.20
25650.00	Agricultural Expenses	25650.00
222365.00	Taxes & Licence	193125.00
	Repairs and Maintenance	
11935140.68	Equipments	12157561.30
1182570.50	Buildings	2071495.55
486282.00	Others	480046.65
216011.00	Staff Training Expenses	15616.00
0.00	Research-In House Projects	25382.00
153637.00	Other Expenses	193805.06
0.00	Bonus & Festival Allowences	
1290737.64	Tools, Glassware & Instruments - consumed	1498033.60
6230287.00	Contribution to Pension Fund	6924960.00
5996112.00	Contribution to Sinking Fund	6555758.00
0.00	Contribution to Gratuity Fund	0.00
233221150.41	**Total**	**262277881.40**

sd/
Financial Adviser &
Chief Accounts Officer

Figures for the previous year	INCOME	Amount
Rs Ps		Rs Ps
	Hospital Collections	
96643643.00	Inpatient Charges	103257830.00
23284415.00	Investigation & Registration Charges	27856863.00
129006.00	Income from Projects	62970.56
113164086.41	Excess of expenditure over Income transferred to Income & Expenditure Account - General	131100217.84
233221150.41	**Total**	**262277881.40**

sd/
Director

Income and Expenditure Account for the year ended 31st March 2000 - Biomedical Technology Wing

Figures for the previous year	EXPENDITURE	Amount
Rs Ps		Rs Ps
689630.20	Chemicals	314988.00
76773.80	Consumable Stores	49602.85
295406.35	Laboratory Expenses	485889.40
13544906.60	Salaries & Allowances	20225455.20
175525.00	Medical benefits to staff	181259.00
123138.50	Travelling Expenses	68523.50
30958.40	Uniforms to Staff	19912.85
24615.00	Expenses for Visiting Faculty	17084.50
197216.50	Postage, Telephone & Telegrams	213125.00
90418.00	Printing & Stationery	84590.00
49824.00	Advertisements	103550.00
1114827.00	Electricity & Water Charges	1522293.00
82129.50	Freight, Insurance & Handling Charges	166212.00
51453.47	Bank Charges & Commission	31816.00
44258.00	Garden & Estate Expenses	79946.50
	Repairs & Maintenance Expenses	
904275.00	Equipments	565930.00
313270.00	Buildings	50330.00
41786.90	Others	57994.00
229154.65	Animal Research Lab Expenses	208976.90
153014.00	Other Expense	136029.55
304986.63	Workshop & Tool room expenses	216718.05
15000.00	Honararium	13500.00
150304.00	Seminar & Conference expenses	156482.70
17547.00	Legal Charges	47600.00
14711.00	Exhibition expenses	7026.00
155246.00	Home travel & Leave travel expenses	53132.00
17375.00	Vehicle maintenance expenses	5881.90
168618.00	Taxes & Licences	157614.00
374517.58	Tools, Glassware and Instruments written off	1462183.11
6178.00	Staff Training expenses	59983.50
0.00	Contribution to Technology Development Fund	0.00
126885.00	Research expenses - In house projects	586103.00
103646.00	Visiting faculty expenses	23604.00
70918.00	Committee meeting expenses	245.00
19758513.08	**Total**	**27373581.51**

sd/
Financial Adviser &
Chief Accounts Officer

Figures for the previous year	INCOME	Amount
Rs Ps		Rs Ps
126885.00	Premium & Royalty received	586103.00
192380.00	Facility charges received	174989.00
90277.84	Overhead charges collected from projects	19879.00
14406.00	Interest received	10137.00
13965.00	Income from Garden & Estates	40390.00
35696.25	Sundry receipts	48129.75
1009933.00	Interest from technology fund	2397113.00
86958.00	Rent collected from staff	68265.00
2400.00	Sale of tender forms	0.00
4000.00	Examination fee received	4500.00
18181611.99	Excess of expenditure over income transferred to general income and expenditure account	24024075.76
19758513.08	**Total**	**27373581.51**

sd/
Director

Receipts and Payments Account for the year ended 31st March 2000

Figures for the previous year	RECEIPTS	Amount
Rs Ps		Rs Ps
	Opening Balance	
278288.53	Cash in hand	251435.65
9480661.88	Balance with banks for G.P.	2591995.12
	Hospital Collection	
95001835.00	Inpatient deposit	102369037.00
22858145.00	Investigation and Registration charges	25995713.00
	Research and Development Wing	
126885.00	Royalty received	586103.00
13965.00	Income from estate	40390.00
30219.00	Sundry receipts	39983.50
11762.00	Interest on bank deposits	8148.00
1009933.00	Interest on special deposit	2397113.00
180380.00	Facility hire charges	171989.00
	General Receipts	
512646.95	Sundry receipts	422394.50
98660.00	Rent	73857.00
862495.00	Interest received	709258.95
954620.02	Application & Examination fee from PG students	1084943.00
112509.00	Notice pay received	425710.00
	Grant received from Govt. of India	
68266000.00	For recurring expenses	100000000.00
144730000.00	For capital expenses	110000000.00
	Grant for specific research	
6923534.00	Projects	18352914.01
10831337.00	Receipts for specific purpose	6252871.59
1158618.00	Deposits received	903079.00
42000.00	Receipts from sale of Assets	0.00
23245084.00	Receipt for PF & Pension Fund	16907661.41
1000000.00	Donation for specific purpose	0.00
0.000	Temporary over draft (Bank)	0.00
0.00	Deposit refunded	10000000.00
387729578.38	**Total**	**399584596.73**

sd/
Financial Adviser &
Chief Accounts Officer

Figures for the previous year	PAYMENTS	Amount
Rs Ps		Rs Ps
	Expenses for Hospital Wing	
96956104.25	To staff	135073486.20
123107756.29	To others	117495142.85
	Expenses for BMT Wing	
14304784.75	To staff	20639735.25
4957547.28	To others	4706815.75
682600.50	Expenses for general purpose	407870.50
9725242.90	Expenses for Academic purpose	11694632.00
170722.00	Expenses for Achutha Menon Centre	188090.00
69690002.70	Payment for fixed assets	46802748.28*
472274.45	Payments for tools	8464.90
634606.30	Payment for glasswares	1198222.25
684240.20	Payment for Instruments	2033491.00
6823112.00	Refund of Bank overdraft	0.00
4536063.24	Payment for Projects	13337313.13
866516.25	Deposits Refunded	960666.00
37855297.50	Deposit for specific expense	33658995.00
13419277.00	Deposit for sinking fund	10720178.00
0.00	Deposit-Others	101740.00
	Closing balance	
251435.65	Cash in hand	363697.75
2591995.12	Cash with banks	193307.87
387729578.38	**Total**	**399584596.73**

sd/
Director

Schedule of Fixed Assets as on 31-03-2000

GROSS BLOCK

Particulars of Assets	Values as on 1-4-1999	Additions during the year	Assets disposed off	Total
Item	Rs. Ps	Rs. Ps	Rs. Ps	Rs. Ps
1. Land	1463299.63	0.00		1463299.63
2. Land development	122543.88	0.00		122543.88
3. Statemond Palace property	2166170.00	0.00		2166170.00
4. Buildings	85638631.18	1133844.00		86772475.18
5. Compound Walls	3379561.68	81095.00		3460656.68
6. Tremporary Partition	0.00	0.00		0.00
7. Equipments	418627891.06	44112676.53	505410.00	462235157.59
8. Gas plant installations	897644.09	128916.00		1026560.09
9. Air conditioners & refrigerators	14965944.91	847071.00	25000.00	15788015.91
10. Cold room installation	341700.00	0.00		341700.00
11. Sub-station	1349552.25	0.00		1349552.25
12. Electrical installation	10550775.82	525564.60		11076340.42
13. Water Cooler	62866.50	0.00		62866.50
14. Lift instillation	2577633.10	0.00		2577633.10
15. Canteen Equipments	83385.49	9830.60		93216.09
16. Furniture & fixtures	15499204.61	1802419.00	54107.00	17247516.61
17. Motor Vehicles	2715789.30	0.00	398614.89	2317174.41
18. Office Equipments	850694.54	6370.00		857064.54
19. Telephone Installation	1728190.94	7345.00		1735535.94
20. Library Books	50721572.64	6029097.00	3338.07	56747331.57
21. Kitchen Utinsils	395088.82	161609.00		556697.82
22. Mural Paintings	271757.63	0.00		271757.63
23. Cycles	6135.33	0.00	80.00	6055.33
24. Roads	647080.04	103742.00		750822.04
25. Animal Houses & cages	433376.70	0.00		433376.70
26. Oxygen Cylinders	203362.42	0.00		203362.42
27. Livestock	31848.00	0.00		31848.00
28. Achutha Menon Centre under construction	52512523.16	2817576.00		55330099.16
29. Bore well	174615.00	0.00		174615.00
Total	**668418838.72**	**57767155.73**	**986549.96**	**725199444.49**

DEPERECIATION BLOCK

Deprciation till 31-3-99	Deprciation for the year	Deprciation till 31-03-2000	Net Block
Rs. Ps	Rs. Ps	Rs. Ps	Rs. Ps
0.00	0.00	0.00	1463299.63
0.00	0.00	0.00	122543.88
563441.30	80136.44	643577.73	1522592.27
35002341.71	2588506.67	37590848.38	49181626.80
724281.43	136818.76	861100.19	2599556.49
0.00	0.00	0.00	0.00
214382994.85	37177824.41	251560819.26	210674338.33
466742.13	83972.69	550714.82	475845.27
6299127.86	1423333.21	7722461.06	8065554.85
325559.03	2421.15	327980.17	13719.83
1135383.71	32125.28	1167508.99	182043.26
5459992.66	842452.16	6302444.82	4773895.60
61358.03	226.27	61584.30	1282.20
1956369.83	93189.49	2049559.32	528073.78
60241.68	4946.16	65187.84	28028.25
9623672.71	1143576.58	10767249.30	6480267.31
1766055.22	110223.84	1876279.06	440895.35
594766.70	39344.68	634111.38	222953.16
1093511.91	96303.60	1189815.52	545720.42
29260006.42	4123098.77	33383105.19	23364226.38
333669.87	33454.19	367124.07	189573.75
159321.63	16865.40	176187.03	95570.60
5230.38	164.99	5395.37	659.96
597002.59	23072.92	620075.51	130746.53
315254.65	17718.31	332972.96	100403.74
170283.51	4961.84	175245.35	28117.07
7335.62	3676.86	11012.48	20835.52
0.00	0.00	0.00	55330099.16
67379.56	16085.32	83464.88	91150.12
310431325.00	**48094499.99**	**358525824.99**	**366673 619.50**

Accounting Policy of Sree Chitra Tirunal Institute for Medical Sciences & Technology, Thiruvananthapuram

System of Accounting followed by Institute :

1. Income and Expenses of Institute are accounted on accrual basis.
2. Depreciation on assets are calculated on reducing method at the rates recommended by Income tax Deaprtment
3. Plan Fund Grants received from Govt. of India, and donations and project grants received specifically for acquiring Fixed Assets are added to General Fund of Institute and expenses incurred for Research and Academic purposes are reduced from it.
4. Five percent of receipts from patients are transferred to a Fund for meeting unexpected expenses on equipments.
5. Funds received from Technologies developed by Institute are transferred to a Fund (Technology Development Fund) for meeting additional expenses on improvement of Technologies already developed.

Notes on Accounts :

1. As per the requirement of Audit, depreciation on Fixed Assets is provided and shown in Balance sheet, calculated on reducing balance method, at the rate fixed by Income tac Act (from the date of installation of equipments).
2. Payment for Fixed assets in Receipts & Payment do not include any advance payments for fixed assets.
3. Since there is no surplus income for the Institute, Income tax is not payable by Institute.
4. Physical verification of Assets and other stock items are done for 1999-2000 and no discrepancy was reported. Physical verification certificates were shown to audit at the time of audit.

Sd/
FA & CAO

Sd/
Director

Audit Report

Audit Report on the Accounts of the Sree Chitra Tirunal Institute for Medical Sciences & Technology, Thiruvananthapuram for the year 1999-2000

1. Introduction:

The Sree Chitra Tirunal Institute for Medical Sciences and Technology (Institute), Thiruvananthapuram is governed by the provisions of "The Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum Act, 1980 (52 of 1980) The Institute is financed mainly by grants from the Central Government. During the year 1999-2000, the Institute received a sum of Rs. 2100.00 lakh as grants from Central Government.

The Accounts of the Institute are audited under section 19(2) of the Comptroller & Auditor General's(Duties, Powers and Conditions of Service) Act, 1971 read with Section 18(2) of the "The Sree Chitra Tiruna Institute for Medical Sciences & Technology Act, 1980".

Comments on Accounts

2. Uncovered Deficit

The liabilities to be discharged by the Institute at the close of the financial year including the provisions accounted for n current year were to the extent of Rs.2240.63 lakh. As against this, the investments and deposits made were to the extent of Rs.2167.80 lakh only. Hence there was an uncovered deficit of Rs.72.83 lakh in the investments resulting in understatement of investments..

Replies to Audit Comments

The defecit amount reported represents provision made for Contribution to Sinking fund and Gratuity during closing of Accounts. Investment against these provisions were made during next year.

3. Mixing up of Plan- Non-Plan Grants

Grant received from Govt: of India to meet capital expenditure was to the extent of Rs.1100.00 lakh. Out of this, expenditure to the extent of Rs.577.67 lakh was only incurred for capital and an amount of Rs.385.79 lakh was used for meeting the expenditure for Research and Academic programme. Hence plan grant of Rs.136.54 lakh were mixed with Non-Plan grant for meeting recurring expenditure.

Second installment of arrears to Accademic staff were made during the year, against Pay revision orders. Since the requirement was not provided in Non-Plan Grant this was met from Plan allocation. Though Institute had taken up with DST for increase in allocation of Non-Plan Grant for meeting additional requirements due to Pay-revision, the additional grant was released for the purpose out of available Plan fund.

4. Investment in Pension and Provident Fund

As per Schedules to Balance Sheet the amount included in State Bank of Travencore Bonds towards Pension and Provident Fund was Rs.85lakh and Rs.933.90 lakh respectively. However, Bonds worth Rs.5 lakh and Rs.12 lakh are yet to be received from State Bank of Travencore.

State Bank of Travencore is in the process of issuing Bonds for the allotment made by them. The Bonds will be shown to audit during next audit.

5. Accounting of Assets

The value of assets shown in the Balance Sheet after charging depreciation was Rs.3666.74 lakh. It was reported by the Institute last year that a committee was formed for identifying and valuing fixed assets, which were of obsolete and unusable and for the disposal. However, no assets were written off or removed from the assets block on the recommendation of the said committee. As such, it could not be certified in Audit that all such assets shown in Balance Sheet are of usable or put into use.

Since depreciation is being provided for all assets from the date of installation the loss due to obsolocence is already provided for. The unserviceble items identified by the committee is being disposed off and the residual value if any of these assets will be written off on disposal of items.

6. Accounting of Stock and Stores

The value of closing stock of Rs.184.97 lakh asaccounted for in the Balance Sheet reflects only the value of stores held in Mainstores and do not include the value of stock item held in Departmental Stores.

The main store issues consumable iitems for the weekly requirements, and such items issued is charged to the consumption account Since value of items remaining in stock from above issues is very small and is difficult to

As such, the value of stock and stores shown in the Balance Sheet do not reflect actual quantity and value of stock and stores held by the Institute. The Institute restored to the practice of accounting of the value of stores issued to Departmental Stores as consumption. The procedure thus followed overestimates the consumption of stores than what is really consumed.

account throgh computer , it is excluded from closing stock valuation.

7. Royalty Receivable

During the year Royalty received and accounted for was Rs.5,86,103. However, there is no mechanism in the Institute to arrive at how much amount is actually receivable in respect of each Technology so far transferred by the Institute. Royalty in respect of Heart valve and Blood Bag for the year 1997-98 onwards and for Hydro-cephalus Shunt for the year 1998-99 onwards are yet to be received.

Efforts are being made to recover the royalty amounts from NRDC (for Heart vaves&Blood bags) and Hindustan Latex Ltd (for Hydreo cephulus shunts) pending. (Both are Central Govt institutions)

8. Accounting of Medicines

As per Ledger Account, the cost of medicines procured was Rs. 239.91lakh.This was arrived at after crediting Rs.1.33lakh being the cost of medicines administered to out patients. Hence, in effect the cost of medicines procured was to the extent of Rs 241.24lakh. This indicated that the Institute has followed the net accounting, which is against the accepted principles of accounting and resulted in understatement of cost of medcine by Rs.1.33 lakh.

The cost of medicines supplied to out-patients will be shown under income from next year onwards as suggested by audit.

sd/
Pr. Director of Audit
Scientific Departments

Place: New Delhi
Date: 27 Dec. 2000

sd/-
Director

Place: Thiruvananthapuram
Date: 25 Jan. 2000

Audit Certificate

I have examined the Receipts and Payment Account, Income and Expenditure Account for the year ended 31 March 2000 and the Balance Sheet as on 31st March 2000 of the Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram. I have obtained all the information and explanations that I have required and subject to the observations in the appended Audit Report, I Certify, as a result of my audit, that in my opinion these Accounts and Balance Sheet are properly drawn up so as to exhibit a true and fair view of the state of affairs of Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram, according to the best of information and explanations given to me and as shown by the books of the organisation.

Sd/
Principal Director of Audit

Place: New Delhi
Dated : 27-12-2000

Administrative Bodies

Institute Body

Dr. N.H. Wadia, President

1. Prof. N.Appaji Rao,
   Department of Biochemistry,
   Indian Institute of Science,
   Bangalore- 500 012.
2. Dr.S.P. Agarwal (Ex-Officio),
   Director General of Health Services
   Government of India,
   New Delhi - 110 011.
3. Dr. N.Babu (Ex-officio)
   Vice Chancellor,
   University of Kerala,
   Thiruvananthapuram.
4. Dr. G. Sundararajan,
   Director, International Advanced Research
   Centre for Power
   Metallurgy and New Materials, Balapur. P.O
   Hyderabad-500 005.
5. Members of Parliament (Lok Sabha)
   to be elected by Parliament.
6. The Secretary to the Government of India,
   Ministry of Health and Family Welfare
   Nirman Bhawan, New Delhi-110 011
7. Dr. M.R.Das
   Chairman,
   State Committee on Environment,
   Science and Technology,
   Government of Kerala,
   Thiruvananthapuram.
8. The Secretary to the Government of India,
   Ministry of Human Resources Development,
   Shastri Bhavan,
   New Delhi - 110 001.
10. Dr. S.K. Mahajan,
    Head, Molecular Biology & Agri. Division,
    BARC, Trombay, Mumbai - 400 085.
11. Dr. K. Mohandas,(Ex-officio)
    Director, Sree Chitra Tirunal Institute
    for Medical Sciences and Technology,
    Thiruvananthapuram - 695 011.
12. Dr. V. R. Muthukkaruppan,
    (former Vice Chancellor
    Bharatidasan University)
    Director, Research Aravind Eye Hospital
    Madurai-625 020
13. Sri. Arun Sharma,
    Joint Secretary and Financial
    Adviser to the Government of India,
    Department of Science and Technology,
    Technology Bhavan,
    New Delhi- 110 016.
14. Dr. K.N. Raj,
    Dhalavakunnu, Kumarapuram,
    Thiruvananthapuram - 695 011.
15. Dr. S. Ramachandran (Ex Secretary DBT, DST)
    1, Playground View Street,
    Nandanam Extension,
    Chennai - 400 035.
16. Prof. V. S.Ramamurthy,
    Secretary to the Government of India,
    Ministry of Science and Technology,
    Technology Bhavan,
    New Delhi - 110 016.

17. Head, Biomedical Technology Wing,
Sree Chitra Tirunal Institute for
Medical Sciences and Technology,
Thiruvananthapuram- 695 012.

18. Dr. K.K.Talwar,
Professor of Cardiology,
All India Institute of Medical Sciences,
New Delhi - 110 029.

19. Sri. Vayalar Ravi,
Member of Parliament (Rajya Sabha)
15, Pandit Pant Marg,
New Delhi.

21. Dr. Vijay Kak, Director,
Principal Secretary,
Medical Education and Research,
Government Medical College,
Chandigarh - 160 036.

22. Sri. V. Vijayachandran,
Secretary to the Government of Kerala,
Health & Family Welfare,
Thiruvananthapuram.

Governing Body

Dr. N.H.Wadia - *Chairman*

1. Dr. S.P. Agarwal,
Director General of Health Services,
Government of India,
New Delhi - 110 011.

2. Dr. M.R. Das,
Chairman,
State Committee on Environment,
Science and Technology,
Government of Kerala,
Thiruvananthapuram.

3. Dr. S.K. Mahajan,
Head, Molecular Biology & Agri. Division,
BARC, Trombay,
Mumbai - 400 085.

4. Dr. K. Mohandas,
Director,
Sree Chitra Tirunal Institute for
Medical Sciences and Technology,
Thiruvananthapuram.

5. Prof. V. S.Ramamurthy,
Secretary to the Government of India,
Department of Science and Technology,
Technology Bhavan,
New Delhi - 110 016.

6. Dr. J. M. Tharakan,
Professor of Cardiology,
Sree Chitra Tirunal Institute for
Medical Sciences & Technology ,
Thiruvananthapuram.

7. Head, Biomedical Technology Wing,
Sree Chitra Tirunal Institute for
Medical Sciences and Technology,
Thiruvananthapuram-695 012.

8. Dr.K K. Talwar,
Professor. of Cardiology
All India Institute of Medical Sciences,
New Delhi - 110 029.

Standing Committees

Academic Committee

1. Dr. K. Mohandas, (Chairman)
   Director SCTIMST.
2. Head, Biomedical Technology Wing,
   Sree Chitra Tirunal Institute for
   Medical Sciences and Technology,
   Thiruvananthapuram-12.
3. Dr. A. K. Gupta,
   Additional Professor of Radiology,
   Sree Chitra Tirunal Institute for
   Medical Sciences & Technology,
   Thiruvananthapuram.
4. Dr. G. S. Bhuvaneswar,
   Scientist -F
   Sree Chitra Tirunal Institute for
   Medical Sciences & Technology,
   Thiruvananthapuram -12.
5. Dr. N. Babu,
   Vice Chancellor,
   University of Kerala,
   Thiruvananthapuram.
6. Dr. K. Srinath Reddy,
   Professor of Cardiology,
   AIIMS,
   New Delhi-29
7. Dr. S.K. Mahajan,
   Head, Molecular Biology & Agri. Division,
   BARC, Trombay,
   Mumbai - 400 085.
8. Prof. S. Ranganathan,
   Emeritus Professor,
   Regional Research Laboratory,
   Thiruvananthapuram.
9. Dr. K. Radhakrishnan,
   Professor of Neurology,
   Sree Chitra Tirunal Institute for
   Medical Sciences & Technology,
   Thiruvananthapuram.

Building Committee

1. Dr. K. Mohandas, (Chairman)
   Director, SCTIMST
2. Head, Biomedical Technology Wing,
   Sree Chitra Tirunal Institute for
   Medical Sceinces & Technology,
   Thiruvananthapuram-12.
3. Sri. V. Vijayachandran,
   Secretary to the Government of Kerala,
   Health & Family Welfare,
   Thiruvananthapuram.
4. The Civil / Construction Engineer,
   ISRO, Vikram Sarabhai Space Centre,
   Thiruvananthapuram.
5. Sri. P. Vijayakrishnan, (Convenor).
   Financial Advisor & Chief Accounts Officer
   Sree Chitra Tirunal Institute for
   Medical Sciences & Technology.

Finance Committee

1. Dr. K. Mohandas, (Chairman)
   Director
   SCTIMST
2. Prof. V. S. Ramamurthy,
   Secretary to the Government of India,
   Ministry of Science and Technology,
   Technology Bhavan, New Delhi - 110 016.
3. Shri Rahul Sarin,
   Joint Secretary to the Government India
   and Financial Adviser,
   Department of Science and Technology
   Technology Bhavan, New Delhi- 110 018
4. Dr. M. R. Das,
   Chairman,
   State Committee on Environment,
   Science and Technology,
   Government of Kerala,
   Thiruvananthapuram.
5. Sri. P. Vijayakrishnan, (Convenor)
   Financial Advisor & Chief Accounts Officer
   SCTIMST
   Thiruvananthapuram.

Senior Staff Selection Committee

1. Dr. K. Mohandas,(Ex-officio)
   Director,
   SCTIMST,
   Thiruvananthapuram.
2. Dr. V. R. Muthukkaruppan,
   (Former Vice Chancellor,
   Bharatidasan University),
   Director,
   Research
   Aravind Eye Hospital
   Madurai-625 020
3. Head, Biomedical Technology Wing,
   SCTIMST
   Thiruvananthapuram-12.
4. A nominee of the Secretary,
   Department of Science & Technology
   Government of India,
   New Delhi
5. A Senior Professor of SCTIMST
   Thiruvananthapuram.
6. A nominee of the President (External Expert).

Junior Staff Selection Committee.

1. Medical Superintendent, (Ex-officio)
   SCTIMST
   Thiruvananthapuram.
2. Head, Biomedical Technology Wing,
   SCTIMST
   Thiruvananthapuram-12.
3. Dy. Director (Admn)
   SCTIMST
   Thiruvananthapuram.
4. Nursing Superintendent
   SCTIMST
   Thiruvananthapuram.
5. A representative of the Academic Staff
   of the Institute nominated by the
   Director.

Ethics Committee

1. Mr. Justice S. Sankarasubban, (Chairman),
   Judge, High Court of Kerala,
   Kochi.
2. Dr. G. Santhakumari,
   (former Prof. of Pharmacology & Director of Medical Education,
   Government of Kerala)
   R.G.286, Thriveni, Ulloor, Trivandrum-695011
3. Dr. K. A Kumar,
   Professor of Psychiatry,
   Medical College,
   Thiruvananthapuram.
4. Head BMT Wing,
   SCTIMST
   Thiruvananthapuram.
5. An external expert on the device technology (to be identified and nominated by the Director each time)
6. Director of the Institute.

Technology Development Committee

1. Dr. K. Mohandas, (Ex-officio) - Chairman
   Director
   SCTIMST
2. Dr. N. Appaji Rao,
   Department of Biochemistry,
   Indian Institute of Science,
   Bangalore-560 012
3. Dr. Aurthur Vijayan Lal,
   Scientist-F
   SCTIMST
   Thiruvananthapuram.
4. Dr. A. P. Chaukar,
   Prof. & Head of CVTS, Dept. of CVTS,
   LTM Medical College,
   Sion, Mumbai- 400 022
5. Dr. M. R. Das,
   Chairman State Commitee of Environment,
   Science & Technology,
   Government of Kerala,
   Thiruvananthapuram.
6. Dr. Meera Mohanty,
   Scientist-F
   SCTIMST
   Thiruvananthapuram
7. Dr. Placid Rodriguez,
   Director
   Indira Gandhi Centre for Atomic Research (IGCAR)
   Kalpakkam 603 102,
   Tamil nadu.
8. Dr. S. Ramachandran (Ex. Secretary,
   DBT, DST, Govt. of India)
   1, Playground View Street,
   Nandanam Extension,
   Chennai - 400 036.
9. Head Biomedical Technology Wing,
   SCTIMST
   Thiruvananthapuram.

Technology Transfer Committee

1. Dr.S.Varadarajan (Chairman),
   President, Indian National Science Academy,
   New Delhi 110 002
2. Sri.S.Sivaram,
   Dy. Director, National Chemical Laboratory,
   Pune 411 008.
3. Sri. S.B. Krishnan,
   Secretary,
   Technology Development Board,
   Dept. of Science & Technology,
   New Delhi-110 016.
4. Sri. C. Venugopal,
   Head, Technology Transfer Division,
   V.S.S.C., I.S.R.O
   Thiruvananthapuram.
5. Head, BMT Wing (Ex-officio member),
   SCTIMST
   Thiruvananthapuram.
6. FA & CAO (Ex-officio)
   SCTIMST, Thiruvananthapuram
7. Scientist-in-charge, (Ex-officio)
   Technology Transfer Cell
   SCTIMST

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