



Annual Report

2004-2005

SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY
THIRUVANANTHAPURAM - 695 011
KERALA, INDIA

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ORIGINS

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



Sri.P.N.Haksar inaugurated the Medical Center in 1976 and the growth of a Biomedical Engineering and Technology Wing followed quickly at the Satelmond Palace, Poojappura, 11 kilometers away from the hospital campus.



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 objectives of the Institute as laid down in the Act are

1. promotion of biomedical engineering and technology
2. demonstration of high standards of patient care and
3. development of post-graduate training programs of the highest quality in advanced medical specialties and biomedical engineering and technology.



INSTITUTE BODY

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OVERVIEW

The Institute maintained its pace of progress with significant achievements in health care technology development, patient care, research and in public health.

Technologies for cardiovascular devices, oral insulin delivery and bone cement are at advanced stages of development, while three other technologies were transferred for commercial production. A new production unit for dental products is due to start functioning at Chennai from this year. Accreditation of the BMT laboratories to ISO 17025 was extended following the first successful surveillance audit. Establishment of the quality system and its international accreditation made a significant impact on the morale and work culture of the entire staff, besides bringing in revenue - in the first year itself - to the tune of more than half a crore through testing services for the health care industry. Externally funded projects worth nearly two crores were also sanctioned during the year by various government and industrial funding agencies. But the crowning glory was the acceptance of our Vision 2020 proposal by the Planning Commission with an outlay of about 100 crores over the next three years. The Institute is confident of fulfilling this mandate with augmentation of existing R&D facilities, setting up a National Testing Centre, as well as venturing into the areas of Tissue Engineering in a major way. The Institute's efforts for over two decades resulted in the establishment of a medical devices industry based on indigenous technology in India. With the infusion of funds and the renewed commitment and dedication of the staff, the Institute is poised to help Indian health care industry to capture a major share of the market in the next 10 years.

The hospital services were further augmented and streamlined with the installation of a new state-of-the-art MRI, near completion of the Picture Archival System and modernizing the kitchen and laundry services. There was significant increase in the number of surgical and interventional procedures, bed occupancy and out patient attendance. The outreach programmes of the Institute were further expanded with the initiation of cardiology and neurology clinics in the neighbouring panchayats under the ASA (Athiyannoor Sree Chitra Action) programme. The Telemedicine programme sponsored by ISRO is awaiting commencement of operations shortly.

The Achutha menon Centre for Health Science Studies continued to provide training, research and consultancy in public health. Apart from the MPH programme, short courses in gender and medical education, non-communicable diseases, ethics and making pregnancy safer, consultancy in the United Nations' Millenium Development

Goals, and WHO programmes in Sri Lanka and DPR Korea, and research on several aspects that impact on public health were carried out during the year under review.

Several basic and clinical research projects are progressing well, which include work on lipoprotein (a) and atherosclerotic/thrombotic diseases, oxidative stress and epilepsy, cardiac stem cells, cardiac fibrosis and several drug trials.

As a University, the Institute currently offers 23 postal doctoral, doctoral and post graduate courses in medical sciences, biomedical engineering and technology, basic sciences and public health. The joint M.Tech programme in Biomedical Technology with IIT, Bombay is expected to commence from the next academic year. All the academic programmes continued to attract students in significant numbers from all over India, and for the MPH course, from other countries as well.

The Institute also committed itself to help develop academic and health care programmes in neighbouring countries. Assistance rendered to Sri Lanka to establish epilepsy and movement disorder centres, development of cardiovascular services in the Republic of Maldives and setting up a school of public health in Nepal are some of them.

For this Institution of National Importance, the year 2004-2005 marked another year of our constant striving towards fulfilling our national obligations, even as we reached out to other countries for international cooperation and partnership.

HIGHLIGHTS OF THE YEAR

- Planning Commission approves Vision 2020 expansion programme and sanctions Rs.100 crores.
- ISO 17025 accreditation extended following successful surveillance audit by COFRAC.
- Three more technologies transferred for commercial production.
- A new state of the art MRI commissioned.
- Picture Archival and Communication System installed.
- New out reach clinics started under Athiyanoor Sree Chitra Action.
- MoU signed with the Republic of Maldives to help develop cardiovascular services at the Indira Gandhi Memorial Hospital, Male'.
- Helped to establish comprehensive epilepsy and movement disorder programmes at National Hospital, Colombo, Sri Lanka.
- Consultancy in WHO and UN programmes.

BIOMEDICAL TECHNOLOGY DEVELOPMENT

Technology transfer efforts gained momentum with the signing of three agreements. After considerable efforts, a good industrial partner was identified in Anabond Ltd., Chennai with excellent technical synergy for commercialisation of the dental products. Anabond have now linked up with M/s Stedman Pharmaceuticals to form a new company, which will manufacture and market the dental products. A new building has been constructed and the product launch is expected in June 2005. Technology transfer of the other two products, (1) scleral band to Aurolab, Madurai and (2) Chitosan based wound dressings to Dynamic Technomedicals, Aluva have been completed and the product launches are expected soon. Vigorous efforts are being made to identify suitable industrial partners for products, which are ready for commercialisation.

Many products like the Centrifugal blood-pump, Hemoconcentrator, Calcium phosphate based injectable cements and Oral insulin delivery system made substantial progress during the year. With the completion of safety and efficacy evaluation during the coming year, most of these products can be expected to reach the advanced stage of clinical evaluation and technology transfer in the near future.

The first surveillance audit of the quality system was carried out by the audit team of Comite Francais D'Accreditation (COFRAC) of France on 23rd and 24th of August 2004. The audit was completed with a minimum number of non-conformities and the accreditation has been extended for another 15 months. Following the accreditation, the demand for testing services from industries steadily increased over the year with a 100% growth. A number of major device evaluation studies were also taken up with current orders totalling Rs. 52.86 lakhs.

The year also witnessed a record increase in externally funded projects with 7 getting sanctioned for a total budget of Rs.180.2 lakhs. With this, the number of R&D projects under execution at the end of the financial year reached 17, while another 10 of them were completed. Another 8 internally funded under the institute's Technology Development Fund are on-going.

With the sanctioning of the VISION 2020 proposal by the Planning commission, the year saw hectic activity in the drawing up of requirements for laboratory space, new buildings, much needed manpower and also the purchase of advanced

equipment towards upgradation of infrastructure. The coming two to three years are expected to witness the growth of the Biomedical Technology Wing to its full potential, thereby enabling it to make greater contributions to the national economy over the coming two decades.

About 8 M. Tech students, 4 B. Tech students, 2 MDS students and 8 M.Sc students (Biochemistry/ Biotechnology/ Microbiology) from various universities in India completed their short term project work in the areas of biomaterials and biomedical engineering under the guidance of faculty at BMT wing. Two international students carried out their project work at BMT wing.

PRODUCT DEVELOPMENT AND TECHNOLOGY TRANSFER

(A) ARTIFICIAL ORGANS

The Division of Artificial Organs consisting of the Modelling & Prototyping and the Devices Testing laboratories has been involved in a number of product development activities as described below.

The Centrifugal blood pump project was completed in March 31, 2004. Vendor development of the drive and control unit was completed with 5 units being supplied and evaluated for 500 hours of continuous running. Various designs of the disposable pump head were fabricated and tested. In-vitro experiments using bovine blood were also carried out to determine the optimum design in terms of minimum blood damage and heat dissipation. Efforts are underway to move the project into the technology proving phase with an industrial partner.

Hemoconcentrator development has reached an advanced stage with the industrial partner SIDD Lifesciences Ltd., Chennai going in for TIFAC funding support for meeting the expenses for scaling up, preclinical safety and efficacy evaluation and then clinical trials. Currently, development of plastic injection dies for moulding the clinical quality components are in progress.

The Improved Tilting Disc Heart Valve project involves the development of a new model aiming at a reduction of its thrombotic potential and making it MRI compatible. The design of nine different valve sizes has been completed. The design validation through finite element analysis and in vitro evaluation are on-going. Prototype fabrication of these valves is in progress by the industrial partner, M/s. TTK Healthcare Ltd.

Membrane oxygenator: The second phase of clinical evaluation was completed during early 2004. The analysis and reporting of the results of the multi-centric clinical evaluation has been completed. The device is under regular commercial production now.

New sizes of heart valves: The joint collaborative project for the development of three new sizes for the current model TTK-Chitra heart valve was completed during the year. The durability testing of the prototypes for 400 million cycles has been completed. The industrial partner has started commercial production of these new sizes.

A new test system for hydrocephalus shunts: A project sponsored by Hindustan Latex Ltd, Trivandrum for the development of a 30 channel computerised test system for the quality control of hydrocephalus shunts was completed. A detailed system validation was carried out at their production plant and the unit is now being routinely in production.

Technology Transfer of Scleral Band Strips:

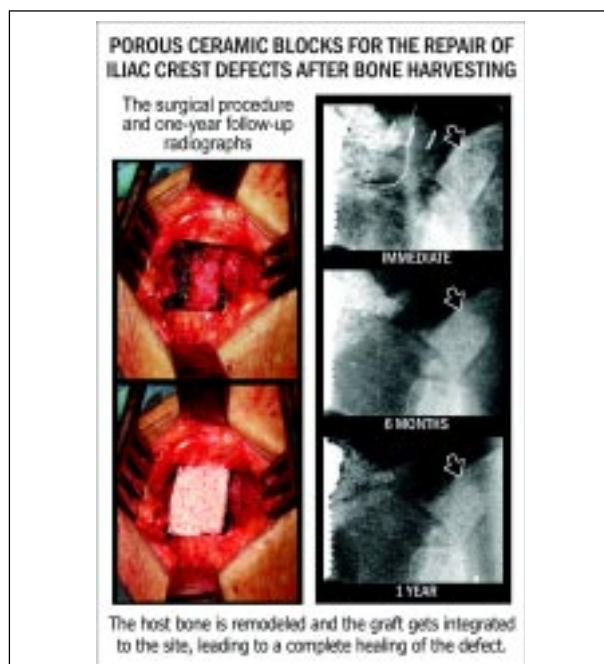
A core production team from Aurolab Ltd., Madurai was trained in the processing and quality control of the device. Technology documentation is in progress.

(B) BIOMATERIALS AND DEVICES

BIS-GMA based Dental Composites:

A technology transfer agreement was signed with Anabond Ltd., Chennai in September 2004 for a group of four products. The industry partner has already initiated civil construction to set up a 3500 sq ft building with the necessary clean areas in the outskirts of Chennai. With the exchange of visits by scientists and engineers from both sides, the transfer has gained considerable momentum and the first batch of products is planned for release in June 2005. The industrial partner has also expressed a keen to enlarge their basket of products by absorbing other technologies like radiopaque glass ionomer, single solution bonding agent, impression material, etc., which are at an advanced stage of development.

Bioceramics: Synthetic bone grafts based on hydroxyapatite- bioactive glass composites, for various orthopaedic procedures were developed. The latest product "Chitra Calcium Phosphate Cement" has reached the stage of clinical evaluation. Identification of a new entrepreneur for these products is being vigorously pursued.



Wound Dressings: A technology transfer licence agreement was signed with Dynamic Techno Medicals Pvt. Ltd. Aluva on completion of the multi-centric clinical evaluation of the Chitosan Wound Dressing. Wound Dressing was evaluated for suitability for application on skin graft donor sites in 50 patients. A comparative study was done with a standard dressing currently being used. The new dressing was very effective as it reduced pain, accelerated the healing and epithelialisation, decreased exudates while reducing the risk of infection.

A second generation wound dressing loaded with insulin exhibited better fibroblast cell proliferation and has been clinically evaluated by Dr. Ramakrishnan Nair at KIMS Hospital, Trivandrum. The results are encouraging and the final report is awaited.

Fibrin Glue: The viral inactivation processes were validated with 3 model viruses with the help of Clinical Virology Department at CMC Vellore. National AIDS Research Institute (NARI), Pune, has extended their facility and expertise for the HIV spiking experiment.

The work has been completed and the results of this validation study are awaited. Multi centric clinical trials are expected to commence soon.

Thrombin: Process for isolation of thrombin from human plasma has been standardized with 200 ml of plasma yielding about 50,000 IU of human thrombin. The activity is stable following the viral inactivation processes. Experimental trials in animal models to assure the efficacy and safety, when used as a component of fibrin glue are ongoing. Once validated, this product has the potential to replace the bovine thrombin being presently used.

Anti-Viper Venom: Antibodies raised against viper venom in chicken have been purified from its egg-yolk. Safety and efficacy studies are in progress in suitable animal models.

(C) DIAGNOSTICS AND INSTRUMENTATION

Instrumentation: The work on development of disposable ECG electrodes progressed further. This involved the development of a conductive polymer and a new design for the electrodes, which is expected accelerate the fabrication and make it possible to initiate clinical evaluation at the earliest.

An improved version of movement artefact-free impedance pneumograph was developed. The new version is mains powered and has an electrically isolated patient circuit meeting current international standards.

Toxicology: A DBT funded project for the development of an *in vitro* pyrogen test kit was initiated. The objective is to develop an ELISA method for testing pyrogenicity of a wide spectrum of products. Specifically, this test will detect non-endotoxin pyrogens of chemical origin. This will eliminate the need for pyrogen testing using rabbits.

Vivarium: Efforts to commercialise the Field Kit for Testing Antibiotic Sensitivity of Mastitic Milk Samples

in Dairy Animals continued. Negotiations are underway with Veterinary Biological Institute, Department of Animal Husbandry, Govt. of Kerala for technology transfer.

2. TECHNOLOGY TRANSFER

Three licence agreements for technology transfer and commercialisation were executed during the year.

- Dental composites** with M/s. AUROLAB Ltd., Chennai on 10-09-2004.
- Chitosan based wound dressings** with M/s. Dynamic Techno Medicals Pvt. Ltd., Aluva on 20-09-2004.
- Scleral band for Ophthalmic Applications** with M/s. AUROLAB, Madurai, on 31-01-2005.

A fourth agreement was signed with M/s. TTK Healthcare Ltd., Chennai for the development and commercialisation of a **New Improved Heart Valve**. The development of this new model is funded by DSIR, Govt. of India under their PATSER scheme.

Negotiations are underway for technology transfer of the following products:

- Field Kit for testing antibiotic sensitivity of Mastitic milk.
- Bioceramic products for orthopaedic & dental applications.
- Polyurethane based Orthopaedic casting tapes.
- Centrifugal Blood Pump.

The royalty being earned by the Institute from its commercialised technologies yields reasonable amounts, which are placed in the Institute's Technology Development Fund. The annual interest accrued is being utilised for targeted development projects per the current guidelines of the institute.

TESTING, QUALITY SYSTEM MANAGEMENT AND TECHNICAL SERVICES

(A) TESTING SERVICES

Customer service cell is a single window service that caters to customers from both within and outside the Institute. The test requests from the customers are processed systematically and the reports are issued on a time bound basis. Customers include Medical Device Industries, Research institutions, Universities & Colleges. With growing awareness of the accredited testing services, the volume of requests is constantly growing as reflected in the table below.

<i>Description</i>	<i>External</i>		<i>Internal</i>	
	2003-04	2004-05	2003-04	2004-05
Work orders received	205	316	241	293
Number of test samples handled	955	2181	1035	1311
Income generated	Rs.4,60,000	Rs.10,51,225	Rs.1,79,700	Rs. 3,83,899

In addition, 12 major studies for the evaluation of materials and devices for the various industries are currently on-going for an estimated total value of Rs. 52.86 lakhs.

Some of the domestic and international customers are:-

- Biomed Health Care Products Ltd., Faridabad, Haryana.
- Dispomed Equipments & Materials Medical, Tunisia.
- Eastern Medikit Limited, Haryana.
- Electro-Medical & Allied Industries Ltd, Kolkata.
- GE India Technology Centre Pvt. Ltd., Bangalore.
- Gharda Chemicals Pvt. Ltd., Panoli, Gujarat.
- Hindustan Latex Ltd., Thiruvananthapuram.
- Indian Institute of Technology, Madras.
- Neuron Biomed Equipments Pvt. Ltd., Pune.
- Prosonic Company Limited, Gyongbuk, Korea.

- Regional Research Laboratory, Thiruvananthapuram
- Sahajanand Medical Technologies Pvt. Ltd., Surat, Gujarat.
- Sisco Latex Private Limited, Pondicherry.
- Terumo-Penpol Ltd, Thiruvananthapuram.
- TTK Health Care Limited, Chennai.
- Vascular Concepts Pvt. Limited, Bangalore
- Vedic Drugs Pvt Ltd., Bangalore.
- VSSC, ISRO, Thiruvananthapuram.
- Welset Plast Extrusions Pvt. Ltd., Bombay.

Toxicology Lab carried out a large of number tests and the current test offering is given below. Acute, sub acute and sub chronic oral toxicity studies for an ayurvedic drug as per GLP procedures are also being carried out.

(a) *Accredited tests conforming to ISO-10993 standards*

1. Acute Systemic toxicity
2. Intracutaneous (intra dermal) reactivity test
3. Implantation on Muscle
4. Subcutaneous Implantation
5. Haemolysis
6. Closed Patch test for delayed hypersensitivity
7. Maximization test for delayed hypersensitivity
8. Pyrogen test

(b) *Non accredited tests*

1. Bone implantation – ISO 10993
2. Gluteal muscle implantation in rats

3. Animal skin irritation
4. Ocular irritation
5. Oral toxicity
6. Intracutaneous test (USP)
7. Systemic toxicity (USP)
8. Water analysis

Vivarium: The division carried out a number of evaluation studies in large animals for external customers for devices like the Drug eluting stents and PDA closure devices. Implementation of GLP standards for these studies is in progress. As part of its support for research activities, the following studies were also carried out:-

- In-vivo evaluation of endothelial cell seeded small diameter vascular graft.
- Pulp and dentine usage test in porcine model to evaluate dual composite.
- Endodontic usage test in porcine model to evaluate a root canal sealer.

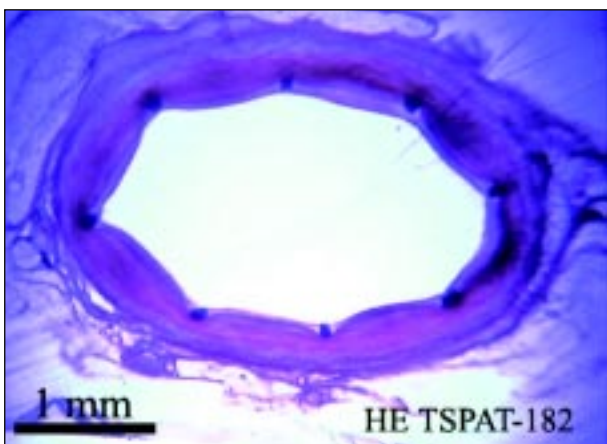
Microbiology Laboratory successfully completed the COFRAC audit and the sterility test as per USP for chemicals and materials has been accredited. The other tests performed are (i) Antimicrobial activity testing of materials (ii)

Evaluation of biomaterial – bacterial interactions like bacterial adhesion studies. The laboratory provides support by monitoring the air quality of controlled environments and microbiological analysis of the water in the technology wing.

The Histopathology Laboratory: The laboratory offers a wide range of specialized techniques as applicable to soft and hard undecalcified tissues, with and without the test biomaterials. The tissue response of various materials was studied, notable ones being

the pulp and dentine test as per ISO/FDIS 7405:1996(E) for dental materials and endodontic usage test for the calcium phosphate cement.

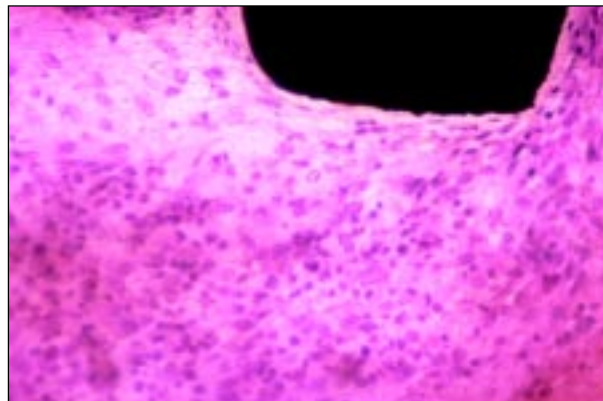
Studies for the pre-clinical evaluation of devices like drug eluting stents, endothelial cell seeded vascular grafts, calcium phosphate ceramics were carried out. To meet the special requirements of industrial customers, Haematoxylin and Eosin staining of resin sections and Verhoeff's staining for elastic tissue in resin sections were standardised.



Cross section of vascular stent (porcine model) embedded in resin 5X

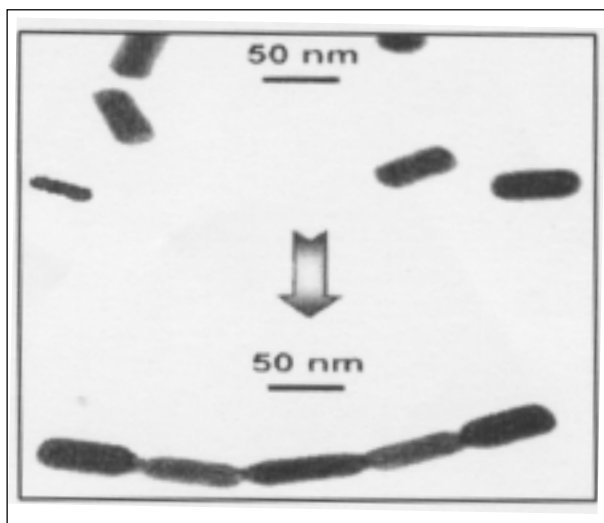


Stretched elastic fibres adjacent to vascular stent strut. Verhoeff's stained, resin section 200X



Cells adjacent to vascular stent strut. H&E stained resin section 200X

Transmission Electron Microscopy: The principle and functioning of the TEM is demonstrated to university and professional students who visit the Laboratory regularly as part of their academic curriculum. Ultrastructure studies for 60 samples were carried out, mainly for academic researchers.



*Transmission Electron Micrograph of Gold nano-rods published in the cover page of **The Journal of Physical Chemistry** (Published weekly by the American Chemical Society) Volume 108, September 2, 2004; Number 35.*

Tissue culture, Thrombosis Research, Dental Products and Polymer Analysis Laboratories extended their test services to various external customers. Blood / platelet bag evaluation for industries, various tests on dental materials for dental students and pharmacokinetics of paclitaxel from drug eluting coronary stents were some of the notable ones.

(B) QUALITY SYSTEM MANAGEMENT

Quality system: The quality system in conformance with ISO/IEC 17025: 1999(E) was maintained and reviewed by regular internal audits and technical management meetings. Comite' Francais D'Accreditation (COFRAC) of France conducted their first surveillance audit on 23rd & 24th of August, 2004. The purpose of the surveillance audit was to ensure that the laboratory continued to maintain its technical competence related to the scope of accreditation and to assess the effectiveness of the quality management system. The team expressed their appreciation of the maintenance of the quality system and the accreditation by COFRAC has been renewed till the next surveillance audit in Nov-Dec of 2005.

Calibration: Calibration of equipment, maintaining traceability in measurements and reference material requirements of the wing were maintained as needed. During the last year the cell carried out 275 calibrations. Of these, 220 were directly related to the testing services under the scope of COFRAC accreditation

(C) TECHNICAL SERVICES

Intellectual Property Rights and Technical Co-ordination

The patent applications were co-ordinated in consultation with the Institute's Patent attorneys M/s. L.S. Davar & Co, Kolkata. Help in patent filing

was extended to the Amritha Institute of Medical Sciences, Kochi, Rajiv Gandhi centre for Biotechnology, Trivandrum and the Regional Cancer Centre, Trivandrum.

The visits of various students and scientists to the BMT Wing and the science expositions on the Institute's Technology achievements are coordinated by the cell. A special SCTIMST R&D SCIENCE EXPOSITION was held at the Achutha Menon Centre for Health Science Studies on 27 Sept., 2004 in connection with the visit of the members of the standing committee of Parliament.

Five new patent applications were filed, while 3 of the earlier ones were granted as per tables below. The current status of the Institute's patents and designs is as follows:-

- Patents held (sealed) = 54 Nos.
- Patents filed and pending = 49 Nos.
- Designs held (sealed) = 13 Nos.

Device Testing Lab: During the current year a new accelerated ageing study was initiated for the qualification of Hydrocephalus shunts packaging of M/s. Hindustan Latex Ltd, Trivandrum. The laboratory started supporting the testing activities by providing service on sample preparation, cleaning, packaging and sterilisation of the material samples from external customers, including coordinating the material qualification for heart valve for M/s. TTK healthcare Ltd, Chennai.

An intranet system (Satelnet) was implemented at BMT Wing for enabling the effective communication and collaboration of personnel at the campus.

Engineering Services: The Toolroom designed and fabricated a number moulding dies for devices

and test systems like ECG snap electrodes, ophthalmic silicone strips, retinal rings, blood pump components (impellers, pivot bearings & casings), blood flow test chambers, plasma filter components using CNC and other machines to meet the requirements of the wing.

The civil section carried out a number of repair and modification works in the various laboratories. It also arranged for the digital survey of the campus followed by soil testing to meet the requirements of the new constructions that are being planned.

Industry –Institute Partnership Cell: A seminar on **“Biomaterials and medical devices. Quality awareness programme”** was organised during September 1-3, 2004. With 10 industrial and 5 institutional participants, the workshop was successful in sensitizing them to the various issues involved in medical devices development and manufacture. The presentations by subject experts from the institute & Hindustan Latex Ltd., covered topics on ‘Biomaterials & Medical Devices’; ISO-10993 requirements; Medical products evaluation and Quality Assurance.

Technology Proving Facility: Routine maintenance of the clean area was carried out and the facilities made

available for (a) Testing of disposable catheters as per ISO 10555 and (b) Training to Aurolab, Madurai on Scleral band fabrication

BMT Wing Library: The library has a collection of 9461 books and 6106 back volumes of journals. During the current year, 116 books were added and 69 journals were subscribed. The collection includes 2040 standards and 275 patent specifications.

The library subscribes to Current Contents databases (Engineering and Computing, Physical Chemical and Earth Sciences, Life Sciences) and Indian Patents database. The library has accounts with Patents Information System, Nagpur, NISAIR and DELNET for the easy retrieval of information.

The information management system and library automation is based on the UNESCO software, CDS/ISIS. The library information is available to both the wings through intranet. As a part of support to the Quality Systems, the library updates all relevant national and international standards. During this year 51 standards specifications and 5 patent specifications were added to the collection of the library.

BIOMATERIALS RESEARCH & DEVELOPMENT

Bioceramics

A speciality radiopaque glass for use in the manufacture of dental composites was developed. The know-how is being transferred to the industry as part of the dental products technology package. Calcium phosphate coatings on titanium metal surface for orthopaedic applications are also being developed. A feasibility study for the coating of hydroxyapatite on PET fabric surfaces to improve tissue healing was started and the initial results seem promising.

Biosurface Lab

The second phase of the CSIR sponsored NMITLI project on “Oral delivery of insulin” was sanctioned. The loading efficiency was improved and the nanosize of the particles was established by TEM. The efficacy of the improved formulation was tested in vivo on diabetic rats and on normal pigs. The formulation was screened successfully for toxicity by acute systemic and acute oral toxicity studies.

Cell mimetic surface modification of materials using monolayers of lipids, proteins and polysaccharides was carried out. The packing, orientation and other physical parameters related to the deposition of such monolayers on polymer surfaces were studied with the help of Langmuir-Blodgett apparatus and Atomic Force Microscope. The blood compatibility of such supported monolayers is being studied.

Porous ceramic matrices were prepared from nanoparticles (300-800nm) of Zinc Phosphate (ZnP), Zinc Calcium Phosphate (CaZnP) and Zinc Calcium Magnesium Phosphate (CaZnMgP). Preliminary studies indicate improved performance when compared to standard hydroxyapatite. Out of the various derivatives of chitosan prepared, the dicarboxylic acid derivative of chitosan exhibited pH sensitivity unlike chitosan. This derivative swells only at alkaline pH. It has excellent mucoadhesivity, which makes it a good choice for oral peptide delivery.

Dental Products

The dual cure resin cement (flowable composite) which is used for orthodontic, veneering and crown adhesion applications in dentistry was synthesised. The material was tested for toxicity, where it compared well with currently used controls. Marginal leakage, crown adhesion and bracket bonding studies were carried out

using the resin cement. Work is in progress to develop new light cure resin cement as well. Biocompatibility tests are currently under progress on the various products.

Following the successful completion of toxicity studies, the pulp and dentine test was initiated in large animals for the dual cure composite. The material was used to restore teeth in pigs and subjected to 7, 28 and 70 day evaluations as per ISO 7405 & ISO10993 procedures. Histopathology of the explanted teeth is in progress.

Development of new inorganic-organic hybrid materials based on ceramics and resins containing alkoxides or mixtures of alkoxides of silicone, aluminium, calcium and titanium with polymeric methacrylate groups were synthesized and characterized. Dental restorative paste prepared using these resins are being evaluated for suitability.

Polymer Analysis Lab

A hyaluronic acid-HEMA copolymer, collagen-HEMA copolymer, gelatin-PVP IPNs and Chitosan with other synthetic entities such as vinylacetate & vinylalcohol were synthesised and characterised for various long-term and short-term applications such as biodegradable GTR membranes, scaffolds for tissue engineering, etc. The data indicate that these materials are biocompatible and some of the materials have enhanced permeation and biodegradation potential.

For the development of biohybrid cartilage, isolation of bovine chondrocytes from articular cartilage, growing monolayers and assessment of cytotoxicity of materials with these chondrocytes was standardised. Novel 3D porous scaffolds of natural polymers such as polysaccharides, gelatin and PVA-PCL were prepared for potential tissue engineering applications.

Towards the development of an artificial biohybrid pancreas, the standardization of islet cell isolation from adult porcine pancreas was carried out. An aromatic polyurethane IPN-CFPU and CFPU-IPN nonporous and porous films were prepared to provide immunoisolation. Physico-chemical characterisation of the materials, glucose permeation studies and in vitro cytotoxicity with fibroblast and islet cells were done.

The concept of molecular imprinting was effectively used to impart analyte specific sites on the surfaces of various polymers such as polyurethane. Polymers modified using this approach were found to bind and retain template molecules. Efforts are being made to use such modified films for discriminating chiral molecules, sensor components etc. A new programme related to the synthesis and evaluation of thermoresponsive polymers for the sensing of clinically relevant molecules has been initiated.

Polymer Chemistry

Work on rapidly gelling polymer system based on gelatin and alginic acid dialdehyde as a potential wound dressing material, tissue engineering scaffold and injectable drug delivery vehicle was completed. The importance of surfactant-modification of polymers for enhanced blood-compatibility was demonstrated using Tween 20 as a surfactant grafted onto PVC surfaces.

The Amphotericin-B-gum Arabic conjugate was prepared and characterized. Preliminary screening of anti-leishmanial activity showed promising results in comparison with the free drug against *L. Donovani* in culture. In the project sanctioned under the Women Scientist Scheme of DST, formation and characterization of gels from oxidized gum Arabic and

soluble chitosan salts are being investigated for applications ranging from tissue adhesives, tissue engineering and drug delivery.

The Indo-French project entitled, “Injectable Adhesive Biomaterials for Vascular Applications” progressed well with the animal evaluation of the adhesive in France. It was able to seal large incisions in the lung model in pigs. For sealing large aortic incisions, the adhesive is presently being modified for enhanced adhesion and strength.

Polymer Division

The institute-funded project for the development for orthopaedic casting tapes with improved mechanical properties and low weight made good progress. Reactive polyurethane prepolymer was prepared and studies on setting characteristics, exotherm and shelf life showed acceptable properties. Castable tapes were prepared by impregnating the polyester cloth with the prepolymer and evaluated for mechanical properties and biocompatibility. With the safety and efficacy tests having been completed, an industrial partner is being identified for scale-up, clinical evaluation and then commercialisation.

Polymer Processing Lab

The DST funded research project ‘Development of non-toxic latex formulations for biomedical applications being jointly executed with the Toxicology

Division was completed during the year. The effect of shelf time on the extent of release of zinc diethyl dithiocarbamate accelerator into artificial sweat from natural rubber latex vulcanizate was studied. A method to quantify the residual dithiocarbamate accelerators that could be extracted in artificial sweat was established. Cytotoxicity, intracutaneous irritation tests and sensitization studies were conducted to identify the non-toxic formulations. Further work to take these developments ahead is in progress.

The joint activity with the instrumentation laboratory for the development of bioelectrodes made good progress during the year. These include various processing methods to fabricate the electrodes with different designs.

The Indo-German joint project on ‘Fabrication of clinically significant shapes of hydroxyapatite - ethylene vinyl acetate co-polymer composites for bone substitute applications was completed during the year. Three-dimensional shapes of the composite were successfully fabricated using optimised processing conditions.

A collaborative project with the Devices testing lab was initiated for imparting a fluoro-passivated surface for PET fabrics aimed at improving the tissue and blood compatibility. A process for generating a fluoro-passivated layer on the polyester was standardised by and the evaluation of biological and physicochemical properties of the coating are in progress.

BIOLOGICAL RESEARCH

DIVISION OF IMPLANT BIOLOGY

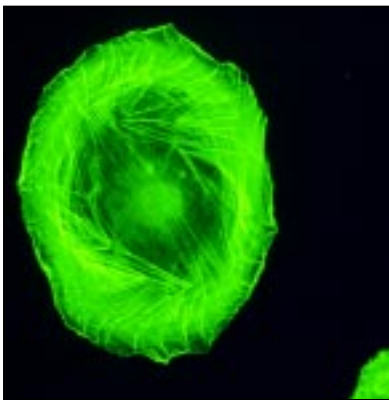
a) Histopathology laboratory:

Research activities in areas like Molecular mechanisms of tissue response to implant debris, Cellular and molecular mechanisms of polymer degradation, Immune response and Polymer Degradation progressed satisfactorily. Work on biocompatibility of different types of indigenous silk fabric was completed. Studies on retrieved human implants continued, which included light and scanning electron microscopy observations on tissue and implant material.

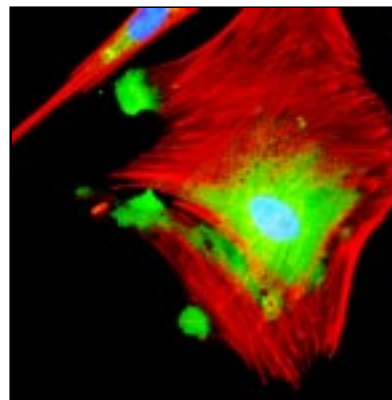
b) Tissue Culture Laboratory

Cell-material interaction studies using continuous cell lines like L-929, MG-63, HOS, SIRC, 3T3, PC-12 and primary cells like endothelial cells, hepatocytes and corneal cells were carried out. In vitro evaluation of the ophthalmic sponge was performed using direct contact and test on extract using the corneal cell line SIRC and compared with in vivo results.

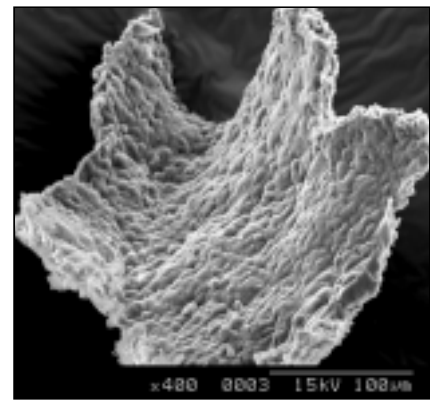
Primary cultures of rat hepatocytes with human umbilical vein endothelial cells and rat liver sinusoidal endothelial cells have been studied. It has been observed that hepatocytes function is influenced by endothelial cells. The possibility of using such a coculture system in hepatotoxicity devices or bioartificial liver devices is being further investigated.



Actin stained human corneal cell



Human foetal hepatocytes triple labelled for actin (red), albumin (green) and nucleus (blue)

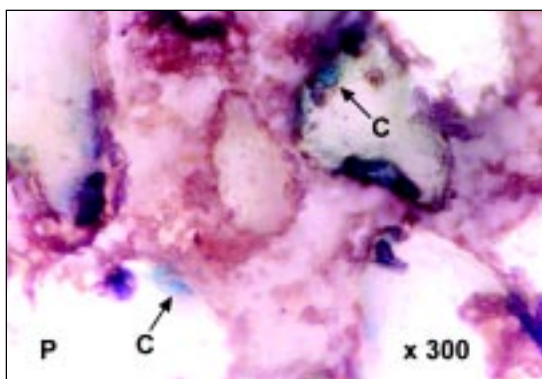


In vitro multilayer tissue structure

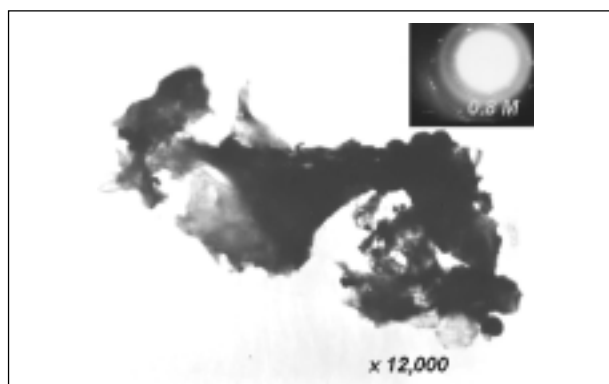
For tissue engineering application, cells sheet structures have been created using in house synthesized temperature sensitive culture surface. Various cell lines (L-929, NRK-49F, SIRC, HOS) have been effectively transferred as in vitro tissue constructs. Studies of primary cells on this polymer surface are currently in progress.

c) Transmission Electron Microscopy Laboratory (Research)

The present work is focussed on Bone Tissue Engineering and stem cell research (MSC). Some of the interesting results are shown in the following micrographs.



Resin section of granule showing adhered fibroblast cells (C) on the wall of the pore (P), stained with Stevenel's blue-van Gieson's Picrofuschin



Transmission electron micrograph of bioactive glass coated hydroxyapatite (BGHA) granule cultured with fibroblast cells for 48 h. Inset shows electron diffraction pattern (camera length = 0.8 M)

Microbiology

The current research focus is on understanding implant associated infections, which are due to the formation of bacterial biofilms on the implant devices. The micro-organisms most commonly responsible are Staphylococcus epidermidis in case of vascular catheters, cardiac valves, endotracheal tubes etc and E.coli in case of urinary catheters. Such infections are not amenable to antibiotic treatment and removal of the implanted medical device becomes necessary.



Figure 1. Initial phase of adhesion E.coli on to calcium phosphate composite.

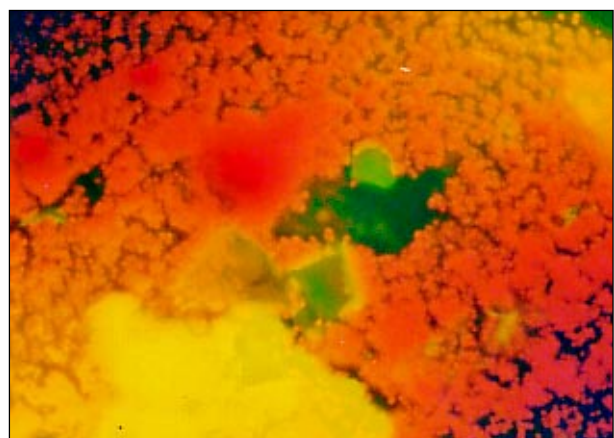
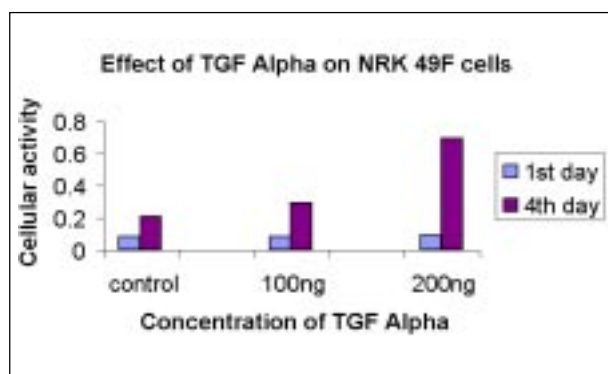


Figure 2. Biofilm formation of Staphylococcus epidermidis on to PVC

Bacteria in biofilms behave entirely differently from their planktonic counterpart and it has been established that more than 38% genes are expressed differently, with the result that conventional microbiological techniques are incapable of addressing these issues. The bacterial adhesion patterns on different biomaterials, differential protein expressions, antibiotic resistance and microbial communications in bacterial biofilms are being investigated to help understand the problem.

Molecular Medicine Lab

Development of recombinant transformation growth factor alpha (TGF alpha): Wound healing in severe burn cases and in diabetic patients, remains a challenge. A recombinant TGF-alpha growth factor to help in accelerate the epidermal grow is being carried out. The preclinical evaluation of the protein by both in vitro and in vivo experiments showed enhanced mitogenic induction of cells. MTT assay on NRK 49F cells showed three fold cellular activity in presence of 200ng of TGF alpha on 4th day ($p < 0.0005$).



Wounds induced in rats have showed excellent healing (>70%) within 5 days in presence of the growth factor. Pathological examination of healed skin

suggested good healing and keratinisation. Fibroblast cells grown in presence of the growth factor showed no cytotoxicity.

Molecular basis of temporal lobe epilepsy:

The focus of research has been on three genes, synpatotagmin, jerky and kininogen, for their roles in temporal lobe epilepsy. In synaptotagmin gene a regulatory sequence for RNA binding has been identified. Chimeric clones and point mutations were generated to further characterize this sequence and it was narrowed down to a heptamer sequence, which regulates protein-RNA interaction.

Jerky gene was cloned and expressed to identify its role in temporal lobe epilepsy. Cloned mRNAs from mouse brain were selected, which specifically bound to jerky during seizure. Preliminary results suggest a significant variation in gene profile of mRNAs bound to jerky from control and epileptic. Characterization of these genes is underway.

Identification of Kininogen like gene during the differential display analysis of genes in epileptic rat model was done and found to express during post seizure time window. Polyclonal antibody for the recombinant protein to study the protein expression profile was raised. Results suggest that the protein follows a similar expression profile like the gene showing a strong expression 24 hours after seizure. Further work is being pursued.

Thrombosis Research Lab

Work on the small diameter artificial vascular graft using autologous endothelial cells and smooth muscle cells by in vitro cell culture techniques made good progress. The circulating endothelial progenitor cells

(EPC) in the isolated blood monocytes that attach and grow on fibrin composite matrix were differentiated to endothelial cells (EC) in the presence of suitable growth factors. The cell types were confirmed using characteristic markers such as antibodies against von Willebrand factor and acetylated low density

lipoproteins (Fig.1&2). Similarly smooth muscle progenitor cells from sheep/human blood was cultivated with appropriate growth factors and differentiated smooth muscle cells (SMC) were obtained, which can be used for making vascular constructs (fig.3).

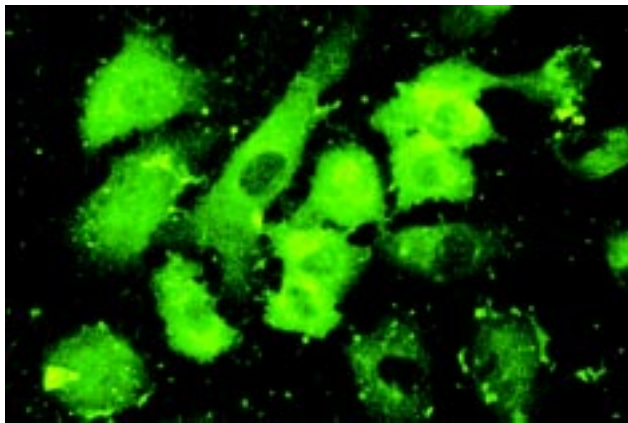


Fig.1 EC differentiated from circulating EPC, stained with FITC conjugated anti-vWF.

Fig. 2 EC differentiated from circulating EPC, has taken up Dil labeled acetylated low density lipoproteins (dil-AcLDL)

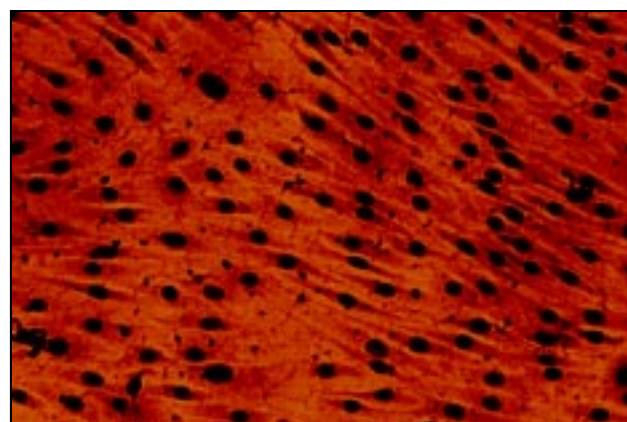
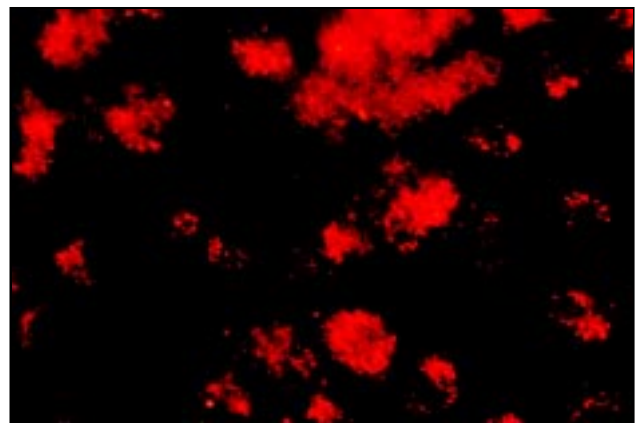


Fig. 3 SMC differentiated from circulating SMPC characterized by staining with anti smooth muscle actin (developed with Dab-HRP)

PATENTS GRANTED

- 1. A process for preparing a prepolymer adhesive**
Indian patent No. 189 911 dated 16.03.1995
Inventors: M. Jayabalan, PP Lizymol
- 2. Preparation of a composite bioceramic material for biomedical application**
Indian patent No. 192629 dated 03-03-2000
Inventors: H.K. Varma, S. Suresh Babu
- 3. Ventilator alarm**
Indian patent No. 188511 dated 04-02-1995
Inventors: Koruthu P Varughese
- 4. Preparation of a new generation bilayer bioceramic burr hole button for cranioplasty**
Inventors: H.K. Varma, S. Vijayan, H.V. Easwar, R.N. Bhattacharya
- 5. A process for the manufacture of nanoporous bioceramic bodies for bone implantation and drug delivery applications**
Inventors: H.K. Varma, S. Suresh Babu, S. Vijayan
- 6. Dual cure resin cement (DCRC) for orthodontic, endodontic and veneering applications in dentistry**
Inventors: V.K. Kalliyankrishnan, PP Lizymol
- 7. Method for cellularization of scaffolds using in vitro cell sheet constructs**
Inventors: T. V. Kumary, PR. Anilkumar
- 8. Process for preparation of viral-safe thrombin intended for therapeutic use**
Inventors: Lissy K. Krishnan, Anila. L

HEALTH SCIENCE STUDIES

The Achutha Menon Centre for Health Science Studies (AMCHSS)

continued its excellence in public health training, research and consultancy in the reporting year. The World Health Organization (WHO) sponsored 7 candidates from the states of Tripura, Sikkim and Gujarat for a short course on community based surveillance of cardiovascular risk factors. A total of 20 students including one student from the United States joined for the Master of Public Health (MPH) program in the year 2005. The number of applicants for the MPH program is increasing every year. For the last batch there were over 45 applicants. In addition to the MPH program there were 15 applicants for the PhD program for Public Health in 2005.

A few courses of the MPH program were offered as short courses. The short courses that were offered in the reporting year were gender and medical education, making pregnancy safer, surveillance prevention and management of non-communicable diseases and ethical issues in health research.

A few of the research programs were completed during this year. A brief summary of each of the completed and on-going research program is given separately. Research projects that were completed during the year were 1. demand side financing for reproductive and child health program, 2. independent review of the National Vector Borne Disease Control Program 3. situational analysis of MTP Services in Kerala: provider perspectives, 4. small grants program on gender and social issues in reproductive health and 5. strengthening health research in non-government organizations in India. The ongoing research programs are 1. Athiyannoor Sree Chitra Action (ASA) 2. banking for better health: Medisave for rural women in Karnataka India 3. establishment of sentinel surveillance system for cardiovascular disease in Travancore Titanium Products LTD Trivandrum 4. political decentralization & status of reproductive health in Kerala. 5. research, training and advocacy for gender sensitization of medical education and capacity building of health professionals for reduction of maternal mortality and morbidity 6. sentinel health monitoring centres in India, 7. stakeholders' perceptions of Institutional Review Boards (IRBs) in India, and 8. tobacco cessation training and research in India and Indonesia.

Consultancy was another major area of activity during the reporting year. Dr T K Sundari Ravindran, honorary professor of AMCHSS was a member of the Millennium

Development Goals (MDG) Task Force on maternal and neonatal health set up by the Millennium Development Project of the United Nations, and contributed to the report of this Task Force (Task Force 4). Dr K R Thankappan Additional Professor and Head of AMCHSS served as a short term consultant to WHO in Pyongyang, DPR Korea on surveillance, prevention and management of non-communicable diseases; March 10 – April 10, 2005. Dr. D. Varatharajan served as a Consultant to the WHO, Colombo, Sri Lanka during August 2004 – February 2005 to draft the

report of Sri Lanka's National Commission on Macroeconomics and Health (NCMH) and to draw up a National Health Investment Plan for Sri Lanka.

Status of Ongoing/Routine Activities:

Eighteen students of the 2003-2004 batch successfully completed the MPH programme. A list of dissertations is included. Currently another batch of 18 students (2004-2005 batch) is working towards completion of their dissertations. From January 2005 a new batch of 20 students joined and is undergoing the course at the AMCHSS.

Dissertations submitted in June, 2004 (Graduates – 2004)

Sl. No.	Name of the Candidate	Title
1.	Dr. Aravind P	Depressive symptoms among the elderly in Kerala prevalence, determinants and validation of Geriatric Depression Scale (GDS-15).
2.	Mr. Aung Cho	Study on evaluation of community utilization of sub-centres in five township in Magway Division Myanmar.
3.	Dr. Arupkumar	HIV counseling testing and referral services in mental healthcare settings in Kolkata – a provider perspective.
4.	Dr. Asim Kumar	Gender differentials in care seeking and delays among RNTCP patients in Purba Medinipur District. West Bengal.
5.	Dr. P.V. Dave	Objective based evaluation of camp approach reconstructive surgery of leprosy affected persons in Vadodara district.
6.	Dr. Gupteshwar Singh	Tobacco use among middle school (5-7th STD) students in Patna District, Bihar.
7.	Gracy A.J	The prevalence of sputum positive pulmonary Tuberculosis in the Sudan people's Liberation Army Held area Tonj County- Southern Sudan.

Sl. No.	Name of the Candidate	Title
8.	Dr. Iype Joseph	Surveillance of malnutrition in children district of Sikkim
9.	Kabita Khati	Tobacco use and its, correlates, among the patients attending general out patient department in state referral hospital, Gangok, Sikkim.
10.	Dr. Manju Renjit	Assessing the oral health related quality of life among dental care seeking adults in Thiruvananthapuram.
11.	Dr. Namgay Shenga	Knowledge and attitude towards blood donation among the general popular in Gangtok East Sikkim.
12.	Prsanth K.S	How adolescents view their para suicide: A qualitative Enquire.
13.	Dr. Raval Dinkar Kantilal	Quality of reproductive health care: the divergence between perceptions of clients and providers.
14.	G.S. Ramakrishna	Prevalence and patterns of Tobacco use among under graduate medical students in Orissa
15.	Dr. Raj Prabha Moktan	Barriers underlying delays among women seeking emergency obstetric in a referral hospital in Sikkim.
16.	Dr. Satyajit Chakraborty	Health seeking behavior of aged population of a rural block in West Bengal.
17.	Dr. Senthil Arasi.D	Managing drug delivery to PGCs: An appraisal of Tamil Nadu model.
18.	Dr. Shrihari	Patterns of consumption and levels of addiction among arecanut chewers in Dakshina Kannada district, Karnatka.

RESEARCH PROJECTS

Completed Projects

Demand Side Financing for Reproductive and Child Health Program

The objective of this project was to find the feasibility of demand side financing strategies for reproductive and child health (RCH) program in India. Till now RCH program, like other health programs, is supported by supply side financing. A major strength of supply side financing is the ability to provide comprehensive health services to the entire population free of cost at point of delivery. However there have been a number of concerns raised with this approach. Important of these being poor targeting, lack of user choice, lack of provider competition, and the absence of linkages between provider payments and performance resulting in provision of inequitable and inefficient services of poor quality. To a large extent, this unsatisfactory situation has been attributed to current financing strategy. In order to find the feasibility of demand side financing discussion with various stakeholders namely Government of India officials and development partners confirmed the need to experiment with newer financing approaches that increase access and utilization of high externality RCH services especially by the poor in India.

A comprehensive report has been submitted to the European Commission ECTA office at New Delhi with the recommendations to pilot a competitive voucher scheme in one or more districts of India, where subsidies will be provided for RCH services targeted at the population living below poverty line. In addition to the district model, three case studies, which have the potential to develop into pilot project, were also recommended. These three pilot projects could test

the impact of competitive voucher scheme in provision of RCH services in different settings in India namely (i) urban slum population (CINI-Kolkata), (ii) rural population in Bihar (Janani model combining vouchers and social franchising) and (iii) tribal population in Rajasthan (SEWA Mandir). This project was funded by the London School of Economics using a grant from the European Commission Technical Assistance (ECTA), New Delhi.

Independent Review of the National Vector Borne Disease Control Program

Seven states were selected for the evaluation of the independent evaluation of the National Vector Borne Disease Control Program with particular reference to malaria. Gujarat and Chattisgarh states were selected from the group of EMCP (Enhanced Malaria Control Project) states, Haryana, Karnataka and Kerala were selected from the group of non-EMCP states and Sikkim and Meghalaya were selected from the group of North-Eastern states. The report of the review was submitted to the directorate of National Vector Borne Disease Control Program at New Delhi. The major recommendations of the review were to provide maximum efforts to control malaria in those states where malaria continues to be a major public health problem. The states of Orissa, Jharkhand, Chattisgarh and West Bengal in the East and Karnataka state in the south contributed to more than 50% of the total malaria cases in the country in the year 2002. Proportion of Plasmodium Falciparum cases was increasing all over the country. There was a need to strengthen the inter sector coordination to control the malaria situation in the country. Biological control like fish hatcheries were reported to be effective in many areas. Expanding such biological control to other areas is likely to have great impact in the control of malaria. In addition to the Achutha Menon Centre

for Health Science Studies, researchers from the Tata Institute of Social Sciences Mumbai and two external full time consultants were members of the evaluation team. This review was funded by the Directorate of National Vector Borne Disease Control Program of the Government of India.

Situational Analysis of MTP Services in Kerala: Provider Perspectives

This was a part of a multi-centric study in six states of India under the aegis of the Abortion Assessment Project of India, co-ordinated by Centre for Enquiry into Health and Allied Themes (CEHAT), Mumbai.

The study was an attempt to assess and analyze abortion services in Kerala from a providers' perspective, including organization, management, facilities, technology, registration, training certification and utilization in the public and private sector. A cross sectional survey carried out in two districts of the Kerala covered 85 health institutions and 107 abortion providers. In addition several case studies were also conducted to understand the quality of services and to identify problems related to abortion services. A need to streamline the process of site registration, improve the quality of services in the public sector by proper referral from lower level institutions and equipping these with infrastructure and staff to deal with first trimester abortions was identified as crucial.

Small grants program on gender and social issues in reproductive health

The 'Small Grants Program on Gender and Social Issues in Reproductive Health Research' sought to set up a research competition program to identify and support research on reproductive health focusing on gender and social dimensions of reproductive health. The research competition and grants program aimed

at supporting research through making research grants and providing ongoing technical support. Five individual grants and six institutional grants were given to the research studies chosen from amongst the 84 proposal received by the end of June 2002.

The studies were monitored and given technical support throughout the study period. Two earlier methodology workshops organized helped to streamline and give focus to the studies within a gender based perspective. A review of the research studies was undertaken in February 2004.

Based on this review, the data collection was completed by the grantees. During the month of April 2004 onwards, the grantees were mostly engaged with data analysis. By September 2004 the draft reports of the research studies were submitted. A review workshop was held in Bombay from October 11, 2004 to October 14, 2004 at YMCA International Guest House, Bombay. Invited guests at the workshop other than the grantees and resource persons, included Dr Annie George, Pune (Sociologist, author and free lance researcher) Ms Laxmi Menon, Mumbai (feminist activist for the cause of women with special interest in popularizing breast feeding and health of the mother; author and researcher), Ms Padma Prakash, Mumbai (former assistant editor Economic and Political Weekly and social science researcher and activist), Ms Sandhya Sreenivas, Mumbai (Editor, Journal of Medical Ethics) and Ms Lakshmi Lingam, Mumbai (Reader, Tata Institute of Social Sciences, Mumbai). The workshop was able to give many inputs on improving the final report. Some reviews even went beyond just critiquing what was written, to bring out the other nuances reflected in the study and which were important to be further brought forth into the report.

Other than the presentations made by the grantees on the studies, a presentation on doing research was given by Dr US Mishra with general guidelines to be followed when doing research and report writing. The other very interesting part of the workshop has been the presentations made by eminent editors, Dr Padma Prakash and Ms Sandhya Sreenivas. The presentations were mainly on writing interesting and comprehensive reports that hold the readers' attention; and on transforming a report into a journal article in particular. The grantees were encouraged to seek assistance from the resource persons on a one-to-one basis during the workshop including after hours, and finalize their report. Thus a very educational workshop came to an end on October 14, 2004 evening. We owe many thanks to M/s. Anusandhan Trust, Mumbai who were the events manager at Mumbai for this workshop.

Final reports were submitted before the end of December 2004. A copy editor, Ms Sharmila Joshi from Mumbai was assigned the copy editing of the reports. The reports were given for printing at M/s Brahma Screens, Trivandrum. The Ford Foundation gave the permission to utilize the earmarked expenditure for all committed expenses until March 31, 2004. Thus the printing of the reports was completed by March 31, 2004. Thus eleven research studies have been completed and published at the end of this project.

The following are the studies undertaken and published under this program:

(1) Gender, class, caste and health care access: household perspectives in Koppal District, Northern Karnataka (2) Middle class sexuality: construction of women's heterosexual desire in the 1990's and early 21st Century Mumbai (3) Gender dimension of adolescent's abortion care seeking behaviour and need

based evaluation of pre and post Abortion care from a Client and provider perspective (4) Towards a rights based approach to understanding gender, sexuality, sexual and reproductive health rights of the adolescents (5) The reproductive health needs of women in the valley of Kashmir (6) Correlates of high risk sexual behaviour among never married male industrial workers in an urban setting of Tamil Nadu (7) Psychosocial implications of involuntary childlessness in urban middle class of Baroda City (8) An exploratory study on the gender dimensions in heart disease and its interface with reproductive health among patients in a tertiary cardiac care hospital in Thiruvananthapuram, Kerala, India (9) Men's participation in reproductive health – A study of Andhra Pradesh (10) The Interface between reproductive and mental health among the urban poor in Delhi (11) The interrelationship between gender and malaria in Jharkhand.

Strengthening Health Research in Non-government Organizations in India

The project was coordinated by the Tata Institute of Social Sciences Mumbai in collaboration with AMCHSS of SCTIMST and three other national level non-governmental organizations (NGOs). During the first phase of the project 2600 NGOs from all over India were contacted. Using preliminary questionnaire information was collected from 500 NGOs. From those NGOs a workshop was organized for selected 157 NGOs for preparing research proposals in health research. Out of the 102 research proposals received 57 proposals were selected using a criteria developed by the advisory committee of the project. Out of these 57 proposals 36 completed the data collection and report writing. A national level meeting was organized in Mumbai in the year 2003 where all the 36 papers

were presented. Incorporating the comments received from this meeting all these papers were published by the Tata Institute of Social Sciences Mumbai. The publications included 6 volumes. The first volume was on the overall objective of the project, lessons learned from the project, inaugural address delivered by Dr N H Antia during the National Dissemination Conference, key note address by Dr Saroj Pachauri and the abstracts of all the 36 papers. The second volume included all the full papers on child health and related issues (8 papers), third volume on adolescent health and related issues (7 papers), fourth volume on women's health and related issues (7 papers), fifth volume on communicable diseases and related issues (8 papers) and the sixth volume on non-communicable diseases and related issues (6 papers). In addition to the original papers a brief write up on general observations by the respective resource person was also included in each of the above volumes.

This project was the outcome of one of the 10 international health research awards for researchers and institutions funded by the Rockefeller foundation and administered by the World Health Organization. The awards were presented during the Bangkok Conference on International Health Research for Development 2000. At the conclusion of the project a research paper was published in the *Journal of Public Health Policy* jointly by all the researchers involved in the 10 research projects all over the world.

Ongoing Projects

Athiyannur Sree Chitra Action (ASA)

This is a collaborative project by SCTIMST and the Athiyannur Block Panchayat. The project aims to bring in evidence-based approach to public health planning and policies, to bring in newer options (including

technological options like GIS-GPS) for public health interventions, to facilitate community based longitudinal research initiatives, and to establish a working model for effective health advocacy. The project goes by three guiding principles namely, community participation, optimal utilization of available resources, and public health approach. The various components envisaged in the program are conduct of monthly specialty clinics, formation of a group of volunteers called Friends of Health, revival of school health program in the area, supporting the health activities of women groups, mainstreaming men into parenthood (fatherhood initiatives), collection household level health information, establishment of geo-referenced mapping of community facilities and setting up of a community based health surveillance system.

Community activities have started in the Venganoor Grama Panchayat under the block. The Director, Dr. K Mohandas has formally inaugurated the specialty clinics on the 12th of February 2005, in a public function at CHC Vizhinjam, which was presided by Mr. B Jayaprakash, the Athiyannur Block Panchayat President. Approval of the Community Advisory Board



Director Prof. K. Mohandas inaugurates the Athiyannur Sree Chitra Action project disease Surveillance

(CAB) with representatives from the community is mandatory for any project/ research initiatives under ASA. Dr. Biju Soman, Assistant Professor, AMCHSS is coordinating the initiative from the institute side. At present a small action research project, Friends of Health (supported by Swiss Development Agency through Cap Deck) is running under the initiative.

Banking for Better Health: Medisave for Rural Women in Karnataka, India

This is a collaborative project between SCTIMST, Vijaya Bank, and a women's NGO called 'Grameena Mahila Okutta' funded by the Ford Foundation, New Delhi. Overall objective of this project is to empower rural women to access basic health care. It seeks to establish a medical saving program for rural women in 3 districts of Karnataka. The program will cover all the women who do not have a bank account in their names in 3 backward villages (one from each district). Basic premise behind this project is that economic empowerment of women through savings habit enhances their chance to seek medical help for their illnesses. The study has three components – research to analyse health care needs of women, intervention in the form of *medisave* account, and evaluation of the intervention to develop a policy package. This project is funded by the Ford Foundation, New Delhi.

Establishment of Sentinel Surveillance System for Cardiovascular Disease in Travancore Titanium Products LTD Trivandrum.

The project is a part of the National Cardiovascular Disease (CVD) surveillance in the Indian industry population. Demographic information and risk factors like tobacco use, alcohol use, physical inactivity, diet habits etc. are being collected from all the 1500 employees and their family members of the factory.

In addition height, weight, waist circumference, blood pressure and pulse rate are measured from all the employees and their family members. From a sub sample of the employees and their family member's detailed information on risk factors are collected. Fasting blood sugar, Total cholesterol, HDL cholesterol and triglycerides are also estimated in a sub sample of the population. So far blood samples were collected from about 1200 employees and family members. The samples are also being sent regularly for external quality control in the coordinating centre at the All India Institute of Medical Sciences New Delhi. The first phase of the project is completed. In the second phase of the project, health education to the employees and their family members was conducted. Experts in the fields of cardiology, nutrition, public health, diabetes, neurology and physical activity offered health education in various aspects of cardiovascular diseases and their risk factors. Now the project has entered into the third phase. In the third phase the project has been diversified into many activities.

Event Registry: One of the activities in the third phase of the project is monitoring of mortality and morbidity among the employees of the factory. All the mortality among the employees will be recorded and relevant information regarding the cause of death will be collected from the relatives and from death certification. Efforts are made to identify the proportion of mortality due to cardiovascular causes. All employees who were admitted in the previous year were also identified. Information from those who were admitted was collected to understand the proportion of hospital admission due to non-communicable diseases.

Annual Surveillance: A sub sample of the employees contacted for risk factor survey including

blood analysis to understand the changes in risk factors among them after the health education intervention in the factory.

Community Based Intervention: A sample of 2500 adults was identified in a nearby community. Information on Knowledge, Attitude and Practice (KAP) regarding non-communicable diseases is being collected from them using a pre-tested structured interview schedule. After the data collection is completed health education will be given to the community. Same information will be collected again to understand the change in KAP among the population. The project is funded by the World Health Organization, India country office, New Delhi.

Political Decentralization & Status of Reproductive Health in Kerala.

This is funded by Centre for Health and Gender Equity (CHANGE), Washington DC. In keeping with 73rd Constitutional Amendment Act of Govt. of India, Kerala opted for a complete decentralization in the form of 'devolution' through a political initiative called People's Plan Campaign (PPC) in 1996 and transferred 35-40 % of the IX Five Year Plan Funds and government healthcare centres to the Panchayat. This study attempts to understand the impact of PPC on health, especially reproductive health. The specific objectives are: To study the structures and processes within the health sector, vis-à-vis women's reproductive health; To examine the role of primary health care system in delivering reproductive health care services; To examine the role of the people's plan campaign in improving local priority setting for women's reproductive health needs; and To examine the dynamics of women's reproductive health care seeking in terms of socio-economic, culture and gender factors. The report of this study has been finalized.

Research, Training and Advocacy for Gender Sensitization of Medical Education and Capacity Building of Health Professionals for Reduction of Maternal Mortality and Morbidity

This project encompasses three major components: (a) regional level initiative for the gender sensitization of medical education and the health professionals in general, (b) a training programme for preparing health professionals in making pregnancy safer and (c) development of the AMCHSS as the institution and expansion of its public health training. The first component is a major challenge and its success would produce well formulated and tested suggestions for the government for changes in the content and method of medical education; and also in the setting in which medical education is imparted. Our major activities would be (i) preparing review papers from gender perspective on the textbooks of several subjects in medicine, (ii) conducting each year a two weeks training programme for medical college teachers, managers and policy makers for the medical education and other medical professionals, (iii) in six states, viz Rajasthan, Gujarat, Maharashtra, Karnataka, Goa and Kerala to follow up the trainees and conduct three days training programs and/or gender based research projects. The second component is for developing a two weeks short training course on "Making Pregnancy Safer". The third component includes many assorted institutional building activities such as organization of seminars, TN Krishnan Memorial Lecture series, publications of the institutions, etc. The project has completed two years. The short courses developed under this project would be integrated with the MPH programme in due course. The WHO-South East Asia Region Office supported the first session of short course on the subject with their South East Asia Region participants.

The short course for 'Making Pregnancies Safer' for programme managers was also conducted as was the second course on 'Gender in Medical Education' for medical educators during the second year of the project. The review of medical textbooks from gender perspective, which was discussed at a national seminar during July 2003, has been revised in keeping with suggestions received from the various discussants and reviewers and is likely to be published shortly. A short curriculum for three days for gender sensitization of medical educators was developed and this has been field tested in Mahatma Gandhi Institute for Medical Sciences, Sevagram. The WHO-SEARO has supported this effort to carry the effort on to sensitive medical educators in three states. Efforts are on to undertake a study of sexual harassment in the workplace, particularly medical institutions and also conduct a workshop for gender sensitization of Vice Chancellors, Deans, and other senior faculty in medical institutions.

Sentinel Health Monitoring Centres in India

The objective of this project is to develop a few sentinel health monitoring centers in India to monitor risk factors of non-communicable diseases. The five centers selected are Dibrugarh in Assam, Vallabghat in New Delhi, Nagpur in Maharashtra, Chennai in Tamil Nadu and Trivandrum in Kerala. Risk factors that are measured under this project are based on the WHO stepwise approach. STEP 1 (based on questionnaire) and STEP 2 (based on physical measurements, height, weight, waist circumference, blood pressure and pulse) of the NCD risk factor survey was completed last year. This year STEP 3 is being implemented in a sub sample of the population. From rural, urban and slum population a sub sample of 500 adults each were identified. Blood samples are being collected from these selected individuals to find

out fasting blood sugar, total cholesterol, HDL cholesterol and triglycerides. This project is expected to provide baseline information on the risk factor prevalence among a sample population. This could be used by the state and central governments for appropriate interventions at community level to reduce risk factors of NCDs. This project is coordinated by the Indian Council of Medical Research and funded by the World Health Organization India Country office, New Delhi.

Stakeholders' perceptions of IRBs in India

This is part of Dr. Mala Ramanathan's work as an Ethics Fellow at the Harvard School of Public Health. This is a study of Institute Ethics Committee members and others involved in reviews of proposals submitted by researchers. It aims to understand the various perceptions of appropriate review processes and their salience. There are three phases to this study, involving a survey of medical institutions in six states as to the functioning of IRBs, the second phase involves an in-depth review of selected IRBs and researchers within those institutions and the third involves discussions of IRB review processes with the last group of stakeholders, the potential participants in various research studies. The duration of the study is 18 months and commenced in July 2004 and presently the survey is on going.

Tobacco Cessation Training and Research in India and Indonesia

This is a collaborative project between Achutha Menon Center for Health Science Studies of SCTIMST, Gadjah Mada University of Indonesia, and three Universities in the US namely Minnesota, Arizona and University of Missouri Kansas City. The overall objective of this project is to strengthen the

capacity for cessation training and research in India and Indonesia. The specific objectives of the project are 1. To develop knowledge capacity through intensive training in state of the art research in tobacco cessation for selected researchers from India and Indonesia (Four researchers are selected from India), 2. Foster experimental capacity through formative research focusing on topics essential for the appropriate and successful adaptation of cessation interventions shown to be efficacious in high-income countries and 3. Expand educational system capacity through the development of a culturally – tailored

tobacco curriculum. The researchers were trained in the US for one week during January 2004. Preliminary data collection from medical students, nursing students, engineering college students, faculty of engineering college and clinicians of medical college is completed. After assessing the demand for tobacco cessation, a few cessation clinics will be organized at appropriate locations. The data collected through the formative research is being analyzed and suitable research papers are being written targeting peer reviewed national and international journals. The project is supported by the Fogarty International Centre of the National Institutes of Health, USA

PATIENT CARE

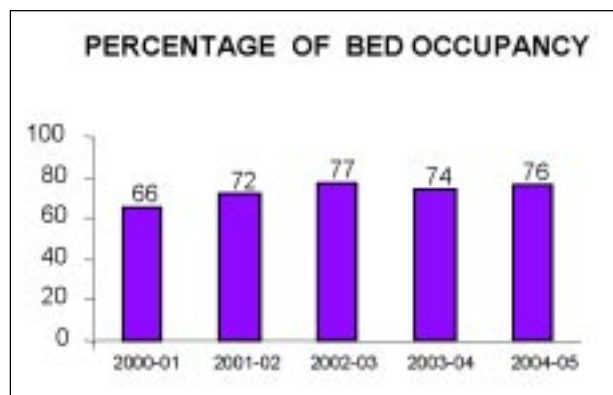
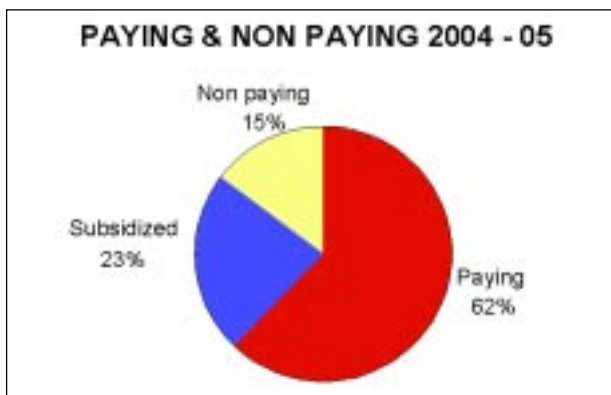
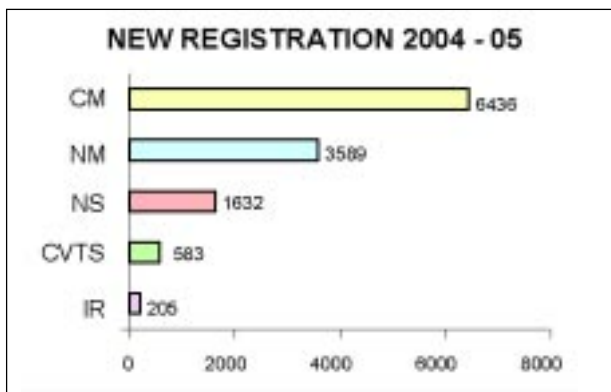
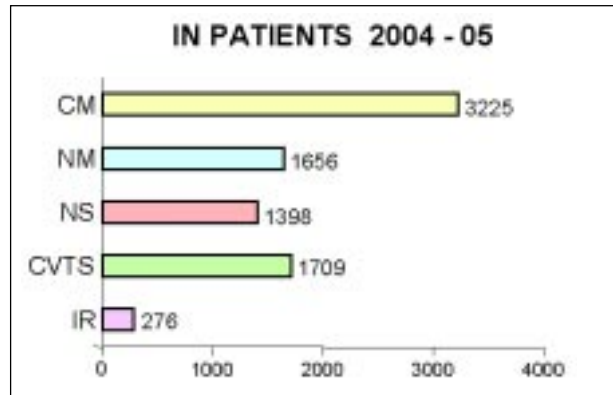
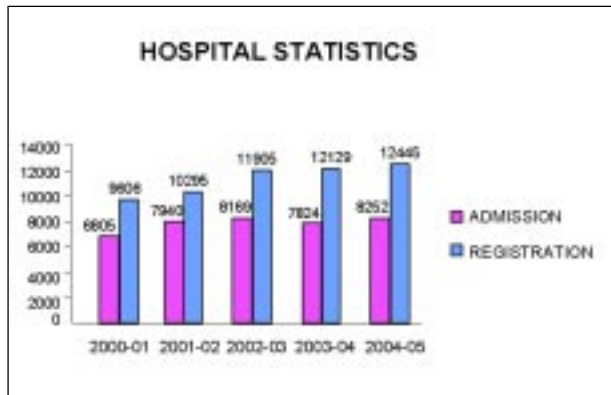
Efforts were made to enhance the quantum and improve the quality of hospital services in order to cater to the demand of patients for health care. This was reflected in the hospital statistics of 2004-05 compared to the previous year. The admissions in the hospital have gone up to 8250 patients compared to 7824 patients for the year 2003-04. The number of surgical procedures have gone up to 3082 cases compared to 2891 cases in the year 2003-04. The bed occupancy rate increased to 76% compared to 74% in 2003-04. New registrations and the number of follow up cases have also increased in this year. Sustained efforts to improve the quality of services in the OPD showed remarkable improvements as reflected by various studies conducted in the OPD. Infrastructure of hospital dietary was restructured in such a way that the division was well equipped to provide better services. The new MRI machine was installed in this year and has started functioning. The plan to renovate the imageology complex is also in the implementation stage. The hospital will shortly introduce Picture Archiving and Communication System (PACS). A new washing machine and washer extractor was purchased in the laundry to augment the output and improve the service. The services of the doctors from the Department of Neurology and Cardiology were extended to the Athiyannoor Panchayath twice a month to provide peripheral community service.

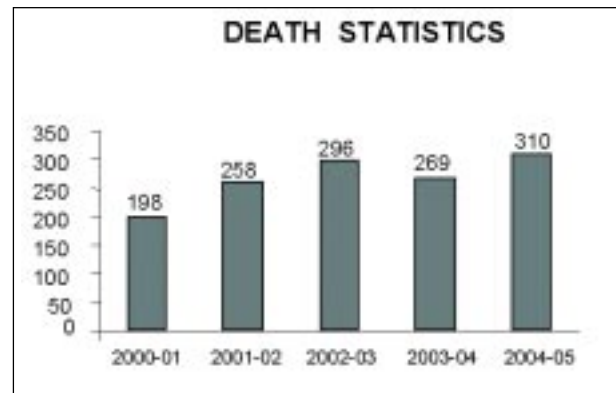
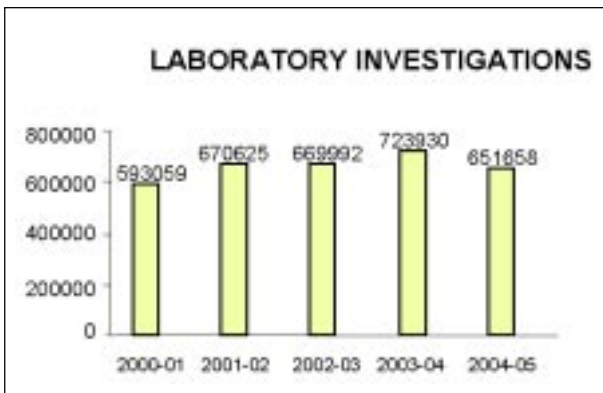
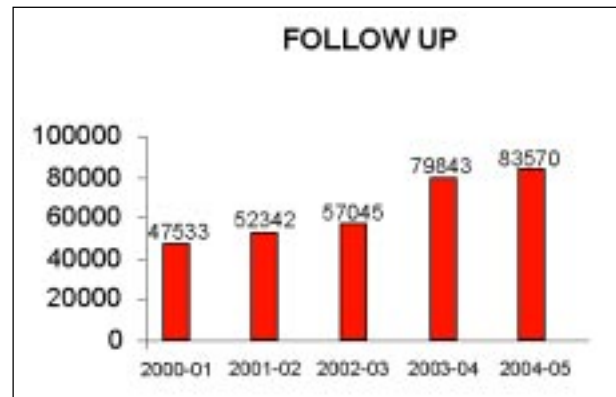
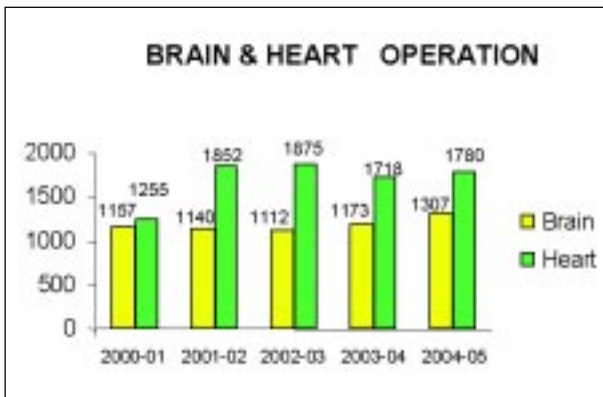
New vistas for international cooperation opened up in this year with the agreement to depute doctors to Indira Gandhi Memorial Hospital, Male from the Department of Cardiology. Measures were also underway to train the manpower from the Indira Gandhi Memorial Hospital, Male at this institute.

Institute has anchored the proposed Tele Health and Medical Education Project – Kerala sponsored by ISRO and Government of Kerala. The project plans to connect 6 Medical Colleges, 9 District Hospitals and one Community Health Centre and two Specialist Centres – this Institute and RCC. The project is in the implementation stage. Government of Kerala granted permission for the signing of Memorandum of Understanding for the collaborative endeavour between our institute and Medical College Trivandrum for the establishment of Organ Bank for cryo preserved homograft.

Medical Records

As usual, our MRD has played an important role in the patients management and hospital administration in 2004- 2005. Without additional staff the MRD has





managed the increased patients load. Detailed monthly statistical reports were published and copies were provided to all HODs and Chairman HMC for discussion in the HMC meeting. The number of registrations and reviews were increased 10% than previous year.

Charts retrieved

(a) Patient's review	83570
(b) Doctor's study purpose	6400
(c) Doctor patients correspondence	1860
(d) Pruning purpose	550
	92380

Certificate issued

8264 discharge summaries and 3087 operation reports were typed by MRD Typing pool. SMRO has issued 5939 certificates to patients for financial assistance/advance and train concession.

25 students of medical documentation, School of Medical Education MG University, Kottayam have undergone medical records training from our computerized MRD from 17/11/2004 to 1/12/2004

IMPORTANT STATISTICS

Sanctioned Bed	239
Percentage of Bed Occupancy	76
Cardiovascular and Thoracic Surgery	1780
Neurosurgery	1307
New Cases	12445
Repeat Cases	83570
Admissions	8252
Discharges	8264
Deaths	310
Non-Paying (%)	18

Paying (%)	82
Average Length of Stay (in days)	8
Bed Turnover Rate	35
Percentage of Mortality	4
Percentage of Post Operative Mortality	4
Sophisticated Investigations	38537
Laboratory Investigations	651658
X-rays	27411
Physiotherapy	25851
Electrocardiogram	25600
Echocardiogram	27845
Electromyogram	751
Pacemaker Implantation	152
Perfusion	1420
TMT	2040
Holter	519

Anesthesiology

Anesthesia support was given as shown below.

Patients	Number
Cardiovascular & Thoracic surgery	2000
Neurosurgery	1200
Neurological & cardiac radiological procedures	475

Biochemistry

The department activities comprise of a) clinical laboratory services (including clinical biochemistry, clinical pathology and hematology) and b) research activities on human diseases pathology.

Clinical Laboratory Services

The Central Clinical Laboratory functions round the clock providing investigative support in clinical chemistry, hematology and clinical pathology. The total number of procedures amounted to about 5.52 lakhs as given below:

Nature of investigation	Number
Lipids	16382
Electrolytes	140238
Enzymes	28612
LFT	33748
BUN	25556
Glucose	25061
Blood gases	31028
Hematology	120906
Coagulation	33390
Urine analysis	49343
CSF	4360
Electrophoresis	201
Miscellaneous	42600
Total no. of investigations	551658

Biomedical Engineering

As in previous years, the activities of the Biomedical Engineering Division included the installation of a number of new highly sophisticated equipments and maintenance of existing equipments with minimum down time. One of the most important activity for this year was providing infrastructure facilities for installation of the new MRI, introducing major design changes in power supply as well as in air conditioning systems, without disrupting the functioning of the old system.

Koruthu P.Varghese attended the basic supplementary training program on Radiometer Equipments at

Copenhagen at Denmark He this year also continued as the curriculum member of VHSE and the advisor to Kerala Science and the advisor to Kerala Science and Technology Museum.

Blood Transfusion Service

With a blood collection of 6485 units, we could support our surgical as well as standby reserve for invasive procedures as well as extend blood component service to the community. This was possible by maximizing each collected unit by way of blood component separation.

Data of blood components prepared

RBC	4876
Plasma	4450
Platelets	1101

RBC and plasma units prepared were more than the previous year with platelet number remaining the same. Every effort was taken to create awareness among the clinician on judicious use of blood components. Leucofiltration of blood was introduced in selected clinical settings. Initiative is being taken for irradiation of blood products. HTC meetings are held regularly to review transfusion guidelines and evaluate adequacy of services. Increasing voluntary blood donations is another priority area we are looking into. Mobile collections are being organized regularly. Fifteen Medical officers from Directorate of Health Services were trained for one month in Modern Blood Banking Technology sponsored by Kerala State AIDS Control Society (KSACS)

Two day workshop on 'serological techniques' for 20 blood bank technicians was conducted at SCTIMST organized by KSACS as part of modern blood banking practice.

70 students from Karakonam Medical College visited Blood Bank to get acquainted with advances in transfusion services



Dr. K. Mohandas inaugurates the Introductory workshop in group therapy

New initiatives:

Following studies were undertaken in collaboration with TRU BMT wing.

- Storage lesions in RBC and platelets in bags provided by Terumo Penpol.
- Validation of leuco filters provided by HLL.
- Quality parameters of platelets and blood stored in CPDA solution.
- An interventional technique - Applied muscle tension was studied in donors for reducing blood donor reactions. Its effect on blood donation experience was also evaluated.

Dr. P.V. Sulochana, Dr.S.Sathyabhama, Mrs. Ushakandasamy delivered talks at the training programme for nurses (Govt. of India DGHS aided) on 'Blood Transfusion- an outline', Safe blood transfusion practice, role of hospital staff in voluntary blood donation respectively.

Dr. P.V. Sulochana and Dr. Sathyabhama participated as faculty members for the training programme for medical officers organized by IMA Kollam branch.

Cardiology

During the year, 6436 new patients were registered as out patients and 3225 patients were treated as inpatients. All newly registered patients undergo complete cardiac evaluation including 2D echo Doppler study the same day. The thrust area during the past year was neonatal and infant pediatric cardiac programme including intra operative trans- esophageal evaluation and assessment of intra cardiac repair of complex congenital heart disease. The electrophysiology and pacing laboratory routinely implants heart failure devices (cardiac resynchronization) and cardioverter defibrillators (ICD).

PROCEDURES DONE IN CATH LAB 2004-2005

DIAGNOSTIC	
Coronary Angiography	1456
Cardiac Catheterization	114
Eps	26
Total-Diagnostic	1695
INTERVENTIONAL	
Ptca+Coronary Stent	269
Ballon/Metal Mitral Commissurotomy	153
Coil Embolisation -pda	90
Coil Embolisation - Coronary Av Fistula	2
Coil Embolisation - Mapca	1
Asd Closure With Amplatzer Device	16
Pda Closure With Blockaid Device	11
Balloon Pulmonary Valvotomy	11
Balloon Aortic Valvotomy	6
Balloon Atrial Septostomy	12
Eps+Rfa	69
Pacemaker Implantations	161
Total - Interventions	773
Total Procedures	2369

Cellular and Molecular Cardiology

During the year under review, the division initiated three new projects: (i) isolation and cloning of human resident adult cardiac stem cells, (ii) molecular mechanisms in high glucose induced MCP-1 expression in aortic endothelial cells and (iii) the effects of a herbal preparation *Calciguard* on myocardial mechanics. Investigations on the molecular mechanisms of cardiac fibrosis, basis of cardiac injury in magnesium deficiency, the role of endocardial endothelium in the regulation of cardiac interstitium and the studies on the effects of hypoxia on cardiac fibroblasts were continued.

Computer Division

Routine activities involved the software development, hardware maintenance, installation, software maintenance for all the user programs and the maintenance of SCTIMST web site and web server.

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

New Installations

PC Pentium IV, 256 MB RAM, 40GB HD – 55
PC Pentium IV 1GB RAM, 80GBx 2 – 2 no
Laptop centrino, 256 MB RAM, 40 GB HD – 1
Router CISCO 1700 – 1 no
Modem leased line HTU-E1/N/AC – 1 no
Printer Laser Samsung ML 1710 – 2 nos
Printer Inkjet HP 3745 – 4 nos
Printer 132 column 24 pin Epson LQ 1150 – 2 nos
Printer 80 column 24 pin TVSE MSP 250 champion – 5 nos
Switch 24 port 10/100 TX, 2 SX PORT- CISCO 2950 – 3 nos
Switch 48 port 10/100/1000 TX, 10 SX – CISCO 4507 – 1 no
Scanner Scanjet 8200C – 1 no
DVD Writer external – 1 no

Major Activities

Computer Division server rooms got renovated for accommodating servers purchased for picture archival and new centralised air conditioning system was implemented. New computer network cabling were done for the server room and the switches and routers were moved to 38U floor rack.

Leased line connection to BMT Wing got upgraded to 2 Mbps and new router and modem got installed at both ends.

BSNL internet connectivity got upgraded to 512 Mbps.

Installed the core switch CISCO 4507 and configured the institute network for VLAN.

Picture Archival System servers and storage for 8 TB (order in the financial year 2003-04) got installed by M/S Agfa after integrating with the current radiology modalities. In order to view the images, 30 web clients with 21" CRT monitors were installed by computer division in all patient care areas and online image transmission commenced by January 2005.

Network outlets of computer room of Achutha Menon Centre were increased additionally by 12 numbers after changing the network rack to 15U. Additional 10 PC's were provided for the students. Two PC's and a printer with network connectivity were provided for the Phd Students in Achutha Menon Centre.

Men's hostel got connected to the institute network and 6 network outlets were provided for internet browsing.

New Software Developments

Purchase Program – GUI based new software for Purchase Division (BMT & Hospital Wing) got implemented. All the 7 old PC's of Purchase Division

(Hospital Wing) got upgraded to Pentium IV based PC's.

Medical Records - GUI based new software for viewing patient care related data in Wards/ICU's/OT's/OP's HL7 interface programs for the radiology information system and picture archival were developed.

Efforts were also made to familiarize the faculty and staff on the best utilization of the machine and software's. System expansion grouped toward closer application with increasing LAN interlinks.

Neurology

Comprehensive Epilepsy Program

The R. Madhavan Nayar Center for Comprehensive Epilepsy Care has completed seven years of its service in the care of persons with epilepsy. Patients with more and more complicated focal epilepsy syndromes are being selected for surgery utilizing invasive monitoring, intraoperative electrocorticography, and cortical stimulation and mapping. More than half of the current referrals to the epilepsy center is from outside the state of Kerala. The total number of epilepsy surgeries undertaken till March 31, 2005 stood at 636, highest in the country.

Community-based Epilepsy Care

The aims of the community-based epilepsy program are to take advanced epilepsy care to the doorsteps of rural population and to educate the public to dispel the myths and misconceptions about epilepsy. Community outreach epilepsy clinics are being conducted regularly on 1st and 3rd Sundays at PHC, Changaramkulam and Ansar Hospital, Perumpilavu, respectively, where nearly 100 patients per month

are examined and counseled. Two epilepsy camps were conducted at Palakkad and at Kannur on May 23rd 2004 and February 27th 2005, respectively. In both the camps, a team comprising of consultants, postgraduate students, psychologist and medical social worker participated. In addition to medical care, public education sessions through lectures and group discussions were undertaken.

Epilepsy Education

Group sessions are conducted regularly 1 hour before the epilepsy clinic to educate persons with epilepsy. A psychologist and medical social worker moderate these sessions. As a part of the National Epilepsy day, a "CME in Epilepsy" was organized for the medical practitioners on November 21st 2004. Around 100 medical practitioners participated. Dr. K. Radhakrishnan, and Dr. M Madhusudhanan (Professor and Head, Kottayam, Medical College) chaired the sessions. Dr. Sanjeev Thomas, Dr. P. N. Sylaja, Dr. Ashalatha, Dr. Samhita, Dr. Kesavadas, Mrs. Aley Alexander and Mrs. Annamma gave talks on various aspects of epilepsy. An essay competition and slogan writing competition for persons with epilepsy was also conducted as a part of the National Epilepsy day. Dr. Radhakrishnan addressed the Tellicherry branch of the Indian Medical Association on March 5, 2005, and talked on the "Rationale Choice of Antiepileptic Drugs" to about 100 primary and secondary care physicians. With the help of State Resource Centre/ State Literary Mission, an epilepsy awareness/ training program was organized on March 21st for adult education volunteers. Mr. Jayachandran and Mrs. Aley Alexander conducted the program. Three issues of "Pratheeksha", a quarterly publication of Epilepsy Self- Help Group, was released during the year 2004.

PATIENT SEEN AND PROCEDURES UNDERTAKEN

Patients		
Epilepsy clinic attendance	-	4444
Epilepsy ward admissions	-	436
Outreach Epilepsy Clinics	-	1317
Procedures		
EEG	-	3273
VEEG	-	418
ECoG	-	75
Invasive Monitoring	-	10
CSM	-	10
WADA	-	10
Epilepsy Surgery		
ATL	-	69
Extra temporal	-	13
Hemispherectomy	-	4
Callosotomy	-	2

Kerala Registry for Epilepsy in Pregnancy

New initiative during the year.

- This year we have started the extension study of developmental assessment of children of mothers with epilepsy that were being followed up as a part of the Kerala Registry of Epilepsy and Pregnancy. The objective is to assess the IQ and language development of children aged six years or more who were exposed to anti epileptic drugs in the antenatal period.
- We have started a new project to study the oxidative stress in women with epilepsy in order to ascertain any association between excess oxidative stress and occurrence of fetal malformations. This is a four year project funded by the Kerala Council for Science Technology and Environment.

- A clinical study of benign childhood epilepsy is also initiated this year.

Neuromuscular Section

Neuromuscular subsection deals with detailed clinical and investigational evaluation and management of patients with nerve and muscle disorders. Diseases like Myasthenia Gravis, Guillain Barre syndrome, Chronic Inflammatory Demyelinating Polyneuropathy and drug-resistant Polymyositis and Dermatomyositis are subjected to Plasma Exchange, both large-volume and small-volume with documented efficacy.

PATIENT SEEN AND PROCEDURES UNDERTAKEN.

Patients		
Neuromuscular clinic attendance	:	886
Procedures		
Nerve conduction studies	:	731
Electromyography study	:	468
Peripheral nerve biopsy	:	26
Muscle biopsy	:	40
Skin + nerve biopsy	:	04
Large volume plasma Exchange	:	50
Small volume plasma Exchange	:	124
Thymectomy for Myasthenia Gravis	:	18

Comprehensive Care Centre for Movement Disorders

This section is staffed by one movement disorder specialist, one clinical research assistant, one social worker and one technical assistant.

New initiative during the year.

- International drug trial in Parkinson's disease began in March 2005.

- Website for Movement Disorders Program started functioning.
- Performed the first deep brain stimulation surgery for the treatment of Dystonia.

PATIENT SEEN AND PROCEDURES UNDERTAKEN

Patients	
Movement disorder clinic attendance	: 1084
Procedures	
Botox clinic attendance	: 49
Deep brain stimulation surgery	: 5
Pallidotomy	: 7
Post operative evaluations	: 60
Patient education programs	: 3



Shri Bharathbushan, IAS Principal Health Secretary inaugurates the Annual Conference of Indian Society of Blood Transfusion and Immuno-haematology (Kerala Chapter)

Cognition and Behavioural Neurology (CBNC) Section

The CBNC is staffed by one neurologist, one speech pathologist, two neuropsychologist and one data manager. It runs a Memory & Neurobehaviour Clinic as a part of Neurology out-patient services. In addition

it provides technical support to the Trivandrum Chapter of the Alzheimer’s & Related Disorders Society of India in running of their Day-Care Center for Dementia. It also carries out active and collaborative research in the field of cognition and dementia.

New initiative during the year.

- Two students from Kerala University have initiated their PhD and MSc. thesis work in the CBNC
- An international multi-centric drug trial on vascular dementia was initiated in January 2005.

PATIENT SEEN AND PROCEDURES UNDERTAKEN

Patients	
Number of Memory & Neurobehavioural Clinics conducted	- 46
Memory & Neurobehavioural clinic attendance	- 192 patients
Dementia and related problems	- 156
New patients with dementia	- 67
Procedures	
Speech therapy visits	- 843
Speech evaluations visits	- 744
Audiometry studies	- 243
Neuropsychological testing	- 558
IQ assessments	- 92
Counselling sessions	- 352
Stroke Section	
Patient seen and procedures undertaken.	
Clinic attendance	- 1379

New initiative during the year.

As a part of the WHO SEARO project, we have started a population based Trivandrum stroke registry to look into the incidence, risk factors and the disability due to acute stroke. This registry will help in planning prevention strategies and stroke rehabilitation.

Neurosurgery

The total number of cases has increased compared to previous year. Number of complicated and challenging cases constituted most of the cases and is probably related to the increasing neurosurgical facilities available in most of the hospitals in the state government and private sectors, where routine neurosurgical operations are being done. The major areas of focus remained: Neuro-vascular, CP angle, skull base, endoscopy, epilepsy and movement disorder surgery. Endoscopic surgeries have increased this year especially surgery for CSF rhinorrhea and pituitary tumors, thus reducing the morbidity associated with more invasive alternatives. A total of 1307 cases were operated with an overall mortality figure less than 3%. The faculty and the students maintained the high standards of the institute in the conferences, symposiums & seminars, with students and staff being awarded best paper for their presentations. Apart from these the department has been actively involved in the Trivandrum Neuroclub and Neuro-oncology club meets every month.

The department has organized a workshop on Neurovascular surgery during 1st and 2nd September (Neurovascular Con2004). Prof Suzuki and Prof. from Japan were the distinguished guest who operated during the workshop which was attended by various neurosurgeons from all over Kerala.

Nursing Service

Nursing service department is striving hard to ensure and maintain high quality patient care. Nurses maintain good therapeutic relationship with patients & are actively engaged in the preventive, curative and rehabilitative care of patients. Many complex procedures and surgeries are performed in the Institute. To manage these complex cases nurses update their professional knowledge and skills by conducting in service education, using library facilities & internet services, bedside teaching & demonstration. We are also conducting ten days training programme for nurses from all parts of Kerala & many nurses from SCTIMST are given opportunities to take part.

Monthly meeting of ward-sisters and staff nurses are conducted to discuss various issues and to solve problems. Guidance and counseling is being given to the employees who are facing health and personal problems, they are highly motivated to do better performance and has achieved better results.

New Initiatives

- Initiative taken to procure more ventilators, emergency cart, Alphabeds etc.,
- Cardiac & Neuro Nursing advanced courses.

Status of ongoing/ routine activities:

- Nursing rounds.
- Patient care activities supervision.
- Nurses, and Class IV employees, Daily wages management.
- Planning manpower requirement and recommends to Director.
- Recruitment and selection of various categories of employees as per the role of a junior staff selection committee member.

- Stock inventory inspection of Nursing depts. (OPD, Wards, OT, ICU)
- Maintenance of machines & equipments, breakage & damage etc.— overall supervision.
- Employees' performance – evaluation & writing ACRS.
- Conducting various nursing conferences, seminar, workshop.
- Motivating nurses to participate in the state & national level conference.
- Taking classes for nurses, unit helpers & cleaners
- Participating in the unit conference
- Orientation to all new nurses, cleaners, daily wages etc
- Orientation to nursing observers from government & private institutions.
- Participating various committee meeting (Hospital Management Committee, Infection Control, Linen Committee etc).
- Maintain discipline amongst subordinates.

Pathology

During the year (April 2004 to March 2005), the division has performed histopathological analysis in 1500 surgical specimens in patients undergoing various surgical procedures for neuro and cardiac diseases. Intraoperative tissue diagnosis (frozen section) was offered in 395 patients. Enzyme histochemical and immunohistochemical studies were performed in 2200 patients. Apart from the service oriented diagnostic work, the department also conducted fortnightly teaching programmes (case demonstration, CPC & Seminars) for postgraduate students this institute, pg pathology students from

Medical College, Trivandrum and Pushpagiri Medical College Tiruvalla.

Radiology

Department of Imaging Sciences & Interventional radiology has been an established center for Diagnostic Imaging and Interventions in Neuro systems. Department runs its Interventional Radiology OPD, have inpatient admission facility and intensive care management. Department provides imaging facilities of CT, MRI and Ultrasound to the OP patients and inpatients. This is the only department in our Institute, which provides imaging services to each and every one from outside unregistered to the Institute.

Department is pioneering in subspecialty Interventional Radiology and Imaging. Interventional Vascular Neuroradiology, Interventional Vascular Radiology and General Interventions are routinely done. Difficult cases of intracranial aneurysms, cerebral AVMs, cerebral dural fistulas, Vein of Galen aneurysms, spinal AVMs, abdominal aortic aneurysms etc. are referred to our department from across the country.

A New MRI, State of the art top of the line 1.5T Avanto TIM with Syngo VD 20N (Siemens) with facilities for doing Diffusion - Perfusion Imaging, MR Spectroscopy and Functional Imaging, MR Angiography (both neuro and peripheral angiography) is presently installed in the department. Thus department provides excellent imaging services with currently available latest technologies in MRI. CR system (ADC QS, Dry Star 5500, Agfa Gevert) was installed in the department. There is considerable reduction in the consumption of X-ray films after the installation of Picture Archiving and Communication System (PACS). The system belongs to Agfa (Impax – 4.5 Version enterprise

PACS with RIS (Quadrat) facility) and this is linked with the Hospital Information System (HIS).

Department also provides excellent imaging services in CT and Doppler. CT Angio, 3D CT, Virtual Endoscopy, Virtual Angioscopy, Vascular Doppler, Transcranial Doppler and MRI of Epilepsy, Stroke, Brain Tumours and Spine are routinely done.

Investigation Procedure Done (From April 2004 to March 2005)

DIAGNOSTIC PROCEDURES

No.	Procedure	No. of Cases
1.	Plain X-rays	28482
2.	MRI Scans	2794
3.	CT Scans	5359
4.	US Scans	3099

INVASIVE DIAGNOSTIC PROCEDURES

No.	Procedures	No. of Cases
1	Peripheral Angio	194
2	4 Vessel Angio	575
3	Miscellaneous	16

INTERVENTIONAL PROCEDURES

Interventional Procedures	Total (No. of cases/ Procedures done)
Cerebral AVM	44/104
CCF	10
Thrombolysis	11
Tumor Embolisation	5
Uterine Artery Embolisation	8

Vein of Galen	1
PT BD	4
Vertebroplasty	9
PTA	37
Percutaneous Biopsies	76
MAPCA	1
Carotid Stenting	2
Cathing Balloon	2
IVC Stenting	1
IVC Filter	1
SMA Stenting	1
Renal Stenting	1
Spinal Embolisation	1
Hepatic Artery Stenting	1
Iliac Stenting	1
Wada	9
Aneurysm Coiling	6
Tracheal Stenting	1
Brochogram	1
Brachial Angio	5
Brachial Embolisation	5
Intra cranial DAVF	1
Ba Swallow	4
Intracranial stenting & coiling	1
Total	321

INTERVENTIONAL RADIOLOGY SERVICES

i. OP Registrations	- 302
ii. IP Admissions	- 280
iii. Interventional Radiology Procedures	- 321

A total of 320 patients were treated by Interventional Radiology procedures out of which 280 patients were admitted under interventional radiology.

New initiative was taken on following front:

- a. Academic – International collaboration.
- b. On clinical side – New procedures have been introduced – Stent Assisted Coiling of intracranial aneurysm and fistulas.

Dissertation works by M.Sc Biotechnology course of RVS College of Arts and Science, Sulus, course of Bharathiar University, Coimbatore

1. Pre diagnosis of oral submucosal fibrosis using fluorescence spectroscopy and high performance liquid chromatography.
2. Fluorescence spectroscopy and high performance liquid chromatography as a pre-diagnosis tool for oral cancer.

Project on International Collaboration:

1. Indo - Italian Collaboration

Indo - Italian Collaborative project on going -2003-2005.

‘Diffusion Weighted Imaging and other Magnetic Resonance based Imaging Modalities in Human Stroke.’

Italian Collaborator

Dr. Marco Fiorelli
Dept. of Neurological Sciences
University of Rome ‘La Sapeinza’
Rome, Italy.

Indian collaborator

Dr. A. K.Gupta
Prof. & Head, Dept. of Radiology
Sree Chitra Tirunal Institute for Medical Sciences & Technology
Trivandrum - 695 071
India.

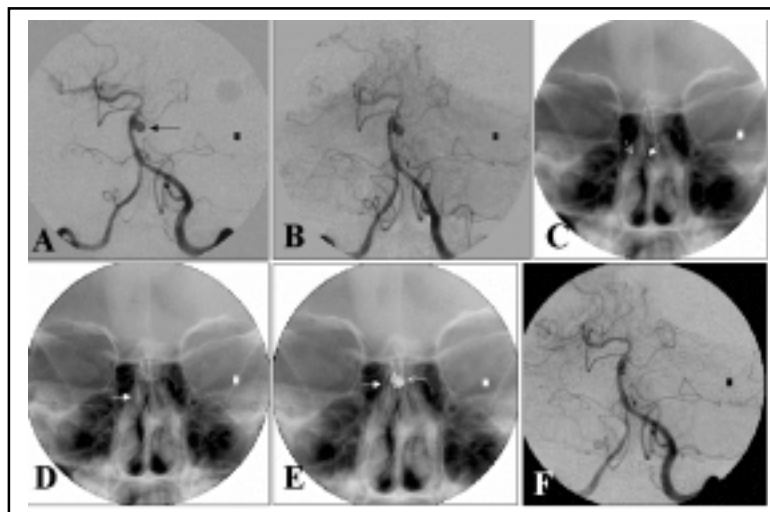


Fig: 1 - Stent assisted coil embolisation of dissecting basilar artery aneurysm. A, Left vertebral injection in AP view shows the wide neck dissecting aneurysm of the basilar artery trunk (arrow). B, The stent (through left vertebral artery) and the microcatheter (through the right vertebral artery) for deploying coils have been taken into the basilar artery. C, The stent (solid arrow) and the microcatheter (arrow) are seen in this unsubtracted image. D, The stent has been deployed (arrow). E, The stent (solid arrow) supporting the coils (arrow) inside the aneurysm is seen in this unsubtracted image. F, Post procedure angiogram shows obliteration of the aneurysm with patent flow in the basilar artery.



Fig 2. Clinical Photograph of Patient with Carotico-Cavernous Fistula Type D.

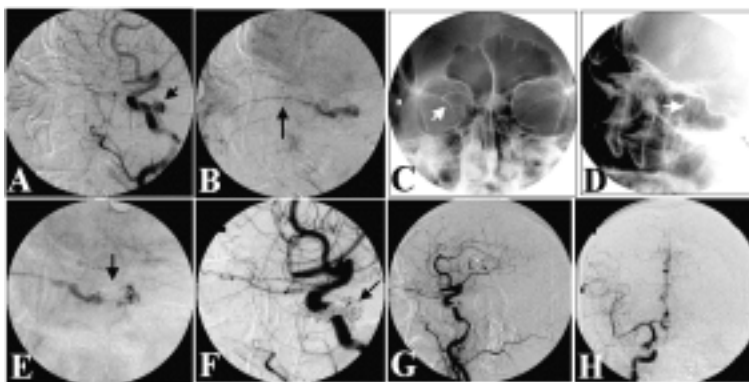


Fig. 3 Type D carotico-cavernous fistula. Following angular vein cut down with transvenous embolisation coil embolisation was performed through superior ophthalmic vein. A, Right carotid lateral injection shows the fistula (arrow). B, The fistula is draining through the superior ophthalmic vein (arrow). C and D, Microcatheter inside the superior ophthalmic vein (arrow). E, Deployment of platinum coils in process (arrow). F and G, Post embolisation right carotid lateral injection shows complete obliteration of the fistula . Note the packed coils inside the cavernous sinus (arrow). H, Post embolisation right carotid AP injection

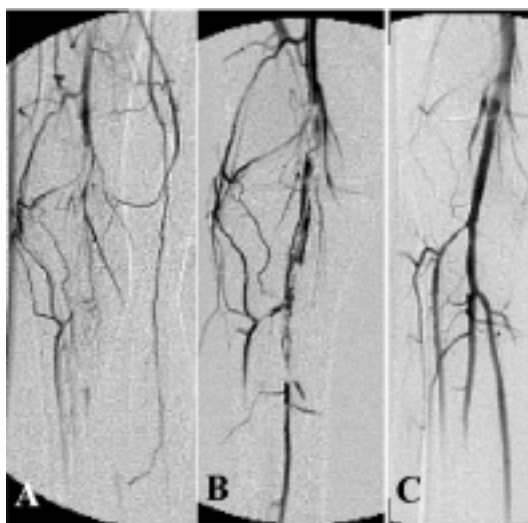


Fig. 4 A & B : Long segment thrombotic occlusion of the right popliteal artery and its bifurcation; collaterals are reforming the anterior tibial artery (solid arrow) and the posterior tibial artery (arrow). C: Following percutaneous aspiration thromboembolectomy, patency of the popliteal artery and its bifurcation is completely established

CLINICAL RESEARCH

Biochemistry

1. Mucin-derived glycopeptides as inhibitors of galectin-1

As a corollary to our recently published observation that O-glycosylated proteins were the preferred ligands for human tissue galectin-1, it was demonstrated that gut mucin-derived O-glycopeptides were among the best inhibitors for galectin-1. Since this lectin is presumed to be instrumental in atherosclerosis, infection and tumor-cell colonization, these O-glycopeptides hold promise as glycotherapeutics. Moreover, myelin-associated glycoproteins(MAG) mediated inhibition of axonal growth has been found to be inhibitable by O-glycopeptides. (Schnar et al., 2005)

2 O-glycosylated proteins in immune complexes:

Human serum immune complexes (IC) were isolated and resolved by high pressure liquid chromatography. IC was found to contain a complex of O-glycosylated proteins and IgG in substantial titer, as detected using specific lectins in enzyme-linked lectin assay (ELLA). These complexes have the potential to adhere to endothelial and underlying cells through O-glycoprotein-specific lectins present on the latter.

3. Oxidative stress and epilepsy.(collaborative project with Dept. of Neurology).

There is ample evidence indicating that the occurrence of seizure and use of antiepileptic drugs during pregnancy is associated with several complications including spontaneous intrauterine death and congenital malformations in children of women with epilepsy. In view of this we have initiated a study, 'oxidative stress in women with epilepsy and its relation to fetal malformations', to examine the involvement of oxidative stress as one of the possible mechanisms contributing to the above unfavorable outcomes in pregnancies of women with epilepsy. The results may suggest therapeutic approaches to reduce the risk.

4. Lipoprotein (a) and atherosclerotic / thrombotic disease.

Although a role for lipoprotein (a), a unique lipoprotein, having structural similarity to both low-density lipoprotein and plasminogen in atherosclerotic and thrombotic

diseases has been postulated, the underlying mechanism is not yet clear. A potential key to the function of lipoprotein (a) might be the presence of lysine binding sites by which it mediates interaction with arterial cell surface receptors. Preliminary characterization of isolated lipoprotein (a) particle and other related in vitro studies are in progress to understand the pathways associated with its entry in vascular cells. As part of characterization, a method to quantitate Lp(a)-cholesterol has been standardized which provides an alternate to Lp(a)-immunoassay and a new way to study clinical and epidemiological implications of Lp(a) heterogeneity.

5. Diagnostic support:

As part of diagnostic support to clinical biochemistry, urinary micro albumin assay was standardized for the early diagnosis of nephropathy in individuals with diabetes and hypertension. Necessary standardization of a HPLC-technique for rapid analysis of serum/urinary aminoacidogram has been initiated for the early diagnosis of metabolic /hereditary disorders, especially in children.

Cellular and Molecular Cardiology

Isolation and cloning of human resident adult cardiac stem cells

The study is aimed at developing a strategy for isolation and expansion of cardiac stem cells from cardiac muscle biopsy, for potential use as cell-based therapy for myocardial infarction and/or end stage heart disease in humans. We also envision the use of these cells as a vector for delivery of pro-angiogenic and other therapeutic genes to the damaged heart. Our approach would be to follow the recent methods of Robert Bolli and Piero Anversa, the pioneer in this area. We would also explore methods to enhance the

harvesting of the cells employing selected growth factors and cytokines.

Modulation of high glucose induced Monocyte Chemoattractant Protein-1(MCP-1) gene expression in aortic endothelial cells

Monocyte chemoattractant protein (MCP-1) is a chemokine, which plays an important role in the adhesion of monocyte to the endothelial cells, an early event in atherogenesis. Several studies have reported increased expression of MCP-1 in endothelial cells in type 2 diabetes and suggested that increased MCP-1 expression may contribute to the increased risk for atherosclerosis in type 2 diabetes. Regulation of high glucose induced Monocyte Chemoattractant Protein-1 (MCP-1) gene both at the transcriptional as well as translational level in endothelial cells is not well elucidated. Understanding the gene regulation is important because the knowledge is likely to reveal targets to abate the expression of MCP-1 in endothelial cells, thus lessening endothelial dysfunction in type 2 diabetes and subsequently enable us to ultimately alter the course of development of atherosclerosis. Our studies are aimed at finding out whether agents known to have anti-inflammatory, anti-thrombotic and antioxidant activity and also found to regulate transcription factors involved in inflammatory gene transcription would abate high glucose induced MCP-1 expression in aortic endothelial cells. These agents already known to reduce MCP-1 expression in conditions such as renal fibrosis, inflammation related to transplant rejection and in monocytes exposed to high glucose, may abate high glucose induced MCP-1 expression in aortic endothelial cells. The finding could lead to identification of agents to reduce risk of atherosclerosis in diabetes mellitus. The study would also pave way for elucidating mechanisms of

high glucose induced MCP-1 expression in endothelial cells.

Role of endocardial endothelium on cardiac fibroblast function

Endocardial endothelial cell regulation of cardiac fibroblast proliferation and collagen synthesis was studied in porcine ventricular endothelial cells and neonatal rat cardiac fibroblasts. Endocardial endothelial cell conditioned medium (EECM) stimulate cardiac fibroblast proliferation as assessed by [3H] thymidine uptake and enhance the rate of collagen synthesis by cardiac fibroblasts assayed as a measure of [3H] proline uptake. Tumor necrosis factor- α (TNF- α), a proinflammatory agent and known potent mitogen of cardiac fibroblasts attenuates these responses of fibroblasts to EECM. The levels of endothelium derived factors such as nitric oxide and transforming growth factor- β (TGF- β) were higher in the TNF- α activated EECM whereas the levels of endothelin-1 were lower than the controls suggesting that the attenuation of the proliferative and collagen enhancing response of cardiac fibroblasts to EECM may be mediated by NO and TGF- β and depression of ET-1 synthesis or release.

Dependence of regression of cardiomyocyte hypertrophy on oxidative stress

Reactive oxygen species has been implicated in the pathophysiology of hypertension. Cardiac hypertrophy is the first visible manifestation of hypertension induced target organ damage. Though initially an adaptive mechanism of the heart for preservation of cardiac output, sustained cardiac hypertrophy is a leading predictor for the development of more serious complications such as arrhythmias, sudden death and heart failure. A study was carried out to examine the

hypothesis that oxidative stress is associated with cardiac hypertrophy. Lipidperoxidation was used as a measure of oxidative stress and serum malondialdehyde levels were determined in 24 individuals. Cardiac myocytes isolated from newborn rat heart were treated with the serum samples for 72 hours and cell volume was determined. A linear regression of cardiomyocyte volume on serum MDA levels was observed. The serum malondialdehyde levels of hypertensive individuals were significantly higher than that of normotensives. Comparably, cell volume of myocytes exposed to sera of hypertensives was also higher. The use of this in-vitro system for identification of susceptible individuals in the preclinical stage is envisaged.

'Cardoguard tablet - delineation of molecular mechanism of action and its efficacy in the regression of ventricular hypertrophy.'

Cardoguard tablet is a new anti-hypertensive combination drug prepared by Nagarjuna Herbal Concentrates Ltd. In addition to the reduction of blood pressure, an ideal anti-hypertensive drug is expected



Director K. Mohandas hands over the agreement for a DST sponsored laboratory research program with Nagarjuna Herbals

to exert beneficial effects on the heart by prevention and regression of ventricular hypertrophy without compromising myocardial function. The myocardial response to this drug has not been characterized. The major objective of this project is therefore to study the effect of the drug on myocardial mechanics and examine using *in-vitro* and *in-vivo* models, the effectiveness of the drug in the regression of myocardial hypertrophy. A clear understanding of the mechanism of action and the cardiac consequences of the preparation is expected to facilitate commercialization and international acceptance of the product.

Molecular mechanisms in cardiac fibrosis

In view of the important role of cardiac fibroblasts in the maintenance of the structural and functional integrity of the myocardium, there has been increasing interest in factors that impact upon their function. Regulation of cardiac fibroblast activity by different pathophysiologic stimuli has been a subject of incisive investigations in this laboratory over the past several years.

Cardiac fibrogenesis in magnesium deficiency

Dietary deficiency of magnesium produces myocardial necrosis and fibrosis but the underlying mechanisms remain unclear. Earlier studies in this laboratory had indicated that circulating factors may exert a superoxide-mediated stimulatory effect on proliferation of cardiac fibroblasts and collagen production in magnesium deficiency. Using receptor antagonists, angiotensin II and aldosterone were identified as the serum factors responsible for these pro-fibrogenic effects. Subsequently, significant elevations in the plasma levels/activity of angiotensin

II and renin, but not of aldosterone or ACE, were demonstrated in magnesium-deficient rats. Cardiac tissue levels of angiotensin II were also found to be higher in these animals. There was no difference between magnesium-sufficient and -deficient rats in angiotensin II receptor density on cardiac membranes. Together, the observations clearly established the involvement of the renin-angiotensin-aldosterone system in cardiac fibrogenesis associated with magnesium deficiency.

Molecular basis of hypoxia-induced cell cycle arrest in cardiac fibroblasts

Hypoxia plays a fundamental role in many pathologic processes. In ischemic diseases, including stroke, myocardial infarction, and acute renal failure, hypoxia leads to cell death and determines tissue pathology. The independent effects of hypoxia on cardiac fibroblasts have, however, received little attention despite the fact that these cells, unlike cardiomyocytes, do not undergo apoptosis in response to hypoxia. Against this backdrop, this laboratory established an *in vitro* cell culture model of hypoxia to evaluate the response of cardiac fibroblasts to hypoxia in the absence of other confounding influences obtained *in vivo*. Investigations using this model revealed that hypoxia induces cell cycle arrest in these cells. The presence of serum did not prevent the effects of hypoxia. FACS analysis revealed that the arrest occurs at the S phase of the cell cycle. Re-oxygenation reversed the arrest. Further, hypoxic fibroblast-conditioned medium caused cell cycle deceleration in fibroblasts even under normoxic conditions, suggesting paracrine effects of soluble factors released by fibroblasts under hypoxia. The laboratory is currently probing the mechanisms underlying the effects of hypoxia on cell cycle events in cardiac fibroblasts.

Developmental stage-specific differences in the response of cardiac fibroblasts to substance P

The neuropeptide, substance P, regulates a variety of biological events, particularly those involved in inflammation. Work done in this laboratory had shown that substance P acts via NK-1 receptors to exert a hyperplastic action on adult cardiac fibroblasts *in vitro*. Alterations in redox state and calcium homeostasis were found to act in concert to mediate the mitogenic action of substance P on these cells. The neuropeptide did not have any effect on collagen production in cardiac fibroblasts from adult rats. However, substance P was subsequently found to down-regulate collagen synthesis but not non-collagen protein synthesis in cardiac fibroblasts from neonatal rats. Such selective down-regulation of collagen expression in neonatal rat cardiac fibroblasts may represent developmental stage-specific differences in the response of these cells to substance P.

Neurology

Epilepsy Section

Intramural ongoing research projects

- 1) A prospective study on the cost-effectiveness of video-EEG monitoring
- 2) Comparison of the ascertainment of interictal and ictal EEG data utilizing fluoroscopically guided, CT guided and blindly placed sphenoidal electrodes in medically refractory temporal lobe epilepsy.
- 3) Long-term seizure outcome of patients following temporal lobe epilepsy surgery
- 4) Clinical, psychosocial and psychiatric characteristics and the outcome of patients with psychogenic nonepileptic seizures.

- 5) Mortality among patients with medically refractory temporal lobe epilepsy with and without epilepsy surgery.
- 6) Clinical and radiological profile of Rasmussen's encephalitis.
- 7) Clinical characteristics and outcome of gelastic seizures with hypothalamic hamartoma.
- 8) Occupational outcome after temporal lobe epilepsy surgery.

Neuromuscular Section

Intramural ongoing research projects

1. A study of the clinical, electrophysiological and pathology of HMSN
2. A registry of patients attending the NM clinic has been started from 2005.

Cognition and Behavioural Neurology (CBNC) Section

Intramural newly initiated projects

1. Neuropsychological and Radiological Changes in Mild Cognitive Impairment: An Analytical Study

Intramural ongoing research projects

1. Clinical & Radiological Evaluation of aphasia in stroke and other neurological disorders. Collaborative work of sections of CBNC, Stroke and Department of Radiology.
2. Design and Evaluation of a neuropsychological battery for the study of Semantic Memory in Indian subjects.
3. Evaluation of Care giving Stress and health in caregivers of patients with dementia and formulation of a Caregiver's Guide.

Stroke Section

Intramural ongoing research projects

1. Evaluation of risk factors, stroke subtypes and their outcome at 30 days and one year in patients with acute ischemic strokes.
2. Prevalence of early seizures and outcome in patients with acute stroke

Neurosurgery

Research programmes:

1. Role of mucoid vasculopathy in the etiopathogenesis of cerebral aneurysms. *(Continuing)*

2. Genetics of SAH; Role of Endoglin gene polymorphism. *(Continuing)*
3. Human trial of hydroxyapatite Burr hole caps. *(Continuing)*

Collaborative programmes:

1. p 53 gene mutations in gliomas in collaboration with Rajiv Gandhi Institute of Biotechnology, Trivandrum.
2. Drug trial: Epicentric therapy for gliomas “an international multicentric study for treatment of recurrent cerebral high grade gliomas with AP 12009” project has been approved. The principal investigator for the trial from our centre is Prof Suresh Nair

MAJOR EQUIPMENTS PURCHASED DURING THE YEAR

1. Agilent HPLC System
2. ISE Attachment for Electrolyte Analysis in Dade Dimension AR Biochemistry analyzer.
3. Colour Doppler Echo Machine
4. ACT Haemostats Management System
5. Thromboelastograph (Computerised)
6. Ventilators
7. Blood Gas Analyser ABL - 555
8. Refrigerated Centrifuge
9. Blood Collection Monitor
10. Biosealex
11. Biotrend System
12. Pace maker (Dual Chamber)
13. Patient Warmer
14. Multimedia Projector
15. U.V Spectrophotometer
16. Binocular Microscope
17. Monophasic Magnetic Stimulator
18. Polysomnography System
19. O. T. Table
20. O. T. Light
21. Transcranial Doppler System
22. Trinocular Inverted Microscope
23. MRI 1.5 T
24. PACS (Partially Commissioned)
25. PICCO Cardiac Output Monitor
26. Transesophagealechocardiography(TEE)
27. Thromboelastograph
28. Hepcon HMS Plus Hemostatic Management System
29. PCA pumps
30. Blood Warmer
31. Operating Table: (Schmitz):
32. Wizard 1470 Gamma Counter (Perkin Elmer)
33. Freeze Dryer 4.5 L (Labconco)
34. S 3000 Ultrasonicator (Misonix)
35. Ultra micro plate reader for endotoxin detection (LAL test)
36. High speed refrigerated Centrifuge
37. Universal Testing Machine, Instron model 3345
38. ELISA reader
39. Siemens Power Mobil Fluoroscopy machin

ACADEMIC ACTIVITIES

Division of Academic Affairs

Student Enrolment

The student strength for DM/MCh degrees and Post Doctoral Certificate Courses during the year was 62. The Master of Public Health degree programme has 38 scholars and the Master of Applied Epidemiology programme 18 scholars. The Institute has, as of now, 36 students for the Ph.D programme, 19 scholars for the Diploma in Nursing programme and 31 scholars for the various Diploma programmes

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

DM (Cardiology)

Edwin Francis
Mukundan C
Bijulal. S
Vinod Thomas
Remash.K
Shajeem.O
Shomu Rajendra Boharo
Pradeep Kumar
Sumanta Shekhar Padhi
Anees.T
Sanjay. G
Sachin Nayyar

DM (Neurology)

Syam.K
Sajith. S
Sudheeran.K
Praveen Kumar.R
Thomas Chemmanam
Ramesha K.N
Vidya. M.V

Raghavendra.S
Mini.S
Praveen.P
Sapna Erat Sreedharan
Himanshu Mehta

DM (Cardiac Anaesthesiology)

Arun Vijayakumar
Bhupesh Kumar

DM (Neuro Anaesthesiology)

Shashi Rao
Smitha. V

DM (Neuro Radiology)

Jayadevan E.R
Sandeep Kumar Burathoki
Hima S. Pendharkar

MCh (Cardiovascular & Thoracic Surgery)

Sanjay Teodore A.C
Patak Sameet Aravind
Rajanish Duara
Chandrabhanu Parija
Adil Sadiqu
Ritwick Raj Bhuyan
Malempati Aaresh Rao
Arunkmar Haridas
Viivek V. Pillai
Suraj Kumar Pradhan
Prashanth Y.M
Neerav Bansal
Gagandeep Singh Nagi

MCh (Neurosurgery)

Bhaskar. S
Purandare Harshad Rajendra
Venkata Srnivasa Rao Nooti
Raghavan S. Iyengar

Komal Prasad
Amitabh Gupta
Gulzar Gupta
Rajiv Agarwal
Nilesh Radheshyam Agrawal
Jayanand Sudhiur.B
C.V. Gopalakrishnan
Dilip .M
Manmeet Singh S. Chhabra

PDCC (Anaesthesiology)

C. Mangesh Sudhakar Rao
Deepa Navkar
Satyajeet Misra
Bikash Sahu

PDCC (Radiology)

Bobby Devassia

Post DM / MCh Fellows

Sreeram. G
Mukund Prasad
Iyer Anand
Pradeep

Ph.D Candidates

Anilkumar PR
Krishnaprasad.C
Anuradha
Asha S. Mathew
Bernadette K.Madathil
Biji Balakrishnan
Bijoy Chellan
Divya. P
Elizabeth K. Abraham
Shiney Velayudhan
Godwin S.K
Indira Adiga. S

Kaladhar.K
Leena Kuruvila
Manju. L
Neethu Mohan
Nishi. K.K
Priyanjana Prabhakar
Sailaja. G.S
Sangeetha. S.R
Siddarth Banerjee
Sumith R. Panicker
Sunitha S.S
Arun. B
Sajeesh. S
Viji Mary Varghese
Josna Joseph
Manitha.B
Edwin Sam
Sangeetha Mohan
Aghila Rani
Anu Paul
Smitha Mathews
Sreeja Purushothaman
Dhanya C.R
Manna Jose
Uma. R

Master of Public Health Students Enrolled in January 2004

Bamne Arun Ramachandra
Minni Khetarpal
Shailaja
Ladish.K
Deepa Susan Daniel
Pratibha E. Singh
Jacob Kuruvila
Prasad B.M
Sukumaran. A
Vishal Khosla

Baburam Pokhrel
Lincoln Priyadarshi Chodhuri
William Rachna
Pyari. T. T.
Ansiem George
Sachi Karki
Suraj Gurung
Pramod Singh Ghartichhetri
Shobha.G

Master of Public Health Students Enrolled in January 2005

Ashis Kumar Das
Arun. R
Ruth Viviek.V
Trivendra Kumar
Sumith Shrimali
Aravind R. Mohan
Preetha Menon.K
Mohammed Shameel. O
Ashwini Kumaar. Singh
Lalnuntlangi
Brady Dutton Beegum
Rajesh Kumar

Diploma in Public Health Students Enrolled in January 2005

Vyas Chandreshkumar Liladhar
Poonamchand Kantilal Parmar
Bhatt Jitesh
Yadav Shilpa
Nimavat Pankatkumar
Patel Vishnubhai Ambarambhai
Chaudhari Hasmukhbhai Jagabhai

Master of Applied Epidemiology Students Enrolled in January 2004

Dr. T.K. Tamta
Dr. H.C.S. Martolia

Dr. Amitaiv Das
 Dr. Susanta Kumar Swain
 Dr. Pachauau Lalmalsawma
 Dr. P.K. Jain
 Dr. Tapas K. Sen
 Dr. S.V. Deshpande
 Dr. S. Solanki

Master of Applied Epidemiology Students Enrolled in January 2005

Dr. Debasis Roy
 Dr. B. Sailaja
 Dr. Debashish Halder
 Dr. Tulshi Prarmanik
 Dr. Puran Kumar Sharma
 Dr. R.R. Katti
 Dr. Manjubala Panda
 Dr. Bikash Patnaik
 Dr. Rajesh Sisodiya

List of Successful Candidates for DM/MCh

Name of Candidates	Degree	Speciality
Byju C.K	DM	Cardiology
Stigimon Joseph	DM	Cardiology
Harikrishnan M.S	DM	Cardiology
Sreeram. G	DM	Cardiology
Gopakumar. V	MCh	CVTS
Sai Kiran K.V.S.S	MCh	CVTS
Murali Krishna	MCh	CVTS
Akbari Jayeshkumar.G	MCh	CVTS
Sathyaki N. P	MCh	CVTS
Tomin Mooney	DM	Neurology
Firosh Khan.S	DM	Neurology
Rakesh H. Shah	DM	Neurology
Ruchir Divatia	DM	Neurology
Dr. Krishnakumar.K	MCh	Neurosurgery
Sunil Valentine Furtado	MCh	Neurosurgery
Mukund Prasad	MCh	Neurosurgery
Hemant Sonwalkar	DM	Neuroradiology

List of Successful Candidates Post Doctoral Certificate Programme

Name of Candidates	Speciality
Priya Motiani	Anaesthesiology
Subrata Kumar Singha	Anaesthesiology
Hetal Kumar Dineshchandra Shah	Anaesthesiology
Tambe Sandeep Pratap Rao	Anaesthesiology
Sunil Kumar. N.K	Anaesthesiology
Ramesh Kumar	Anaesthesiology

List of Successful Candidates for Post Basic Certificate Programme

Name of Candidates	Speciality
Sreeja S. Nair	Cardiac Nursing
Susmitha T.R	Cardiac Nursing
Deepa C.M Capt.	Cardiac Nursing
Smitha C.T	Cardiac Nursing
Ria Zacharia	Cardiac Nursing
Robin V. Cyriac	Cardiac Nursing
Neena A.S	Neuro Nursing
Bindu V.C	Neuro Nursing
Vidhu.s	Neuro Nursing
Sunitha Mol Varghese	Neuro Nursing
Tina Daniel	Neuro Nursing
Maya S.S	Neuro Nursing

List of Successful Candidates for Diploma programme

Name of Candidates	Speciality
Prajeesh Joseph	Cardiac lab Technology
Gireesh Goppinath	Cardiac lab Technology
Jose. M	Cardiac lab Technology
Rajesh Kumar.S	Neuro Technology
Vibhin.V	Neuro Technology
Krishna Kumar.G.K	Operation Theatre Technology
Tiny Babu	Operation Theatre Technology

Prajith. P	Clinical Perfusion Technology
Jeeva K.H	Medical Records Science
Ambily. R	Medical Records Science
Sanoj Varghese	Medical Imaging Technology
Arun Kumar M.P	Medical Imaging Technology
Sanil. B	Medical Imaging Technology
Anoop Joy	Blood Banking Technology

The Institute has initiated two Diploma Programmes in Speciality Nursing of 2 years duration each from the year 2005. Currently 19 students are undergoing training in these two Diploma programmes namely (1) Diploma in Cardiovascular and Thoracic Nursing and (2) Diploma in Neuro Nursing.

Heart Sim Interactive ACLS training System

An intensive one-week (12 hours) training on Basic Life Support, Advanced Cardiac Life Support and Arrhythmia interpretation was given to 24 staff nurses of this Institute in 2 batches.

Library

The library has a collection of 21614 and 19507 back volumes and subscribes to 184 journals. 392 books and 25 backvolumes are added during the year 2004-05.

Nursing Education

The seventeenth batch of Cardiovascular and Thoracic nursing and the thirteenth batch of Neuronursing students successfully completed their programme in December 2004. There were 6 graduates in Cardiovascular and Thoracic Nursing and 6 graduates in Neuronursing this year adding up the total number to 146 and 95 respectively. Advanced clinical experience of one-year duration was given to three Post Basic Certificate Holders in the year 2004.

Three Neuro nursing students attended the 25th annual conference of the Society of Indian Neuroscience Nurses held at Hotel Sayaji, Indore, during December 2004. They presented three papers, posters and models and participated in Neuro written quiz. The students secured prizes for Model, poster and quiz.

Institute	Programme	No.of Students
R.A.K College of Nursing New Delhi	MN	2
College of Nursing Trivandrum	MSc(N)	24
Fr. Muller's College of Nursing	MSc(N)	4
Annai JKK Sampoorani College of Nursing, Coimbatore	MSc(N)	3
Sree Mookambika College of Nursing	MSc(N)	4
College of Nursing, Kottayam	BSc(N)	64
College of Nursing	BSc(N)	58
College of Nursing Holy Cross Hospital Kottiyam	Post Basic BSc(N)	18
Centre for Adult Continuing Education & Extension University of Kerala	Certificate in Nursing Administration	28

EXTERNALLY FUNDED RESEARCH PROJECTS

ACHUTHA MENON CENTRE FOR HEALTH SCIENCE STUDIES

NEWLY INITIATED PROJECTS

Sl. No.	Title	Principal Investigator	Funding Agency
1.	Banking for better health: Medisave for rural women in Karnataka, India	Dr. Varatharajan D	Ford Foundation
2.	Friends of Health (FoH) project in Venganoor Grama Panchayat - ASA initiative	Dr. K.R. Thankappan	CAPDAC
3.	Community Based Interventions for Cardiovascular Disease	Dr. K. R. Thankappan	WHO
4.	Prevention of Non- Communicable Diseases: Tuning Epidemiology in to Practice	Dr. K. R. Thankappan	WHO

ONGOING PROJECTS

1.	Political Decentralisation and status of RH in Kerala	Dr. Mala Ramanathan	Tide Foundation
2.	Stakeholders' perceptions IRBs India	Dr. Mala Ramanathan	Harvard School of Public Health
3.	Situational analysis of MTP services in India	Dr. Mala Ramanathan Dr. P. Sankara Sarma	AIIMS
4.	Workshop on integrating gender in medical education	Dr. Mala Ramanathan	WHO
5.	Research, Training and Advocacy for Gender Sensitization of Medical Education and Capacity Building of Health Professionals for Reduction of Maternal Mortality and Morbidity.	Dr. K. Mohandas Dr. Mala Ramanathan	MacArthur Foundation
6.	Tobacco Cessation Research and Training in India and Indonesia.	Dr K. R. Thankappan	Fogarty International Centre of the National Institutes of Health.
7.	Sentinel Health Monitoring Centres in India	Dr K. R. Thankappan	ICMR/WHO

Sl. No.	Title	Principal Investigator	Funding Agency
8.	Establishment of sentinel surveillance systems in Indian industry	Dr. K.R. Thankappan	AIIMS/ WHO
9.	Industrial participation in public health care provisions in Tamil Nadu- A Case Study.	Dr. D. Varatharajan	BAIF

COMPLETED PROJECTS

1.	Gender and social issues in Reproductive Health	Dr. Sundari Ravindran / Dr. Mala Ramanathan	Ford Foundation
2.	Independent Evaluation of Anti Malaria Programme.	Dr. K. R. Thankappan	NAMP
3.	Strengthening Health Research in NGO's in India.	Dr. K. R. Thankappan	TISS
4.	Management training of senior health officers from Maharashtra.	Dr. D. Varatharajan	BAIF

HOSPITAL WING

NEWLY INITIATED PROJECTS

Sl. No.	Title	Principal Investigator	Funding Agency
1.	A 16 week double blind, placebo controlled, randomized, parallel group, multicentre, international study to evaluate the efficiency and safety of 40mg/day Istradefylline (KW6002) and that of entacapone versus placebo as treatment for Parkinson's disease in patients with motor response complications on levodopa therapy	Dr. Asha Kishore	Quintile Spectral
2.	Tele health and medical education	Dr. S.K. Jawahar	ISRO & Govt. of Kerala
3.	Modulation of high glucose induced monocyte chemoattractant protein-1 gene expression in aortic endothelial cells	Dr. C. C. Kartha	Kerala State Council for Science, Technology & Environment.
4.	Adult human resident cardiac stem cells and endothelial progenitor cells: detection of optimum conditions for their therapeutic use	Dr. C. C. Kartha	Department of Biotechnology, Government of India.
5.	A 24-week, multicenter, randomized, double-blind, placebo-controlled evaluation of the efficacy, safety and tolerability of Donepezil Hydrochloride(E2020) in patients with dementia associated with cerebrovascular disease	Dr. P. S. Mathuranath	Sreenath Clinical
6.	Identification of Mycobacterium tuberculosis by <i>In-situ</i> hybridisation and demonstration of mycobacterial antigen in the CSF cytospin smears by an immunocytochemical method for the early laboratory diagnosis of tuberculous meningitis (TMB)	Dr. V. V. Radhakrishnan	DST
7.	Pilot study for comprehensive stroke care program.	Dr. K. Radhakrishnan	WHO
8.	Assessing Feasibility of setting up a population based stroke registry in a defined population: The Trivandrum Stroke Registry	Dr. K. Radhakrishnan	WHO

Sl. No.	Title	Principal Investigator	Funding Agency
9.	<i>Cardoguard</i> Tablet- delineation of molecular mechanism of action and Drugs and its efficacy in the regression Pharmaceutical of ventricular hypertrophy Research Programme.	Renuka Nair & A.C. Fernandez	Department of Science & Technology, Government of India
10.	Study of oxidative stress in women with epilepsy and its impact on fetal malformations	Dr. Sanjeev V. Thomas	Kerala Council for Science Technology and Environment
11.	Pro-inflammatory cytokine expression in cardiac fibroblasts in response to hypoxia: modulation by Substance P	Dr. K. Shivakumar	DBT
12.	Studies on Matrix Metalloprot einsase (MMP) gene transcrip tion by Nitric Oxide mechanism of MMP gene induction in human colon cancer cells	Dr. Srinivas. G	DBT
13.	Molecular basis for plumbagin as an antitumor and chemosensitizing agent in human breast cancer cells	Dr. Srinivas. G	DST
14.	Mechanisms of anticancer activity of ernodin /aloe ernodin: effects on cell growth angiogenesis and metastasis in human colon cancer cells.	Dr. G. Srinivas	DAE-BRNS
15.	A Multi-national, Multi-center, Open-label, Active-controlled, Randomized Parallel-Group Dose-finding Study to Evaluate the Efficiency and Safety of Two Doses of AP 12009 in Adult Patients with Recurrent High Grade Glioma, Administered Intratumorally as Continuous High-flow Microperfusion over a 7-day period Every other Week (study protocol no: AP 12009-G004)	Dr. Suresh Nair	SIRO CLINPHARM

Sl. No.	Title	Principal Investigator	Funding Agency
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ONGOING PROJECT

1.	Immunopathological studies in myasthenia gravis	Dr. Annamma Mathew	Department of Science and Technology, State Council, Kerala State.
2.	Detection and treatment of Cancer using Laser based Techniques.	Dr. A.K. Gupta	BRNS
3.	Diffusion Weighted imaging and other magnetic resonance based imaging modalities in human stroke	Dr. A. K. Gupta	DST
4.	Blood component separation unit Control Society	Dr. Jaisy Mathai	Kerala State AIDS
5.	Group Interactions in psycho-social care epilepsy Association	Dr. Jayachandran	Indian Epilepsy
6.	A 24-week, multi-center, randomized, double-blind, placebo-controlled evaluation of the efficacy, safety and tolerability	Dr. P. S. Mathuranath	CBNC
7.	Evaluation of sub types of Dementia in the cognitively impaired elderly subject in urban Kerala.	Dr. P.S. Mathurnath	Kerala State Council for Science Technology and Environment.
8.	Antiviral principles from Indian Medicinal Plants & their possible use to make blood transfusion safe & as antiviral drugs.	Dr. Molly Antony	Penpol
9.	Studies on anti-viral properties of some known medicinal plants vis-à-vis phytomedicine development.	Dr. Molly Antony	DBT
10.	Pilot study for Homograft Harvesting	Dr. P. V. Ramanarayanan	STEC
11.	Investigation of serum and urinary mucopolysaccharides in patients with coronary artery and cerebrovascular disease	Dr. Sandhyamani	KSCSTE
12.	Leukocyte and platelet deposition in atherosclerotic plaques: role of sugar- specific adhesion to endothelial	P.S.Appukuttan & S.R. Sangeetha	ICMR

Sl. No.	Title	Principal Investigator	Funding Agency
	lectin galectin-1 and prospect of its inhibition by human erythrocyte membrane oligosaccharide.		
13	Indian Registry of Epilepsy and Pregnancy	Dr. Sanjeev V. Thomas	European Registry
14	Indian Registry of Epilepsy and Pregnancy Coordination	Dr. Sanjeev V. Thomas	Indian Epilepsy Association
15.	Registry of pregnancy in women with epilepsy	Dr. Sanjeev V. Thomas	ICMR
16.	Angiotensin II in the pathogenesis of myocardial lesions in magnesium deficiency.	K.Shivakumar	Indian Council of Medical Research
17.	Neuronal control of cardiac growth: Does substance P Technology,regulate cardiac fibroblast function?	K. Shivakumar	Department of Science & Government of India.
18.	Femoropopliteal bypass graft with reversed saphenous-A retrospective study of 110 patients operated upon over 10 years	Dr. M. Unnikrishnan	STED

COMPLETED PROJECTS

1.	Does cerium activate endocardial Endothelial Cells? (Molecular Basis of Endomyocardial Fibrosis).	Dr. C.C. Kartha	DST
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BIOMEDICAL TECHNOLOGY WING**INDUSTRY SPONSORED PROJECTS****NEWLY INITIATED**

Sl. No.	Title	Principal Investigator	Funding Agency
1.	Pilot level production of HAP granules	Dr. H.K. Varma	Dynamic Techno Medicals Pvt. Ltd, Aluva
2.	Biofunctional evaluation of paclitaxel eluting coronary stent-preclinical evaluation in porcine model	Dr. P. R. Umashankar	Sahajanand Medical Technologies Pvt. Ltd, Surat
3.	Biofunctional evaluation of sirolimus eluting coronary stent - preclinical evaluation in porcine model	Dr. P.R. Umashankar	Sahajanand Medical Technologies Pvt. Ltd, Surat
4.	Biofunctional evaluation of PDA closure device-preclinical evaluation in porcine model	Dr. P.R. Umashankar	Vascular Concepts Ltd, Bangalore

COMPLETED PROJECTS

1.	Development of new sizes of TTK Chitra Heart Valve prosthesis	Mr. Muraleedharan CV	M/s. TTK Healthcare Ltd, Chennai
2.	Development of 30 channel test system for quality control of hydrocephalus shunts	Mr. Muraleedharan CV	M/s. Hindustan Latex Ltd, Trivandrum
3.	Chitosan wound dressing materials	Dr. Chandra P. Sharma	Dynamic Techno Medicals Pvt. Ltd, Aluva
4.	Scale up of dental composite technology	Dr. Kalliyankrishnan V	Dynamic Orthopedics, Aluva

BIOMEDICAL TECHNOLOGY WING

NEWLY INITIATED PROJECTS

Sl. No.	Title	Principal Investigator	Funding Agency
1.	Clinical evaluation of medical instruments developed By BARC	Dr. Jindal (BARC) and Dr. Niranjana D Khambete, Co P I	DST
2.	Quantitative immunophenotyping of inflammatory cells in biocompatibility assessment of materials	Dr. Mira Mohanty	DST
3.	Development of an in vitro pyrogen test kit: evaluation of pyrogenicity using human whole blood	Dr. Mohanan PV	DBT
4.	Polysaccharides for medical applications	Dr. Nirmala R James	DST Women Scientist Scheme
5.	Development of smart biomaterials for cardiovascular tissue engineering	Dr. Prabha D Nair	DBT
6.	Islet immunoisolation with xenotransplantation and stem cell regeneration to Islets As strategies for treatment of diabetes.	Dr. Prabha D Nair	DBT
7.	Development of temperature responsive copolymers as sensing elements for C-reactive protein	Dr. Sreenivasan K	Life Science Research Board, DRDO

ONGOING PROJECTS

1.	Ultrastructural study of the interface between bone and bioactive ceramics – pre-clinical evaluation.	Dr. Annie John	KSCSTE, Govt. of Kerala
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Sl. No.	Title	Principal Investigator	Funding Agency
2.	Bone regeneration in a diabetes-induced rat model	Dr. Annie John	DST
3.	Bone regeneration in large segmental defects using tissue engineered new generation bioceramic scaffold.	Dr. Annie John	Life Sciences Research Board, DRDO
4.	Langmuir-Blodgett Monolayer on polymer substrates: blood compatibility	Dr. Chandra P Sharma	DST
5.	Injectable adhesive biomaterials for vascular applications	Dr. Jayakrishnan A	Indo-French Centre, New Delhi
6.	Development of an in vitro coculture system of hepatocytes and endothelial cells for bioartificial liver.	Dr. Kumary T.V	KSCSTE, Govt. of Kerala
7.	Immune mechanisms of polyurethane degradation.	Dr. Mira Mohanty	Life Sciences Research Board, DRDO
8.	Development of improved tilting disc heart valve (PASTER)	Mr. Muraleedharan C.V	CSIR
9.	Technology development and commercialization of hemoconcentrators for open heart surgical application.	Mr. Nagesh D.S	TIFAC
10.	Development of movement artefact free breathing monitor based on impedance pneumography.	Dr. Niranjana D. Khambete	DST

COMPLETED PROJECTS

1.	Experimental evaluation of EPC-Lined dacron vascular grafts in sheep models	Dr. Lissy Krishnan	DST
2.	Development and biocompatibility studies on organically modified ceramics for medical applications.	Dr. Lizymol P.P	DST

Sl. No.	Title	Principal Investigator	Funding Agency
3.	Development of a new photoinitiator for dental applications	Dr. Lizymol PP	KSCSTE, Govt. of Kerala
4.	Apatitic calcium phosphate bone cements	Dr. Manoj Komath	KSCSTE, Govt. of Kerala
5.	Development of non-toxic latex formulation for biomedical applications.	Dr. Mohanan PV	DST
6.	Design & development of centrifugal pump for extracorporeal cardiopulmonary bypass	Mr. Nagesh D.S	DST
7.	Biopolymers for medical applications	Dr. Prabha D. Nair	KSCSTE, Govt. of Kerala.
8.	Fabrication of clinically significant shapes of hydroxyapatite - ethylene vinyl acetate co-polymer composites for bone substitute application by special thermoforming techniques.	Dr. Ramesh P	DST-DAAD

SCTIMST TECHNOLOGY DEVELOPMENT FUNDED PROJECTS

NEWLY INITIATED PROJECTS

Sl. No.	Title	Principal Investigator	Duration
1.	Preclinical evaluation of calcium phosphate cement.	Dr. H. K. Varma	1 year
2.	Pulp and dentine test for single solution bonding agent.	Dr. V. Kalliyankrishnan	10 months
3.	Fluoropassivation of polyester fabric for improved tissue compatibility: a feasibility study	Dr. Roy Joseph	1 year
4.	A process for producing hydrophilic lubricious coating on natural rubber latex products.	Dr. P. Ramesh	1 year
5.	Standardization and evaluation of genotoxicity studies.	Dr. P.V. Mohanan	1 year

ONGOING PROJECTS

1.	Toxicological evaluation of a dual cure dental composite restorative material.	Dr. V. Kalliyankrishnan	2 years
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COMPLETED PROJECTS

1.	Development of a test set-up for disposable ECG electrodes.	Dr. Niranjana D. Khambete	2 years
2.	Development and evaluation of antimicrobial silver oxide coated latex material for use as urinary catheter	Dr. A Maya Nandkumar	3 years

SCIENTIFIC PUBLICATIONS

ACHUTHAMENON CENTRE FOR HEALTH SCIENCE STUDIES

1. Abrahams N, Adhikari R, Bhagwat IP, Christofides N, Djibuti M, Dyalchand A, Gotsadze G, Grzmava O, Huertas LL, Jacobs T, Jewkes R, Kapadia-Kundu N, Karnikowski MG, Kimboka S, Kitua AY, Lens JU, Lopez A, Lugina H, Malecela-Lazaro, Mashalla Y, Mishra A, Mishra SK, Mlay R, Moreno MJ, Mpanda S, Mwanga F, Ndossi G, Nigenda G, Nkwera A, Nobrega OT, Pahari SK, Paz SA, Phoolchareon W, Ramachandran P, Rannan-Eliya RP, Rodrigues KG, Salazar A, Sarma PS, Shija J, Silver LD, Tatsanavivat P, Thankappan KR, Tuesta AJ, Vasadze O, Velez AC, Webster N, Yesudian CA. Changing the debate about health research for development. International Health Research Awards Recipients. *J Public Health Policy* 2004; 25: 259-87.
2. Nair VM, Thankappan KR, Vasan RS, Sarma PS. Community utilisation of subcentres in primary health care-an analysis of determinants in Kerala. *Indian J Public Health* 2004; 48:17-20.
3. Raveendran T K. Zeroing in on gender discrimination. *Health Action* 2004; 17 : 4-7
4. Ravindran TK, Balasubramanian P. "Yes" to abortion but "no" to sexual rights: the paradoxical reality of married women in rural Tamil Nadu, India. *Reprod Health Matters* 2004;12:88-99.
5. Sudha S., S. Irudaya Rajan, P S. Sarma. 'Intergenerational family support for older men and women in South India'. *Indian J of Gerontology* 2004; 18: 449-65.
6. Varatharajan D. Provision of health care by the government. *Indian J of Medical Ethics* 2004; 1:117-18.
7. Varatharajan D. Impact of fiscal crisis on public health services in Kerala. In: Prakash BA ed. Kerala's Economic development: Performance and problems in the post-liberalization period. New Delhi: Sage Publications, 2004, 335-55

HOSPITAL WING

Books

1. Radhakrishnan K. Reviews in Indian Neurology 2004. Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum 2004.
2. Radhakrishnan K. Silverlines. Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum 2004.

Chapters in books

1. Ashalatha R, Nair MD. Immunotherapy for Gullian Barre Syndrome-In:Radhakrishnan K. ed. Reviews in Indian Neurology. Sree Chitra Tirunal Institute for Medical Sciences and Technology: Trivandrum, 2004: 237-54.
2. Bhattacharya RN, Rao BRM, Easwer HV, Rajesh BJ, Menon G, Muthuretnam T, Abraham M, Nair S. Changing trends in the management of pineal region tumors. In: BS Sharma ed. *Progress in Clinical Neurosciences* 2004; 19: 101-27.
3. Nair S, Menon G. Syringomyelia: Current controversies in etiopathogenesis and management In:Radhakrishnan K ed. Reviews in India Neurology. Sree Chitra Tirunal Institute for Medical Sciences and Technology: Trivandrum, 2004;167-93.
4. Nair S, Rao BRM, Menon G, Bhattacharyra RN. Petroclival meningiomas. In: Sharma BS ed. *Progress in Clinical Neurosciences* 2004; 19: 79-100.
5. Nair S, Rao BRM, Kachhara R, Easwer HV, Rajesh BJ, Muthuretnam. T, Menon G, Bhattacharya RN. Current perspectives in hearing preservation in large acoustic

schwannomas. In: Sharma BS ed. *Progress in Clinical Neurosciences*, 2004: 19: 216-25.

6. Radhakrisnan K, Sylaja PN. Neuro epidemiology in the topics. In: Misra UK, Kalita J, Shakir RA. Georgeton ed. *Tropical Neurology*. Texas: Landes Bioscience, 2004: 491-511.
7. Shivakumar K, Kumaran C. Magnesium deficiency and cardiovascular disease: molecular mechanisms and recent advances. In: Nath R, Khullar M and Singhal PK ed. *Antioxidants and Cardiovascular Disease*. New Delhi: Narosa Publishing House, 2004; 180-97.

Publications in Journals

1. Apurba Sarma, Theodore S, Karunakaran J, Hari Krishnan SP, Neelakandhan KS. Revascularisation for left main ostial stenosis in Takayasu's disease. *Indian J Thorac Cardiovasc Surg* 2004; 20:137-9.
2. Ashalatha.R, Radhakrishnan.VV, Radhakrishnan.K, Sarma PS. Medically refractory epilepsy associated with temporal lobe gangliogliomas: characteristics and post-operative outcome. *Neurology Asia* 2004; 9:130-1.
3. Ashalatha R, Kishore A, Sarada C, Nair MD. Satayoshi syndrome. *Neurology India* 2004; 56: 93-4.
4. Bak TH, Rogers TT, Crawford LM, Hearn V, Mathuranath PS, Hodges JR. Cognitive bedside assessment in atypical parkinsonian syndromes. *J Neurol Neurosurg Psychiatry* 2005; 76: 420-2.
5. Bhattacharya RN, Easwer HV, Rajesh BJ, Nair S, Menon G, Rao BRM, Muthurenam T,

- Abraham M, Sudish K. Basilar artery aneurysms. *Indian J of Cerebrovasc Surg* 2005; 1:6-14.
6. Gayatri P. Post operative pain services. *Indian Anaest* 2005; 49: 17-19.
 7. Gupta A.K, Varma D R. Vein of Galen malformations: Review Article. *Neurol India* 2003; 52:43-53.
 8. Gupta AK, Joseph S, Kapilamoorthy T.R., Kesavadas C, T. Bejoy, Purkayastha S. Carotid Artery Stenting – An Indian Experience. *Rivista di Neuroradiologia* 2003; 16: 1169-72.
 9. Gupta A K, Joseph S, Bhattacharya R N, Kapilamoorthy T R, Kesavadas C, Thomas B. Coil Embolization for Intracranial Aneurysms: An Indian Experience. *Rivista di Neuroradiologia* 2003; 16: 1223-6.
 10. Gupta A K, Rao V R K, Kapilamoorthy TR, Bhattacharya R N, Joseph S, Krishnamoorthy T. Endovascular Treatment of Carotido-cavernous Fistula. *Rivista di Neuroradiologia* 2003; 16: 1287-8.
 11. Gupta A K, Rao V R K, Kapilamoorthy TR, Joseph S, Kesavadas C, Bejoy T. Preoperative Embolization of Craniofacial Vascular Malformations. *Rivista di Neuroradiologia* 2003; 16: 1269-71.
 12. Gupta A K, Rao V R K, Bhattacharya R N, Joseph S, Kapilamoorthy T R, Krishnamoorthy T. Spinal Arteriovenous Malformations Role of Interventional Neuroradiology. *Rivista di Neuroradiologia* 2003; 16: 1275-6.
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 14. Gupta A K, Kapilamoorthy T R, Joseph S, Bejoy T. Intra – Arterial Thrombolysis in Stroke and Procedure-Related Complications. *Rivista di Neuroradiologia* 2003; 16: 1337-8.
 15. Gupta A K, Rao V R K, Joseph S, Kapilamoorthy T R, Bejoy T, Varma D R. Vein of Galen Malformations: An Indian Experience. *Rivista di Neuroradiologia* 2003; 16: 1304-7.
 16. Gupta A K, Kapilamoorthy T R, Joseph S, Bejoy T. Intra – Arterial Thrombolysis in Stroke and Procedure-Related Complications. *Rivista di Neuroradiologia* 2003; 16: 1337-8.
 17. Gupta A K, Kapilamoorthy T R, Bejoy T, Santhosh J, Kesavadas C. Thrombolysis in Dural Sinus Thrombosis. *Rivista di Neuroradiologia* 2003; 16: 1339-41.
 18. Gupta A K, Joseph S, Kapilamoorthy T R, Kesavadas C, Bejoy T. Direct Puncture Embolization of Head and Neck Tumor. *Rivista di Neuroradiologia* 2003; 16: 1344-46.
 19. Gupta A K, Kapilamoorthy T R, Joseph S, Thomas B, Kesavadas C, Bodhey N K. Percutaneous Laser Disc Decompression: Indian Experience and Long term follow up. *Rivista di Neurodiologia* 2003; 16: 1371-2.
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- radiculopathy: an unusual clinical syndrome in intracranial sino-venous thrombosis. *Neurology India* 2004; 56: 95-97.
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43. Neema PK. Monitoring in pediatric anesthesia (Review article). *Indian J Anaesth* 2004; 48:365-75.
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HONOURS, AWARDS AND RECOGNITIONS

Dr. T.V. Anil Kumar and Dr. P.V. Mohanan were elected as Fellows of the Society of Toxicology, India.

Mr. Anil Kumar PR, Ph.D student was awarded the Young Scientist Best Paper Award in Health Science category of XVII Kerala Science Congress held at Peechi, Kerala on 29-31st Jan, 2005.

Dr. Hetalkumar D Shah, PDCC candidate, got best paper presentation award during Annual Conference of ISA- West Zone held at Ahmedabad from 30-31st Oct.2004.

Mr. K. Kaladhar, bagged the second best presentation award at Macro 2004, International Conference on Polymers for Advanced Technologies, Dec 15-17, 2004. Title of the presentation was “Modification of chitosan using N- aryl anthranilic acid derivatives for insulin delivery”.

CC. Kartha was elected as a Fellow of National Academy of Medical Sciences, India.

CC. Kartha was nominated to the Ethical Committee for Biomedical Research on Human Subjects of the University of Kerala.

Dr Mathew Abraham received best paper award in Epilepsy Ceba Giegy award session in the 53rd National Conference of NSI held at INDORE during 15th- 19th December 2004 for the paper “Functional hemispherectomy and hemispherotomy for medically refractory epilepsy due to unihemispheric pathology”.

Dr. P.V. Mohanan was elected as a Fellow of Academy of Sciences for Animal Welfare [FASc (Aw)]

Dr. P.V. Mohanan became a member of the Advisory Board, Toxicology International journal, published by Society of Toxicology, India

Dr. V.V. Radhakrishnan has been elected as a Fellow of the National Academy of Medical Science during this year.

Ms. G. S. Sailaja obtained best poster presentation award in the INDO-Australian conference on Biomaterials, Implant devices and Tissue Engineering, BITE 2005, Trivandrum for her paper “Biomimetic growth of hydroxyapatite on a novel functionally modified poly(2-hydroxy ethyl methacrylate-co-methyl methacrylate).

Mr. Sandeep G, Research Assistant, received the BAJPAI-SAHA Award for the best paper presented at the XV National Conference of Society for Biomaterials and Artificial Organs-India on Medical Devices and Biomaterials: Quality Assurance, Ethics and Regulatory Issues, 21-22 January 2005.

Dr. Sanjeev V. Thomas was awarded the Tadakoro Certificate for the best poster presentation at the 5th Asian Oceanian Epilepsy Congress, Bangkok, Thailand 2004.

Dr Sunil Valentine Furtado was awarded “NSI MCQ award” in the 53rd National Conference of NSI held at INDORE during 15th- 19th December 2004.

VISITORS

ACHUTHA MENON CENTRE

The World Bank team visited the Centre on 5th March 2005 to discuss about Kerala's secondary health system project.

Dr. V Raman Kutty, Health Action by People, Thiruvananthapuram taught a module of health policy analysis course in November-December 2004.

Mr. Ravi Duggal, CEHAT, Mumbai visited the centre during July 2004 to teach a module under health economics course.

Mr. Subrata Banerjee, Centre for Development Studies taught a module of health economics course during July-August 2004.

Professor Loke Bikram Thapa, Vice-chancellor, B.P. Koirala Institute of Health Sciences, Nepal has visited the center in January, 2005

18 Students from the Harvard School of Public Health visited the center during January, 2005 as a part of their study programme. The team was headed by Dr. Richard A. Cash, Harvard School of Public Health, USA.

BMT WING

Dr. John AM Ramshaw, Chief Research Scientist at CSIRO Molecular Science, Australia visited the BMT wing.

Dr. Anne Christine Albertson, Lund University, Sweden visited the Biosurface laboratory on December 18, 2004.

Prof. Subbu S. Venkatraman, Associate Professor in Materials Science & Engineering, Nanyang Technological University, Singapore visited the BMT wing and delivered a lecture. He held discussions on possible areas of collaboration as a follow-up to the visit there from our side.

Mr. Inder Jaggi, CEO, Novakos, USA visited the BMT Wing and held discussions on possible areas of collaboration.

Dr. Steven Wood and Dr. Dawn Walker from University of Sheffield visited BMT wing and held discussions on technical areas of mutual interest.

Prof. Yasuhiko Tabata Ph.D, Professor and Chairman, Department of Biomaterials, Field of Tissue Engineering, Institute for Frontier Medical Sciences, Kyoto University, Japan, visited BMT wing.

Prof. Hanry Yu, Associate Professor, Dept of Physiology at National University of Singapore visited the BMT wing

Dr. Laura Poole Warren, University of Sydney, Australia, visited BMT wing.

Ms. Katie Styan, University of Sydney underwent a short term research program on synthesis and characterisation of polyurethane-silica nanocomposites in the Polymer Analysis lab.

Prof. Denis Labarre, Centre d'Etudes Pharmaceutiques, University of Paris (Sud), France visited the Polymer Chemistry Division and held discussions on the progress of the project "Injectable adhesive biomaterials for vascular applications"

Ms. Fumani Matlhare from VAAI University of Technology (South Africa) of Biological Sciences, B.Tech student in Biomedical Technology, visited this institute as part of junior student exchange program

HOSPITAL WING

Nursing students (18) and Nursing co-ordinator Ms. Gurrie Aalmo from Department of Nursing Stockholm Sweden visited the Institute on 8th January 2004.

Prof. Joachim Laas from Bad Bevensen in Germany visited the hospital and demonstrated the use of freestyle valve for aortic root replacement.

Dr. Gouri Devi, former Professor and Head, Department of Neurology, and Director and Vice Chancellor, NIMHANS, Bangalore visited the Department of Neurology on 21st June 2004.

Dr Wajtek Rakowicz Consultant Neurologist, Hallington Hospital, Uxbridge, U K, visited the neurology department from 8th Sept to 15th Sept 2004. He conducted bedside postgraduate case discussions and delivered the following lectures 'Hereditary motor neuron diseases; curiosities or windows to the future?' and 'Muscular Dystrophies: A clinical approach.'

Dr. Nathan, consultant neurophysician, Sushrusha Hospital and Dr. Shemim Nathan visited R. Madhavan Nayar Centre for Comprehensive Epilepsy Care from 19.04.04 to 21.04.04. They actively participated in presurgical evaluation, patient management conference and epilepsy surgery. A discussion regarding ketogenic diet was also conducted.

Dr. Shilpi Dhawan, from B.R.D. Medical College, Gorakhpur, UP, visited the R. Madhavan Nayar Centre for Comprehensive Epilepsy Care as an observer, from June 1-26,2004.

Dr. Ravindra Kumar Saran, Associate Professor of Neuropathology, Maulana Azad Medical College, New Delhi, visited, R. Madhavan Nayar Centre for Comprehensive Epilepsy Care on 04.05.04. He had discussions about the pathology of epileptic brain tissue.

Dr. Joy Vijay, Lecturer, Department of Neurology, CMC, Vellore, was in the epilepsy section as an observer from August 15th to September 15th 2004.

Dr.Ranjani Gamage, Head of Epilepsy Task Force, Sri Lanka along with a team of 3 doctors (neurosurgeon, electrophysiologist and anesthesiologist) visited the epilepsy centre from 15.02.05 to 19.02.05. They attended the presurgical evaluation and intraoperative sessions.

Dr.Sunil Periera, University of Colombo. SriLanka visited the Movement Disorder Section.

Dr. Pulak Deb, University of Calcutta, West Bengal, visited the Movement Disorder Section.

Dr. B. Lokesh, Assistant Professor in Neurology, Kasturba Hospital, Manipal, Mangalore spent a month as an observer in CBNC and Epilepsy sections of Neurology.

Ms. Vandana Purushottaman, PhD student from the All India Institute of Speech and Hearing, Mysore, spent 3 weeks as an observer in CBNC.

VISITS ABROAD OF FACULTY MEMBERS

Dr. Asha Kishore visited the department of Neurology, University of Colombo, Sri Lanka to initiate and train the faculty in the presurgical evaluation and selection of candidates for surgical treatment of Movement Disorders.

Dr. Asha Kishore did a one month sabbatical at the Movement Disorders Program, Institute of Neurology, Queen Square London, and a 3 months sabbatical at the Movement Disorder Program, University of Toronto, Canada.

Dr. T V Anilkumar carried out his Post Doctoral Fellowship in 'Animal models in tissue engineering' at the National Centre for Biomedical Engineering Sciences, National University of Ireland, Ireland, from 28 October 2003 to 27 October 2004.

Mr. Anil Kumar PR, PhD student successfully completed six months attachment program entitled "Study of hepatocyte endothelial cell interaction using confocal microscopy" with Department of Physiology at National University of Singapore utilizing Jawaharlal Nehru Memorial Scholarship for doctoral studies

Dr. Anoopkumar Thekkuveetil was a Fellow at Harvard University, USA (September 2004 to January 2005).

Dr. R.N. Bhattacharya visited "Wayne State University; School of Medicine" in Detroit during 6th – 13th August. He has also visited "South Western University: School of Medicine" in Dallas during 16th –20th August, "Louisiana State University Health Science Center, Shreveport" Louisiana during 23rd-25th August, "Roosevelt hospital" New York during 26th and 27th August, Barrow Neurological Institute, USA as a visiting faculty during 14th-19th November 2004.

Dr. G.S.Bhuvaneshwar & Dr. Sharma visited Nanyang Technological University Singapore to have discussion with Prof. S.S. Venkatraman, School of Materials Engineering regarding the development of collaborative programmes between SCTIMST and NTU, Singapore during February 1 to 5, 2005. They also visited the National University of Singapore.

Dr. A.K.Gupta visited Department of Neurological Sciences, University La Sapienza Rome Italy as a scientist to take part in Indo-Italian programme of co-operation in science and technology 2002-2004 scientific project MH6 (Magnetic Resonance Imaging in Stroke). (Period July 15th to Oct 15th).

Dr. Jayakrishnan visited the Faculty of Pharmacy, University of Paris (Sud), France and held discussions with the French collaborators on the progress of the project “Injectable adhesive biomaterials for vascular applications” from 21.10.2004 to 10.11.2004.

Dr.T.R.Kapilamoorthy visited Department of Neurological Sciences, University La Sapienza Rome Italy as a scientist to take part in Indo-Italian programme of co-operation in science and technology 2002-2004 scientific project MH6 (Magnetic Resonance Imaging in Stroke). (Period May 1st to July 31st 2004).

Dr. K. Radhakrishnan and Dr. Sylaja. P. N visited National Hospital, Colombo, from 17- 19th December 2004 for Phase II of their Epilepsy Surgery Program

as a part of Epilepsy Task Force. They provided their expertise in detailed case discussions with epilepsy team and helped in the selection of patients for epilepsy surgery.

Dr. K. Sreenivasan worked as a visiting fellow in the Indo- French project “Injectable adhesive biomaterials for vascular applications” for a period of 6 months from May to November, 2004 in the Centre D’ etudes Pharmaceutiques, Universite Paris (Sud), France.

P.R. Umashankar visited Centre for Research in Interventional Imaging, INRA, Jouy en Josas, France as part of an Indo-French project to evaluate a polymer for endovascular coating and for applications as surgical glue.

FUNCTIONS, WORKSHOPS & CONFERENCES

BIO MEDICAL TECHNOLOGY WING

Indo-Australian Conference on Biomaterials, Implantable Devices and Tissue Engineering (BITE 2005), Jointly Organised by Sree Chitra Tirunal Institute for Medical Sciences & Technology, Thiruvananthapuram & Australian Education International, Australian High Commission, New Delhi Sponsored by Department of Science & Technology, Govt. of India at SCTIMST, Thiruvananthapuram was held during 19-21 January 2005.

This conference was an effort to review the current state of knowledge in the area of biomaterials, implantable devices and tissue engineering, and explore the possibilities for future collaborative programmes. In particular, the emerging technologies of tissue engineering, where a living assembly based on the patients own cells and a delivery scaffold, is used to specifically repair diseased or damaged tissue, as the key area for progress in this challenging area of health care.

The inauguration of the conference was done at 5.00 p.m on 19th January 2005 Thiruvananthapuram by Dr. R. Chidambaram, Principal Scientific Adviser to Govt. of India & President, Sree Chitra Tirunal Institute for Medical Sciences & Technology (SCTIMST). Prof. K. Mohandas, Director, SCTIMST, Thiruvananthapuram & Chair, Association of Commonwealth Universities, presided the function. Felicitations were by Mr. Quentin Stevenson-Perks, Counsellor, Education, Science and Training, Australian High Commission Dr. GS Bhuvansewar, Head, BMT Wing, SCTIMST, Shri S.K. Varshney, Director, International Division, DST, New Delhi. Dr. Chandra P Sharma, Chairman, Organising Committee welcomed and vote of thanks was given by Shri. D.S. Nagesh, Convener, Organising Committee.

The list of speakers were

Australia

Dr. John A.M. Ramshaw, CSIRO, Melbourne, Dr. Tony Weiss, USYD, Dr. John Whitelock, University of New South Wales, Dr. Justin Cooper-White, University of Queensland, Dr. Martina Stenzel, University of New South Wales, Dr. Jerome Werkmeister, CSIRO, Melbourne, Dr. Laura Poole-Warren, University of New South Wales, Dr. Glenn Edwards, University of Melbourne, Dr. Keith McLean, CSIRO, Melbourne

India

Dr. Mary Babu, CLRI, Chennai, Dr. Satish Totey, Manipal Hospital, Bangalore, Dr. Ajit K. Banthia, IIT Kharagpur, Dr. Alok R. Ray, IIT Delhi, Dr. S. Pal, Jadavpur University, Kolkata, Dr. K. Satyamoorthy, MAHE, Manipal, Dr. Bhubanesh Gupta, IIT Delhi, Dr. Bikramjit Basu, IIT Kanpur, Dr. Rinti Banerjee, IIT Bombay, Dr. Dharendra S. Katti, IIT Kanpur, Dr. T.V. Kumary, BMT Wing, SCTIMST, Dr. G.S. Bhuvaneshwar, BMT Wing, SCTIMST, Dr. Chandra P. Sharma, BMT Wing, SCTIMST.



Dr. Chidambaram, President of the Institute inaugurates the Indo-Australian conference on Biomaterials.

XV National Conference of Society for Biomaterials and Artificial Organs (India) on Medical devices and Biomaterials: Quality assurance, Ethics and Regulatory issues was carried out at Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram, during 21-22 January 2005. The conference was inaugurated by Prof. K. Mohandas (Director, SCTIMST & Chair, Association of Commonwealth Universities) at 3.15 p.m on Friday, 21st January 2005, at Achutha Menon Centre Auditorium, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram – 695 011. Prof. A. K. Banthia

(President – SBAOI & Prof and Head- Material Science Research Centre – IIT Khargpur) presided over the function. Dr. G.S. Bhuvaneshwar (Chairman, Organising Committee & Head, BMT Wing SCTIMST) gave the welcome speech, Dr. Chandra P. Sharma (Founder, SBAOI & Scientist-SCTIMST) felicitated, Sri. D.S. Nagesh (Organising Secretary & Scientist-SCTIMST) gave the vote of thanks.

During the inaugural function, Chandra P. Sharma awards for 2003 and 2004 was given to Prof. Leo Vroman (Professor & Director of Bioengineering, Veterans Administration Medical Centre in Brooklyn, USA) and Prof. Xingdong Zhang, FBSE (Director of National Engineering Research Center for Biomaterials, Sichuan University, Peoples Republic of China) respectively.

Along with experts from all leading institutions in India, Dr. Shintani, H (National Institute of Health Sciences, Japan), Dr. Fazal Mohammad. S (University of Utah, USA), Dr. Rajendra S. Bhatnagar (University of California, San Francisco & Berkeley, USA), Dr. Suryanayana, R (University of Paris, France), Prof. Mirza Rosca (Las Palmas de Gran Canaria University, Spain) also presented their work during the conference.



Director K. Mohandas releases the souvenir of the National conference of SOBAO, India

Silver Jubilee Year Celebrations of Society of Toxicology, India

The Silver Jubilee Year celebrations of Society of Toxicology, India was held at Sree Chitra Tirunal Institute for Medical Sciences and Technology Thiruvananthapuram during October 28-30, 2004. The Celebrations was inaugurated by His Highness Sri Padmanabha Dasa Marthanda Varma Maharaja. Dr. Mohandas, Director of our Institute Presided over the function. His Excellency, The Governor of Kerala Sri RL Bhatia inaugurated the valedictory function. Dr. PV. Mohanan was the Organizing Secretary of the conference.

A National Symposium on Good Laboratory Practice and Regulatory Issues was organized in connection

with the Silver Jubilee Year Celebrations of Society of Toxicology, The main aim was to communicate the ideas and advantages of GLP and regulatory Issues among the scientific community. The meeting catalyzed the spread of awareness among the young scientific community and moulded their thought process, so that Research and Development in India gears up to meet the GLP requirements and lead to globally competitiveness.

The highlight of the symposium was a Continuing education course on Good Laboratory Practice by Dr. Nigel Dent, Director, Country Consultancy, UK. More than 220 delegates from India and abroad attended the symposium



His Highness Uthradam Thirunal Maharaja inaugurates silver jubile celebrations of STOX 3.A.

ACHUTHA MENON CENTRE FOR HEALTH SCIENCE STUDIES

The World Health Organisation (WHO) has identified tobacco use as one of the major preventable causes of death and disease in the world, currently accounting for nearly 5 million deaths annually and projected to escalate to 10 million by 2030, disproportionately affecting developing countries like India, where 70% of the deaths are likely to occur. Half of these deaths will occur during middle age (35-69 years), which is when people are at their productive best.

Against this backdrop, in a pioneering multi-country effort, 3 US Universities in collaboration with the Achutha Menon Centre for Health Science Studies of the Sree Chitra Tirunal Institute for Medical Sciences and Technology (in India) and the Gadjah Mada

University (in Indonesia) have started work on a research project with the overall goal of increasing capacity for tobacco cessation. The ultimate aim of this project is to develop culturally suitable tobacco cessation inventions, based on extensive formative research among different sections of the society, which could be implemented in both nations.

The tobacco cessation Initiative was officially launched at a meeting organized at the Achutha Menon Centre Auditorium. Justice Narayana Kurup delivered the key note address for this meeting. Dr. Myra L Muramoto MD, MPH Associate Professor of department of family and community medicine, University of Arizona USA spoke on the medical impacts of tobacco use, need for introduction of tobacco control in patient care and medical curriculum in the same meeting.

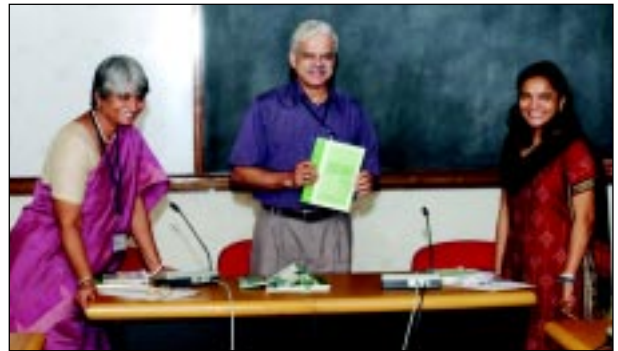


Justice Narayana Kurup delivering the key note address of the Tobacco cessaion initiative.



Dr. Myra L Muramoto, MD., MPH Asso. Professor of department of family & community medicine, University of Arisona, USA at the seminar on Medical Impact of tobacco use and introduction of Tobacco control in patient care and Medical curriculum.

The Dissemination workshop to present the findings of the National Report of the 'Abortion Assessment Project of India' held on August 13, 2004 at the AMCHSS Seminar Hall, SCTIMST. On this occasion a brief presentation of the Kerala study was also made. The Director, K. Mohandas released one of the state reports of this study, ' Situational Analysis of MTP Services in Kerala: Community Perspectives' on this occasion. The report was received by a representative of CEHAT, Mumbai, the organisation that coordinated all of the studies under the 'Abortion Assessment Project of India'.



Director Prof. K Mohandas releases report on situational analysis of MTP services in Kerala: community perspectives



Honorable Minister for Education Sri. E.T. Mohammed Basheer inaugurates the TOLIC meeting.



Participants of the joint meeting on higher education organized of AIU and Australian High Commission in India

CONFERENCE ATTENDED BY STAFF**INTERNATIONAL CONFERENCES**

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. R. Ashalatha	5 th Asian – Oceanian Epilepsy Conference1	Bangkok, Thailand Aug, 2004	Ganglioglioma and medically refractory TLE -characterities and postoperative outcome
Dr. R. Ashalatha	5 th Asian – Oceanian	Bangkok, Thailand Aug, 2004	Utility of emer gent EEG– a Epilepsy Conference1 critical reappraisal
Dr. Asha Kishore		Rome	Mutational Screening of June, 2005 Parkin in a South Indian population on Parkinson's disease and Movement Disorders.
Dr.Bejoy Thomas	12 th Scientific Meeting of ISMIRM	Japan May, 2004	Diffusion Tensor Imaging & Fiber Tracking in degeneration in Motor and sensory pathways in Periventricular 1 leukomalacia.
Dr. G.S.Bhuvaneshwar	7 th World Biomaterials Congress.	Australia May, 2004	Medical Devices Testing & Quality Assurance – an Indian experience
Dr. G.S.Bhuvaneshwar	Indo US work shop on “Innovation & Radical Innovation,” Technopark.	Trivandrum Dec, 2004	“Innovation at SCTIMST – an Indian experience”
Dr. Chandra P Sharma	7 th World Biomaterials Congress.	Australia May, 2004	Improvement in Blood Compatibility of Immunoad- sorbent Matrix for hemoperfusion

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. Chandra P. Sharma	7 th World Biomaterials Congress.	Australia May, 2004	Blood Compatibility of Cell Mimetic Surface Coatings.
Dr. Chandra P. Sharma	7 th World Biomaterials Congress.	Australia May, 2004	Tricalcium Phosphate Micromatrix for Oral Insulin Delivery: A Proof-of-Concept Study
Dr. Chandra P. Sharma	7 th World Biomaterials Congress.	Australia May, 2004	Chitosan Based Microparticles for Oral Insulin Delivery.
Dr. Chandra P. Sharma	7 th World Biomaterials Congress.	Australia May, 2004	Zinc Phosphate Ceramic articles for Oral Insulin Delivery
Dr. Chandra P. Sharma	7 th World Biomaterials Congress.	Australia May, 2004	Surface Modifications: Blood Compatibility of Cardiovascular Devices
Dr. Chandra P. Sharma	BITE- 2005 : Indo-Australian Conference on Tissue Engineering.	Trivandrum Jan, 2005	Plenary Lecture Polymeric nano/ Biomaterials, Implant Devices microparticles towards and potential oral insulin delivery.
Dr.A.K.Gupta	2 nd World Congress of Interventional Cardiology Society of India.	Mumbai Feb, 2005	
Dr. M S Harikrishnan	CSI 2004		Long-term follow-up of mitral valve replacement (MVR) in children- poster presentation.
Dr. M S Harikrishnan	CSI 2004		Comparison of mitral valve replacement (MVR) in younger and older children- poster presentation.

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. M S Harikrishnan	CSI 2004		Long-term follow- up of aortic valve replacement (AVR) in children poster presentation.
Dr. S. K. Jawahar	International Telemedicine Conference	Bangalore March 2005	Tele Health and Medical Education- Kerala.
Mr. Joy Vithayathil	National Convention on Information and Knowledge Management in Health Science: Newer Perspective.	University of Madras Dec. 2004	Electronic Journal its accessibility in Medical Libraries with special reference SCTIMST Library
Dr. C.C. Kartha	XVIII World Congress of the International Society for Heart Research	Australia Aug. 2004	Cardiomyopathis in the Tropics
Dr. Krishnakumar Nair	CSI 2004		Clinical profile and follow-up of brain abscess associated with congenital heart disease poster presentation.
Dr. TV. Kumary	BITE- 2005 : Indo-Australian Conference on Biomaterials, Implant Tissue Engineering.	Trivandrum Jan, 2005.	Cell Sourcing of Devices and Tissue Engineering.
Dr. P. S. Mathuranath	9th International Conference on Alzheimer's Disease and Related Disorders.	USA July, 2004	Role of Subjective Memory Complaints in Cognitive Defining Mild Impairmet.
Prof. K. Mohandas	7 th World Biomaterials Congress.	Australia May, 2004	Participant
Dr. Nirmala R. James	MACRO-2004 :	Trivandrum Conference on Polymer for Advanced Technologies.	Antifouling Dec, 2004 polymers from International Tween 20 (podium presentation)

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. K. Nair	CSI 2004		Long-term follow-up of aortic valve replacement with Starr-Edwards prosthesis- oral presentation.
Dr. Prabha D. Nair	MACRO-2004 : International Conference on Polymer for Advanced Technologies.	Trivandrum Dec, 2004	Synthesis and characterisation to gelatine-NVP Semi IPN as potential biohybrid polymer.
Dr. Prabha D. Nair	BITE- 2005 : Indo- Australian Conference on Biomaterials, Implant tissue engineering.	Trivandrum Jan, 2005	Porous 3D scaffolds for Devices and Tissue Engineering.
Dr. Rajneesh Kachhara	7 th Asian Oceanian Internati- onal Congress on Skull Base Surgery.	Taipei April, 2004	Craniopharyn giomas.
Dr. Rajneesh Kachhara	7 th Asian Oceanian Internati- onal Congress on Skull Base Surgery.	Taipei April, 2004	Esthesioneuro blastoma.
Dr. Ravimohan Rao	7 th Asian Oceanian Internati- onal Congress on Skull Base Surgery.	Taipei April, 2004	Foramen Magnum Meningiomas
Dr. Ravimohan Rao	7 th Asian Oceanian Internati- onal Congress on Skull Base Surgery.	Taipei April, 2004	Trigeminal schwannomas: surgical experience.
Dr. Ravimohan Rao	7 th Asian Oceanian Internati- onal Congress on Skull Base Surgery.	Taipei April, 2004	Ophthalmic segment aneurysms.
Dr. Ravimohan Rao	7 th Asian Oceanian Internati- onal Congress on Skull Base Surgery.	Taipei April, 2004	Surgical experience with paragangliomas

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. Ravimohan Rao	7 th Asian Oceanian International Congress on Skull Base Surgery.	Taipei April, 2004	Rare pediatric cerebellopontine angle lesions
Mrs. C. Radhakumary	MACRO-2004 : International Conference on Polymer for Advanced Technologies	Trivandrum	Synthesis, characterisation and properties of poly vinyl alcohol grafted chitosan.
Dr. Ravimohan Rao	7 th Asian Oceanian International Congress on Skull Base Surgery.	Taipei April, 2004	Surgical experience of skull base chordomas.
Dr. Roy Joseph	MACRO-2004 : International Conference on Polymer for Advanced Technologies	Trivandrum Dec, 2004	Isochronous creep of particulate composites: influence of filler morphological features and specific surface area.
Dr. Sanjev Thomas	5 th Asian Oceanian Epilepsy Congress	Bangkok Aug, 2004.	Obstetric Care and prevention of epilepsy.
Dr. Sanjeev Thomas	5 th Asian Oceanian Epilepsy Congress	Bangkok Aug, 2004.	Language Development is Normal in Children Exposed Antiepileptic Drugs.
Dr. Sanjeev Thomas	Workshop on pregnancy and Epilepsy	Italy Sept, 2004.	Pregnancy in women with epilepsy a prospective study based on the Kerala Registry of Epilepsy and pregnancy
Dr.T.K.Sundari Ravindran	International Conference on Population and Development (ICPD) +10 meeting	London Sept, 2004	Contraceptive technologies: Needs from a women's perspective Tamil Nadu and Kerala.
Dr. Suresh Nair	7 th Asian Oceanian International Congress on Skull Base Surgery.	Taipei April, 2004	Cerebellopontine angle epidermoid cyst operative series of 47 cases.

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. Suresh Nair	7 th Asian Oceanian International Congress on Skull Base Surgery.	Taipei April, 2004	Cystic vestibular schwannomas
Dr. Suresh Nair	7 th Asian Oceanian International Congress on Skull Base Surgery.	Taipei April, 2004	Neurogenic pulmonary edema: Review of four cases
Dr. Suresh Nair	7 th Asian Oceanian International Congress on Skull Base Surgery.	Taipei April, 2004	Posterior petrous pyramid meningiomas.
Dr. Suresh Nair	7 th Asian Oceanian International Congress on Skull Base Surgery.	Taipei April, 2004	Surgery for vestibular schwannomas: Towards zero mortality.
Dr. Suresh Nair	7 th Asian Oceanian International Congress on Skull Base Surgery.	Taipei April, 2004	Chordoma and Chondrosarcoma.
Dr. Suresh Nair	7 th Asian Oceanian International Congress on Skull Base Surgery.	Taipei April, 2004	Does cochlear nerve preservation really benefit patients with large vestibular schwannomas.
Dr. Suresh Nair	4 th International Skull Base Congress	Australia Nov, 2004	Trigeminal schwannomas: Surgical experience
Dr. Suresh Nair	4 th International Skull Base Congress	Australia Nov, 2004	Rare paediatric cerebellar pontine angle lesions.
Dr. Suresh Nair	4 th International Skull Base Congress	Australia Nov, 2004	Usefulness of hearing preservation in large vestibular schwannomas.
Dr. Suresh Nair Congress	4 th International Skull Base Nov, 2004	Australia	Cystic vestibular schwannomas
Dr. Suresh Nair	4 th International Skull Base Congress	Australia Nov, 2004	Surgery for vestibular schwannomas: Towards zero mortality.

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. Suresh Nair	4 th International Skull Base Congress	Australia Nov, 2004	Surgical experience with skull base chordo mas.
Dr. Suresh Nair	4 th International Skull Base Congress	Australia Nov, 2004	Posterior petrous pyramid meningiomas
Dr. Suresh Nair	4 th International Skull Base Congress	Australia Nov, 2004	Controversies in the management of hind brain anomaly related syringomyelia.
Dr. Suresh Nair	4 th International Skull Base Congress	Australia Nov, 2004	Cerebellopontine angle epidermoid cysts.
Dr. Suresh Nair	4 th International Skull Base Congress.	Australia Nov, 2004	Ophthalmic segment aneurysms
Dr. Suresh Nair	4 th International Skull Base Congress.	Australia Nov, 2004	Lower cranial nerve schwannomas: Surgical experience.
Dr. Suresh Nair	4 th International Skull Base Congress.	Australia Nov, 2004	Surgical experience with skull base paragan gliomas.
Dr. Suresh Nair	4 th International Skull Base Congress.	Australia Nov, 2004	Foramen magnum meningiomas.
Dr. Suresh Nair	4 th International Skull Base Congress.	Australia Nov, 2004	Neurogenic pulmonary edema: Review of three cases.
Dr. Suresh Nair	1 st ACNS / AASNS / WFNS Joint Educational Neurosurgical Meeting.	Indonesia Dec. 2004	Management issues in vestibular schwannomas in developing countries.
Dr. Suresh Nair	1 st ACNS / AASNS / WFNS Joint Educational Neurosurgical Meeting.	Indonesia Dec. 2004	Frontotemporal approach for trigeminal schwannomas
Dr. Suresh Nair	6 th Minimally Invasive Neurosurgical conference	Japan Mar, 2005	Management philosophy and surgical outcome in intramedullary glial neoplasms of the spinal cord

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. Suresh Nair	6 th Minimally Invasive	Japan Mar, 2005	Extra inter dural paracavernous Neurosurgical conference approach for trigeminal schwannomas.
Dr. J. A. Tharakan	International Pediatric heart Cardiology Congress	Chennai	Congenital disease on adults.
Dr. K.R. Thankappan	Tobacco Cessation Research and Training in India and Indonesia	Yogyakarta June, 2004	
	36 th annual conference of Asia Pacific Academic Consortium of Public Health (APACPH), Public Health Networks and Alliances: Building Capacity in the Asia Pacific Region, Brisbane.	Australia Dec, 2004	Prevalence of non- communicable diseases risk factors in Kerala, India.
Dr. Thomas Koshy	6 th SACA conference Feb, 2005	Colombo	Myocardial protection. Descending Thoracic and Thoracoabdominal aneurysms- Anesthetic Considerations.
Dr. P K Varma	CSI 2004		Clinical profile and Long Term outcome of Aneurysm follow ing interruption of PDA: analysis of 14 cases from a single center- oral presentation. Coronary arterio venous fistula foster
Dr. D. Varatharajan	Symposium on Health Economics, 27 th Annual Academic Sessions of the Kandy Society of Medicine.	Sri Lanka Feb, 2005	A health invest ment plan for Sri Lanka

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. D. Varatharajan		Sri Lanka Feb, 2005	Economics of health
Dr. D. Varatharajan	38 th Globalisation Lecture Series on Health and Wealth of nations	Sri Lanka Jan, 2005.	
Dr. D. Varatharajan	The meetings of the working groups on budgeting and financing of the National Commission on Macroeconomics and Health.	Sri Lanka Jan, 2005	Participant
Dr. D. Varatharajan	107 th National Health Council Meeting.	Sri Lanka Nov, 2004.	Participant
Dr. D. Varatharajan	Technical Committee meeting of the World Bank project on Annual Health Summit	Sri Lanka Oct, 2004.	Participant
Dr. D. Varatharajan	Health Outcomes and the Poor.	Colombo Sept, 2004	Participant
Dr. D. Varatharajan	The Core Group meeting of the World Bank project on Annual Health Summit.	Sri Lanka Sept, 2004	Participant
Dr. D. Varatharajan	The scope and potential for working with the private sector to improve health.	Sweden May, 2004	Partnership for health: Recent experiences with public-public and public-private partnerships

CONFERENCE ATTENDED BY STUDENTS

INTERNATIONAL CONFERENCES

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Biji Balakrishnan	MACRO-2004: International Conference on Polymer for Advanced Technologies.	Trivandrum Dec, 2004	Self cross-linking biopolymers as injectable in situ forming bio-degrad able scaffolds (poster).
Elizabeth K Abraham	2nd International Rubber Glove Conference and Exhibition	Malaysia June July, 2004	Reduction of Residual Dithiocarbamate Accelerators in Gloves -Some Practical Recommendations.
K.Kaladhar.	MACRO-2004: International Conference on for Advanced Technologies.	Trivandrum Dec,2004	Modification of chitosan using n-aryl anthranilic Polymer acid derivatives for insulin delivery.
C.Krishna Prasad	Joint meeting of the Tissue Engg Soc Int and the European Tissue Engg Soc	Switzerland Oct,2004	Matrix composition influences differentiation of endothelial cell in vascular engineering.
K.K.Nishi	MACRO-2004: International Conference on Polymer for Advanced Technologies.	Trivandrum Dec, 2004	Synthesis and characterization of water soluble gum arabic-amphotericin-B conjugates (poster)
S. Sajeesh	MACRO-2004: International Conference on Polymer for Advanced Technologies.	Trivandrum Dec, 2004	Chitosan coated polymethacrylic acid microparticles for oral insulin delivery

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Shiny Velayudhan	7th International Conference on Flow Processes in Composite Materials, University of Delaware.	USA July, 2004	Influence of stamp forming parameters on final part prop erties of hydroxya patite filled ethylene vinyl acetate co-polymer composites.
Shiny Velayudhan	MACRO-2004: International Conference on Polymer for Advanced Technologies.	Trivandrum Dec, 2004	Three-dimensional forming of hydroxyapatite filled ethylene Polymer for vinyl acetate copolymer.

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4. Prof. K. Radhakrishnan
SCTIMST, Thiruvananthapuram
5. Dr. S. K. Mahajan
Ex-Head
Agriculture & Molecular Biology
Division, BARC, Mumbai - 400 085
6. Prof. J. M. Tharakan
SCTIMST, Thiruvananthapuram
7. Dr. A. Jayakrishnan
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Poojappura, Thiruvananthapuram
8. Prof. Jayaprakash Muleyil
Christian Medical College, Vellore
3. Secretary to the Government of Kerala
Health & Family Welfare
Thiruvananthapuram
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ISRO, Vikram Sarabhai Space Centre
Thiruvananthapuram
5. Sri. Chandrasekharan Nair (Ex-Officio Convenor)
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SCTIMST, Thiruvananthapuram
6. A member to be co-opted by the
Director as and when necessary

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Thiruvananthapuram
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Secretary to the Govt. of India
Ministry of Science and Technology,
Technology Bhavan,
New Delhi - 110 016
3. Shri. Arun Sharma
Joint Secretary to Govt. of India &
Financial Advisor,
Department of Science & Technology,
New Delhi - 110 016
4. Vice Chancellor
University of Kerala, Thiruvananthapuram
5. Sri. P. Chandrasekharan Nair
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Poojappura, Thiruvananthapuram

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Director, SCTIMST, Thiruvananthapuram
2. Dr. G. S. Bhuvaneshwar
Head, BMT Wing, SCTIMST
Poojappura, Thiruvananthapuram
3. Dr. K. A. Dinshaw
Director
Tata Memorial Hospital
Parel, Mumbai - 400 012
4. A nominee of the Secretary
Department of Science & Technology
Govt. of India, New Delhi - 110 016
5. A Senior Professor of SCTIMST
Thiruvananthapuram to be nominated
by the Director of SCTIMST
6. An External Expert to be nominated by
the President of the Institute

Junior Staff Selection Committee

1. Dr. S.J. Douglas Linsby (w.e.f 01.07.2004)
Medical Superintendent,
Hospital Wing, SCTIMST, Thiruvananthapuram
2. Dr. G. S. Bhuvaneshwar
Head, BMT Wing
SCTIMST, Poojappura, Thiruvananthapuram
3. Shri. P B. Sourabhan
Deputy Director (Admn)
SCTIMST, Thiruvananthapuram
4. Mrs. Vijayamma Harikrishnan
Nursing Superintendent
SCTIMST, Thiruvananthapuram
5. Dr. R. Shankar Kumar
Professor, Cardio Vascular and Thorasic Surgery
SCTIMST, Thiruvananthapuram

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

Ethics Committee

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(Chairman)
Judge, High Court of Kerala, Kochi
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Former Prof. of Pharmacology & Director of
Medical Education, Government of Kerala
R.G. 286, Thriveni, Ulloor
Thiruvananthapuram - 695 011
3. Smt. J.A. Lalithambika
4. Prof. K.A Kumar
Professor of Psychiatry
Medical College, Thiruvananthapuram
5. Dr. P.G. Pramila
Professor of Pediatrics(Rtd.)
7C, Kowdiar Manor
Kowdiar, Trivandrum
6. Dr. B. Ekbal
Former Vice Chancellor, University of Kerala
7. Dr. Amar Jesani
Co ordinator, CSER (Centre for Studies
in Ethics and Rights) Candelar, 4th Floor
26 St. John Baptist Road
Bandra West, Mumbai 400 050, India
8. Dr. S.N. Pal
Executive Director
Hindustan Latex Ltd. Thiruvananthapuram
9. Dr. K. Mohandas
Director
SCTIMST, Thiruvananthapuram

10. Dr. G.S. Bhuvaneshwar
Head, BMT Wing
SCTIMST, Poojappura, Thiruvananthapuram
11. Mr. P.V. Mohanan
Scientist 'D', Toxicology Division
BMT Wing, SCTIMST
12. One faculty from SCTIMST by rotation
(from any of the wings)
(for the first year Dr. Mala Ramanathan)
13. Dr. T. Anoop
Scientist 'E', Molecular Medicine
BMT Wing, SCTIMST

Technology Development Committee

1. Prof. K. Mohandas (Chairman)
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2. Dr. G. S. Bhuvaneshwar
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SCTIMST, Poojappura, Thiruvananthapuram
3. Dr. A. P. Chauker
Cardiovascular & Thoracic Surgeon
19, Nav Nirman Society, Grant Road Bridge
Low Parel (South), Mumbai - 400 022
4. Dr. S. N. Pal
Executive Director
Hindustan Latex Ltd, Thiruvananthapuram
5. Prof. Chitra Sarkar
Dept. of Pathology
All India Institute of Medical Sciences
New Delhi - 110 029
6. Prof. Ramachandra Rao
Vice Chancellor
Banaras Hindu University
Varanasi - 221 005

7. Dr. C. P. Sharma
Scientist F, BMT Wing
SCTIMST
Poojappura, Thiruvananthapuram
8. Shri. O. S. Neelakantan Nair
Engineer F, BMT Wing
SCTIMST, Poojappura, Thiruvananthapuram

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(Former Director, IGCAR Kalpakkam)
Chairman, Recruitment & Assessment Centre
DRDO, Lucknow Road
RAC House, Timarpur
Delhi - 110 054
2. Mr. V.P. Balagangadharan
Dy. Director & In charge, Technology
Transfer & Industrial Coordination
VSSC, Tumba, Trivandrum
3. Dr. G.C. Gopala Pillai
Managing Director
KINFRA, Kerala Industrial
Infrastructure Development
Corporation Ltd)
Vellayambalam, Trivandrum-10
4. Dr. P. Parameswar Iyer,
Principal Research Scientist
Centre for Scientific & Industrial Consultancy
Indian Institute of Science
Bangalore
5. Head, BMT Wing (Ex-officio member)
6. FA & CAO of the Institute (Ex-officio)
7. Scientist-in-charge, Technology
Transfer Cell (Ex-officio)

DEPARTMENTS AND PERSONNEL

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Director

Academic Division

Dr. K. Radhakrishnan, MD

Dean

Dr. A.V. George, MA, BEd, PhD

Registrar

Sundar Jayasingh, MA, MBA, DLL

Assistant Registrar

Library

S. Jayachandra Das, BSc, MLISc

Librarian-cum-Documentation Officer - B

(Librarian-in-Charge)

T. Sudha, M.A, MLISc.

Librarian-cum-Documentation Officer - A

Nursing Education

P. P. Saramma, BSc, MN

Instructor in Nursing

Public Relations

T.V. Hemalatha, MA, MPhil, LLB, PGDJ

Public Relations Officer

Achutha Menon Centre for Health Science Studies

Dr. T.K. Sundari Ravindran, PhD

Honorary Professor

Dr. K.R. Thankappan, MD, MPH

Additional Professor

Dr. P. Sankara Sarma, PhD

Additional Professor

Dr. Mala Ramanathan, PhD, MA

Associate Professor

Dr. D. Varatharajan, PhD

Associate Professor

Dr. Biju Soman MD, DPH

Assistant Professor

Dr. Manju R Nair MBBS, MPH

Scientist C

Administration

Dr. K. Mohandas, MD, FRCA

Director

V. Ambujakshan Nair, BCom, LLB

Secretary to the Director

PB. Sourabhan, MA, LLB, PGDMM, DCA

Deputy Director (Administration)

P Vijayakrishnan, BSc, FCA

Financial Advisor & Chief Accounts Officer

(up to 12.08.2004)

S. Chandrasekharan Nair

Financial Advisor & Chief Accounts Officer

(On deputation) contract from 13.08.2004

S. Sasikumar, BA, BGL, LLB, PGDIR, PGDIRPM, MA (PA)

Administrative Officer Gr I

P.V. Chandrasekharan BSc, SAS

Internal Audit Officer (On deputation)

I.T. Edwin, BA

Administrative Officer Gr II

C. Gopinathan, BSc, LLB, SAS

Accounts Officer Gr I

A. Santhakumari, MCom

Accounts Officer Gr I

C.R. Mohandas, BCom

Accounts Officer Gr II

R. Sreekumar, BSc, PGDMM

Purchase Officer Gr I

M. Sudhakara Sharma, BA

Stores & Purchase Officer Gr II

P. Gopalakrishnan Nair, BA

Stores & Purchase Officer Gr II

B. S. Anil Kumar, BA

Security Officer

K. Prasanna Kumar B.Com, DEE

Security Officer

S. Venkitachalam Iyer, BCom

Pool Officer

Construction Wing

P.N. Ramachandran BSc (Engg.)

Constuction Engineer (Contract) from 09.12.2004

G. Gopinatha Kurup

Junior Engineer (Civil)

BIOMEDICAL TECHNOLOGY WING

Dr. G.S. Bhuvaneshwar, MS, PhD

Head

Artificial Organs

Dr. G.S. Bhuvaneshwar, MS, PhD

Mr. C.V. Muraleedharan, MTech

Engineer F & in-charge, Device Testing Laboratory

Mr. D.S. Nagesh, MTech

Engineer F & in-charge, Modelling & Prototyping Lab.

Mr. V. Vinod Kumar, BTech

Engineer B (on study leave)

Mr. Sujesh Sreedharan, ME

Engineer B

Mr. V. Arun Anirudhan, BTech

Engineer B

Bioceramics & SEM Laboratory

Dr. P.R. Harikrishna Varma, PhD

Scientist D & in-charge

Dr. Manoj Komath, PhD

Scientist C

Mr. R. Sreekumar, BSc

Jr. Scientific Officer A

Mr. S. Vijayan, MSc

Jr. Scientific Officer A

Biosurface Technology

Dr. Chandra P. Sharma, MTech, MS, DSc, MEBE

Scientist G & in-charge

Calibration Cell

Mr. C.V. Muraleedharan, MTech

Engineer F & in-charge

Mrs. Leena Joseph, BTech

Engineer B

Customer Service Cell

Mr. S. Balram, MTech

Engineer E & in-charge (on leave)

Dr. Annie John M.Sc, Ph D

Scientist D (Acting in-charge)

Dental Products Laboratory

Dr. V. Kalliyana Krishnan, PhD

Scientist F & in-charge

Engineering Services

Mr. O. S. Neelakantan Nair, BSc(Engg)

Engineer G & in-charge

Mr. V. Ramesh Babu, BE

Engineer D

Mr. E. B. Mohan Raj, Dip. Mech. Engg.

Foreman B

Implant Biology

Dr. Mira Mohanty, MD

Scientist G & in-charge

Dr. T. V. Kumary, PhD

Scientist F & in-charge Tissue Culture Laboratory

Dr. Annie John, PhD

Scientist D & in-charge Transmission Electron Microscopy Lab.

Dr. T. V. Anilkumar, MVSc, PhD

Scientist C

Instrumentation Laboratory

Dr. Niranjana D. Khambete, MTech, PhD

Engineer D & in-charge

Microbiology

Dr. A. Maya Nandkumar, PhD
Scientist D & in-charge

Molecular Medicine

Dr. T. Anoopkumar, PhD
Scientist E and in-charge

Polymer Analysis

Dr. K. Sreenivasan, PhD
Scientist F & joint in-charge

Dr. Prabha D. Nair, PhD
Scientist F & joint in-charge

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Jr. Scientific Officer A

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Dr. A. Jayakrishnan, PhD, FASc
Scientist G & in-charge

Polymer Division

Dr. M. Jayabalan, PhD
Scientist F & in-charge

Polymer Processing Laboratory

Dr. Roy Joseph, MSc, MTech, PhD
Scientist D & joint in-charge

Dr. P. Ramesh, MTech, PhD
Scientist D & joint in-charge

Mr. M.C. Sunny, BSc, AIC
Jr. Scientific Officer A

Quality Cell

Mr. D.S. Nagesh, MTech
Engineer F & Quality Manager

Mr. S. Balram, MTech
Engineer E (on leave)

Dr. PRamesh, PhD
Scientist D

Small Animal House

Dr. A.C. Fernandez, PhD
Scientist F & in-charge

Technology Proving Facility

G.S. Bhuvaneshwar, MS, PhD
D.S. Nagesh, MTech
Engineer F

Technology Transfer & Co-ordination Cell

D. Ranjit, BE
Engineer F & in-charge

Thrombosis Research

Dr. Lissy K. Krishnan, PhD
Scientist F & in-charge

Toxicology

Dr. P.V. Mohanan, PhD
Scientist D & in-charge

Vivarium

Dr. P.R. Umashankar, MVSc
Veterinary Scientist C & in-charge

HOSPITAL WING

Dr. S.J. Douglas Linsby, MBBS, MS
Medical Superintendent (01.07.2004 – till date)

Dr. P. V. Ramanarayanan, MS, DipNB
(*Cardio thoracic surgery*)
Medical Superintendent (01.04.2004 – 30.06.2004)

Dr. S.K. Jawahar, MBBS, MHA, DipNB (Health Admn)
Administrative Medical Officer

Smt.Vijayamma Harikrishnan, B Sc (N) (Post –Basic),
M.A; PGDHHM
Nursing Superintendent

Smt.Sudhamaniamma, MSc(N), PGDHRM
Deputy Nursing Superintendent

Anaesthesiology

Dr. K. Mohan Das, MD
Professor & Director of the Institute

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

Dr. Raymond Douglas Latimer, MBBS, FFRC, MA
Honorary Professor

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

Dr. Thomas Koshy, MD
Additional Professor

Dr. Srinivas V. Gandhinhaljkar, MD
Additional Professor on leave from 1.10.04

Dr. Prasantkumar Dash, MD
Associate Professor

Dr. Raghunath Sreedhar Nalgirkar, MD
Associate Professor Up to 23.11.04

Dr. P.K. Neema, MD
Associate Professor

Dr. S. Manikandan, MD
Assistant Professor

Dr. P.K. Sinha, MD
Assistant Professor

Dr. P. Gayatri, MD, FRCA
Assistant Professor

Dr. P.R. Suneel, MD
Assistant Professor

Dr. K.P. Unnikrishnan, MD
Assistant Professor

Dr. Hetal Kumar D Shah, MD
Ad-hoc Consultant from 1.1.05 to 31.3.05

Dr. Sunil Kumar N.K, M.D
Ad-hoc Consultant from 1.1.05

Dr. Subratakumar Singha, M.D
Ad-hoc Consultant from 1.1.05

Biochemistry

Dr. P. S. Appukuttan, PhD
Professor and Head

Dr. N. Jayakumari, PhD
Additional Professor

Dr. G. Srinivas PhD
Scientist C

K. I. Annamma, BSc
Junior Scientific Officer

B. Sasikumar, MSc
Junior Scientific Officer

Biomedical Engineering

K. Vijayakumar, BSc, BSc (Engg.)

Engineer F & Head

Koruthu P. Varughese, BSc (Engg.), PGDEDT,

PGDCA, MBA

Engineer

G. Mohanlal, BSc (Engg.), MBA

Engineer

B. Madhusoodanan Pillai, BSc (Engg.), PGDCA, MBA

Scientist/ Engineer

N. Sivanandan

Junior Engineer(Electrical)

Blood Transfusion Services

Dr. Jaisy Mathai, MBBS, DCP

Scientist F and Head

Dr. P.V. Sulochana, MBBS

Scientist F

Dr. S. Sathyabhama, MBBS

Scientist E

Cardiology

Dr. Jagannathan A Tharakan, MD, DM

Professor & Head

Dr. Thomas Titus, MD, DM

Professor

Dr. V. Ajithkumar, MD, DM

Additional Professor

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

Additional Professor (On leave from August 2004)

Dr. K M. Krishnamoorthy, MD, DM

Assistant Professor

Dr. S. Harikrishnan, MD, DM

Assistant Professor (On deputation from Jan.2005)

Dr. Santhoshkumar Dora, MD, DM

Assistant Professor (On fellowship from Sept .2004)

Dr. Krishnakumar Nair

Assistant Professor

Dr. Narayanan Namboodri

Assistant Professor

Cardiovascular & Thoracic surgery

Dr. K.S. Neelakandhan, MS, MCh, FAMS

Professor & Head

Dr. K. Jayakumar, MS, MCh

Professor

Dr. R. Sankar Kumar, MS, MCh

Professor

Dr. K.G. Shyam Krishnan MS, MCh

Professor

Dr. M. Unnikrishnan, MS, MCh

Professor

Dr. S.R. Krishna Manohar, MS, MCh

Additional Professor

Dr. Apurba Kumar Sharma, MS, MCh

Assistant Professor (till Aug 2004)

Dr. Praveen K. Varma, MS, MCh

Assistant Professor (On leave)

Cellular and Molecular Cardiology

Dr. C.C. Kartha, MD, FNASc, FASc, FAMS

Professor & Head

Dr. Renuka Nair, PhD, MNAMS, MNASc

Scientist- G

Dr. K. Shivakumar, PhD

Scientist-F

Computer Division

G. Geetha, MTech (Computer Science)

Scientist F

Medical Records

P. Krishnamoorthia Pillai, MA
Senior Medical Records Officer cum Lecturer & Head

N.G. Thampi MA, BMRSC
Medical Records Officer

P.J. Varghese
Assistant Medical Records Officer

Microbiology

Smt. Molly Antony, MSc, DMV
Scientist E

Dr. Muralidhar K. Katti, MSc, PhD, FISC
Associate Professor

Smt. K. Naseema, MSc, MLT
Scientific Assistant

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

Neurology

Dr. K. Radhakrishnan, MD, DM, FAMS
Professor & Head

Dr. MD. Nair, MD, DM
Professor

Dr. C. Sarada, MD, DM
Additional Professor

Dr. Sanjeev V.Thomas, MD, DM
Additional Professor

Dr. Asha Kishore, MD, DM
Additional Professor

Dr. PA. Suresh, MD, DM
Additional Professor (On leave)

Dr. Abraham Kuruvilla, MD, DNB, DABN(CI /N Ph)
Associate Professor

Dr. Joseph Cheriyan P, MD, DM, DNB
Assistant Professor (On leave)

Dr. PS. Mathuranath, DM
Assistant Professor

Dr. PN. Sylaja, MD, DM
Assistant Professor

Dr. Ashalatha R., MD, DM
Adhoc Consultant

Dr. Rajesh Iyer, MD, DM
Adhoc Consultant

Neurosurgery

Prof. R N. Bhattacharya, MS, MCh
Head of the Department

Dr. S. Suresh Nair, MCh Neurosurgery
Professor

Dr. Ravi Mohan Rao, MS, MCh, Dip NB Neurosurgery
Associate Professor

Dr. R. Girish Menon, MCh, DipNB Neurosurgery
Associate Professor

Dr. Rajesh B. J., MS, MCh Neurosurgery
Assistant Professor

Dr. Muthu Retnam S., MS, MCh Neurosurgery
Assistant Professor

Dr. Mathew Abraham, MS, FRCS, MCh Neurosurgery
Adhoc Consultant

Dr. H.V. Easwer, MCh Neurosurgery
Adhoc Consultant

Pathology

Dr. V.V. Radhakrishnan, MD, FAMS
Professor & Head

Dr. S. Sandhyamani, MD, FAMS
Professor

Dr. Annamma Mathai, PhD
Scientist C

Radiology

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

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

Dr.C.Kesavadas, DMRD, MD
Associate Professor

Dr.Bejoy Thomas, MD, DNB
Assistant Professor

Dr.Krishnamoorthy, MD, DNB, DM
Assistant Professor

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

Dr.Sukalyan Purkayastha, MD, DNB, DM
Assistant Professor