Annual Report

2003-2004

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.

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OVERVIEW

The year 2003-2004 was a year of achievements, international recognition and further progress for the Institute.

The major achievement of the year was the accreditation of the biomedical technology laboratories to ISO 17025 for testing and evaluation of biomaterials and medical devices, the Institute thus becoming the first such institution in South Asia. The Institute's successful efforts in technology development paved the way for the beginning of a medical devices industry based on indigenously developed technology in India. The ISO accreditation is expected to further encourage the growth of Indian Medical Devices Industry by providing testing facilities of international standards. Commercial production of membrane oxygenator, the first major industry sponsored project commenced during the year. A well-attended international conference on Tissue Engineering and Stem Cell Technology was held as a prelude to setting up a tissue engineering center at the Institute, even as several implants and devices reached advanced stages of technology development and transfer. Recognizing that technology development in future can only be sustained with industrial support and patronage and realizing the need to help the indigenous health care industry to produce commercially viable devices at affordable prices, the Institute is striving to position itself as a catalyst and facilitator for the successful growth of the Indian Medical Devices industry.

The commissioning of a dedicated operation theatre complex and surgical intensive care unit for congenital cardiac surgery reinforced the Institute's commitment to sustain and expand paediatric and neonatal cardiology. A modest increase in the patients and the increasing complexity of cases being referred to the Institute reflected continued confidence reposed on the Institute by the public and the professional community, despite a mushrooming of tertiary care centers in the neighbouring areas. The Institute responded to it by further streamlining and augmenting the existing services, adding new facilities and introducing state-of-the-art diagnostic and therapeutic management strategies.

The ongoing clinical and basic science research on coronary artery disease, atherogenesis, cardiomyopathy, myocardial mechanics, epilepsy, movement disorders and cerebrovascular abnormalities made satisfactory progress. The concept of nanoparticle based oral insulin delivery was successfully demonstrated in a rat model (NMITLI programme). Based on this, the CSIR has sanctioned a second phase with industrial collaboration under the same scheme.

With more than 12 research projects – 3 of them being international collaborative programmes - several consultancy assignments and with the MPH course attracting increasing number of national and international students, the Achutha Menon Centre for Health Science Studies stayed on the path of progress in the field of public health training and research. The MacArthur Foundation funded gender programme, and short courses in ethics and maternal health proved to be hugely popular, judging by the demand to hold such courses more frequently.

As the Institute sails along the first decade of the twenty first century, navigating through the turbulent waters of academic, professional and economic challenges, it draws confidence from, but does not remain complacent about, its record thus far.

HIGHLIGHTS OF THE YEAR

Testing Laboratories of Biomedical Technology Wing accredited to ISO 17025

First ISO accredited device evaluation report released by the President, Prof. R. Chidamabaram

Commercial production of membrane oxygenator, the first industry sponsored project, commenced

Indo-US Workshop on Tissue Engineering and Stem Cell Technologies sponsored by the Department of Science and Technology and the US National Science Foundation held on 2-3 February, 2004

D.M. Courses in Cardiac Anaesthesiology and Neuro Anaesthesiology started

MoU signed with IIT, Bombay to start a joint M.Tech (Biomedical Technology) programme

A dedicated congenital cardiac surgery unit inaugurated

Epilepsy surgery crosses 500

The concept of nanoparticle based oral insulin delivery successfully tested in rat models

BIOMEDICAL TECHNOLOGY DEVELOPMENT

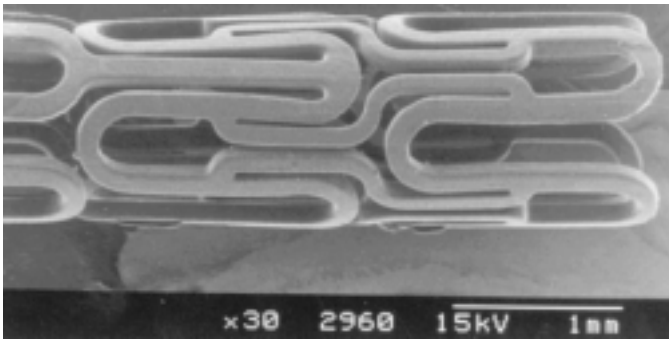
No. 1-1433

A major achievement during the year was the accreditation of the test laboratories by Comite' Francais D'Accreditation (COFRAC) of France. The accreditation conforming the international standard ISO 17025 became effective for 5 years from 1st November 2003 .The site audit was carried out during the first week of July 2003 by COFRAC with Dr.A.K.Chakrabarty, Director of National Accreditation Board for Testing and Calibration Laboratories(NABL) as observer. According to the COFRAC auditors, this was one of the very few institutions to have done so well in the very first audit, having few non-coformities and get accredited in the first instance.

Hon'ble Union Minister of State for Science and Technology, Sri. Bachi Singh Rawat dedicated the ISO 17025 accredited laboratories to the Nation, on 4th December 2003. Dr. R. Chidambaram, President of the Institute and Principal Scientific Advisor to the Govt. of India Cabinet presided. The first accredited test reports with the COFRAC logo were released at the function to M/s Sahajanand Medical Technologies Pvt. Ltd., Surat and Terumo Penpol Ltd., Thiruvananthapuram.

The clinical evaluation of the membrane oxygenator and its technology transfer were successfully completed during the year and commercial production started by the industrial partner. Many new projects have been initiated and others continued to make good progress. The details of all these activities are given in the following sections.

The pre-clinical evaluation of a Drug Eluting Stent developed by M/s Sahajanand Medical Technologies Pvt., Ltd. was successfully completed and the data presented at an international workshop organised by the industry in Mumbai in January 2004. Medical device industries, research institutions and students continued to patronize the biocompatibility evaluation and analytical testing services of the Institute. Contracts worth Rs.25 lakhs were obtained for carrying out studies and tests from these external sources during the year.



SEM of Sahajanand Coronary Stent showing good surface finish

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.

Membrane Oxygenator and Hemoconcentrator

The second phase clinical evaluation of the membrane oxygenator coordinated by the Department of Cardiovascular and Thoracic Surgery was completed successfully in March 2004. This division was involved in the data analysis and reporting. The technology transfer to SIDD, Chennai was completed during the previous year and the units needed for this evaluation were made and supplied by the industry. A total of 120 oxygenators were used in various open-heart surgical procedures in 6 centres spread over the country. Prospective data on the use of imported devices have also been collected in parallel for comparison. The results clearly indicate that the indigenous oxygenator is as good as the imported in terms of safety and performance. Commercial production and sale has begun.

The development of a hemoconcentrator under the sponsorship of SIDD, Chennai progressed satisfactorily during the year. In-vitro experiments using slaughter house bovine blood were carried out with machined prototypes. Based on the results of the testing, the design has been finalized for the 0.4 sq. metre model.

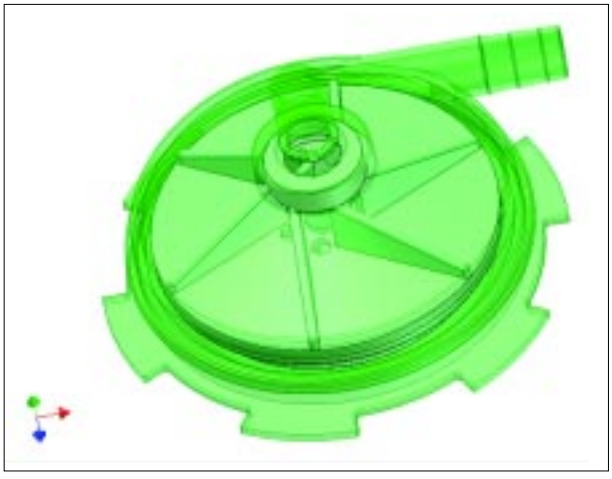
Centrifugal pump

The project for the development of a centrifugal blood pump under DST funding was extended till March 31, 2004 with significant progress being made in terms of meeting the original targets. The major milestones that were crossed during the year are:

* Analysis of results from in-vitro experiments using animal blood leading to optimisation of design and its freezing.
* Completion of *in vitro* performance evaluation using animal blood with good results. The parameters measured were levels of blood damage, priming volume, low heat dissipation and pump output at comparable speeds.

The vendor development for the drive unit progressed satisfactorily with the validation of the first drive and control unit during the year. Fabrication of 4 commercial model drive units is underway by the vendor.

The project has reached the stage, where a major investment in injection moulds for the fabrication of the polycarbonate pump components is needed. Following this, the final *in vitro* and *in vivo* large animal evaluation for safety and efficacy needs to be completed using production model pump heads, before clinical evaluation can start.



In-vitro testing of centrifugal blood pump

Centrifugal blood pump - disposable head

During the Laboratory visit of Dr. R. Chidambaram - President, Prof. V.S. Ramamurthy - Secretary DST, Mr. P.G.S. Mony - Director - IFCPAR and Dr. Harigopal Advisor - DST (4-12-2003)

Artificial Heart Valves

New Model Chitra Valve: A collaborative project with M/s. TTK Healthcare Ltd was sanctioned under the PATSER programme of the DSIR, Ministry of Science and Technology, Govt. of India during the year. The 3-year project is aimed at developing an improved model with reduced thrombotic potential, MRI compatibility and easier fabrication of the metal cage. The new design is based on optimisation studies carried out here earlier. Material sourcing, design validation and prototype fabrication are some of the activities currently underway.

Development of new sizes of heart valves :

The joint project for the development of three new sizes of TTK-Chitra heart valve, with M/s. TTK Healthcare Ltd made substantial progress during the year. The prototype valves have completed 200 million cycles of accelerated life cycling. The evaluation will be completed by middle of 2004 and the company is planning to make these sizes available in the market during the last quarter of 2004.

Hydrocephalus shunts – Test system for performance evaluation

Development of a Mark II computerized test system for 100% qualification of hydrocephalus shunts sponsored by M/s. Hindustan Latex Ltd, Trivandrum during the previous year has been completed and the system handed over. The final validation of the test system is being carried out at the plant site, before being commissioned. This new and improved 30 channel computerized test system will enable the company to increase their production capacity without additional manpower.

Vascular graft

Pilot production of 100 vascular grafts in six different sizes for the multicentric clinical trials were completed. As part of the technology transfer, the personnel from M/s. TTK Healthcare Ltd, Chennai, were trained in the processing and quality control of vascular grafts.

Retinal bands

A program in collaboration with the Tool Room & Engineering Services Division was initiated for the development of a suitable process for the flash free fabrication of silicone retinal bands. The process has been developed and is undergoing standardisation

Chest drainage catheters

The technology for the production of chest drainage catheters were transferred to M/s. SAFEMED, Trivandrum. As part of the technology transfer, the production team of the company was imparted training during 2003.

(B) BIOMATERIALS AND DEVICES

Fibrin glue

The scale up and pilot production of fibrin glue, developed by the Thrombosis Research Unit and sponsored by ATMRF, Ahmedabad, was bogged down with considerable difficulties faced in carrying out validation of the viral inactivation procedures to WHO standards. Two procedures for viral inactivation that have been developed were standardised and the validation studies in collaboration with the Department of Clinical Virology, CMC Vellore initiated. It is expected that the product will be ready for clinical evaluation during the latter half of 2004.

Hydroxyapatite and Bioglass

A major milestone was reached with the completion of the clinical trial of bioactive glass composites (HABG) for periodontal applications. The study was conducted

X ray radiographs showing the application of Chitra porous hydroxyapatite granules for treating various clinical problems (1) Bone TB defect in femur (2) tibial fracture (3) wrist fracture (4) scoliosis correction (5) spondilolisthesis (6) degenerative spine and (7) osteosarcoma

at the Department of Periodontics, Dental College Trivandrum by its Head and Prof. K. Nandakumar. The clinical evaluation and radiographic changes has shown the regenerative effect of Chitra-HABG composite granules and demonstrated a definite gain in clinical attachment level with a reduction in probing pocket depth.

The clinical evaluation of hydroxyapatite burr-hole buttons for neurosurgery has been started at our Department of Neurosurgery. Another clinical study on the use of HABG for spinal surgery and iliac crest reconstruction is progressing at Department of Orthopaedics, Amrita Institute of Medical Sciences, Cochin.

Dental composites

The technology transfer of 4 dental products: - chemical cure, light cure, radiopaque dental composite and Dentine bonding agent received a serious set-back with the industry pulling out of the programme. Intensive efforts are underway to identify a new industrial partner for this group of products. In the meantime, newer materials like dual-cure composites, resin cement, impression materials and glass-ionomer cements are under development and it is expected that this enlarged basket would prove more attractive to an entrepreneur in the near future.

Wound dressings

With adequate number of wound dressings prepared and supplied to Dynamic Techno Medicals Pvt. Ltd. Aluva, multicentric evaluation of the chitosan wound dressing was initiated at four centres. Current results so far received indicate that the application of chitosan wound dressing helped the chronic ulcers to heal faster. Painless healing was achieved at the donor sites. Further evaluation is on going.

The development of silver-oxide coated dressings in the Laboratory for Polymer Analysis has been completed under sponsorship of the same company. Scale-up and clinical evaluation of this product, which could not be pursued last year, is now planned for this coming year in collaboration with the industry.

Heparin coating of intra-ocular lenses

The project sponsored by Aurolab, Madurai for the heparin coating of intra ocular lenses(IOL) has been completed. Process standardisation and technology transfer have now been initiated. Clinical evaluation is slated to begin during the latter half of 2004 on completion of the technology transfer and commencement of pilot production at the Madurai plant of the sponsor.

(C) DIAGNOSTICS AND INSTRUMENTATION

Antibiotic sensitivity of mastitic milk – field kit for testing

An extended field trial using the 120 kits was completed with excellent results, proving the concept and the practical value of the kit. Technology transfer of this product has been initiated with two companies showing interest. Samples have been provided to them for their evaluation and feedback. Efforts are also underway to identify other interested entrepreneurs for this product.

Disposable ECG Electrodes

Work continued on the development of disposable ECG electrodes. The development of a test set-up for the testing of the electrodes was completed. ECG electrodes fabricated in the laboratory were tested and were found to satisfy the requirements of the American National Standard ANSI/AAMI EC 12:2000. Work on development of a conductive polymer for the electrode also

progressed and a mould is being fabricated for a combined snap connector and electrode.

Artefact free breathing monitor

Instrumentation was developed for recording thoracic impedance from a 6-electrode configuration and was found successful in recording breathing without any movement artifacts. An interface to PC and associated software is being developed to continuously record breathing data from volunteers in the presence and absence of body movements.

(D) TECHNOLOGY TRANSFER SERVICES

Technology Transfer Cell

The Technology Transfer Cell handled routine matters like drafting of MOUs and licence agreements. The identification of suitable entrepreneurs for the commercially viable technologies developed at the BMT Wing and the follow up monitoring on those that have been transferred are the major activities.

The technologies followed up during the year after MOU for scale up and feasibility study were;

(1) Heparinisation of IOL, M/s. AUROLAB, Madurai,TN

(2) Chitosan based wound dressings, M/s. Dynamic Technomedicals Pvt. Ltd; Aluva

(3) Chest drainage tubings, M/s. SAFEMED, Trivandrum.

Negotiations for technology transfers are underway on the following;

1) Field kit for testing antibiotic sensitivity of mastitic milk.

2) Bioceramic powders for orthopaedic & dental applications.

3) Dental composites.

The licence agreement for commercialization of technology related to the production of an improved heart valve is scheduled to be signed in the coming year with M/s. TTK Health Care Ltd., Chennai. The technology is based on the PATSER project funding from the DSIR granted to TTK Health care Ltd and the Institute.

Technology proving facility

Regular maintenance of the clean areas was carried out and the facilities made available to different projects.

1. Production of wound dressing material by biosurface technology with M/s DOPL, Angamaly

2. Production of vascular graft by Devices Testing Lab with TTK Healthcare, Chennai

3. Production of chest drainage tube by Devices Testing Lab with M/s SAFEMED, Trivandrum.

TESTING, QUALITY SYSTEM MANAGEMENT AND TECHNICAL SERVICES

(A) TESTING SERVICES

Customer Services

The customer service cell handles all test requests, from medical device industries, research institutions, universities, colleges and students. The necessary forms and information are made available and assistance for proper selection of tests and reasonable access to the laboratories are provided.

About 200 test requests were received from external customers alone and around 1000 external samples were analyzed. An equal number of samples from internal customers were also handled. Feedback from external customers was regularly obtained and their complaints promptly handled.

Testing services provided

Laboratory & Tests	External Requests	Internal Requests	No. of Samples Analysed
Analytical Tests /Material Characterization			
Laboratory For Polymer Analysis			
Thermal analysis Infrared / UV-Vis spectroscopy HPLC, GC Mechanical Properties	69	59	449
Bioceramics : X-Ray diffraction and Vickers microhardness	31	4	156
Scanning Electron Microscopy	21	33	215
Transmission Electron Microscopy	15	4	74
Dental Products : Mechanical properties of dental materials	17	3	251

Biological Evaluation

Tissue Culture :			
Cytotoxicity and cell adhesion	6	29	105
Thrombosis Research Unit :			
In vitro blood compatibility	8	14	125
Toxicology :			
Irritation, sensitisation, intramuscular implantation and pyrogen tests	3	11	69

Product Evaluation Studies

No	Sponsor	Study	Main Laboratory
1	Hindustan Latex Ltd. Trivandrum	a. Evaluation of whole blood storage in HLL blood bags with new composition	Thrombosis Research Unit
		b. Evaluation of whole blood bags and platelet bags	
2	Sahajanand Medical Technologies Pvt.Ltd.	Estimation of the in vitro release of profile of the drug from sterilized (ETO) and unsterilized drug eluting stents	Lab. for Polymer Analysis
3		Effect of ETO sterilization on the drug incorporated in drug eluting stents	Lab. for Polymer Analysis
4		Effect of ETO sterilization on the stability of polymers	Lab. for Polymer Analysis
5		Biofunctional and pharmacokinetic evaluation of drug coated endovascular stents-preclinical evaluation in porcine model	Vivarium
6		Evaluation of hemocompatibility of anti-restenosis drug eluting stents- in vitro for polymer coated and drug coated stent	Thrombosis Research Unit
7		Accelerated aging studies on drug coated stents	Device Testing Lab.
8		Invitro estimation of half time release point (t ½) of drug from drug eluting stents	Lab. for Polymer Analysis
9		Toxicological evaluation of drug eluting endovascular stents	Toxicology

(B) QUALITY SYSTEM MANAGEMENT

The three member COFRAC audit team carried out their assessment from 1st to 4th July 2003. (Dr.A.K.Chakrabarty, Director, NABL was present as an observer) The proposed scope was accepted in total. Following the assessment and the approval by the COFRAC board, the Institute has been accorded accreditation with number N° 1- 1433. This accreditation is valid for 5 years from 1st November 2003, subject to periodical inspection / surveillance audits.

Calibration services

The calibration requirements of equipment, maintaining traceability in measurements and meeting reference material requirements of the BMT Wing are the major activities of the cell. During the last one year the cell carried out more than 300 calibrations. Of these, 210 were directly related to the testing services under the scope of COFRAC accreditation.

In collaboration with other divisions, the cell is involved in developing in house reference materials (RM) for use in testing activities. The currently ongoing ones are :-

- The validation of in house RMs for cytotoxicity testing through inter-laboratory comparison studies have been completed
- Development of suitable RM for haemolysis test has been taken up.

Quality Cell

The Quality Cell continued its support for the routine monitoring of the quality system. Two internal Audits were conducted as per schedule and the continuous improvement of the quality system by review and revision of documents continued.

Microbiology

Microbiological monitoring of controlled environments and analysis of water are the routine support test being carried out. Support for research and development include (a) antimicrobial activity testing of materials and (b) evaluation of biomaterial for bacterial interactions.

Routine test services performed:

1.	Sterility test	31
2.	Spore viability test	12
3.	Air monitoring	48
4.	Anti-microbial activity	10
5.	Staining & culture	3
6.	Water analysis	55

SEM, TEM and other analytical services

Three analytical test services, namely Scanning Electron Microscopy (SEM), X-ray Diffractometry (XRD) and Vickers Microhardness Testing are routinely available to both internal and external customers. Last year the laboratory had completed the estimation of uncertainty in measurements and conducted inter-laboratory comparison studies for XRD and Microhardness testing. More than 400 samples were observed in SEM and 150 samples were analysed for XRD.

(C) TECHNICAL COORDINATION

Intellectual Property Rights and Technical Co-ordination Cell

Four new patent applications were filed, while 5 of the earlier ones were granted. The current status of the Institute's patents and designs is as follows :

- Patents held (sealed) : 51 Nos.
- Patents filed and pending : 47 Nos.
- Designs held (sealed) : 13 Nos.

A collaborative technology venture for the establishment of an Indo-Russian Biomedical Technologies Centre at SCTIMST was proposed. The meetings co-ordinated by this cell was supported by the DST International Division and the visiting Russian academician Prof. Yuri Gulyaev during March, 2003.

Engineering services

Tool Room Division: Fabrication of jigs, fixtures and moulds for the various projects were carried out. 129 work orders related to machining and fabrication of moulds were executed during the year by the Tool Room. The notable ones are:

- Fabricated a batch of blood pump impeller, housing top &bottom, pivot bearings and plasma filter components in CNC machines.
- Designed and fabricated a syringe holder column assembly and two tube holder blocks to Thrombosis Research Unit.
- Designed and fabricated a burst test setup fixture to Polymer Chemistry Lab.
- Designed and fabricated a acrylic mould for spinal spacer to Bioceramic Lab.
- Designed and fabricated 6 sets of stylet to puncture the bone to Toxicology Lab.

The division also continued to support the running and maintenance of the various utility services like electricity, water, sewerage, air-conditioning, telephones, in the BMT Wing.

Some of the important works are:-

- Re-arranged the distribution system to provide generator power supply to the entire campus by sharing the load between the two generators.
- Installed a new incinerator, which fulfils the CPCD norms including a corrosion free brick chimney.
- Established controlled environmental conditions like temperature, humidity, and proper air changes as per international requirements for animal experimental rooms. This was achieved by installing individual energy recovery ventilator, dehumidifier and air conditioning plants in each of the four experimental animal rooms.
- Established a reptile free area of 2 meters aroundthe animal house to make the animal holding area rodent free.

BMT Wing Library

The library has a collection of 9357 books and 6106 back volumes of journals. During the current year 277 books and 109 back volumes were added. Currently 65 journals are being subscribed. The collection includes 1990 standards and 270 patents.

The information management system of the library is based on the UNESCO software, CDS/ISIS. The acquisition, circulation, serials control and cataloguing are carried out on the system. The library maintains databases of current contents which includes engineering and computing, physical and chemical sciences, and life sciences. The Indian Patents Database on CDROM is also subscribed. The library information is available to both the wings through intranet.

As a part of supporting the quality systems, the library updates all relevant national and international standards. During this year 70 standards specifications were added to the library collection and the medical devices and services section of ASTM standards on CDROM is being subscribed.

BIOMATERIALS RESEARCH AND DEVELOPMENT

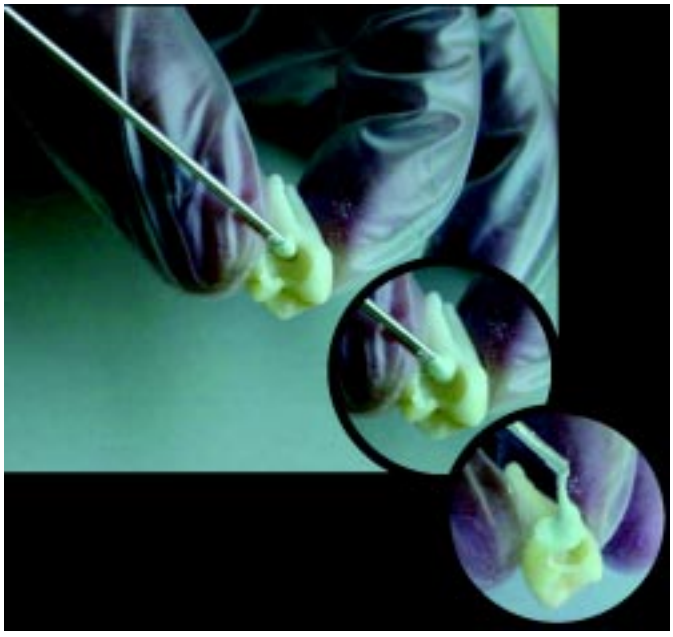
Bioceramics

The development of synthetic bone substitutes is the main research interest of the Bioceramics Laboratory. Presently the lab is engaged in the synthesis and testing of calcium phosphate based bioceramics, bioactive glasses and their composites and cements.

The cell culture studies of transparent hydroxyapatite (HAP) and hydroxyapatite-bioglass composite (HABG) discs have been initiated in collaboration with a team from Dresden University, Germany. The work focuses on the material-cell interactions and on the development of biomimetic compounds.

A new characterization instrument "*Mercury Porosimeter*" (Poremaster Model, Quantachrome Instruments) was installed. This equipment provides important data on the open pore sizes, their distribution, neck radius etc in porous materials, which are critical in determining the healing of the materials, when implanted.

The work on development of self-setting calcium phosphate bone cement progressed satisfactorily. The efficacy of the material in bone healing is being tested in rabbit



Injectable Calcium Phosphate Cement

model. An injectable formulation of the cement (fully-injectable calcium phosphate cement) is also being tested for biocompatibility.

Research in the area of biomimetic processing of novel biomaterials in collaboration with National Institute of Advanced Science and Technology, Chubu Centre, Japan has made considerable progress. A copolymer of phosphorylated poly[(2-hydroxy ethyl methacrylate)-methyl methacrylate] was synthesized and *in vitro* biomimetic growth of hydroxyapatite was observed on the copolymer compositions under simulated body fluid environment. Further work is ongoing.

Biosurface Technology

The project on stimuli sensitive polymeric nanoparticle based advanced drug delivery system for cancer, diabetes and antibacterials, under the prestigious NMITLI scheme of CSIR made excellent progress. Nanoparticles loaded with insulin were tested successfully on streptozotocin induced diabetic rats.

Based on the success of phase 1, phase 2 of the above project has now been approved for a period of 3 years with a budget of Rs.1.2 crores. The planned activities are:-

a) To optimize the process for 1 litre capacity and analyze insulin loading in the nanoparticles using ELISA.

b) To repeat stability studies for periods of over 3 months at storage temperatures of 4-8 degree centigrade.

c) To confirm insulin delivery in rat and pig models via oral and subcutaneous route; maintain the pigs for a minimum of 1 month.

d) To study the in vivo degradation of the polymer and seek Ethics Committee and other regulatory approvals for human trials.

Ceramic-based insulin loaded nanoparticles (zinc phosphate, zinc-calcium phosphate and zinc-magnesium-calcium phosphate) in the size range of 300 – 800 nm were developed for drug delivery and other applications. It was found that the loaded insulin was 100% active. In vitro studies with polymer-coated nanoparticles exhibited pH dependent release behavior. These nanoparticles may also have applications as DNA delivery systems or anti-viral vectors. Attempts are ongoing towards obtaining particles of size less than 100nm and to coat these nanoparticles with lipids or suitable polymers for sustained release, stability and enhanced absorption.

The DST funded project on Langmuir-Blodgett monolayer on polymer substrates for blood compatibility has progressed well. Preliminary effect of phospholipid monolayer onto polymer substrate in the formation of apatite crystals of insulin and antibiotics has been investigated. Work is on to study the blood compatibility aspects of these phospho/glycolipid layers. Various cell mimetic phospholipid/glycolipid/cholesterol compositions were deposited as monolayers over polymer surface using the Langmuir-Blodget technique (BARC, Mumbai) and an optimum combination was identified as blood compatible.

Dental Products

Addition type silicone impression material of three consistencies was developed this year (putty, medium body and light body). Their properties such as total working and setting times, tensile strength, consistency, strain in compression, dimensional change, etc. were measured and compared with imported control materials.

Toxicological evaluation of dual cure dental composite was initiated and a major part completed. On successful completion of the pulp and dentine test in large animals

this year, it will be ready for clinical evaluation. This composite will meet the demands of dentists for the latest type of dental composites.

Development of a new photo-initiator has progressed well. A new inorganic/organic hybrid materials developed in the lab for dental applications were characterized and their physical properties studied.

Polymer Analysis

The research activities were in the areas of molecular imprinting, surface modification of polymers, stimuli responsive polymers and development of methodologies for the isolation and chemical modification of hyaluronic acid and collagen. New initiatives have been made to synthesis copolymers containing phosphate groups for ophthalmic applications and novel materials for tissue engineering applications.

The concept of molecular imprinting was effectively used to create affinity sites for clinically relevant molecules on the surface of various polymers. Stimuli responsive polymer complexes based on polyvinyl alcohol were synthesized and evaluated. The water uptake of these polymers was found to vary linearly with glucose concentration indicating the feasibility of using these for various applications including insulin release in response to glucose. In collaboration with Bioceramic Laboratory new polymeric formulations containing phosphate moieties were synthesized and the preliminary evaluation indicates that they could be used for ophthalmic applications.

In the STEC project on biopolymers for medical applications, the extraction and purification of biopolymers such as hyaluronic acid and collagen from natural sources was further refined with an objective to improve the purity and yield. Work was continued on graft copolymers of hyaluronic acid, collagen and chitosan with other synthetic entities for various long-term and short-term medical applications such as biodegradable GTR membranes, scaffolds for tissue engineering, alternate wound dressing or coating materials for enhancement of blood compatibility or tissue compatibility.

The polyester in the vascular graft, was grafted with chitosan-vinylacetate copolymer. The methods were standardized so as to achieve minimum permeability for the polyester materials with biocompatible and blood compatible linings. Further studies are ongoing.

Polymer Chemistry

Work on the rapidly gelling polymer system based on gelatin and alginic acid dialdehyde was mostly completed including evaluation of the efficacy of the system as a wound dressing material in rats. Histology data obtained on the wound healing characteristics of the system were promising. The material could find other applications such as an injectable scaffold for tissue engineering as well as an injectable drug delivery vehicle.

In view of the good results on blood compatibility obtained using a vinyl derivative Tween 20 as a surfactant incorporated into methyl methacrylate in small proportions, another protein desorbing surfactant Triton-X100 was converted into its vinyl derivative and copolymerized with methyl methacrylate in small proportions and its blood compatibility is being evaluated with some promising results. Work on a *primaquine-crosslinked gum arabic as matrix for drug delivery* is being continued, while work on Amphotericin-B-gum arabic conjugate has been initiated.

Polymer Division

Development of light-weight, high strength and radiolucent orthopaedic casting tapes using

indigenously available polyurethane raw materials was initiated under Institute's technology development funding scheme. Various formulations of polyurethane based on carbodimide-modified dipheny methane diisocyanate, polyol-modified dipheny methane diisocyanate and polymeric dipheny methane diisocyanate and polypropylene glycol were tried so as to get the optimum properties of setting time and storage life. Orthopaedic casting tapes were prepared using E-Glass fiber mat and polyester fabric as prepreg. The aging studies have been started to assess the shelf life of the product.

In continuation of the development of biodegradable polymeric implant materials, studies on biodegradable carboxy terminated poly propylene fumarate for muco-adhesive drug delivery were carried out. Aging studies in various isotonic solutions revealed gradual degradation, weight loss and low pH of the aging medium.

Studies on fast setting aromatic polyurethane compounds were carried out to identify potential indigenous raw material suppliers. This potting compound is intended for the manufacture of hollow fiber based medical devices. The setting characteristics and storage life are being evaluated.

Polymer Processing Laboratory

A joint activity with Instrumentation Laboratory to develop electrically conductive polymer composites for ECG electrodes made steady progress. An appropriate polymer matrix was chosen based on the properties required. The filler loading was optimized to get the required electrical conductivity and mechanical properties.

The DST funded research project for the development of non-toxic latex formulations together with the Toxicology division made satisfactory progress. A number of natural rubber latex formulations having adequate mechanical properties and minimum amount of residual dithiocarbamates were formulated. Some of the latex formulations that passed the cell culture cytotoxicity test are being evaluated for intracutaneous irritation and sensitization potential.

Fabrication of clinically significant shapes of hydroxyapatite-ethylene vinyl acetate composites for bone substitute applications under the Indo-German funding scheme progressed well. Three-dimensional hemispherical shapes fabricated were analysed for formability ratio, variation in thickness, and change in surface texture. The deformation mechanism was also demonstrated. Additional data on fatigue testing of the composite was also generated.

BIOLOGICAL RESEARCH AND EVALUATION

Implant Biology

The Tissue Culture Laboratory: Cell-material interaction studies using different continuous cell lines and primary cells were carried out. The continuous cell lines included L-929, MG-63, HOS, SIRC, 3T3 and PC-12. Primary cells used were calvarial osteoblasts, endothelial cells and hepatocytes. In vitro cytotoxicity test as per ISO10993-5, 1999 were done for 100 samples which included drug coated and uncoated stents using all three modes of contact.

The development of a co-culture system of endothelial cells and hepatocytes was the main area of research. Cells grown on thermo-sensitive polymer coated tissue culture dishes gave encouraging results.

The Histopathology Laboratory: The laboratory is unique as a histopathology laboratory having facilities to undertake routine as well as a wide range of specialized techniques as applicable to soft and hard undecalcified tissues, with and without materials. Gross and histological evaluation of tissue response to materials in biocompatibility testing (124 samples) included evaluation of polymer coated and drug coated stent materials, and calcium phosphate cement. End use application studies (66 samples) of biological response to wound dressing materials and pre clinical evaluation of devices like polymer coated and drug coated stent materials in pigs were conducted regularly and these were carried out using protocols based on international standards. Gross and histopathological evaluation of tissues (800) received in an oral toxicity evaluation test of a dental composite material were also done.
Study of retrieved human implants continued, which included light and scanning electron microscopy observations on tissue and implant material. Work on understanding the healing mechanisms of ceramic bone substitutes and in tissue engineering made progress.

Studies to understand the following mechanisms were initiated during the year:

a) Molecular mechanisms of tissue response to implant debri

b) Cellular and molecular mechanisms of polymer degradation

c) Immune response and polymer degradation

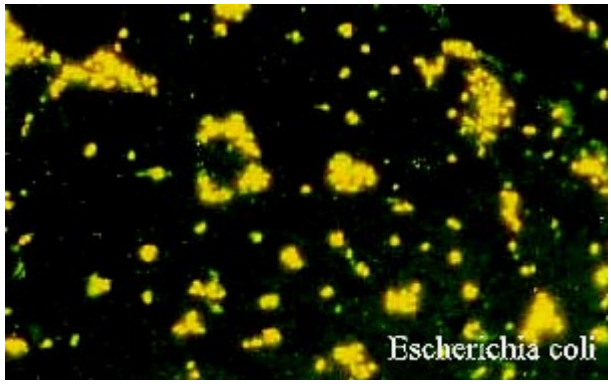
d) Effect of renal osteodystrophy and its impact on bone healing: normal and with metal prosthesis in an animal model.

The Transmission Electron Microscopy Laboratory(TEM), provided service in ultrastructural studies of tissues received from external and internal sources covering biological and inorganic samples. Samples (79 samples in 2003) for analyses were received from research students as well as from clinicians.

Microbiology

The institute funded project on the "Development and evaluation of antimicrobial silver oxide coated latex material for use as urinary catheter" was completed. Anti microbial coating on both the internal and external lumen is most promising as it prevents bacterial migration and colonization along both surfaces. The antimicrobial silver oxide coated catheter is developed in collaboration with LPA and evaluated here in this laboratory.

The present research focus is on understanding bacterial behaviour in biofilms. Bacteria in biofilms behave entirely differently than their planktonic counterpart. It has been established that more than 38% genes are expressed differently in biofilms. So the conventional microbiological techniques are incapable of addressing these issues. The present study aims at specifically understanding the molecular biology of biofilms of bacterial strains isolated from retrieved catheters from our hospital patients. The adhesion patterns, differential protein expressions, antibiotic resistance and microbial communications in these bacterial biofilms are being investigated. A thorough understanding of the problems is essential in addressing these implant associated infections effectively.



Acridiene orange stain *E.coli* adhered to Biomaterial

Molecular Medicine

Studies on temporal lobe epilepsy : So far, 43 genes whose expressions are modified, either up or down regulated during seizure conditions have been isolated. The sequence data of 22 genes has been deposited in the Genebank maintained by National Centre for Bioinformatics at USA (www.ncbi.nlm.nih.gov). The putative proteins translated from these genes include

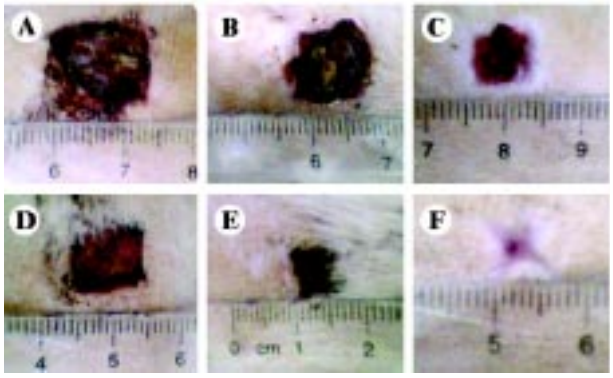
Latex Foley's urinary catheter coated with Silver Oxide

Uncoated Foley's catheter

SNARE receptors, cystein proteases, Norbin, NGF induced factor, Kininogen etc.

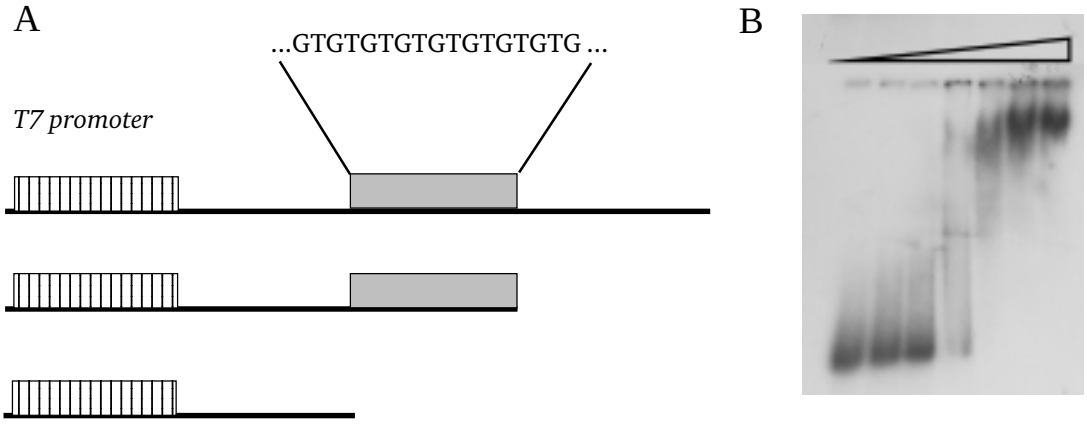
Other candidate genes focussed, apart from the gene expression profiling, include synaptotagmin and jerky. During the year, polymorphic changes in the GT number at the 3'UTR and heteroallelic frequency in epileptic patients were identified. To characterize further the functional significance of this conserved sequence within the non-coding region, mutation experiments within the repeat region were carried out. It has been found that the GT repeat sequence may function as a protein binding sequence motif of the synaptotagmin mRNA. This novel role of synaptotagmin in mRNA regulation has been further studied to identify the putative proteins, which are preferentially bound to the sequence. Preliminary results suggest that the gene has a preferential binding to its own protein. This opens up new possibilities in regulated expression for this gene.

Developing recombinant TGF α for wound healing : Small peptides which functions as growth factors have important roles in wound healing. Transformation growth factor alpha (TGF α), an epidermal growth factor homologue can induce faster epidermal regeneration in second degree burns. The first stage of developing the recombinant TGF in terms of expressing them and purifying from a prokaryotic host has been completed. These studies have suggested that the recombinant protein has enhanced the wound healing by 25-30%, when compared to controls in rat model (Figure 2). In the second phase currently in progress, this recombinant protein will be used with various wound-healing materials developed by the polymer laboratories.



Wound healing in rats: A, B and C control rats (no treatment except carrier solution applied to the wounds) at 2nd day, 7th day and 14th day respectively.

D, E and F : TGF alpha treated wounds on 2nd day, 7th day and 14th day respectively.



A. Deletion mutant constructs of synaptotagmin 5' UTR.
B. Gel retardation assay showing synaptotagmin 5' UTR binding to brain protein extract. The binding enhances as the concentration protein increases.

Thrombosis Research

An ideal artificial graft used for replacement of damaged blood vessels must resist thrombosis, inflammation and intimal hyperplasia. The main cause of failure of small diameter (less than 6mm diameter) artificial grafts is the lack of endothelial cell (EC) monolayer formation on the luminal surface. One approach being tried here is the in vitro endothelialization of the blood contacting surface of small diameter polyester grafts. Major challenges in this process of in-vitro endothelialization are achieving resistance of grown EC to shear stresses and maintenance of intact physiological function. The major ongoing work elements of the current project work are:

1. Standardization of technique to get confluent monolayer of EC as quickly as possible
2. In vivo evaluation of endothelialized graft in a suitable animal model
3. Evaluation of the blood compatibility of endothelialized graft
4. Isolation and characterization of adult human endothelial cells of cardio vascular patients who might be subjected to surgery
5. Growing the circulating progenitor cells from sheep into endothelial cells and seeding 4 mm diameter polyester grafts.

Research is also focused on platelet glycoproteins, platelet activation dependent cytokines to understand cardiovascular diseases. Production and evaluation of monoclonal and polyclonal antibodies for diagnostic and therapeutic applications are also in progress.

Toxicology Evaluation and Animal House

Animal House

The care and management of small laboratory animals, namely mice, rat, guinea pigs and rabbits were carried out routinely. Animals demanded for testing and research activities were supplied promptly. Health status of stock and experimental animals are routinely evaluated and found satisfactory. The new facility for experimental animals with controlled environment is expected to be ready in May 2004.

Toxicology

The primary focus in the division is the toxicity evaluation of materials, intended for the fabrication of medical devices and to investigate the potential biological hazards by careful observation for unexpected adverse reactions or events in humans during clinical use of the medical device.

A new initiative during the year is in the development of in vitro alternative methods for pyrogen testing using human whole blood. The proposal is approved by the Department of Biotechnology, New Delhi. The toxicological evaluation of the newly developed non toxic latex formulation for biomedical application was carried out and the results are promising.

Various test and studies were carried in support of the development activities of other divisions. These include:-

* Subcutaneous implantation, subacute oral toxicity, sensitization and intracutaneous irritation tests were carried out on dental composite material in collaboration with Dental Products Laboratory
* Intracutaneous irritation, closed patch sensitization test and in vitro haemolysis tests were conducted on latex for an industry in Chennai.
* Wound healing studies of fast gelling system (polymer) was carried out for Polymer Chemistry Laboratory

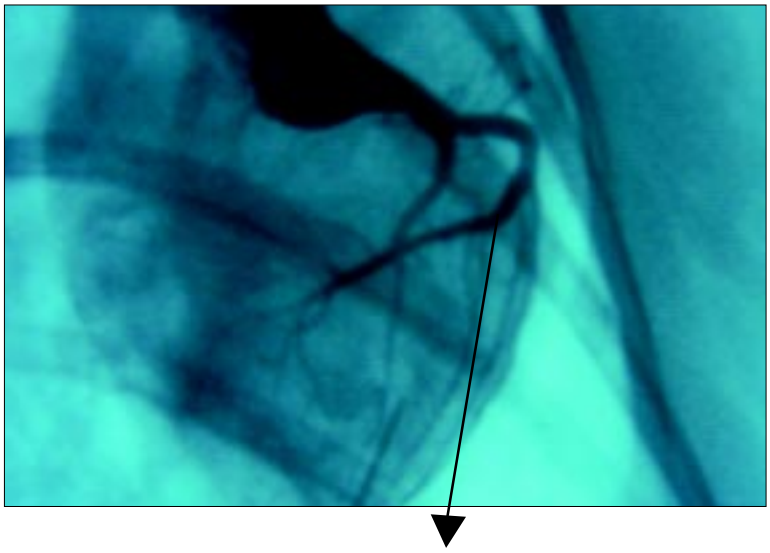
* Initiated wound healing studies of growth factor in rats in collaboration with Molecular Medicine Laboratory
* Long term bone implantation of dual cement composite for the Bioceramics Laboratory
* DMBA induced chemical carcinogenicity studies in golden hamsters is underway in collaboration with the Department of Radiology, SCTIMST.

Vivarium

The experimental facilities available for the conduct of animal research include a well-equipped large animal operation theatre, radiography facility and a clinical laboratory for pre-experiment clinical/ laboratory evaluation of animals. The OT is equipped with facilities needed for conducting evaluation of devices/ materials used in cardiovascular, neuro-surgical, orthopedic and dental applications. Sheep house constructed with raised slatted roof and pig house with wallowing facility meets the INSA as well as CPCSEA requirements for housing sheep and pigs.

Major studies conducted in the division were:-

1. Biofunctional and pharmacokinetic evaluation of drug coated endovascular stents- Pre-clinical evaluation in porcine model.
2. *In vitro* evaluation of blood pump.
3. *In vitro* evaluation of hemoconcentrator
4. *In vivo* evaluation of EC coated small diameter vascular graft.



Coronary angiography of LAD artery 10 minutes post stent implantation in pig coronary artery model

PATENTS GRANTED

1) **A Process for the Preparation of Alginate beads for Oral Delivery of Preparations such as Insulin and Albumin**.
Inventors: P.R. Hari, T. Chandy, C.P. Sharma

2) **A Process for the Preparation of Steroid loaded Chitosan Beads.**
Inventors: T. Chandy, C.P. Sharma

3) **A Process for the Preparation of Heparin Immobilized Pericardium.**
Inventors: C.P. Sharma, L.R. Moses

4) **Polyethylene glycol Pericardium and a Process for the Preparation thereof.**
Inventor: C.P. Sharma

5) **A Process for the Preparation of Haemostatic Fibrin Sheet for Wound care Applications.**
Inventors: Lissy K. Krishnan, G. Arthur Vijayan Lal

HEALTH SCIENCE STUDIES

The Achutha Menon Centre for Health Science Studies continued to excel in public health training and research in the reporting year. The World Health Organization (WHO) Nepal Country Office sponsored 3 candidates for the MPH program in the year 2003. A non-governmental organization sponsored another student from Nepal. In addition, 8 doctors who joined MPH program in the year 2002 under the WHO fellowship program of the Government of India are continuing their studies. These 8 doctors came from the states of Bihar (1), Gujarat (2), Sikkim (3) and West Bengal (2). A total of 18 students joined MPH program in 2003; 14 from India and 4 from Nepal. The 14 Indian students are from various parts of the country giving a national spread of MPH students. This is the only public health training program that is supported by the World Health Organization in India. The number of applicants for the open category is increasing every year. For the last batch there were over 40 applicants. In addition to the MPH program there were 15 applicants for the PhD program for public health in 2003. Out of these, 5 students were selected.

From the year 2003, the duration of the MPH program has been extended to 2 years from the existing one and a half year. A few courses of the MPH program will be offered as short courses also. These courses will be required courses for the MPH students and a few students from outside will be able to join. However the total number of seats for the short course will be limited to a maximum of 30 per batch. These short courses have been planned because a lot of in-service candidates have shown interest to join such short courses. Many state governments are not willing to send their doctors for long duration course such as MPH and PhD. However they need to be trained in public health. These short courses are mainly intended for such candidates. In addition many funding organizations are also willing to support short courses in public health. As a part of the project supported by the MacArthur Foundation two short courses are being developed; gender and medical education and making pregnancy safer. The other short courses which are being planned are ethical issues in health research, a one week course, quantitative research methodology, qualitative research methodology, infectious disease epidemiology and epidemiology of non-communicable diseases.

Dissertations submitted in June, 2003 (Graduates – 2003)

Sl. No.	Name of the Candidate	Title
1.	Thankachi Yamini Ramachandran	Prevalence of overweight and obesity among school and college going adolescents in rural and urban Thiruvananthapuram district of Kerala
2.	Chitra Grace. A	Prevalence of diarrheal diseases in children under five years of age in two rural communities in Thiruvananthapuram district of Kerala
3.	Sonia Andrews	Structure and functioning of in-patient health care institutions in Thiruvananthapuram taluk, Kerala
4.	Sailesh Mohan	The prevalence and correlates of tobacco use among 13-17 year old m ale high school going students in the corporation area of Thiruvananthapuram.
5.	Laxmaiah A.	Assessment of overweight and obesity and its predictors among urban adolescent school children, Hyderabad, Andhra Pradesh
6.	Bimal Kumar Rai	Epidemiology of iodine deficiency disorders in the south district of Sikkim, India
7.	Karma Jigme Tobgay	Health seeking behavior and delays in diagnosis & treatment in patients reporting with cough of three weeks or more to tuberculosis units & microscopy centers in east Sikkim
8.	Tseten Yamphel Bhutia	Practice and perception of married men about different contraceptive methods in a rural community in east district of Sikkim
9.	Thinlay Wongyal	Prevalence of hazardous drinking and its correlates in a community in Gyalshing West Sikkim, India
10.	Asha Raghavan	Health seeking behavior of tuberculosis patients of Kollam, Kerala
11.	Vinai Krishna Sinha	Role of non government healthcare providers in leprosy activities in Sitapur, Uttar Pradesh
12.	Kanchana. T	Determinants of infant mortality in Virudhunagar district, Tamil Nadu
13.	Devashish Bhattacharyya	Assessment of the information, education communication (IEC) component of cancer control program in primary health care set up of government of Delhi

RESEARCH PROJECTS

Completed Projects

Community based detection and monitoring of hypertension in Kumarakom Panchayat

This was funded by the Kerala Research Program for Local Level Development, Centre for Development Studies, Trivandrum. The main objective of this project was to reduce risk factors of non-communicable diseases by people's participation. Over 5000 adults above the age of 30 years in Kumarakom panchayat were identified and interviewed by trained volunteers. Information on risk factors was collected using a pre-tested interview schedule and height, weight, waist circumference and blood pressure were measured. After the first round of measurement health education for reducing risk factors like tobacco use, alcohol use, over eating, lack of physical activity, was provided to the people in neighbourhood groups which are already established in the panchayat during the peoples plan campaign. The selected volunteers were given a BP apparatus, weighing scale and a measuring tape to monitor the various measurements. During the monitoring time also health education would be provided by interpersonal communication. Those who were detected to be hypertensives for the first time during the project were referred to the local primary health centre for treatment. The trained volunteers are expected to continue monitoring blood pressure and other risk factors among the population in this panchayat using the BP apparatus and other equipment provided to them.

Gender and poverty issues in Tuberculosis in the WHO South-East Asia region

This project funded by the WHO-South East Asia regional office, consisted of two phases. The first phase included the preparation of a comprehensive annotated bibliography and review of literature on poverty and gender dimensions of tuberculosis in countries of the WHO South-East Asia region. In the second phase, based on the findings from the review, a protocol for rapid appraisal of gender and poverty-related barriers to accessing Directly Observed Treatment Short Course (DOTS) services for tuberculosis was developed, field-tested and finalized. Three volumes – an annotated bibliography, a review paper and a protocol have been produced from this project

Industrial participation in public health care provision in Tamil Nadu: A case study of Virudhunagar district

The World Bank, New Delhi, funded the Project. The objective of the study was to document the rationale, content and implications of the government policy of involving industrial units to improve the public health care system (PHCs) in Tamil Nadu in general and in Virudhunagar district in particular. Using stakeholder analysis, the study found that the magnitude of the resource support to the PHCs was not significant but it made a qualitative impact on the overall functioning of the PHCs. The real success of the policy is that the small quantum of resources provided by the industrial units made a big difference in activating already existing resources that were idling earlier. However, its sustainability is questionable, as it is designed as a 'one-time booster'.

Private health sector performance (PSP) – A review of past studies in India

The Karolinska Institute, Stockholm, Sweden funded the project. This project reviewed the existing literature with an overall aim to find out the role played by the non-government sector in the provision of health care

in India. The study included 101 papers, reports, and government documents pertaining to India and covered 8 topics – (1) size and distribution of the non-government sector, (2) their characteristics, (3) investment decisions, (4) clientele, (5) cost of care, (6) quality of care, (7) financing of care, and (8) regulation. Results indicated that the exact size of the non-government sector is still not known. However, the perception was that Indian non-government sector is the biggest in the world and that it is bigger than the government sector in terms of number of institutions and practitioners. Non-government sector is the preferred option and first contact point for over 50% of the patient-consumers. Inadequacy/inefficiency of government sector is one of the major reasons for the growth of this sector. The growth is more pronounced in urban and prosperous areas and a vast majority of non-government providers are small-sized.

Ongoing Projects

Demand side financing for reproductive and child health program

This project is funded by the London School of Economics using a grant from the European Commission Technical Assistance (ECTA). The objective of this project is to find out the feasibility of demand side financing strategies for reproductive and child health program in India. Till now RCH program like other health programs is supported by supply side financing. Supply side financing has lot of problems like inefficiency, inequity, lack of targeting and competition. The objective of this project is to see whether demand side financing like voucher scheme will be more effective in addressing the RCH challenges in India.

Establishment of sentinel surveillance system for cardiovascular disease in Travancore Titanium Products Ltd, Trivandrum

The project is a part of the national CVD surveillance in the Indian industry population. Demographic information and risk factors like smoking, alcohol use, physical inactivity, diet habits etc. are being collected from all the 1500 employees 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 health education to the employees and their family members are scheduled. Experts in the above fields will offer health education in various aspects of cardiovascular diseases and their risk factors. After the health education a sub-sample of the population will be examined again to see the impact on risk factors of CVDs.

Independent evaluation of the National Malaria Control program

This evaluation is funded by the Directorate of National Vector Borne Disease Control Program of the Government of India. Seven states are selected for the evaluation of the malaria program. Gujarat and Chatisgarh states were selected from the group of EMCP (Enhanced Malaria Control Project) states, Punjab,

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. 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 are members of the evaluation team.

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

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) 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 short courses developed under this project would be integrated with the MPH programme in due course. The WHO-South East Asia office has highly appreciated work being done on the gender sensitization of medical education and it has come forward to support the first session of short course on the subject with their South East Asia region participants. We have completed one year of this project, two more years are remaining. The national seminar to discuss the papers reviewing medical textbooks from gender perspective is scheduled to take place in the last week of July 2003, the first short term training on gender and medical education for the Indian as well as South East Asian participants will take place from

November 3 to 15. And the first session of the short course "Making Pregnancy Safer" is scheduled to take place in January 2004.

Sentinel health monitoring centres in India

This is funded by the Indian Council of Medical Research using funds from the World Health Organization India Country office. 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. Currently only the step 1 and step 2 are being done in all the centers. Step 1 is collection of information on risk factors using an interview schedule and step 2 is taking measurements like body weight, height, waist circumference, blood pressure etc. ICMR is planning to include step 3, which is examination of blood samples for fasting blood sugar, serum cholesterol and triglycerides.

Situational analysis of MTP services in Kerala: Provider perspectives

This is 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 is 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. Preliminary analysis of the data points to the need of streamlining the process of site registration, and the need to 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.

Small grants program on gender and social issues in reproductive health

During 2003-2004, the 11 grantees under this program started their research studies.

In keeping with the advice of the advisory committee and the need of the grantees, a Methodology Workshop was organized from June 28-29, 2004 at Asha Nivas, Chennai. The objectives of this workshop were to help grantees with operationalising a gender perspective within their specific research questions, their research methodology and data collection tools. The workshop was attended by all the grantees and members of the advisory committee who double as reviewers/mentors for the researchers. All grantees presented their methodology and research tools and reviewers gave suggestions and directions.

Following this workshop, grantees sent back the revised research tools to each reviewer and further corrections were made and the data collection was started after this. Most of the grantees (8 of 11) have by now completed data collection. They have sought and received support from their reviewers as and when needed. Reports have been submitted of work completed six months into the beginning of the research process. A mid-term assessment of the progress of research was to be done by reviewers. This has now been completed

for nearly all the grantees and assessment reports have been received.

The grantees are expected to submit their draft reports by September 2004. There will then be a workshop to give feedback on these reports and to help grantees finalize the reports. We hope to be able to have eleven completed research reports by the end of the next academic year in March 2005.

Strengthening health research in non-government organizations in India

This is a collaborative project funded by the Rockefeller Foundation, US. The project is coordinated by the Tata Institute of Social Sciences Mumbai in collaboration with AMCHSS of SCTIMST and three other national level non-governmental organizations. 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 37 have completed the data collection and report writing. A national level meeting was organized in Mumbai in the year 2003 where all the 37 papers were presented. The papers will now be published in the form of a book.

Tobacco cessation training and research in India and Indonesia.

This is a collaborative project between India, Indonesia and the US. The project is supported by the Fogarty International Centre of the National Institutes of Health, USA. The collaborating institutions are University of Minnesota, USA, Achutha Menon Centre for Health Science Studies of SCTIMST and Gaja Mada University Indonesia. 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.

PATIENT CARE

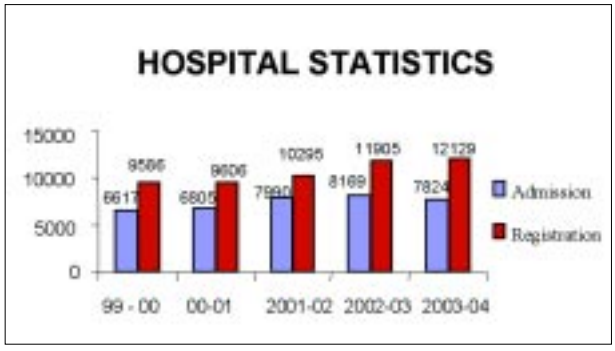
Hospital services continued to contribute significantly in providing care to the patients from Kerala, nearby districts of Tamilnadu and a few patients from other parts of India and abroad. The Six-Sigma initiative to improve the quality of services in the out patient department proved to be a good endeavor and was appreciated by the patients. There is an increasing role for medico social workers in providing information to the patient and relatives.

A Congenital Heart Surgery unit was commissioned during this year incorporating two theatre rooms, a nine bedded fully equipped Intensive Care Unit and a dedicated Pediatric Cardiac Surgery Ward.

Structural modification to modernize the hospital kitchen and improve dietary services has been initiated. A plan for modern manifold system was also prepared and is waiting to get implemented. The procedure for annual purchase of medicines and annual maintenance contract for various equipments were revised.

Measures were taken to have a Memorandum of Understanding between this hospital and the Department of Forensic Medicine, Medical College, Thiruvananthapuram to harvest heart valves and accessory parts in order to start a homograft bank in this Institute. A plan has been formalized to include the hospital as a tertiary referral centre for tele-medicine service for the hospitals in Kerala. The hospital has taken all steps to implement the Biomedical Waste Management Programme as per the regulations of the Government of India.

Preliminary discussions to provide orientation –training programme for nurses from the Republic of Maldives were carried out which will be a stepping-stone for international cooperation in this area.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5000
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6617
6805
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8169
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Admission
Registration
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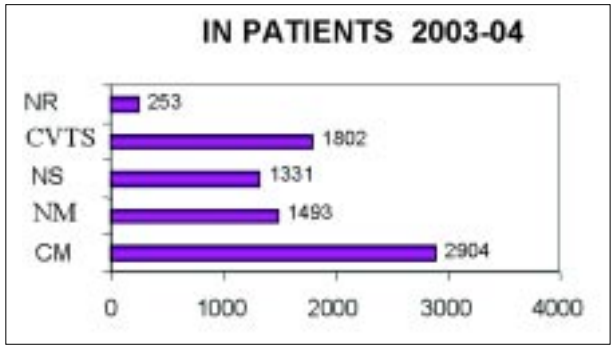
00-01
2001-02
2002-03
2003-04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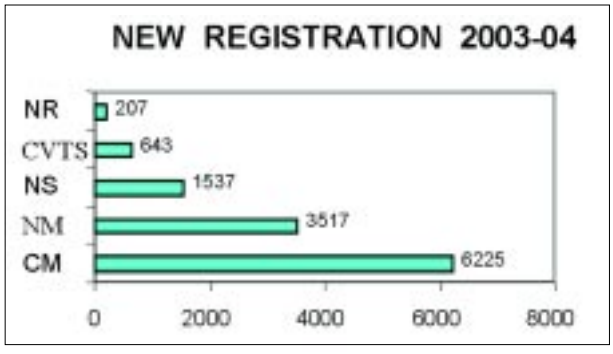
0
1000
2000
3000
4000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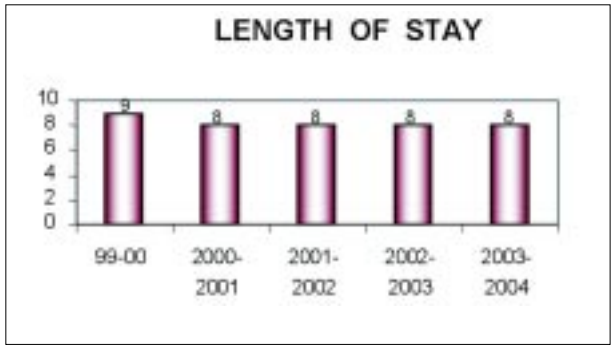
6000
8000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6
4
2
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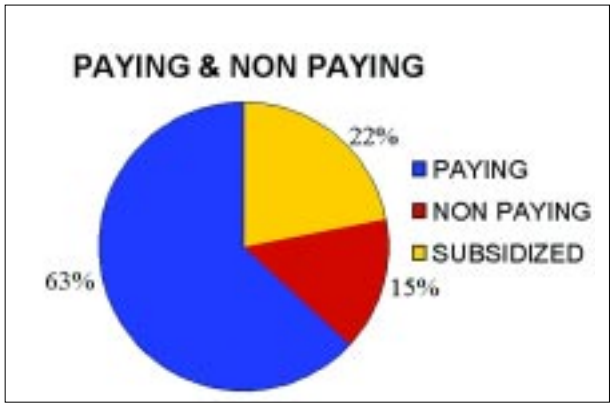
8
8
8
8
8
99-00
2000-2001
2001-2002
2002-2003
2003-2004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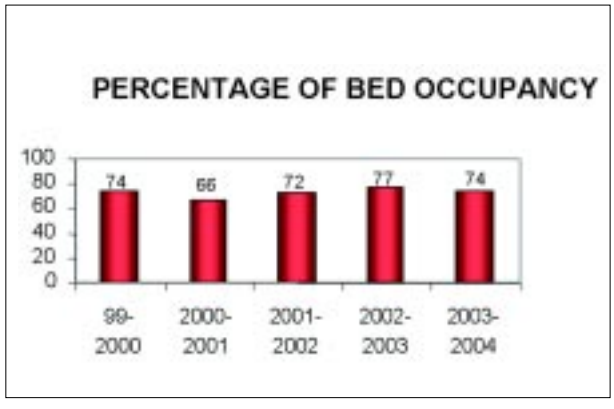
63%
15%
PAYING
NON PAYING
SUBSIDIZED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66
72
77
74
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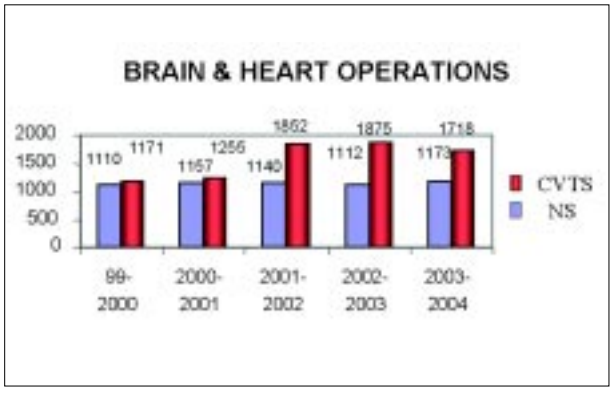
2000-2001
2001-2002
2002-2003
2003-2004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500
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1157
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1862
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1875
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1718
CVTS
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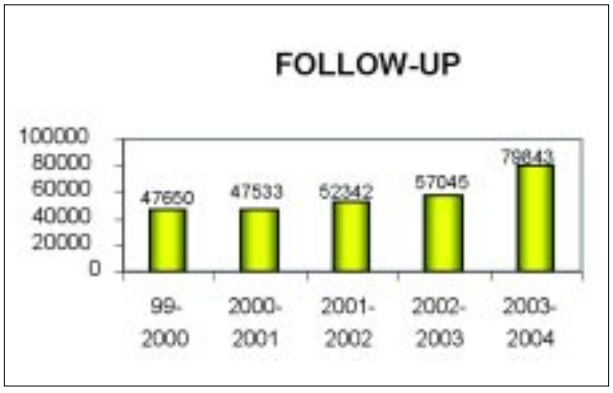
99-2000
2000-2001
2001-2002
2002-2003
2003-2004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60000
40000
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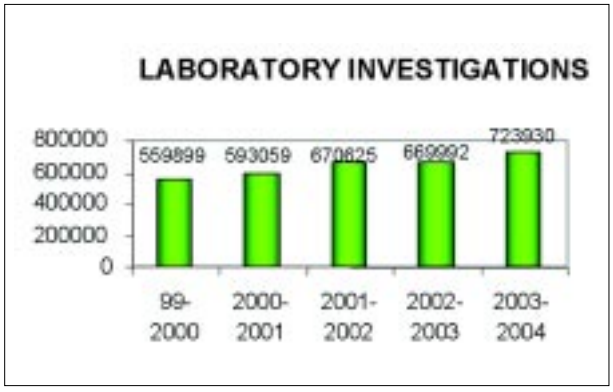
2000-2001
2001-2002
2002-2003
2003-2004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600000
400000
200000
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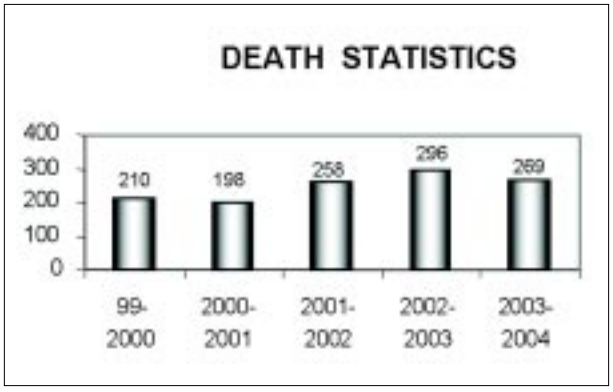
593059
670825
669992
723930
99-2000
2000-2001
2001-2002
2002-2003
2003-2004


DEATH STATISTICS
400
300
200
100
0
210
198
258
296
269
99-2000
2000-2001
2001-2002
2002-2003
2003-2004

A project "Re-organisation of hospital services" was started during the current year to monitor and evaluate the quality of services and facilities which are provided to the patients.

Medical Records

Medical Records Department(MRD) played a significant role in patient management in 2003-04. As per the recommendation of Six Sigma, all the appointment dates of patients were rescheduled with different timings and token numbers, which controlled the overcrowding of patients in the out patient departments. Detailed monthly statistical reports were published and copies were provided to all the heads of departments and Chairman of Hospital Management Committee(HMC). The same was discussed in the HMC meeting also. 1,20,000 old inactive charts were shifted to BMT wing and 50,000 charts were pruned, which saved space. The number of registrations, reviews and investigations increased this years 15% more than previous year. In addition to that, 79,843 charts were retrieved for patients' purpose. 17,222 charts were issued for doctors-patients correspondence and study purposes. 7,783 discharge summaries and 2,891 operation reports were typed by MRD typing pool. 4,147 certificates were issued by senior medical records officer to patients for financial assistance/advances and train concessions.

IMPORTANT STATISTICS

Sanctioned bed	239
Percentage of bed occupancy	74
Cardiovascular and Thoracic Surgery	1718
Neurosurgery	1173
New cases	12129
Repeat cases	79843
Admissions	7824
Discharges	7783
Deaths	269
Non-paying (%)	15
Paying (%)	85
Average length of stay (in days)	8
Bed turnover rate	33
Percentage of mortality	3
Percentage of post operative mortality	4
Sophisticated investigations	39760
Laboratory investigations	723930
X-rays	24960
Physiotherapy	23531
Electrocardiogram	19536
Echocardiogram	23540
Electromyogram	726
Pacemaker implantation	122
Perfusion	1294

Anaesthesiology

Anesthesia support was given as shown below.

Patients	Number
Cardiovascular & Thoracic surgery	2050
Neurosugery	1170
Neurological, cardiac and radiological procedures	450

Biochemistry

Activities of the division comprised of both routine clinical laboratory services(including clinical biochemistry , clinical pathology and hematology) and research related to clinical problems

Clinical Laboratory Services

The Central Clinical Laboratory functioned round the clock providing investigative support in clinical chemistry, hematology and clinical pathology. The total number of procedures crossed 5.12 lakhs and details are given in the following table :

Nature of investigation	Number
Lipids	15475
Electrolytes	135757
Enzymes	25160
Liver function tests	31405
Blood urea nitrogen	21960
Glucose	31920
Blood gasses	29627
Hematology	93307
Coagulation	33589
Urine analysis	45001
CSF studies	5334
Electrophoresis	177
Miscellaneous	44185

Biomedical Engineering

As in previous years, the mission of the Biomedical Engineering Division, to perform installation of new equipments and maintenance of equipments and utilities, keeping maximum uptime was well executed. One of the most important activity of this year was the provision of infrastructure facilities for the Paediatric Cardiac Surgery Complex.

This division actively participated in the procurement of some of the highly sophisticated equipments like the state of the art models of MRI Units, CR, PAC systems, plane X-ray machine, high end colour doppler system, transcranial doppler system, refrigerated centrifuge, patient monitoring systems, micro electrode recording system, blood gas cum electrolyte analyser, EEG, EMG, polysonography system, brain magnetic stimulator system, fully automated dish washing machine for hospital dietary, high capacity washing machine for hospital laundry, operating theatre tables and other OT equipments for Department of Cardiovascular Thorasic Surgery and Neurosurgery.

This year, a program for optimal utilisation of space and power in various departments were initiated and work has already been started in dietary and laundry.

Blood Transfusion Services

Apart from the routine activities like providing support to surgical and interventional procedures, blood bank has shouldered and effectively managed situations during the outbreak of dengue epidemic. Platelet components were prepared and given to combat the emergency.

Donor awareness programs in the community and blood support to other hospitals are continuing.Talks on different aspects of transfusion practice were organized for clinicians and nursing staff of SCTIMST on behalf of Hospital Transfusion Committee. Dr.P.V.Sulochana gave a talk on "An overview of blood bank facilities". Panel discussion on transfusion practice was organized and was moderated by Dr.Rupa Sreedhar.

Individualized efforts are being taken to create awareness about blood components usage among clinicians of other hospitals.Medical officers from the Directorate of Health Services were trained for one month in modern blood banking technology sponsored by the State AIDS Cell. In addition a three-day training in blood banking was given for the drug inspectors of the state.

Data of blood components prepared

RBC	4567
Plasma (FFP & SDP)	3460
Platelets (PRP, PC, AP- PLC)	1107

Component preparation had doubled, compared to the previous year.

New Initiatives during the year were :

- ID-Gel Card system introduced for blood grouping and compatibility
- Bar coding of blood components was initiated and program integrated with VB software with the support of the computer division
- Determination of factor VIII and fibrinogen levels in cryo precipitate as a QC measure of blood collection and separation and storage of plasma with TRU,BMT Wing, was also initiated.

Cardiology

During the year, 6225 new patients were registered in the department and 2904 patients were treated as inpatients. The non-invasive cardiac laboratory acquired a new 2-D Echo Doppler System (VIVID 7), which has given a boost to pediatric echocardiography and presently the vast majority of pediatric cardiac patients are subjected to surgical corrections on the basis of echo doppler study alone.

The following invasive and interventional procedures were performed in the cardiac catheterization laboratory :

INVASIVE INVESTIGATIONS AND PROCEDURES

Coronary angiograms	1391
Cardiac catheterization studies	174
Cardiac electrophysiology studies	26
PTCA + Coronary stent	186
Balloon/metal mitral commissurotomy	171
Septal ablation (PTS MA)	1
Coil embolisation– PDA	65
Embolisation – Coronary AV Fistula with Device	1
Coil embolisation – Coronary AV Fistula	1
Coil embolisation– MAPCA	1
ASD Closure with amplatzer device	16
PDA Closure with blockaid device	10
Balloon pulmonary valvotomy	15
Stent implantation MAPCA	1
Stent implantation PA	1
Balloon aortic valvotomy	6
Baloon atrial septostomy	10
EPS + RFA	52
Pacemaker implantations	111

Primary angioplasty is presently being offered to all.

Cardiovascular and Thoracic Surgery

The department performed 1718 operations during the year, 1357 being open-heart procedures.

A dedicated Paediatric Cardiac Surgery unit was inaugurated during this year. The Thoracic Surgery complex was renovated with state-of-the-art equipments and was converted to paediatric unit.

A continuing medical education programme was conducted by the department for the residents and junior surgeons from all over India in January 2004.

Computer Division

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

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

New Installations

IBM e232 reconfigured with Mylex RAID controller card
PC Pentium IV, 256 MB RAM, 40GB HD- 5 nos
PC Pentium IV 1GB RAM, 40GBx 2-1 no
PC Pentium IV,128 MB RAM, 40 GB HD-20 nos
Modem 2 MBPS
Printer laser colour HP 1500L
Printer laser HP 1005
Printer server with three printer ports-1 no
Switch 10/100 MBPS 5 port-2 nos
Printer 24 pin, 80 column-10 nos
Printer 9 pin, 80 column-5 nos
Scanner scanjet 8200C
DVD writer internal-1 no

Software Installed

Microsoft Internet Security & Acceleration Server 2000
Norton Internet Security 2003
Wingate Proxy Server
Acrobat 6.0
Windows 2000 Professional
Office XP Professional
3D MAX STUDIO
Adobe Photoshop CS

New Software Developments

Intranet Website: - Developed an Intranet website http://intranet.sctimst.ac. in, which can be accessed by the staff and students with login/password for viewing the personal data and general forms.

Physiotherapy register: - This software is used to automate routine activities of the department with statistical reports.

Web based pharmacy tender: - A tender processing software was made to facilitate the vendors to quote their offer online through web and to evaluate & select the suppliers.

Hardware configurations for the purchase order of PACS (Picture Archival and Storage- Phase I Radiology) got finalised.

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

Microbiology

Diagnostic investigations increased in the microbiology laboratory with additional tests being introduced such as Chlamydiae pneumoniae antibody levels, T3, T4, TSH levels etc.

PCR for Mycobacterium tuberculosis and HSV antigens have been introduced in the routine lab.We continue to test for IgM anti-dengue antibodies and detect about 30% samples positive for Dengue.

Neurology

Epilepsy section

The R.Madhavan Nayar Center for Comprehensive Epilepsy Care, has completed six years of its service in the care of persons with epilepsy. The new initiatives this year was the starting of the one-year epilepsy fellowship. Epilepsy surgeries are being performed with

all advanced investigations which include intraoperative electrocorticography, invasive monitoring and cortical stimulation and mapping. Several neurologists and neurosurgeons from India and abroad visited the epilepsy center to learn about the presurgical evaluation and epilepsy surgery. The community based epilepsy care and research is as active as in previous years

Epilepsy Care

Epilepsy clinic is conducted regularly at SCTIMST on Wednesdays and Fridays and at the community outreach clinics on 1st and 3rd Sundays at PHC, Changaramkulam and Ansar hospital, Perumpilavu, respectively. Patients with medically refractory epilepsy from various parts of India came to the epilepsy center seeking better treatment. These patients underwent systematic presurgical evaluation and psychosocial intervention. Two epilepsy camps were conducted at Kozhencherry, and at Punalur, on August 3rd and October 12th, 2003, respectively. In both the camps a team comprising of four consultants, four postgraduate students, a psychologist and a medical social worker participitated.

Epilepsy Education

Group sessions are conducted regularly one hour before the epilepsy clinic to educate persons with epilepsy and their families. A psychologist and medical social worker moderate these sessions. Patients clarify their doubts and also share their experiences during these sessions. A painting competition was conducted on the National Epilepsy Day, November 16th 2003, for children with epilepsy. The world renowned sculptor, Shri. Kanayi Kunhiraman, Chief Guest of the day distributed prizes to the winners. Three issues of "Pratheeksha", quarterly publication of Epilepsy Self Help Group was released during 2003. A get together of patients who underwent epilepsy surgery at the center was arranged on August, 8, 2003 in connection with the 6th anniversary of the R. Madhavan Nayar Center for Comprehensive Epilepsy Care. Patients shared their experiences and the program was well appreciated.

Procedures	**Number**
Electroencephalography (EEG)	2745
Video - EEG telemetry	281
Electrocorticography	77
Invasive monitoring	4
Cortical stimulation & mapping	8
Intracarotid amobarbital	31
Epilepsy surgery	**Number**
Anterior temporal lobectomy	49
Extratemporal resections	18
Hemispherotomy	5
Neuropsychological evaluation	**Number**
Pre-operative assessment	120
Post-operative assessment	140
Quality of life assessment	250
IQ evaluation	80
Counseling session	300
Relaxation therapy	62

Neuromuscular Section

New initiatives during the year:

The electrophysiology laboratory was equipped with a new Nicolet Viking machine to enhance the number as well as the electrophysiological services provided by the laboratory. The study protocols for sphincter EMGs, diaphramatic conduction study, bulbocavernous reflex latency, pudendal conduction study were initiated.

Procedures	Number
Large volume plasma exchange	86(21)
Thymectomy	27
Muscle biopsy	21
ENMG studies	883
Evoked potential studies	138
Optometry studies	1652

Movement Disorder Section

New initiatives include :5-channel intra-operative microelectrode recording system for intra operative electrophysiology in movement disorder surgery

Procedures	Number
Botox treatment	39
Movement disorder surgeries	14

Cognition & Behavioural Neurology Section

CBNC runs a Memory and Neurobehaviour Clinic as a part of neurology out-patient services. In addition it provides technical support to the Trivandrum chapter of the Alzheimer's and Related Disorders Society of India in the running of their day-care center for dementia. It also carries out active and collaborative research in the field of cognition and dementia.

New Initiatives during the year :

New neuropsychological test materials worth nearly of Rs. 95,000 were purchased and included a computerized neuropsychological test battery developed in the Netherlands. These materials were mainly used for the ongoing research activities of the section.

Speech therapy

Evaluation	Number
Speech therapy visits	805
Speech evaluations visits	455
Audiometry Studies	243
Neuropsychological Testing	186

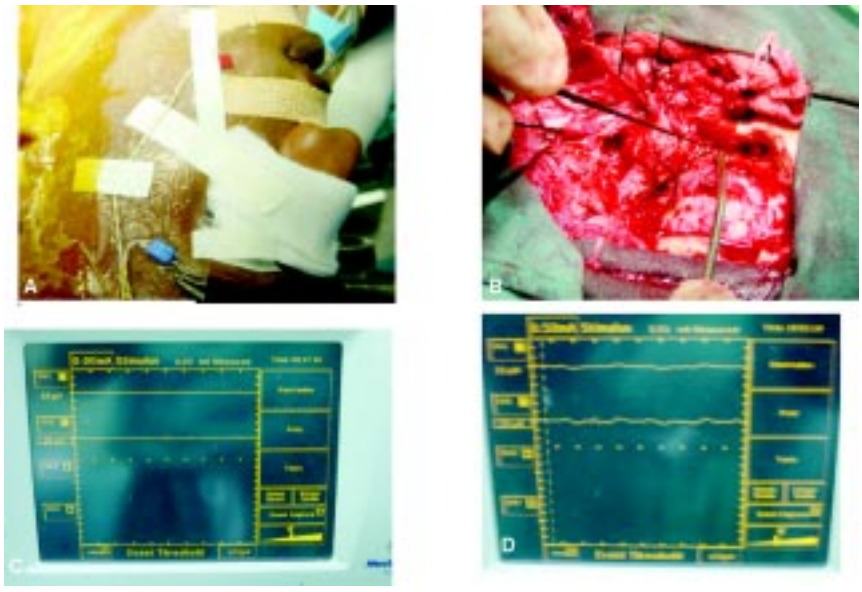
Stroke Section

Stroke section runs a stroke clinic on all Fridays. Patients are given advice regarding risk factor modification.Stroke rehabilitation is given in co-ordination with speech therapist and physiotherapy section

Neurosurgery

The number of complicated and challenging cases has increased this year and is probably related to the increasing neurosurgical facilities available in most of the hospitals in the state government and private sectors. The major areas of focus were**:** Neuro-vascular, CP

Endoscopic CSF Rhinorrhea surgery: A minimally invasive surgery for repair of CSF rhinorrhea. This shows the operative set up of the endoscopic instruments and the monitor.



Intraoperative monitoring of the facial nerve during surgery for glomus jugulare. This procedure helps in identifying the course of the nerve and helps in preserving the function.

A: Site of insertion of the electrodes
B: Stimulation of the cranial nerve with unipolar electrode
C: Base line recording
D: Pattern on stimulation

angle, skull base, endoscopy, epilepsy and movement disorder surgery & craniovertebral / spinal instrumentation. This year has seen newer surgical procedures such as trans nasal endoscopic surgeries and certain state of art surgeries including image-guided surgery and artificial disc surgery. A total of 1103 cases were operated with an overall mortality figure of less than 3 %. The faculty and the students maintained the high standards of the institute in the conferences, symposiums & seminars. Five candidates successfully completed their MCh training and four new residents joined the department. Apart from these the department has been actively involved in the Trivandrum Neuroclub and Neuro-Oncology club meets every month.

The total number of cases operated during the year 2003-2004 was 1103 and their distribution is as follows.

NUMBER OF PATIENTS OPERATED

Lesions	Number
Vascular	145
Cerebello pontine angle	34
Sellar/ suprasellar	79
Skull base	62
Epilepsy	74
Movement disorder	17
Stereotactic procedure	22
Endoscopy	69
Posterior fossa tumours	59
Spine	125
Craniovertebral junction	42
Supratentorial tumours	249
Others	126
Total	**1103**

Nursing Service

Nursing service continued to provide high quality nursing care to patients. Ward sisters meeting are conducted once in a month and staff nurses meetings are conducted once in two months to discuss various issues and find out solutions which helps to motivate and promote patient care. Orientation to new nurses, students, class IV employees and clinical presentations programmes in all areas contributed to the optimum care and patients satisfaction. Educational programme on infection control and waste management were arranged to nurses, unit helpers, cleaning attendants in different batches. Observation visits were arranged for nursing administration course graduate and post-graduate nursing students from other hospitals.

New initiatives during the year:

1) Linen Committee formed to ensure quality of linen supplied to the patient and improved laundry system
2) Proposed one infection control nurse and approved by hospital, management committee and Director.
3) Infection control committee reformed and implemented Biomedical Waste Management as per the Ministry of Environment and Pollution Control Board guidelines and continuous monitoring is done.
4) Voluntary internship introduced for PBNC students.

Pathology

During the year (April 2003 to March 2004), the division has performed histopathological analysis in 1525 surgical specimens in patients undergoing surgical treatment for neuro and cardiac diseases. Intra-operative tissue diagnosis (frozen section) was offered in 389 patients. Enzyme histochemical and immunohistochemical studies were performed in 48 muscle biopsies. Immunopathological investigations were performed in 2200 cases. Apart from the service oriented diagnostic work, the department also conducted fortnightly teaching programmes (case demonstration, CPC and seminars) for the postgraduate students in neurology and neuro-surgery. The division also undertook training programme for postgraduate students in pathology from Medical College, Trivandrum.

Radiology

Department of Radiology has been an established center for imaging and interventions in neuro and vascular diseases and problems of other systems. The 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 out side unregistered to the Institute.

Department is pioneering in the subspeciality of 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.

Department provides excellent imaging services. CT, CT Angio, 3D CT, virtual endoscopy, virtual angioscopy, vascular doppler, transcranial doppler and MRI of epilepsy, stroke, brain tumours and spine are routinely done.

The statistics for the investigative procedures done during the year are given below

DIAGNOSTIC PROCEDURES

Procedures	No. of Cases
Plain X-rays	25948
Magnetic Resonance Imaging	2618
Computerised Tomography	4435
Ultra Sound scans	3107

INVASIVE DIAGNOSTIC PROCEDURES

Procedures	No. of Cases
Peripheral angiography	172
4 Vessel angiography	600
Miscellaneous	16

INTERVENTIONAL PROCEDURES

Interventional Procedures	Total (No. of cases/ Procedures done)
Cerebral arteriovenous malformations	54/147
PVA	14/34
Dural arteriovenous fistula	1
CCF	6
Aneurysm coiling	15
Vein of Galen malformation	3
Carotid stenting	4
Intracranial angioplasty stenting	2
Occlusion test (Carotid)	
Thrombolysis	15
Spinal AVM/AVF	12
Angioplasty	15
Renal	4
SMA	3
Peripheral	25
Peripheral stent graft	1
Bronchial artery embolisation	13
IVC Interventions	1
PTBD	2
Hepatic chemoembolization	2
Percutaneous biopsies	86
Uterine.artery embolisation	6
WADA Test	27
Vertebroplasty	14
Gastrointestinal bleed embolization	1
Fibrinogen injection to sinus tract	6
Tumour embolization	5
Tracheal stenting	2
Vertebroplasty	14

Interventional Radiology

A total of 300 patients were treated by interventional radiology procedures, out of which 245 patients were admitted under interventional radiology.

New initiatives were taken on following fronts:

a. Academic - Request for increasing seats for DM, PDCC and to start post DM fellowship was placed before academic committee.

b. On clinical side - Request for increasing the bed strength for admission of patients for imaging and intervention has been placed before hospital management committee.

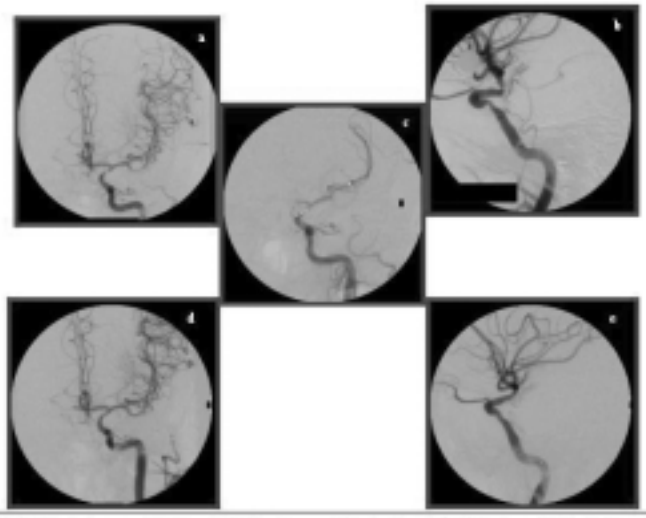


FIGURE 1: Intracranial Carotid Stenting. a) Left Carotid AP view. b) Left Carotid lateral view - shows focal atherosclerotic stenosis of Cavernous and Supraclinoid segments of Internal Carotid artery. c) Microcatheter and Stent in situ before deployment. d) Post procedure AP view. e) Post procedure lateral view shows successful angioplasty and stent deployment.

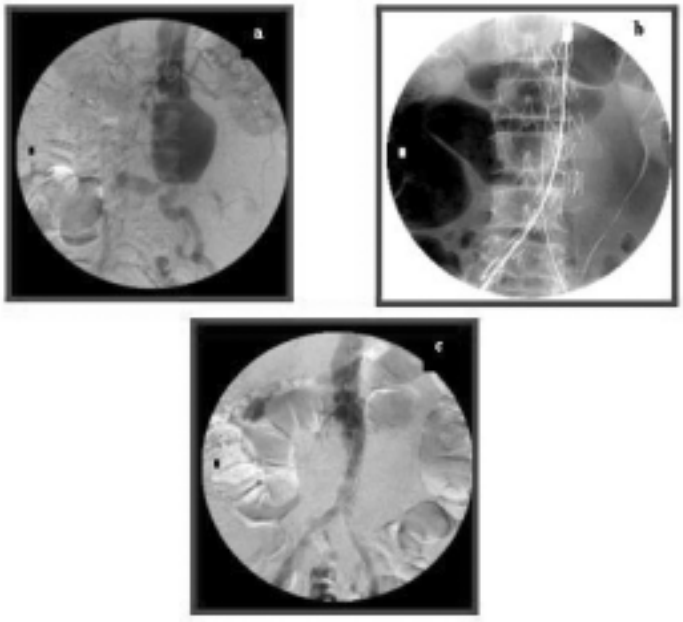


FIGURE 2: Aortic stent graft. a) Aortogram AP view showing infra renal abdominal aortic aneurysm. b) Stent graft in situ before deployment. c) Post procedure aortogram showing successful stent deployment.

CLINICAL AND BIOMEDICAL RESEARCH

Biochemistry

Lipoproteins and antioxidants in coronary artery diseases (CAD)

The recently completed project conducted on patients (n=552) having angiographically confirmed CAD and normal coronaries (no lesion) points out again that low plasma high density lipoprotein-cholesterol (HDL-C) remains as a major dislipidemia in CAD patients and is even more predictive of coronary risk than total cholesterol or low density lipoprotein-cholesterol (LDL-C). In addition, CAD patients are also found to have significantly lower levels of antioxidant vitamins - vitamin. C and -carotene. This implies that the total antioxidant status is insufficient in patients to counteract the oxidative stress thereby leading to peroxidative injury and atherogenesis.

HDL-Paraoxonase in CAD

HDL is a heterogeneous particle consisting of lipids, major apoproteins (A-I, A-II), minor apoproteins and enzymes which act in tandem to make native HDL as an antiatherogenic and antioxidative agent. Most of the antioxidative properties of HDL are attributed to its associated enzymes such as paraoxonase and platelet activating factor acetyl hydrolase, which have the capacity to hydrolyze harmful lipid peroxides and any variation in activity may affect the functional ability of HDL. To study this relationship, HDL-associated paraoxonase was monitored in CAD patients and healthy controls having varying plasma levels of HDL-C.

Molecular basis of Lp (a) entry in atherogenesis.

The ongoing research programme on lipoprotein (a) is focused on the underlying pathways by which Lp (a) enters the arterial wall and contributes to atherogenesis. The presence of highly glycosylated apolipoprotein (a) makes Lp (a) unique among the plasma lipoproteins and this leads to search for apo (a)-protein ligands on arterial cells. As part of this programme, a short run ultracentrifugation technique has been standardized to isolate Lp (a). The purified Lp (a) is being subjected to carbohydrate-specific binding proteins using lectins, in order to detect the reactive sites on Lp(a)

Oxidative stress in epilepsy

In collaboration with the Department of Neurology, a pilot study was conducted to evaluate oxidative stress, the possible mechanism contributing to teratogenicity in women with epilepsy. Malondialdehyde, one of the products of lipid peroxidation was quantitated as a marker.

Glycoconjugates as mediators of immune pathology

Recent evidences increasingly indicate that coronary heart diseases in developing countries are not fully explained by conventional risk factors including hyperlipidemia, sedentary life style, smoking and stress. At the same time, immune inflammatory reactions especially following infectious episodes have been found to correlate with atherogenesis herogenesis in many studies. In addition to releasing a host of immune inflammatory mediators capable of tissue injury, viral and bacterial pathogens can release enzymes that modify the host tissue macromolecules, both locally and systemically. Investigations on these lines yielded the following results

Immune complexes are prone to capture by tissue galectin-I

Precipitated immune complexes from human serum were compared to supernatant in terms of presence on O- and N- glycosylated proteins, using human heart galectin-1, peanut agglutinin (PNA) and concanavalin A (ConA) as probes. Immune complexes were far superior to supernatant in O-glycosylation and therefore in binding galectin 1 and PNA, indicating immune complexes capture by tissue galectin-1 as a major event in immune-mediated pathology.

Platelets and lymphocytes bear glycoforms that bind to tissue galectin-1 following microbial desialylation

Western blots of membrane proteins as well as lymphocytes were probed with enzyme-labeled human galectin-1. Desialylation with bacterial neuraminidase drastically increased their recognition by galectin-1, indicating that pursuant to microbial infection, increased deposition of these cells in tissues containing galectin-1 may contribute to lymphocyte infiltration and thrombosis.

Cardiovascular and Thoracic Surgery

The Department has started a project to establish a Homograft Bank, in collaboration with the Department of Microbiology and the Department of Forensic Medicine of Medical College, Trivandrum.The clinical evaluation of the membrane oxygenator was successfully completed. The device is to be shortly marketed.

1) CHITRA TTK Vascular Graft
   Large diameter vascular graft prosthesis is ready for multi centric trial having completed 5 years of controlled clinical trial.
2) Endothelial seeding of small diameter vascular prosthesis

Completed 11 implantations with endothelial precursor cell seeded 4 mm polyester graft in sheep. 25 in vitro experiments are proposed including controlled graft.

Cellular and Molecular Cardiology

Molecular mechanisms in cardiac fibrosis

Cardiac fibroblasts constitute about 90% of the interstitial cells in the heart. In view of their important

role 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 intensive 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. Studies carried out in this laboratory had shown that serum factors may exert a superoxide-mediated stimulatory effect on proliferation of cardiac fibroblasts and collagen production. Attempts to identify the serum factor(s) responsible for these effects suggested that circulating aldosterone and, to a lesser extent, angiotensin II may exert pro-fibrogenic effects in the heart in the rodent model of magnesium deficiency.

Response of cardiac fibroblasts to hypoxia

A major factor influencing the extent of cell injury and response in acute and chronic myocardial ischemia and infarction is hypoxia. Although hypoxia is a powerful regulator of gene expression for multiple regulatory proteins, the independent effects of hypoxia on cardiac cells have received little attention. Intrinsic difficulties in evaluating these in the ischemic heart in vivo include the existence of a heterogeneous cell population in the heart and the inability to produce a uniform hypoxic insult. 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. Preliminary observations using this model revealed that while hypoxia slows down the progression of the cell cycle, re-oxygenation of hypoxic fibroblasts causes a markedly accelerated hyperplastic effect which is consistent with the role ascribed to these cells in the context of ischemic myocardial damage.

Role of endocardial endothelium on cardiac fibroblast function

The role of endocardial endothelial cells on proliferation and collagen synthesis of cardiac fibroblasts was studied using, endocardial endothelial cells isolated from porcine ventricles. Cultured endocardial endothelial cells were activated with proinflammatory agents such as tumor necrosis factor-a (TNF-a) and bacterial lipopolysaccharide (LPS). Cardiac fibroblasts were then cultured in conditioned medium from activated and non-activated endothelial cells. Proliferation of cardiac fibroblasts was assessed by tritiated thymidine uptake. Fibroblasts grown in non-activated endothelial cell-conditioned medium showed an increased tritiated thymidine uptake compared to those grown in non-conditioned medium suggesting that endocardial endothelial cells release factors, which have a mitogenic effect on fibroblasts. This response was seen to be attenuated when endocardial endothelial cells were challenged with proinflammatory agents. To understand the mediators of fibroblast proliferation by endocardial endothelial cells, growth factors such as TGF beta, endothelin, and angiotensin were assayed in the conditioned medium. Nitric oxide synthesis by endocardial endothelial cells challenged with proinflammatory agents, was assessed by Griess reaction and was found to be about 2-4 fold higher than that of the controls.

Cardiac response to oxidative stress

Cardiac response to oxidative stress was examined using in-vitro experimental models. Oxidative stress induced negative inotropic response in rat papillary

muscle. Pretreatment with antioxidants had a protective effect but addition of free radical scavengers following the induction of contractile variation had a paradoxical effect, with further reduction in the force of contraction; suggesting that maintenance of a basal level of antioxidant reserve may be important in the protection against oxidative stress. Marginal magnesium deficiency augmented the negative inotropic response to oxidative stress accompanied by enhanced lipid peroxidation and reduction of high-energy phosphate compounds. Reactive oxygen species were also seen to stimulate cardiac myocyte hypertrophy.

A thesis titled, 'Biochemical basis for alteration of myocardial mechanics in oxidative stress and marginal magnesium deficiency,' has been prepared and the synopsis submitted.

Role of reactive oxygen species in hypertension and cardiac hypertrophy

Experiments are in progress to examine the role of reactive oxygen species in hypertension and ventricular hypertrophy. Exposure to superoxide generators induced hypertrophy of isolated rat cardiomyocytes. Lipid peroxidation was significantly high in hypertensive individuals compared to control.

Microbiology

The division extended support in establishing a Heart Valve Bank along with our Cardiac Surgery department and Forensic department of Medical College Trivandrum and work on the pilot project in this respect has begun.

A collaborative study with the Department of Medicine, Medical College, Trivandrum was initiated on the topic "Prevalence of IgG antibodies against Chlamydia pneumoniae and its significance in coronary artery disease".

Neurology

Epilepsy section

Intramural ongoing research projects

1) A prospective study on the cost-effectiveness of video-EEG monitoring.
2) An assessment on the role of electrocortico graphy in temperal lobe epilepsy .
3) Comparison of the ascertainment of interictal and ictal EEG data utilizing fluroscopically guided and blindly placed sphenoidal electrodes.
4) Patient response to visualization of their own video-recorded seizures.
5) Topography of temporal spikes.
6) Role of more closely spaced scalp electrodes in the ascertainment of interictal and ictal EEG data during video-EEG monitoring.
7) Semiological characterization of bitemporal seizures.
8) Clinical, psychosocial and psychiatric characteristics and the outcome of patients with psychogenic nonepileptic seizures.

Neuromuscular section

Ongoing research projects :

1) Hereditary motor sensory neuropathy, an electrophysiological and clinical study.
2) Mutation analysis in Duchenne muscular dystrophy.
3) A one year data analysis of mortality in the Neuro-ICU.
4) Our Institute is a nodal centre for the project "Acute Flaccid Paralysis" which was initiated under WHO sponsored Polio Surveillance Programme.

Movement disorder section

Clinical and genetic study of Parkinson's disease, Parkinsonian syndromes and dystonias

Cognition & behavioural neurology section

1. Design and evaluation of a neuropsychological battery for the study of semantic memory in Indian subjects.

Stroke section

1. Clinical and radiological evaluation of aphasia in stroke and other neurological disorders.
2. Clinical, angiographic characteristics and outcome of patients with cranio cervical dissections.

Neurosurgery

1. Role of mucoid vasculopathy in the etiopathogenesis of cerebral aneurysms (Continuing)
2. Corrosion casts of cerebral vessels (Continuing)
3. Genetics of SAH; Role of endoglin gene polymorphism. (Continuing)
4. Clinical evaluation of hydroxyapetite burr hole caps

Collaborative programmes:

1. *p 53 gene mutations in gliomas* in collaboration with Rajiv Gandhi Institute of Biotechnology, Trivandrum.

Pathology

During the year, the division initiated the following research programmes. (A) Immunological studies in Myasthenia Gravis- In this study, an attempt have been made to isolate the tumour specific antigen in patients with myasthenia gravis with thymoma and also to correlate the antigenic similarities between skeletal muscle antigens and tumour specific antigen in patients with myasthenia gravis. Immunoassays to estimate the circulating antigen in the sera of patients with myasthenia gravis have been applied not only in the diagnosis but also in the prognosis of the disease. The Science and Technology State council, Kerala state, have funded this study for 3 years (2003-2005). (B) Immunocytochemical method for the demonstration of mycobacterial antigens in cerebrospinal fluid specimens for the rapid laboratory diagnosis of tuberculous meningitis. This was attempted in the cytospin smears of cerebrospinal fluid. This direct immunocytochemical method is simple, rapid reproducible and can be used an adjunct in the early laboratory diagnosis of tuberculous meningitis particularly in patients in whom bacteriological methods did not yield positive results for mycobacterium tuberculosis in cerebrospinal fluid specimens. A research project was submitted and Department of Science and Technology- New Delhi has approved (Jan 2004- Dec2006) the project and this is entitled " Demonstration of Mycobacterium tuberculosis by an in-situ hybridization and immunocytochemical method in the CSF-cytospin smears for the diagnosis of tuberculous meningitis". The division also submitted the following research projects (a) Molecular pathogenesis of malignant glioma (submitted to DBT New Delhi). (b) Proliferative markers in non-functioning pituitary adenomas (submitted to ICMR).

MAJOR EQUIPMENTS PURCHASED DURING THE YEAR

1. Cardiac Patient Monitoring System
2. Transcranial Doppler System
3. Intellivue Monitor
4. Operation Theatre Table
5. Blood Gas Cum Electrolyte Analyser
6. Micro Electrode Recording System
7. ACT Haemostatic Management System
8. Ventilators for ICU
9. Computed Radiography System
10. Magnetic Resonance Imaging System
11. Picture Archival & Communication System (PACS)
12. Portable Echo-Cardiography System

ACADEMIC ACTIVITIES

Division of Academic Affairs

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

Programmes on offer- 2004

Post-doctoral	*PhD./Master's*	*Diploma*
1. DM Cardiology 2. DM Neurology 3. DM Neuro Radiology 4. DM Cardiac Anaesthesia 5. DM NeuroAnaesthesia 6. MCh Cardio vascular&Thoracic Surgery 7. MCh NeuroSurgery (after M.S) 8. MCh NeuroSurgery (after MBBS and 1 year Residency in General Surgery) 9. Certificate course in Anaesthesia 10. Certificate course in Radiology 11. Certificate course in Vascular Surgery 12. Post DM/MCh Fellowship 13. Fellowship in Biomedical Technology	14. PhD 15. Master of Public Health (MPH) 16. Master of Applied Epidemiology (MAE)	17. Post basic Cardiac Nursing 18. Post basic Neuro Nursing 19. Blood Banking Technology 20. Cardiac Laboratory Technology 21. Neuro Technology 22.Operation Theatre Technology 23. Advanced Medical Imaging Technology 24. Clinical Perfusion 25. Medical Records

Student Enrolment

The student strength for DM/MCh degree, Post Doctoral Certificate Courses and Post DM/MCh Fellowship during the year was 60.The Master of Public Health degree programme has 33 Scholars.The Institute has, as of now, 25 scholars for the PhD programme, 12 scholars enrolled for the Post Basic Nursing Certificate programme and 31 scholars for the various diploma programmes. The Master of Applied Epidemiology programme, an off-campus course of SCTIMST at the National Institute of Epidemiology, Chennai has 15 Scholars on roll.

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

DM (Cardiology)

Byju C.K, MD
Stijimon Joseph, MD
M.S. Harikrishnan, MD
Sreeram. G, MD
Edwin Francis, MD
Mukundan. C, MD
Bijulal. S, MD
Vinod Thomas, MD
Shajeem. O, MD
Shomu Rajendrasingh Bohora, MD
D. Pradeep Kumar, MD
Ramesh. K, MD

DM (Neurology)

Tomin Mooney, MD
Firosh Khan.S, MD
Rakesh H. Shah, MD
Ruchir Divatia, MD
Syam.K, MD
Sajith. S, MD
Sudeeran. K, MD
Praveen Kumar, MD
Thomas Chemmanam, MD
Ramesha K.N., MD
Vidya M.V, MD
Raghavendra. S, MD

DM (Neuro Radiology)

Hemant Sonwalkar, MD
Jayadevan E.R., MD
Sandeep Kumar Burathoki, MD

MCh (Cardiovascular and Thoracic Surgery)

Gopakumar. V, MS
Sai Kiran K.V.S.S, MS
Murali Krishna, MS
Akbari Jayesh Kumar, MS
Sathyaki N.P, MS
Sanjay Theodore A.C, MS
Pathak Sameet Aravind, MS
Rajaneesh Duara, MS
Chandrabhanu Pareja, MS
Adil Sadiq, MS
Ritwick Raj Bhuyan, MS
Malempati Amresh Rao, MS
Arun Kumar Haridas, MS

MCh (Neurosurgery)

Krishna Kumar. K, MS
Sunil Valentine, MS
Mukund Prasad, MS
Bhaskar.S, MS
Purendare Harshad Rajendra, MS
Venkata Srinivasa Rao Nooti, MS
Raghavan S. Iyengar, MS
Komal Prasad, MS
Amitabh Gupta, MS
Rajiv Agarwal, MS

Nilesh Radheshyam Agarwal, MS
Gulzar Gupta, MS

DM Cardiac Anaesthesiology

Dr. Arun Vijaykumar, MD

DM Neuro Anaesthesiology

Sashi Rao, MD

PDCC (Anaesthesiology)

Sunil Kumar N.K, MD
Ramesh Kumar, MD
Priya Motiani, MD
Tambe Sandeep Prataprao, MD
Subrata Kumar Sinha, MD
Hetal Kumar D. Shah, MD

PDCC (Radiology)

Surjith. V, MD

PDCC (Vascular Surgery)

Arun Peter Mathew, MS

Post DM /MCh Fellow

Sudish Karunakaran, MCh
Rajesh. B, DM
Narayan Naboodiri, DM

Ph.D Candidates

Sangeetha S.R
Indira Adiga
Manju.L
Vijai.J
Shiney Velayudhan
AnilKumar P.R
Krishnaprasad C.
Leena Kuruvila
Biji Balakrishnan
Elizabeth K. Abraham
Asha. S. Mathew
Bernadette K. Madathil
Bijoy Chellan
Sapna. S
Sailaja. G.S
Nishi. K.K
Sunitha S.S
Sidharth Banerjee
Priyanjana Prabhakar
Anuradha
Godwin S.K
Kaladhar
Neethu Mohan
Diya. P
Arun. B
Vandana Sankar
Sumith R. Panikar
Anie. Y
Sumi. S

Post-Basic Cardiovasular & Thoracic Nursing Course

Sreeja S. Nair
Susmitha T.R
C.M. Deepa
Smitha C.T
Ria Zachariah
Robin V. Cyriac
Neena A.S
Bindu V.C
Vidhu.S
Sunitha Mol Varghese
Tina Daniel
Maya S.S

Nursing Internship

Riji Rappi
Deepthi Kumari.S
Jayanthi V.S

Amrutha L. Raj
Anitha Philip
Rajani V.R
Anuradha.S
Gego M.A
Mercy P. Xavier
Krishnamma K.S
Manjusha.V

Diploma Students
Diploma in Cardiac Laboratory Technology

Prajeesh Joseph
Gireesh Gopinath
Jose M.
Anu Suseel
Rupesh Kumar
Arun John

Diploma in Neuro Technology

Rajesh Kumar. S
Vibhin. V
Shana N. Nair
Ajeesh. P

Diploma in Operation Theatre Technology

Krishna Kumar G.K
Tiny Babu
Damodara Sharma E.
Mumthas. K

Diploma in Clinical Perfusion

Prajith.P
Sujith. V. M

Diploma in Medical Records Science

Jeeva K.H
Ambili. R
Ambly. R

Diploma in Advanced Medical Imaging Technology

Sanjog Varghese
Arunkumar. M.P
Sanil.B
Babunath.B
Jan Paul Alappadan
Raghurajan.M

Diploma in Blood Banking Technology

Anoop Joy
Sindhu. M.S
Vimalraj.R

Master of Public Health (2003)

Aravind P.
Arupkumar Chakrabartty
Asim Kumar Das Malakar
Aung Cho
Dave Paresh Vamanrao
Gracy A.J.
Gupteswar Singh
Iype Joseph
Kabita Khati
Manju Renjith Darwin
Namgay Shenga
Prasanth K.S.
Raj Prabha Moktan
Ramakrishna G.S.
Raval Dinkar Kantilal
Satyajit Chakrabarti
Senthil Arasi
Shrihari J.S.

Master of Public Health (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 Choudhury
Pyari T.T.
William Rachna
Sachi Karki
Suraj Gurung
Pramod Singh Gharti Chhetri
Shobha.G

Candidates awarded Ph.D Degree

Scholar's Name	Thesis Title	Guide
1. Sumi Mary George	Immunodiagnostic System for Neuro-Tuberculosis suited to Laboratories in Developing countries	Dr. V. V. Radhakrishnan
2. Abiraman S.	*in vitro and in vivo* Characterizations of Bioactive Calcium Phosphate Ceramic, Glass Ceramic, and their composite with Fibrin Glue in Osteogeneis and Osseointegration for Orthopaedic Application.	Dr. Annie John

List of successful candidates for DM/MCh

Name of Candidates	Degree	Speciality
Rajeev E.	DM	Cardiology
Siva Subramaniam.P	DM	Cardiology
Balu Vaidyanathan	DM	Cardiology
Hemant Madan	DM	Cardiology
Murugu Sundara Pandiyan R.	MCh	CVTS
Anbarasu M.	MCh	CVTS
Baiju S. Dharan	MCh	CVTS
Anand K. T.	MCh	CVTS
Sreekumar.J	DM	Neurology
Rajesh B.	DM	Neurology
Parameswaran K.	DM	Neurology
Somarajan A.	DM	Neurology
Somesh Desai	MCh	Neurosurgery
Prakash N.C	MCh	Neurosurgery
Sudish Karunakaran	MCh	Neurosurgery
Dandu Ravi Verma Sukalyan Purkayastha	DM	Neuroradiology

List of successful candidates Post Doctoral Certificate Programme

Name of Candidates	Speciality
Gopalkrishnan.V	Anaesthesiology
Ajay.B. Rao	Anaesthesiology
Dholakia Hiren Aravindbhai	Anaesthesiology
Ravi. K.M	Anaesthesiology
Chethana Anand M.M	Anaesthesiology
Pradeep Bhaskar	Anaesthesiology
Rajesh Kannan	Anaesthesiology

List of successful candidates Master of Public Health (MPH)

Name of Candidates
Thankachy Yamini Ramachandran
Chitra Grace A.
Sonia Andrews
Sailesh Mohan
Laxmaiah A.
Bimal kumar Raj
Karma Jigmee Topgay
Tseten Yamphel Bhutia
Thinlay Wangya
Asha Raghavan
Vinai Krishna Sinha
T. Kanchana
Devashish Bhattacharya

List of successful candidates for Post Basic Certificate Programme

Name of Candidates	Speciality
Salini K. Nair	Cardiac Nursing
Riji Rappal	Cardiac Nursing
Swapna Michael K.	Cardiac Nursing
Deepthi Kumari S.	Cardiac Nursing
Jayanthi V.S.	Cardiac Nursing
Indu V.	Cardiac Nursing
Christeena B.	Cardiac Nursing
Mercy P. Xavier	Cardiac Nursing
Krishnamma K.S.	Cardiac Nursing
Amrutha L. Raj	Neuro Nursing
Anitha Phillip	Neuro Nursing
Rajani V.R.	Neuro Nursing
Anuradha S.	Neuro Nursing
Rosamma Philip	Neuro Nursing
Gego M.A.	Neuro Nursing
Manju Rose	Neuro Nursing
Anitha K. Kurup	Neuro Nursing

List of successful candidates for Diploma and Certificate Programmes

Name of Candidates	Speciality
Seenu L.	Cardiac Lab Technology
Sreeraj S.	Cardiac Lab Technology
Sunitha K. V.	Cardiac Lab Technology
Sreeja Ramahandran	Cardiac LabTechnology
Vinita T. Achankunju	Neuro Technology
Nibu Jacob	Neuro Technology
Rekha V. Nair	Medical Records Science
Suma K.K.	Medical Records Science
Pradeep S.L.	Operation Theatre Technology
Smitha P.	Operation Theatre Technology
Renjini P.	Blood Banking Technology
Preethi Prakash	Blood Banking Technology
Shibu G.S	Advanced Medical Imaging Technology
Charly P.V.	Advanced Medical Imaging Technology
Biju K.V.	Advanced Medical Imaging Technology

Nursing Education

The sixteenth batch of cardiovascular and thoracic nursing and the twelth batch of neuronursing students successfully completed their programme in December 2003. There were 9 graduates in cardiovascular and thoracic nursing and 8 graduates in neuronursing this year adding up the total number to 140 and 89 respectively. Currently 12 students are undergoing training in these two programmes.

Nursing students from Institutions all over the country were provided clinical experience for periods varying from two weeks to one month. A total of 352 nursing students utilized the clinical field of this Institute for their study purpose. Nursing students from Karolinska Institute, Sweden also visited the Institute during the current year.

Library

Since its inception in 1975, Library supported the academic and research programmes of the Institute with its valuable resources. It is fully computerised for both house keeping and information retrieval purpose by using latest information technologies like CD-ROM network, intranet and internet etc.

The hospital wing library has a collection of 11796 books and 13376 back volumes and subscribes to 120 journals. The catalogue of both libraries is available on the intranet. About 65 journals have been registered for online access. Accounts with NISCAIR and patent information system are maintained for easy retrieval of documents and information. More than 350 articles were received from Delnet during the current year.

FUNCTIONS, WORKSHOPS AND CONFERENCES

Biomedical Technology Wing

Indo-US Workshop on Tissue Engineering and Stem Cell Technologies

A highly acclaimed international Indo-US workshop titled "Tissue Engineering and Stem Cell Technologies", sponsored by DST-NSF was organized under the leadership of the Laboratory for Polymer Analysis. This was in partnership with the Georgia Tech/Emory Center for the Engineering of Living Tissues, Atlanta and University of Washington Engineered Biomaterials Research Center, U.S.A. with the aim of catalyzing the growth of tissue engineering in this country.

Dr. Prabha D.Nair, of BMT Wing, Prof.R.M.Nerem, Director, Georgia Tech/Emory Center for the Engineering of Living Tissues and Prof.B.D.Ratner, Director, University of Washington Engineered Biomaterials Research Center were the co-chairs of this workshop. Dr. K.Sreenivasan, LPA was the convenor of the same.

Prof. M.S.Valiathan, President INSA, India inaugurated the workshop and delivered his inaugural address on progress of biomedical devices and Prof. K.Mohandas, Director, SCTIMST presided over the meeting. Prof. Nerem delivered his keynote address on "Tissue engineering: The end of the beginning" at the inaugural session of the workshop and Dr. Mitra, Director, DST Indo-US forum spoke of all the initiatives that were covered by the Indo-US cooperation programme. Prof. Buddy Ratner presented an overview of his center's research programmes.

Eighteen internationally renowned scientists from leading US, Singapore and Canadian universities and 9 leading scientists from Indian universities/research labs were the invited speakers and they spoke about their research work and findings. The workshop was well attended with over 200 participants comprising students, faculty and researchers from universities, institutes and industry. It is hoped that this would catalyze the growth of R&D in tissue engineering in this country.

Industry Institute Partnership Cell

The Industry Institute Partnership Cell funded by AICTE, New Delhi organized two workshops during the year. The main objectives of these workshops were to develop awareness and relevance of quality consciousness in the development of biomedical technology amongst the Indian Industry. Dr.C.P.Sharma was the chief coordinator of these workshops.

Prof K. Mohandas inaugurates the Foundation Course on Biomaterials for Drug Delivery Systems

1) "Foundation course on biomaterials for drug delivery systems", July 17-18, 0002003. Co-ordinator for the programme was Dr. K.Sreenivasan. Lecturers, students, researchers and industry personnels involved in the biomaterials field participated in the course. There were a total of 15 participants.

2) "Course on evaluation of dental materials", November 14-15, 2003. Co-ordinator for the programme was Dr. V.Kalliyana Krishnan. The course had post graduate dental students, lecturers from various dental colleges and participants from dental Industry, totaling 33.

The cell also organized an orientation programme for the M.Tech. students from Vellore Institute of Technology during January 29-30, 2004 at Biomedical Technology Wing.

National Seminar and Interactive Session on Degradable Polymers for Consumer Applications

Dr. M.Jayabalan, Polymer Division, BMT Wing organised a national seminar and interactive session on degradable polymers for consumer applications (Industry - User - Academia Meet On Environmental Issues And Recent Developments) under the joint auspices of Society for Polymer Science, India, Thiruvananthapuram Chapter and Materials Research Society Of India, Biomaterials Subject Group on May 07, 2003. The staffs and students of the BMT Wing actively participated in the seminar.

National Workshop on Biological Evaluation of Materials for Medical Devices was held at Biomedical Technology Wing during 26-30 April 2003 under the leadership of the Division of Implant Biology. Participants from India and abroad attended the workshop. The staffs and students of the Institute also actively participated in the workshop.

Prof. K. Mohandas addressing the participants at the workshop on Biological Evaluation of Materials for Medical Devices

Achutha Menon Centre for Health Science Studies (AMCHSS)

AMCHSS have conducted the following seminars in the last year

1. "Health reforms in a changing political economy" was conducted on 20 June, 2003. The paper was presented by Dr. Ravi Duggal, Co-coordinator, CEHAT, Mumbai.
2. "Ethical review of biomedical research in developing world: importance and values" was conducted on 29th of January, 2004. The paper was presented by Dr. Richard A. Cash, Harvard School of Public Health, Boston USA.
3. "Access to medicines in Tamil Nadu" was conducted on 30 January, 2004. The paper was presented by Dr. N. Lalitha, Gujarat Institute of Development Research, Ahmedabad.
4. "Assessing the economic Impact of HIV/AIDS in developing countries" was conducted on 9 February, 2004.
5. "Epidemic of corruption in health services" was conducted on 22 April, 2003. The paper was presented by Dr. H. Sudharshan, Vigilance Director (Health), Karnataka Lokaykta.
6. "Decentralization and Health" was conducted on 26 April, 2003. The paper was presented by Shri S.M. Vijayanand IAS, Secretary, Kerala State Planning Board.
7. "Sexual harassment at workplace" was conducted on 3 May, 2003. Ms. Mini Mathew, Mac Arthur Fellow from Mumbai presented the paper.
8. "Health sector reform – lessons from Andhra Pradesh" was conducted on 14 May, 2003. Dr. Ajay Mahal, Harvard School of Public Health, Boston, USA presented the paper.
9. "Ethics in biomedical research"was coducted in association with ICMR, New Delhi from 8th to 10th May, 2003.

Ms. Nandini K. Kumar talking the participants at the workshop on Ethics in Biomedical Research

10. "Gender Review of Medical Text Books" was conducted from 23 to 26 July, 2003.
11. One month short term course was conducted in January, 2004 for 15 MPH students from Harvard School of Public Health, Boston, USA.

Students in rapt attention during the session

Gender Mainstreaming in Medical Education- A Short Course for Medical Educators

As a part of the Mac Arthur Foundation funded project to mainstream gender issues in medical settings, a short course for medical educators was organized from the 10th to the 21st November 2003. The course was partly funded by the WHO-SEARO, New Delhi.

There were totally 28 participants from all over South East Asia, and of these, 12 were from India belonging to the states of Maharashtra, Karnataka, Gujarat, Rajasthan, and Kerala. The course was conducted using participatory methodology, with the use of role plays, group discussions, assignments, class room exercises and lectures. In spite of the cultural differences and the diverse health care settings to which the participants belonged, common ground with respect to gender in the provision of health care was established.

While many participants began the workshop with some skepticism about the relevance of gender issues in their practice, by the end of the course they were convinced about its relevance in their settiings. All the participants prepared & presented proposals on the final two days, utilizing this training to become agents of change and to try to start addressing gender issues in their medical teaching institutions.

Faculty, participants and organisers of Gender Mainstreaming in Medical Education- A short Course for Medical Educators

Hospital Wing

NURSING

Development of Nursing Services Training Programme for Staff Nurses/Head Nurses/Matron/Assistant matron sponsored by DGHS- Nursing Section Government of India. Rs. One lakh was given for conducting 10 days training programme.

Prof. K. Mohandas inaugurating the training programme for Nurses

A family get together of women with epilepsy was organised on September 22, 2003.

The programme was inaugurated by Mr.L.M.Rajendran Nair, Hon. Judge, Family court, Trivandrum. Educational talks were given by neurologists, gynecologists and pediatricians. Patients and the family members shared their experiences. Around 350 persons with epilepsy and their family members attended this one day program.

Family get together of women with epilepsy

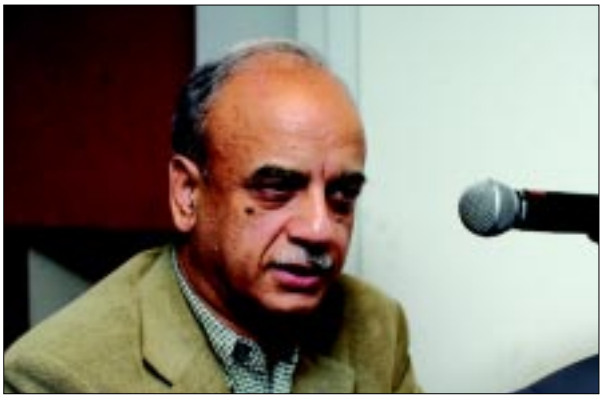
Heart Sim Interactive ACLS training System

The Institute purchased an interactive Mannequin for practicing Advanced Cardiac Life Support and Interpreting Arrhythmias, from Laerdal, Norway. A one-day workshop on ACLS and Arrhythmias was

conducted for the nurses, doctors and technicians. An intensive 12 hours training on Basic Life Support, Advanced Cardiac Life Support and Arrhythmia interpretation was given to 38 staff nurses in 3 batches. Training on Basic Life Support was given to 53 employees of the Institute.

Training programs for graduate, diploma and certificate holders in the concerned branches were conducted fully well. Observer trainees deputed from other Governmental institutions were also entertained. Guiding project work, delivering technical talks etc for outside students were also done as in previous years.

Opening Meeting of the COFRAC audit (01-07-2003)



Dr. Qureshi speaks at the workshop on 'Stent in Congential Heart Disease'

Shri. K. Sankaranarayanan Hon'ble Minister of Finance delivering the inaugural speech for the Joint Hindi Fortnight

EXTERNALLY FUNDED RESEARCH PROJECTS

ACHUTHA MENON CENTRE FOR HEALTH SCIENCE STUDIES

NEWLY INITIATED PROJECTS

Sl. No.	Title	Principal Investigator	Funding Agency
1	Stakeholders perceptions of institutional review boards in India	Dr. Mala Ramanathan	Harvard University
2	Independent evaluation of the National Anti Malaria Program	Dr. K.R. Thankappan	NAMP, New Delhi

ONGOING PROJECTS

1.	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	Mac Arthur Foundation
2	Situational analysis of MTP services in Kerala : Provider perspective	Dr. Mala Ramanathan	CEHAT, Mumbai
3	Establishment on sentinel surveillance systems in Indian Industry	Dr. K.R. Thankappan	WHO
4	Gender and social issues in reproductive health	Dr. T.K. Sundari Ravindran	Ford Foundation
5	Political decentralization & status of reproductive health in Kerala	Dr. Mala Ramanathan	Tide Foundation
6	Strengthening of research in health	Dr. K.R. Thankappan	Tata Institute of Social Science
7	Development of sentinel health monitoring centers in India	Dr. K.R. Thankappan	ICMR, CSIR, New Delhi
8	Tobacco cessation research and training in India and Indonesia	Dr. K.R. Thankappan	University of Minnesota

Sl. No.	Title	Principal Investigator	Funding Agency
9	Industrial participation in public health care provision in Tamil Nadu - A case study	Dr. D. Varatharajan	World Bank
10	Management training of senior health officers Foundation from Maharashtra	Dr. D. Varatharajan	BIAF Dev Res
11	Workshop on integrating gender in medical education	Dr. Mala Ramanathan	WHO

COMPLETED PROJECTS

1	Define/redefine the job responsibilities of various categories of employees in the Kerala Health Services	Dr. V. Mohanan Nair	Directorate of Health Service
2	Community based detection and monitoring of hypertension in Kumarakom panchayat, Kottayam	Dr. K. R. Thankappan	ICMR
3	Gender and Tuberculosis, STDs and HIV/AIDS in the WHO South East Asia region	Dr. R. Sukanya	WHO
4	Private health sector performance	Dr. D. Varatharajan	Karolinska Institute, Sweden
5	Independent review of the enhanced Malaria Control Project in India	Dr. K.R. Thankappan	Directorate of National Anti Malaria Programme Govt. of India

HOSPITAL WING

NEWLY INITIATED PROJECTS

Sl. No.	Title	Principal Investigator	Funding Agency
1.	Femoropoplitcal bypass graft with reversed saphenous vein - A retrospective study of 110 patients operated upon over 10 year	Dr. M. Unnikrishnan	STED, Kerala
2.	Immunological evaluation in Myastheniagravis	Dr. Annamma Mathew	STEC, Kerala
3.	Registry of pregnancy in women with epilepsy	Dr. Sanjeev V. Thomas	ICMR, New Delhi
4.	Pilot study homograft harvesting (for hundredvalves)	Dr. P. V. Ramnarayan	STEC, Kerala
5.	Studies on anti-viral properties of some known medicinal plants vis-à-vis phytomedicine development	Dr. Molly Antony	DST

ONGOING PROJECTS

1	Detection and treatment of cancer using laser based techniques	Dr. A K Gupta	BRNS, DAE Govt. of India
2	Clinical and genetic studies of Parkinson's disease, Parkinsonian syndromes and idiopathic dystonia in India	Dr. Asha Kishore	Kerala Transport Dev. Corporation
3	Identification and characterization of protective antigens of mycobacterium tuberculosis	Dr. Muralidhar Katti	STEC, Kerala
4	Investigation of serum and urinary mucopolyaccharides in patients with coronary artery and cerebrovascular disease	Dr. Sandhyamani	STEC, Kerala
5	Group interaction in social psychosocial care of epilepsy	Mr. Jayachandran	Indian Epilepsy Association
6	Does cerium activate endocardial endothelial cells? (Molecular basis of endomyocardial fibrosis)	Dr. C.C. Kartha	DST

Sl. No.	Title	Principal Investigator	Funding Agency
7	Indian registry of epilepsy & pregnancy co-ordination	Dr. Sanjeev V. Thomas	Indian Epilepsy Association
8	Health awareness programmes	Ms. T. V. Hemalatha	SBT, Trivandrum
9	Estimating prevalance types of dementia and cognitive impairment	Dr. Mathuranath P.S	SBT, Trivandrum Indian Ladies Assn. Abudhabi
10	European registry of epilepsy and pregnancy	Dr. Sanjeev V. Thomas	European Registry
11	Blood component separation unit	Dr. Jaisy Mathai	Kerala State AIDS Control Society
12	Neuronal control of cardiac growth : Does substance regulate cardiac fibroblast function ?	Dr. K. Shivakumar	DST
13	Risk factor for epilepsey : A population based case control study	Dr. K. Radhakrishnan	Indian Epilepsy Association
14	Effect of blood donation on body iron stores and relationship between body iron and ischaemic heart disease	Dr. Sathyabhama	Terumo Penpol
15	Angiotensin II in the pathogenesis of myocardial lesions in magnesium deficiency	Dr. K. Shivakumar	ICMR New Delhi
16	Antiviral principles from Indian medical plants and their possible use to make blood transfusion safe and as antiviral drugs	Ms. Molly Antony	Terumo Penpol
17	Evaluation of the sub-types of dementia in the cognitively impaired elderly subjects in urban Kerala	Dr. P. S. Mathuranath	STEC, Kerala
18	Diffusion Weighted Imaging and other magnetic resonance based imaging modalities in human stroke	Dr. A. K.Gupta	DST

COMPLETED PROJECTS

Sl. No.	Title	Principal Investigator	Funding Agency
1.	Estimating prevalance and types of dementia and cognitive impairment	Dr. P.S. Mathuranath	Sri Ratan Tata Trust in elderly persons
2.	Open label, multicentre, randomized trial to evaluate the development of polycystic ovary syndrome in female subjects with newly diagnosed epilepsy initiated on antiepileptic drug treatment on either Lamotrigine or Valporate	Dr. K. Radhakrishnan	Quintiles Spectral

BIOMEDICAL TECHNOLOGY WING

INDUSTRY SPONSORED PROJECTS

NEWLY INITIATED

Sl. No.	Title	Principal Investigator	Funding Agency
1	Development of a new model Chitra tilting heart valve prosthesis	Mr. C.V. Muraleedharan	TTK Healthcare Ltd. (under DSIR's PATSER funding scheme)
2	Hemoconcentrators for open heart surgical application	Mr. D.S.Nagesh	TIFAC, SCTIMST & SIDD (Technology Partner)

ONGOING PROJECTS

1	Development of new sizes of TTK-Chitra Heart Valve	Mr. C.V. Muraleedharan	TTK Healthcare Ltd.
2	Fibrin glue – scale up and validation of viral inactivation	DR. Lissy Krishnan	ATMRF, Ahmedabad

COMPLETED PROJECTS

1	Wound dressing materials	Dr. C.P.Sharma	Dynamic Technomedicals Pvt. Ltd., Aluva
2	Industry institute partnership cell	Dr. C.P.Sharma	AICTE, New Delhi
3	Heparinization of intraocular lenses	Dr. K.Sreenivasan	AUROLAB, Madurai
4	Biofunctional evaluation of drug coated endovascular stents - preclinical evaluation in porcine model	Dr. P.R.Umashankar	Sahajanand Medical Technologies Pvt. Ltd, Gujarat

BIOMEDICAL TECHNOLOGY WING

NEWLY INITIATED PROJECTS

Sl. No.	Title	Principal Investigator	Funding Agency
1.	Bone regeneration in a diabetes-induced rat model	Dr. Annie John	DST
2.	Ultrastructural study of the interface between bone and bioactive ceramics – pre-clinical evaluation bioceramic	Dr. Annie John	Kerala State Council for Science, Technology and Environment
3.	Bone regeneration in large segmental defects using tissue engineered new generation scaffold	Dr. Annie John	Life Sciences Research Board- DRDO
4.	Quantitative immunophenotyping of inflammatory cells in biocompatibility assessment of materials	Dr. Mira Mohanty	DST

ONGOING PROJECTS

1.	Development of co-culture system for bioartificial liver	Dr. T.V. Kumari	STEC, Kerala
2.	Development of an artefact-free breathing monitor based on impedance pneumography	Dr. Niranjan D. Khambete	DST
3.	Design and development of blood pump control and monitoring unit with disposable centrifugal pump head for extra-corporeal circulation	Mr. D.S. Nagesh	DST
4.	Langmuir Blodgett film deposition onto polymer substrates blood compatibility	Dr. C.P.Sharma	DST
5.	Biopolymers for medical applications	Dr. Prabha D. Nair	STEC, Kerala
6.	Immune mechanisms of polyurethane degradation	Dr. Mira Mohanty	Life Sciences Research Board of DRDO, New Delhi

Sl. No.	Title	Principal Investigator	Funding Agency
7.	Development and biocompatibility studies on organically modified ceramics for medical applications	Dr.P.P.Lizymol with Dr. V.Kalliyana Krishnan, Project Co-ordinator	SERC Fast Track Proposals for Young Scientists, DST
8.	Development of a new photoinitiator for dental applications	Dr. P.P.Lizymol	STEC, Kerala
9.	Apatitic calcium phosphate bone cement	Dr. Manoj Komath	STEC, Kerala
10.	Fabrication of clinically significant shapes of hydroxyapatite-ethylene vinyl acetate composites for bone substitute application by special thermoforming techniques	Dr. P. Ramesh (DST-DAAD programme with Institute of Composites Materials Ltd., University of Kaiserslautern, Germany)	DST
12.	Non-toxic latex formulation for biomedical application	Dr. P.V. Mohanan	DST

COMPLETED PROJECTS

1	Stimuli sensitive polymeric nanoparticle based advanced drug delivery systems for cancer, diabetes and antibacterials	Dr. C.P. Sharma	CSIR under New Millenium Indian Technology Leadership Initiative (NMITLI)

SCTIMST TECHNOLOGY DEVELOPMENT FUNDED PROJECTS

NEWLY INITIATED PROJECTS

Sl. No.	Title	Principal Investigator	Duration
1	Recombinant TGF- α development – Phase 2	Dr. Anoop Kumar	1 year

ONGOING PROJECTS

1	Toxicological evaluation of a dual cure dental composite	Dr. V.Kalliyana Krishnan	Extended for 2nd year
2	Development of a test set-up for disposable ECG electrodes	Dr. Niranjan D.Khambete	Extended for 2nd year
3	Isolation of anti-viper venom antibodies from egg yolk	Dr. Lissy Krishnan	Extended for 2nd year
4	Development for orthopaedic casting tapes using indigenously available polyurethane raw materials.	Dr. M.Jayabalan	Extended for 2nd year

COMPLETED PROJECTS

1	Scale-up of field kit for testing antibiotic sensitivity of mastitis milk	Dr. P.R.Umashanker	6 months
2	Recombinant TGF- α development – phase 1	Dr. Anoop Kumar	1 year

STUDENT PROJECTS IN BIOMEDICAL TECHNOLOGY WING

Sl. No.	Title	Name of the Student(s) and Course	Supervised by
1.	Synthesis and characterization of copolymers based on phosphorylated HEMA and MMA.	Titto P.Varghese M.Sc, M. G. University	Dr. K. Sreenivasan
2.	Blends of gelatin-vinyl-acetate for biomedical applications.	M.Pradeepkumar M.Sc, M. G. University	Dr. Prabha D.Nair
3.	Design and development of novel oral insulin delivery system based on bioadhesive pH responsive microparticles.	T.Manoj Kumar M.Pharm, College of Pharmaceutical Sciences, Trivandrum	Dr. C. P. Sharma
4.	Microscopical assessment of the cytotoxicity of a novel glass coated porous hydroxyapatite bioactive ceramic for use as a bone substitute – an in vitro study.	V.R.Nisha M.Sc, School of Biosciences M.G. University, Kottayam	Dr. Annie John
5.	Ultrastructure of the scenario at the bio-implant (metal, polymer and ceramic) interface – an in vivo study.	A.G.Aneeshkumar M.Sc, School of Biosciences, M. G. University, Kottayam	Dr. Annie John
6.	Sensorless measurement of flow in centrifugal pumps.	Bobsen Babusenan, Neetha Mary Sebastian, Smitha Sunny,Susanna Jacob B.Tech, Model Engineering college, Thrikakkara	Mr. D.S.Nagesh
7.	Studies on biodegradable carboxy terminated polypropylene fumarate oligomer.	Sheeba Samuel M.Sc, Catholicate college, Pathanamthitta, Kerala	Dr. M. Jayabalan
8.	Studies on fast setting aromatic polyurethane compound.	Ashok Zachariah Samuel M.Sc, St.Berchman's college, Changanachery, Kerala	Dr. M. Jayabalan
9.	A comparison of properties of dental composites cured using elipar led light cure units and other conventional units.	Anupama Gopinathan MDS, Government Dental College, Calicut	Dr. V. Kalliyana Krishnan
10.	An *in vitro* study on the properties of novel denture base resins.	George John MDS, Rajas Dental college, Nagercoil	Dr. V. Kalliyana Krishnan

Sl. No.	Title	Name of the Student(s) and Qualification	Supervised by
11	Dextran dialdehyde crosslinked gelatin as a biocompatible tissue adhesive.	Sintu Mathew Ipe M.Sc, St. Berchman's College, Changanachery	Dr. A.Jayakrishnan
12	Platelet a–granule proteins: Isolation and production of monoclonal antibodies.	T.J.Mridula MSc (Biotechnology), Dhanalakshmi Srinivasan college of Arts and Science for Women, Perambalur affiliated to Bharathidasan University, Tiruchirapalli	Dr. Lissy K. Krishnan
13	Platelet membrane glycoproteins IIb/IIIa: Isolation and production of monoclonal antibodies.	Iyer Vidula Venkateswaran MSc (Biotechnology), Dhanalakshmi Srinivasan College of Arts and Science for Women Perambalur affiliated to Bharathidasan University, Tiruchirapalli	Dr. Lissy K. Krishnan
14	Development of a servo drive mechanism for pulse duplicator.	Bubith Moses Wilby M. Tech, Dept of Biomedical Engg, Manipal Institute of Technology, Manipal	Mr. C. V. Muraleedharan
15	Analytical modeling of deflection characteristics of Chitra heart valve occluders.	Devi Nandakumar, Savitha Venugopal and Vinoy Thomas B. Tech, Dept of Electronics & Biomedical Engg, Model Engineering College, Cochin.	Mr. C. V. Muraleedharan
16	Steady flow testing of artificial system on valve characteristics. Effect of test heart valves instrumentation Engg,	S.R.Malini and Dhanalekshmi S.Nair B. Tech, Dept of Electronics & Noorul Islam College of Engineering, Kumaracoil	Mr. C. V. Muraleedharan
17.	Haemocompatibility study.	Pinky Haneef M.Sc, Dept. of Environmental science, MG University, Kottayam	Dr. P. V. Mohanan

SCIENTIFIC PUBLICATIONS

Publications

Books

1. *Health Problems of This Century*. Kartha CC (ed). State Institute of Languages, Trivandrum 2003.
2. *Reviews in Indian Neurology*. Radhakrishnan K (ed). Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum 2003.

Chapters in books

1. Ashalatha R, Radhakrishnan K.Rational choice of antiepileptic drugs. *Prog Clin Neurosci* 2003; 18:7-16.
2. Daniel Horak, Jayakrishnan A, Reza Arshady. Poly (2-hydroxyethyl methacrylate) Hydrogels. In: R. Arshady (ed). *Preparation and Properties, PMS Series*, Citus Books, London, 2003; 1: 65-106.
3. Fiorelli M, Kesavadas C. Diagnostica nell'ictus : TC e RMN. In: *Rapporto sull'ictus* ed. Istituto Auxologico Italiano, 2003.
4. Gupta AK, Kesavadas C. Advances in Neuroimaging. In: Mishra US (ed). *Progress in Clinical Neurosciences* 2003.
5. Kartha CC, Rajasree S.Vitamin D and atherosclerosis: A noteworthy link. In: Dhalla NS, Chockalingam A, Berkowitz HI and Singal PK (eds). *Frontiers in Cardiovascular Health*. Kluwer Academic Publishers, Boston 2003; 261-70.
6. Kishore A, Panikar D. Deep Brain stimulation for Parkinson's disease. In: Radhakrishnan K (ed). *Reviews in Indian Neurology.*: Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum 2003; 245-62.
7. Kishore A. Multiple system atrophy. In: Radhakrishnan K.(ed). *Reviews in Indian Neurology* : Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandum 2003; 223-44.
8. Mathuranath PS. *Dementing Illnesses*. In: Radhakrishnan K (ed). *Reviews in Indian Neurology*: Sree Chitra Tiruanl Institute for Medical Sciences and Technology, Trivandrum 2003; 81-102.
9. Neema PK, Rathod RC. Anesthetic management – neurological and neuromuscular diseases in pregnancy. In: *Obstetric Anaesthesia* Arya Publications 2003; 559-575.

10. Paul W, Sharma CP. Membranes for hemodialysis. In: Arthur Hubbard (ed). *Encyclopedia of Surface & Colloid Science,* Marcel Dekker 2003.

11. Paul W, Sharma CP. Polysaccharides: Biomedical Applications. In: Arthur Hubbard, (ed). *Encyclopedia of Surface & Colloid Science,* Marcel Dekker 2003.

12. Radhakrishnan VV, Ashalatha R. Clinipathological spectrum of chronic meningitis In: Radhakrishnan K (ed). *Reviews in Indian Neurology*: Sree Chitra Tiruanl Institute for Medical Sciences and Technology, Trivandrum 2003; 49-70.

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14. Unnikrishnan M. Renovascular Hypertension – Surgical & Anaesthetic challenges. In: Visweswaran K, (ed). *Essentials of Nephrology & Urology* 2004.

Publications in Journals

1. Anand KT, Manohar SR, Harikrishnan S, Neelakandhan KS. Right ventricular mass: a histopathological surprise. *Ann Thorac Surg* 2003; 75:1969-71.

2. Cherian PJ, Radhakrishnan VV, Radhakrishnan K. The significance of corpora amylacea in temporal lobe epilepsy. *Neurol India* 2003; 51: 277-9.

3. Dora SK, Ajit Kumar VK, Anil Bhat, Tharakan JA. Venogram guided extra thoracic subclavian vein puncture. *Indian Heart J* 2003; 55: 637-40.

4. Gadhinglajkar SV, Sreedhar R, Bhattacharya RN. Carotid artery injury during transsphenoidal resection of pituitary tumour: anesthesia perspective. *J Neurosurg Anesthesiol* 2003 ;15: 323-6.

5. George KA, Sreedevi R, Suresh Kumar N, Sarma PS. A study on the influence of maternal factors on birth weight. *The Indian J Nutr Diet* 2003; 40: 291-6.

6. Harikrishnan S, Byju CK, Tharakan JA. Severe valvar aortic stenosis in a child with familial hypercholesterolaemia. *Heart* 2004; 90:238.

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9. Harikrishnan S, Manohar SR, Nair KK, Tharakan JA, Titus T, Ajit Kumar VK, Bhat A, Sivasankaran S, Bimal F, Moorthy KM., Kumar RP. Supravalvar aortic stenosis: clinical and hemodynamic profile and surgical outcome. *Indian Heart J* 2003; 55:49-54.

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12. John A, Varma HK, Kumari TV. Surface reactivity of calcium phosphate bioceramics in a cell culture medium. *J Biomater Appl* 2003; 18: 63-78.

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immunoglobulin therapy. *Acta Neurol Scand* 2004; 109: 71-4.

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HONOURS, AWARDS AND RECOGNITIONS

Dr. Asha Kishore has been elected as member of the Asian Committee of the International Congress on Parkinson's disease organized by the World Federation of Neurology to be held in Berlin 2005.

Dr. P.Gayatri was declared joint winner for the poster paper presented during IACTA Conference held at Cochin Feb.2004 and she also got an award during Annual Conference of ISNACC, for the best paper presented during the conference at Bangalore February 2004.

Dr.Jayadevan received first prize for the paper "Effect of urokinase and papaverine in chronic vasospasm in an animal model of subarachnoid haemorrhage" at 6th Annual Conference of ISVIR & ISNR at PGIMER, Chandigarh, October 2003.

Dr. Jaisy Mathai was nominated as a member of the technical committee of NABL for accreditation of blood transfusion services.

Dr. CC.Kartha was renominated to the editorial board of Current Science and was inducted into the editorial boards of Indian Journal of Pathology and Microbiology and Indian Journal of Cardiology. He was invited to be a member of the ICMR Task force on Molecular Cardiology and Diabetes. He was also an invitee to the Program Formulation Group on Cardiovascular Diseases convened by the Department of Biotechnology.

Dr. T.K. Krishnamoorthy received 'T.S.Srinivasan outstanding investigator award' for best scientific paper, in the International Stroke Conference held at Chennai 2004.

Dr. Mathew Abraham was conferred the best paper award for the paper "Functional hemispherectomy and hemispherotomy" at the Annual Conference of Kerala chapter " Malabar Neurocon 2004" held at Calicut, February 2004.

Dr. Manoj Komath and Dr. H.K.Varma, received MRSI best paper award for the year - 2003 given by the Materials Research Society of India for their article "Development of a fully injectable calcium phosphate cement for orthopaedic and dental applications".

Ms. Neethu Mohan and Dr. Prabha D Nair for their paper - *Polysaccharide scaffold for tissue engineering* won the Bajpai –Saha Award for best student paper at the XIV National Congress on Biomaterials and Artificial Organs, at IIT Mumbai, December 2003.

Dr.P.K.Neema was elected as secretary of the Kerala state branch of IACTA for 2004.

Dr. Rajneesh Kachhara has been appointed as a member of the editorial board of Neurology India, the official journal of Neurological Society of India.

Dr. S. Rupa received an award during Annual Conference of ISA , for the best poster presentation at Bhubaneswar 2003.

Dr. V.V. Radhakrishnan received the Best Doctor Award-2002, instituted by the Ministry of Health- Government of Kerala.

Dr. V.V. Radhakrishnan received the National Academy of Medical Sciences (NAMS) award - " Dr. Pran Nath Chuttani Oration".

Dr. V.V. Radhakrishnan received the University Grants Commission (UGC) award -Jagadish Chandra Bose' for Life Sciences - 2002.

Dr. V.V. Radhakrishnan received the Dr. B.C. Roy award-2002 in the category of 'Oration'.

Dr.P.K.Sinha received Kop's award (Neuroanesthesia) during Annual Conference of ISA, for his paper on "Anesthesia for awake craniotomy –a retrospective study" at Bhubaneswar 2003.

Dr.P.R.Suneel got an award during Annual Conference of ISNACC, for the best paper presented during the conference at Bangalore, February 2004.

K.Shivakumar received the Chaturvedi Kalwati Jagmohan Das Memorial Award of the Indian Council of Medical Research for his contributions in the field of Cardiovascular Biology.

K. Shivakumar was selected as member of the International Reviewers' Panel of *Medical Science Monitor.*

Mr.Suresh Kumar received the best presentation award for the paper on "Burden assessment of caregivers of dementia patients" at the 30th National Annual Conference of Indian Association of Clinical Psychologists at Thrissur, January 2004.

Dr. Sunil Furtado, Dr. N Srinivas and Dr. Krishna Kumar received best paper awards in the conference Neuropedicon 2003 at Lucknow in November 2003.

Dr. Suresh Nair was elected as the Vice President of the "Asian Conference of the Neurological Surgeons" (ACNS).

Ms. G.S.Sailaja got the young scientist award of the Kerala State Council for Science, Technology, and Environment for the year 2004 for the best paper in the subject area Health Sciences during the 16th session of Kerala Science Congress held at CWRDM, Kozhikode, 2004.

Dr. Sukalyan Purkayastha received first prize for the paper "Role of percutaneous vertebroplasty in debilitating backache"., at Annual Conference of Neurological Society of India at PGIMER, Chandigarh December 2003.

Dr. T.K. Sundari was appointed as Member of the United Nations Millennium Development Goal (MDG) Task Force for Maternal and Neonatal Health.

Dr. Thomas Koshy was elected as the Treasurer of the Kerala state branch of IACTA for 2004.

Dr.Vijai Chandran received first prize for the paper "Metallic self expanding stents in tracheal stenosis" - at 6th Annual Conference of ISVIR & ISNR at PGIMER, Chandigarh, November 2003.

VISITORS

ACHUTHA MENON CENTRE

Dr. V. Muraledhar, Associate Professor, LTM Medical College, Mumbai gave lectures on "Occupational and Environmental Health" on 1 –2 April, 2003.

Dr. Jayaprakash Muliyil, Christian Medical College, Vellore gave lectures on "Introduction to Epidemiology" from 3 to 5 April, 2003.

Dr. Hanimi Reddy, Chief Statistician, SEARCH, Mumbai gave lecture on "Child Mortality in Maharashtra" on 29 April, 2003.

Prof. CAK Yesudian, Head, Department of Health Services, Tata Institute of Social Sciences, Mumbai gave lectures on "Management in Public Health" from 12 to 24 May, 2003.

Dr. Oommen Philip, Director, Foundation for Health Management, Thiruvananthapuram gave lectures on "Management in Public Health" from 26th to 31st May, 2003.

Dr. V Raman Kutty, Executive Director, Health Action by People was invited to teach a part of the course module on Health Policy Analysis in October, 2003.

Dr. V.R. Muraleedharan, Indian Institute of Technology, Chennai was invited to teach another part of the course module on "Health Policy Analysis" in November, 2003.

Dr. Padma Prakash, Deputy Editor, Economic and Political Weekly, Mumbai conducted a workshop on "Writing and Publication Skills" during the second week of June, 2003.

Dr. T.R. Dhilip, National Health Accounts Cell, Bureau of Planning, Ministry of Health and Family Welfare, New Delhi has presented a paper on "Arriving at NHA estimates for India" on 16 February, 2004.

Dr. Richard A. Cash, Professor, Harvard School of Public Health, Boston, USA gave lectures on "Introduction to Epidemiology" during February/March, 2004.

BIOMEDICAL TECHNOLOGY WING

Prof. Allan S.Hoffman, Distinguished Professor, Department of Bioengineering and Chemical Engineering, University of Washington, Seattle, USA visited the Biosurface Technology Division during December 3-4, 2003. He delivered a lecture on "Applications of smart polymers in separations, diagnostics, enzyme bioprocesses and drug delivery" during the visit.

Dr. Elsie Damien, Dept. of Histopathology, University College, London, UK visited the Polymer Processing Laboratory. She delivered a lecture on "Enhancement of osteointegration of bone replacement biomaterials" in July 2003.

Dr. Glynn Van-de-Velde, Director Marketing and Applications, Triton Technology Limited, UK, visited the Polymer Processing Laboratory. He delivered a lecture on "Dynamic Mechanical Analysis" in January 2004.

A collaborative technology venture for the establishment of an Indo-Russian Biomedical Technologies Centre at SCTIMST was proposed. The meetings co-ordinated by Technical Coordination Cell was supported by the DST International Division and the visiting Russian academician Prof. Yuri Gulyaev during March, 2003.

Mr. Stefan Schmitt and Mr. Bjoern Lehmann of Institute for Composite Materials, University of Kaiserslautern, Kaiserslautern, Germany, visited the laboratory from 13th March 2004 to 25th March 2004 as part of the on-going DST-DAAD project. Mr. Bjoern Lehmann gave a talk on "Polymeric Nanocomposites – Promising materials for the future" on 18th March 2004.

Dr. Bijoy Chandapillai and Dr. K.V.Shajo, postgraduate students from the School of Medical Sciences and Technology, IIT, Kharagpur, visited the Division of Implant Biology as observers for one month in December 2003.

HOSPITAL WING

Prof. Ray Latimer, from UK gave a talk on 18th Feb 2004, in the hospital premises as visiting Professor to the department of anesthesia.

Dr Anjali Kale, Director BTS, AIMS Cochin gave a talk on "Leuco reduced blood components."

Dr. Torbjorn Tomson, Professor of Neurology, Karolinska University, Stockholm, Sweden who is also the Chairman of European Registry of Anti Epileptic Drugs and Pregnancy, visited our department and expressed his profound appreciation of the functioning of the Kerala Registry of Epilepsy and Pregnancy.

Dr. Girish Mirle, Program Director, Sleep Laboratory, State University of Eastern Tennesse, USA, visited the R. Madhavan Nayar Centre for Comprehensive Care for Epilepsy Centre from 22.12.03-23.12.03. He gave a lecture on 'Sleep disorders in Elderly".

Dr.Satishchandra, Head, Neurology and Dr. Chandramouli, Neurosurgeon from NIMHANS, Bangalore visited R. Madhavan Nayar Centre for Comprehensive Care for Epilepsy Centre from 28.01.04 to 30.01.04. They actively participated in presurgical evaluation, patient management conference and epilepsy surgery.

Jennifer Frontera MD, Neurology Resident, Columbia University, New York, USA, visited our epilepsy section 17.10.03-02.11.03.

Dr. Jeyaraj D. Pandian, Consultant Neurologist, CMC, Ludhiana visited our epilepsy centre from 12.06.03 – 14.06.03. He utilized his stay to learn more about presurgical evaluation of refractory epilepsy patients.

Dr. Vinod Joseph Thomas Choodal, Assistant Professor, Department of Neurology, Kasturba Medical College, Manipal, Karnataka, visited the R. Madhavan Nayar Centre for Comprehensive Care for Epilepsy Centre from 12.01.04 to 24.01.04.

Prof Gerard Mohr**,** Prof of Neurosurgery, Mc Gill University, Montreal, Canada had clinical discussion with residents and CME lectures on 20th and 21st December. He visited the department on 21st December and interacted with the staff of Neurosurgery

Dr. Shakeel Ahmed Qureshi, the Chairman of Pediatric Cardiology training programme in U.K, visited the department and conducted an excellent workshop on "Advanced pediatric interventions on congenital heart disease", on 01.12.2003.

Dr. Marco Fiorelli visited the Insistute in August 2003.

VISITS ABROAD OF FACULTY MEMBERS

Dr. T.V.Anilkumar is on a post doctoral fellowship in Tissue Engineering at National University of Ireland, Galway, from October 2003.

Mr. S. Balram is on his sabbatical leave doing research in Japan from October 2003.

Dr. Bejoy Thomas went to Belgium for study and training in functional MR imaging under BOYSCAST Fellowship for a period of one year from March 2002 to March 2003.

Dr. A.Jayakrishnan spent two weeks from October 1 to October 16, at the University of Paris XI to discuss the progress made in the Indo-French project "Injectable adhesive biomaterials for vascular applications".

Dr. Mala Ramanathan is on her sabbatical leave doing research in Harvard School of Public Health, Boston, USA for one year from November 2002.

Dr. Mala Ramanathan participated as a reviewer in the International Consultation of the ' Initiative for sexual and reproductive rights in health reforms' of University of Witwatersrand, Johannesburg for the paper, SRRH and decentralization of health systems in Africa, Asia and Latin America and the Caribbean, by Mary Kawonga, Amy Nunn and Daniel Maceira, held between April 23-24, 2002 at Cape Town, South Africa.

Dr. Prabha D. Nair was visiting professor at the University of Washington and Georgia Institute of Technology, USA where she participated in a joint programme of Bioengineering and Tissue engineering.

Dr. P. Ramesh visited Institute of Composite Materials, University of Kaiserslautern, Germany, as part of the on-going DST-DAAD project during 20th October 2003 to 31st October 2003.

Dr. S. Sivasankaran, underwent a one year advanced training in Pediatric Cardiology at Guy's Hospital, London, U.K. under the Commonwealth scholarshiop programme and is presently involved in setting up the Comprehensive Pediatric Cardiology programme.

Dr. D. Varatharajan visited Singapore National University on 16th October 2003 to discuss about its curriculum and works in health economics with health economics faculty.

Visits Abroad of Students

Ms. Shiny Velayudhan, Ph.D. Student, visited Institute for Composite Materials, University of Kaiserslautern, Germany, during 4th August 2003 to 31st October 2003 as part of the on-going Indo-German (DST DAAD) joint research programme.

Mr. P. R. Anilkumar is on a Jawaharlal Nehru Memorial Fund scholarship for doctoral students programme at the National University of Singpore, from May 2003.

CONFERENCES, MEETINGS AND WORKSHOPS ATTENDED BY STAFF

INTERNATIONAL CONFERENCES

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. Apurba Kumar Sarma	The Biennial Conference of the Asian Association of Cardiovascular and Thoracic Surgeons	Bangkok Nov, 2003	Participant
Dr. R. N. Bhattacharya	11th Asia Australasian Congress of Neurological surgery	Singapore Nov, 2003	Participant
Dr. G.S.Bhuvaneshwar	DES - East meets the West New-Horizons,	Mumbai Jan, 2004	Pre-clinical animal data on infinnium stent
Dr. Chandra P. Sharma	Indo-Australian Symposium on Biomaterials and Biomedical Engineering	Manipal Feb, 2004	Blood compatible materials-challenging areas
Dr. Gupta A. K.	3rd Indo-Japanese Neurosurgery Conference	Mumbai 2003	Endovascular treatment of dural AV fistula
Dr. George A.V	International Health Ecnomics Association's 4th world congress	San Francisco June, 2003	Participant
Dr. M.Jayabalan	International Conference on Materials for advanced Technologies (ICMAT 2003) and IUMRS-ICA 2003	Singapore Dec, 2003	Studies on biomechanical characteristics of aliphatic poly urethane urea for blood contact applications
Dr. A. Jayakrishnan	Indo-Australian Symposium on Biomaterials and Biomedical Engineering	Manipal Feb, 2004	Immobile plasticizer in flexible PVC

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. K. Jayakumar	The Biennial Conference of the Asian Association of Cardiovascular and Thoracic Surgeons	Bangkok Nov, 2003	Participant
Dr. N.Jayakumari	International Conference on Natural products, Free radicals and Radioprotec tors in Health	Annamalai University Jan, 2003	High prevalence of low antioxidants and HDL-C in patients with coronary artery disease
Dr. M.K. Katti	Interscience Conference on Antimicrobial Agents and Chemotherapy	Chicago Sep, 2003	Trehalose 6,6 demycolate (TDM,cord factor) from mycobacterium tubercu losis modulates macroph age functions through activation focal adhesion kinase
Dr. Mira Mohanty	DES - East meets the West - New-Horizons,	Mumbai Jan, 2004	Participant
Mr.C.V Muraleedharan	DES - East meets the West - New-Horizons,	Mumbai Jan, 2004	Participant
Dr.K.S. Neelakandhan	The Annual Conference of European Association of Cardiovascular and Thorasic Surgeons	Vienna Oct, 2003	Participant
Dr.K.S. Neelakandhan	SAARC Cardiac Society Conference	Kathmandu Feb, 2004	Participant
Dr. K.S. Neelakandhan	The Biennial Conference of the Asian Association of Cardiovascular and Thoracis Surgeons	Bangkok Nov, 2003	Participant
Dr. Prabha D.Nair	DST-NSF sponsored Indo -US Workshop on Tissue Engineering and Stem Cell Technologies	SCTIMST Trivandum Feb 2004	Pancreatic cell tissue engineering: Polymer macrocapsules for immunoisolation of islet cells

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. Prabha D.Nair	Indo-Australian Symposium on Biomaterials and Biomedical Engineering	Manipal Feb, 2004	Biomaterials for tissue engineering
Dr. K. Radhakrishnan	55th AAN Annual Meeting	USA Mar, 2003	Selection of ideal candidates for temporal lobe epilepsy surgery in a developing country
Dr.Raghunath Nalgirkar	International Conference on Pediatric Anesthesia (Joint meeting of Asian Society of Pediatric anesthesia and Pediatric forum of Indian Society of anesthetist	New Delhi Nov,2003	Supraclavicular subclavian Experience in 75 patients
Dr. Renuka Nair	International Conference on Natural Products,Free radicals and Radioprotec tors in Health	Annamalai University Jan, 2004	Role of oxidative stress in cardiac hypertrophy
Dr. R. C. Rathod	27th Congress of the Scandinavian Society of Anesthesiologist and Intensive Care Medicine	Finland Aug, 2003	Analysis of circuit hypoxia with Aestiva /5 anesthesia machine – A Retrospective study Incidence and treatment of bradycardia during elective epilepsy surgery – A retrospective analysis.
Mr. Sabumon R.	International Conference on Digital Libraries	New Delhi Feb, 2004	Participant
Dr. Sanjeev V. Thomas	25th International Epilepsy Congress	Lisbon, Portugal	Outcome of 440 pregnancies
Dr. K Sreenivasan	DES - East meets the West - New-Horizons,	Mumbai Jan, 2004	Participant

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. P.V. Sulochana	International Symposium on "Total Quality Management"	Ahmedabad Dec. 2003	Participant
T.K. Sundari Ravindran	Second Asia-Pacific Conference on Sexual and Reproductive Health	Bangkok Oct, 2003	Participant
T.K. Sundari Ravindran	International Conference 'Making the Link: sexual -reproductive health and health systems'	UK Sep, 2003	Participant
Dr. T.K. Sundari Ravindran	Global Conference on Tobacco or Health	Helsinki Aug, 2003	Participant
Dr. T.K. Sundari Ravindran	Kerala's Health Status	Nepal July 2003	
Dr. Suresh Nair	5th ACNS	Jakarta Jan, 2004	Meningiomas of the poste-rior petrous pyramid vascular lesions of the brain
Dr. Suresh Nair	11th Asia Australasian Congress of Neurologic -al surgery	Singapore Nov, 2003	Participant
Dr. Suresh Nair	2nd Indo Japanese Neurosurgery Conference	New Delhi Feb, 2004	Management issues in vestibular schwannomas
Dr. D. Varatharajan	Second Asia-Pacific Conference on Reproductive and Sexual Health,	Bangkok Oct, 2003	Resource allocation to reproductive health under political decentralization in Kerala: A stakeholder analysis

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. D. Varatharajan	International Conference on Towards equity in Education, Training and Health care delivery	Australia Oct, 2003	Emerging models of public health care management in India: An analysis of three models in Kerala and Tamil Nadu
Dr. T.K. Sundari Ravindran	Second Asia-Pacific Conference on Sexual and Reproductive Health	Bangkok Oct, 2003	Participant
Dr. H.K.Varma	2nd Symposium on Advanced Materials for Next Generation- Future of Biofunctional Integrated Materials	Japan Oct, 2003	Bioceramics- clinical applications and future perspectives

NATIONAL CONFERENCES

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr.Aley Alexander	Joint Annual Meeting of Indian Epilepsy Association and Indian Epilepsy Society	Visakhapatnam Sep, 2003	Quality of life outcome after epilepsy surgery
Dr.P.S.Appukuttan	30th Annual Meeting of Indian Immunology Society	Lucknow Nov, 2003	Microbial desialylation of serum IgA1 leads to its formation of immune complex with serum anti-T antibody
Dr. Apurba Kumar Sarma	Annual Conference of the Indian Association of Cardiovascular Thoracic Surgeons	New Delhi Feb, 2004	Participant
Dr. Asha Kishore	52nd Annual Conference of the Neurological Society of India	Chandigarh Dec, 2003	Clinical contribution of genetic factors in Parkinsons disease
Dr. Asha Kishore	Annual Conference of Indian Academy of Neurology	Visakhapatnam Sep, 2003	Problems and pitfalls in the management of parkinsonism
Dr. Asha Kishore	7th World Parkinson's day International Symposium	Mumbai	Non motor problems in Parkinson's disease
Dr. Asha Kishore	7th National Conference of the Indian society of Stereotactic and Functional surgery	Mumbai	What does and doesn't improve with deep brain stimulation of STN for Parkinson's disease
Dr. Ashalatha R.	Joint Annual Meeting of Indian Epilepsy Association and Indian Epilepsy Society	Visakhapatnam Sep, 2003	Seizure outcome after hemispherectomy for medically refractory epilepsy
Dr.R.N.Bhattacharya	4th Annual Skull Base Surgery Society Conference	Bangalore Sep, 2003	Participant

Name of the participant/ Speaker	Name of the Conference	Date&Venue	Title of the paper/ Participant's Status
Dr.R.N.Bhattacharya	3rd Cerebrovascular Surgery	Chandigarh Dec, 2003	Participant
Dr.R.N.Bhattacharya	All India Annual Coal Medical Conference	Ranchi Jan, 2003	Participant
Dr.R.N.Bhattacharya	The 52nd Annual Conference of the Neurological Society of India	Chandigarh Dec, 2003	PICA aneurysms: Surgical outcome
Dr. Chandra P.Sharma	XIVth National Conference – Society for Biomaterials & Artificial Organs India	Mumbai Dec 2003	Biomaterials and artificial organs: Few challenging areas
Dr. P.K. Dash	Annual Conference of ISA	Bhubaneswar Dec,2003	Crisis management in myasthenia gravis
Dr. P.K. Dash	7th Annual Conference of IACTA	Cochin Feb, 2004	Tetralogy of Fallot and anesthetist
Dr. P.K. Dash	The Annual CME programme of Indian Society of CVTS	Trivandrum Jan, 2004	Blood Gases
Dr. P.K. Dash	The Cardiac Anaesthesia Update	Chennai Nov, 2003	On pump CABG is better than off pump CABG
Dr. P.K. Dash	51st Annual Conference of Indian Society of Anaesthetists	Bhubaneswar Dec, 2003	Crisis management in myasthenia gravis External jugular vein as an alternative approach to central venous catheterization
Dr. Easwer H V	The 52nd Annual Conference of the Neurological Society of India	Chandigarh Dec, 2003	Symptomatic unruptured cerebral aneurysms: Clinicoradiological profile and management

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr.P.Gayatri	7th Annual Conference of IACTA	Cochin Feb, 2004	Combined administration of Propofol and Ketamine for cardiac catheterization procedures
Dr.A.K.Gupta	The 52nd Annual Conference of the Neurological Society of India	Chandigarh Dec, 2003	Long term result of endovascular management of spinal arteriovenous malformations
Dr.A.K.Gupta	The Annual Conference of the Neuroradiological Society of India	Chandigarh Dec, 2003	Advances in Neuroimaging
Dr.A.K.Gupta	6th Annual Conference of ISVIR & ISNR,	Chandigarh Oct, 2003	Complications and manage ment of endovascular treat- ment of aneurysm Choose the material cerebral AVM
Dr.A.K.Gupta	3rd Annual Conference of Indian Society of Cerebro vascular Surgery	Chandigarh Dec, 2003	Intracranial Dural AV Fistulas - Changes in management
Dr.A.K.Gupta	Annual Conference of Neurological Society of India	Chandigarh Dec, 2003	Management of carotico - cavernous Fistulas
Dr.A.K.Gupta	Annual Conference of Thoracic Surgery	Calcutta Jan, 2004	Hemoptysis - Interventions in emergency
Dr. Jaisy Mathai	XII Asia Pacific Conference of ISBT jointly with Annual Conferences of ISBTI and ISHTM	New Delhi Nov, 2003	Efficiency of surgical blood ordering practice

Name of the participant/ Speaker	Name of the Conference	Date&Venue	Title of the paper/ Participant's Status
Mr. S.Jayachandradas	ICDL-2004: International Conference on Digital Libraries.	New Delhi Feb, 2004	Participant
Dr. Jayadevan ER	6th Annual Conference of ISVIR & ISNR,	Chandigarh Oct, 2003	Effect of urokinase and papaverine chronic vasos pasm in an animal model of subarachnoid haemorrhage MRI Findings in a case of brain death Spontaneous intracranial hypotension- MRI features
Dr. A.Jayakrishnan	National Seminar on Current Trends in Chemistry	Thodupuzha Jan, 2004	Polymers for drug delivery
Dr. K. Jayakumar	Annual Conference of the Indian Association of Cardiovascular Thoracic Surgeons	New Delhi Feb, 2004	Participant
Mr. Joy Vithayathil	MLAI-2003 National Convention	Pune Dec, 2003	The role of library and information centers in the preservation of the traditional biomedical knowledge related to medicine plants and herbs.
Dr. Kannan R	6th Annual Conference of ISVIR & ISNR,	Chandigarh Oct, 2003	Caisson's Disease with CNS Involvement - Report of two cases Interventions in IVC Stenosis
Dr. Kapilamoorthy TR	6th Annual Conference of ISVIR & ISNR,	Chandigarh Oct, 2003	Carotid and brachiocepha lic artery stenting - SCTIMST experience

Name of the participant/ Speaker	Name of the Conference	Date&Venue	Title of the paper/ Participant's Status
Dr. C.C. Kartha	Joint International Conference of International Academy of Cardiovascular Science and International Society for Heart Research-Indian Section	Lucknow Jan, 2004	Exercise and Endothelium.
Dr. C. C. Kartha	International Update on Heart Failure	Porur Mar, 2004	Molecular Basis of ventricular remodelling.
Dr. C. C. Kartha	National Seminar on Cardiovascular Genomics	Madurai Kamaraj University- Mar, 2004	Genomics of endothelium.
Dr. C. C. Kartha	National Seminar on Recent Advances in Stress Physiology immunology & Toxicology	West Bengal Nov, 2003	Exercise & Endohelium.
Dr. Kesavadas C	6th Annual Conference of ISVIR & ISNR,	Chandigarh Oct, 2003	Focal cortical dysplasias – radiology - pathology correlation. Imaging in spinal neoplasms.
Dr. K. M. Krishnamoorthy	National Conference of Indian Academy of Pediatrics	Mumbai 2003	Balloon mitral valvulo plasty in children 12 years and younger.
Dr. K. M. Krishnamoorthy	National Conference of Indian Academy of Pediatrics	Chennai 2004	Percutaneous closure of patent ductus arteriosus with a new device and comparison with coil closure. Myxoma in children: a 20 year experience. Percutaneous closure of atrial septal defects and comparison with surgical patients

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. K. M. Krishnamoorthy	Cardiological Society of India Conference	Kolkatta 2003	Echocardiographic corre lation of balloon sizing of atrial septal defects
			Haemodynamic correlates of Tei index in patients with coronary artery disease.
Dr. K. M. Krishnamoorthy	Cardiological Society of India Conference	Kolkata 2003	Predictors of coronary artery disease in patients with exercise capacity $\geq$10 METS.
			Mitral stenosis and sinus rhythm: predictors of spontaneous echocardiographic contrast.
Dr. K. M. Krishnamoorthy	Cardiological Society of India Conference	Kolkatta 2003	Wave dispersion after balloon mitral valvulo plasty.
Dr. K. M. Krishnamoorthy	Cardiological Society of India Conference	Kolkatta 2003	Comparison of balloon mitral valvuloplasty in younger and older children
			Removal of catheter fragments using a new snare.
			Right ventricular Tei index before and after right coronary angioplasty
Dr. Mala Ramanathan	31st Annual Conference of the Indian Association for Preventive and Social Medicine	Feb, 2004	Gender and medical education
Dr. Mathew A	Neuropedicon 2003	Lucknow Nov, 2003	Functional hemisphereotomy and hemisperectomy : A safe alternative for managementof medically refractive seizures in children

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. P. S. Mathuranath	9th Annual Conference of the Alzheimer's and Related Disorders Society of India (ARDSI)	Calcutta Nov, 2003	Memory Recent Advances
Dr. P. S. Mathuranath	Annual Conference of the Indian Academy of Neurology	Visakhapatnam Sep, 2003	Pitfalls in the diagnosis and management of dementia Symptomatic and asymp impairment
Dr. Muthu Retnam T	The 52nd Annual Conference of the Neuro-logical Society of India	Chandigarh Dec, 2003	CP angle epidermoids: Operative series of 47 cases
Dr. Muthu Retnam T	Neuropedicon 2003	Lucknow Nov, 2003	Rare CP angle tumours in children
Dr. M.D. Nair	52nd Annual Conference of the Neurological Society of India	Chandigarh Dec, 2003	Whipple's disease - A historical review
Dr.Narendra K.Bodhey	Annual Conference of Neurological Society of India	Chandigarh Dec, 2003.	Efficacy of balloon occlusion test prior to carotid mapping
Dr. K.S. Neelakandhan	Annual Conference of the Indian Association of Cardiovascular Thoracic Surgeons	New Delhi Feb, 2004	Participant
Dr. P. K. Neema	51st Annual Conference of Indian Society of Anaesthetists	Bhubaneswar Dec, 2003	Bilateral multiple emphy sematous bullae with secondum atrial septal defect-anesthetic implica tions and management Muscle relaxant in altered physiology

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. P. K. Neema	7th Annual Conference of IACTA	Cochin Feb, 2004	Bilateral multiple emphysematous bullae with secondum atrial septal defect-anesthetic implications and management
			Tetralogy of Fallot and anaesthetist
Dr. Prabha D. Nair	M.Tech programme of the School of Medical Science and Technology	Kharagpur Apr, 2003	Opthalmic biomaterials, Artificial Organs and Tissue Engineering
Dr. Prabha D. Nair	Interactive Discussion Meeting on Cardiovascular Diseases (DBT sponsored)	New Delhi Mar, 2004	Invited Faculty
Dr.K.Radhakrishnan	52nd Annual conference of the Neurological Society of India	Chandigarh Dec, 2003	Rational choice of antiepileptic drugs
Dr.K.Radhakrishnan	6th Jaslok Neurosciences CME	Mumbai Feb, 2004	Seizure semiology: Localization and lateralization on Video EEG
Dr.K.Radhakrishnan	Epilepsy Update 2004	Kolkata Mar, 2004	The role of video-EEG in the presurgical evaluation
Dr.K.Radhakrishnan	Epilepsy CME	Ahmedabad Mar, 2004	EEG recording and interpretation
			Presurgical evaluation and surgery for epilepsy
			Treatment of epilepsies, and pediatric epilepsies
Dr. V.V. Radhakrishnan	Annual Conference of the Indian Academy of Neurology	Visakhapatnam Sep, 2003	Chronic meningitis- clinico pathologic analysis

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. V.V. Radhakrishnan	The 52nd Annual Conference of the Neurological Society of India	Chandigarh Dec, 2003	Tumour necrosis factor alpha and soluble tumour necrosis factor receptor profiles in patients with Guillain Barre- Syndrome following Intravenous immunoglobulin therapy and plasma exchange.
Mrs C.Radhakumary	XIVth National Congress on Biomaterials and Artificial Organs	Mumbai Dec, 2003	Biopolymer composites of chitosan and methyl methacrylate for medical applications
Dr. Raghunath Nalgirkar	10th Annual Conference of Indian Society of Critical Care Medicine & International Critical Care Congress	Mumbai Feb, 2004	Central venous access through infraclavicu lar axillary vein – a prospective study
Dr. Rajesh B.J.	The 52nd Annual Conference of the Neurological Society of India	Chandigarh Dec, 2003	Mycotic cerebral aneurysms : A review of 18 cases
Dr. Rajneesh Kachara	4th Annual Skull Base Surgery Society Conference	Bangalore Sep, 2003	Participant
Dr. R. C. Rathod	Annual Conference of ISA	Bhubaneswar Dec, 2003	Muscle relaxant in altered physiology
Dr. R. C. Rathod	51st Annual Conference of Indian Society of Anesthetist	Bhubaneswar Dec, 2003	Myocardial protection strategies
Dr. B Ravimohan Rao	The 52nd Annual Conference of the Neurological Society of India	Chandigarh Dec, 2003	MRI guided stereotactic depth electrode recording in bitemporal epilepsy

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. Rupa S	51st Annual Conference of Indian Society of Anaesthetists	Bhubaneswar Dec, 2003	Dilated, non-reacting pupil need not indicate brain death in haemorrhagic shock
			Epidural analgesia with preservative free Ketamine for postoperative pain relief in patients with myasthenia gravis
Dr. Rupa S	Annual Conference of ISA	Bhubaneswar Dec, 2003	Present status of hypother mia in neurosurgical anesthesia
Dr. Rupa S	Annual Conference of Neuroanaesthesiologist	Bangalore Feb, 2004	Anesthesia for endovascular treatment of cerebral aneurysm
Dr.Samhita Panda	Joint Annual Meeting of Indian Epilepsy Association and Indian Epilepsy Society	Visakhapatnam Sep, 2003	Predictors of seizure out come after surgery for tumor related medically refractory partial epilepsy
Dr. Sanil B	6th Annual Conference of ISVIR & ISNR,	Chandigarh Oct, 2003	evaluation of abdominal aortic aneurysm with spiral CT and 3D recon struction method
Dr. Sanjeev V.Thomas	Joint Annual Meeting of Indian Epilepsy Association and Indian Epilepsy Society	Visakhapatnam Sep, 2003	Lipid Peroxidation in women with epilepsy
			Managing women with epilepsy
Dr. R. Sankar Kumar	Annual Conference of the Indian Association of Cardiovascular Thoracic Surgeons	New Delhi Feb, 2004	Participant

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr.C.Sarada	52nd Annual Conference of the Neurological Society of India	Chandigarh Dec, 2003	Evaluation of antistriational antibodies in myasthenia gravis
Dr. S. Sathyabhama	XII Asia Pacific Conference of ISBT jointly with Annual Conference of ISBTI and ISHTM	New Delhi Nov, 2003	Effect of blood donation on haemogram of the donor
Dr. Shrinivas V G	7th Annual Conference of IACTA	Cochin Feb, 2004	Preoperative assessment of cardaic risk in ischaemic heart disease
Dr. Shrinivas V G	7th Annual Conference of IACTA	Cochin Feb, 2004	Delayed thrombosis of left internal jugular vein and left subclavian vein: complication related to drainage of left superior.
Dr. Shrinivas V G.	51st Annual Conference of Indian Society of Anaesthetists	Bhubaneswar Dec, 2003	Nitrous oxide in clinical anesthesia practice. Preoperative management of combined intracranial aneurysm and arterio venous malformation.
Dr. K.G. Shyamkrishnan	Annual Conference of the Indian Association of Cardiovascular Thoracic Surgeons	New Delhi Feb, 2004	Participant
Dr. P. K.Sinha	51st Annual Conference of Indian Society of Anaesthetists	Bhubaneswar Dec, 2003	Effect of nitrous oxide in reducing pain on Propofol injection in adult patients. Anesthesia for awake craniotomy – a retrospective study.

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. P. K. Sinha	Annual Conference of Indian Society for study of pain	Kolkata Jan, 2004	Comparison between lumbar and thoracic epidural buprenorphine on postoperative pain relief following thoracotomy- A double blind, randomized study
Mr. R.Sreekumar	26th Annual Conference of Electron Microscopic	Simla Apr, 2003	Microstructural features of microspheres prepared by a novel processing method
Dr. K.Sreenivasan	Assessors conclave of NABL	Bangalore Mar, 2004	Invited Speaker
Dr.Suresh Nair	The 52nd Annual Conference of the Neurological Society of India	Chandigarh Dec, 2003	Surgery for vestibular schawannoma towards zero mortality
Dr.Suresh Nair	4th Annual skull base surgery society Conference	Bangalore Sep, 2003	Participant
Dr.Suresh Nair	3rd cerebrovascular surgery	Chandigarh Dec, 2003	Participant
Dr. P. N. Sylaja	Joint Annual Meeting of Indian Epilepsy Association and Indian Epilepsy Society	Visakhapatnam Sep, 2003	Employment outcome and the factors affecting em ployment in persons with epilepsy
Dr. P. N. Sylaja	The 52nd Annual Conference of the Neurological Society of India	Chandigarh Dec, 2003	Multivariate approach to predictors of outcome after temporal lobectomy in refractory epilepsy diseases
Dr.K. R. Thankappan	Strengthening of Health Research in NGOs	Mumbai Nov, 2003	Tobacco use in India
Dr.K. R. Thankappan	National Conference of the Indian Association of Preventive and Social Medicine	Chandigarh Feb, 2004	Non-Communicable Disease Control Program

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. K. R. Thankappan	National Seminar of Epidemiology of Non- Communicable diseases	Chennai Oct, 2003	Tobacco use and cardio-vascular diseases in India
Dr. Thomas Koshy	Annual Conference of ISA	Bhubaneswar Dec, 2003	Post anesthesia care unit
Dr. Thomas Koshy	7th Annual Conference of IACTA	Cochin Feb, 2004	Thoraco-Abdominal Aortic Aneurysm Surgery: perioperative anesthesia care
Dr. Thomas Koshy	The Cardiac Anaesthesia Update	Chennai Nov, 2003	Vasodilatory shock in the CABG patient after CPB
Dr. Thomas Koshy	51st Annual Conference of Indian Society of Anesthetist	Bhubaneswar Dec, 2003	Holt Oram Syndrome with congenital heart diseases uncommon associations
Mrs Usha Kandasamy	XII Asia Pacific conference of ISBT jointly with Annual Conferences of ISBTI and ISHTM	New Delhi Nov 2003	Voluntary blood donation-a solution to psychological problem faced by patients in arranging blood donors
Dr. M. Unnikrishnan	Annual Conference of Vascular Society of India	Goa Oct, 2003	Participant
Dr. H.K.Varma	Solid State Chemistry and Allied Areas	New Delhi Dec 2003	Bioactive ceramic materials for bone tissue engineering
Dr. Vijay Chandran	6th Annual Conference of ISVIR & ISNR	Chandigarh Oct 2003	Use of mettalic tracheal stents in the management of Tracheal Stenosis
Mr. Vijayakumar	-	IIT Kharagpur	Biomedical Engineering Education in India

WORKSHOPS ATTENDED BY STAFF

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. Annie John	National Workshop on Biological Evaluation of Materials for Material Devices	Trivandurm Apr, 2003	Application of transmission electron microscopy for biomaterial evaluation
Dr. Bijoy Thomas	The 2nd Leuven f MRI course UZ Leuven	Gasthuisberg Oct, 2003	Participant
Dr. Gupta A. K.	Workshop on Interventional Neuroradiology	Sri Lanka Nov, 2003	Participant
Dr. Gupta A. K.	3rd Workshop on Clinical and Biomedical MR	Lucknow Sep, 2003	MR in supratentorial extraaxial Tumours MR in infratentorial tumours MR in Spinal Tumour
Dr. Jaisy Mathai	Quality Management Programme for Blood Transfusion Services in India	Cochin Feb, 2004	Participant
Dr. Kartha C. C.	National workshop on Medical Curriculum	New Delhi Oct, 2003	Participant
Dr. Manoj Komath	National Workshop on "Testing and Characterisation of Engineering Materials (TCEM-2003)	Trivandrum July, 2003	Participant
Dr. Mira Mohanty	National Workshop on Biological Evaluation of Materials for Medical devicees	BMT Wing, Trivandrum Apr, 2003	Gross and histopathologi cal evaluation for biocompatibility devices

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
			Biological evaluation of materials for medical devices: An introduction
Dr. Praveen Varma P. K.	Workshop on Mitral Valve Repair in Care Hospital	Hyderabad Sep, 2003	Participant
Dr. Radhakrishnan K.	International EEG workshop	Chandigarh Dec, 2003	Seizure Semiology Invasive EEG
Mr. Ranjith D.	All India workshop of IPR & Technology	New Delhi Nov, 2003	Participant
Dr. Sanjeev Thomas	Clinical Electrophysiology Workshop	Vellore Feb, 2004	EMG and Intraoperative monitoring
Dr. T. K. Sundari Ravindran	Workshop on Qualitative Research Methods	Baroda Mar, 2004	Engendering Research Participant
Dr. Thankappan K. R.	Development of Guidelines for High Risk Primary and Secondary Prevention of Coronary Heart Disease in India, with Special Emphasis on Primary Health Care	London Feb, 2004	Management of High Blood Pressure in Primary Care- Current Practice Patterns and Critical Deficiencies
Dr. Varma H. K.	National Workshop on Biological Evaluation of Materials for Material Devices	BMT Wing, Trivandrum Apr, 2003	Application of scanning electron microscopy for biological evaluation of materials

CONFERENCE ATTENDED BY STUDENTS

INTERNATIONAL CONFERENCES

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Ms. Elizabeth K. Abraham	Sixth International Latex Conference	U.S.A July, 2003	Migration of dithiocar bamate accelerators into artificial sweat from natural rubber latex vulcanizates
Ms. Shiny Velayudhan	18th European Society for Biomaterials Conference-ESB-2003	Germany Oct, 2003	Stamp forming of hydroxyapatite filled polymer composites

NATIONAL CONFERENCES

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/
Dr. Bhasker S.	The52nd Annual Conference of the Neurological Society of India	Chandigarh Dec, 2003	Functional hemispherec tomy/ hemispherotomy: SCTIMST experience
Dr. Harshad Purandare	The 52nd Annual Conference of the Neurological Society of India	Chandigarh Dec, 2003	Neurogenic pulmonary edema: Review of four cases
Dr. Komal P.	Neuropedicon 2003	Lucknow Nov, 2003	A retrospective analysis of hypothalamic hamartomas
Dr. Krishna Kumar	Neuropedicon 2003	Lucknow Nov, 2003	Management of deep seated and eloquent location abscesses in children
Dr. Mukund Prasad	The 52nd Annual Conference of the Neurological Society of India	Chandigarh Dec, 2003	Cerebellopontine angle arterio venous malformations

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. Parameswaran K.	Annual Conference of the Indian Academy of Neurology	Visakpathanam Sep, 2003	Caissons'disease
Dr. Purkayastha S.	Annual Conference of Neurological Society of India	Chandigarh Dec, 2003	Role of percutaneous vertebroplasty in debilitat ing backache
			Carotico - jugular and vertebro - vertebral fistu las of neck
Dr. Raghavan Iyengar	The 52nd Annual Conference of the Neurological Society of India	Chandigarh Dec, 2003	Central neurocytoma: A review of fifteen cases
Dr. Rajesh B.	Annual Conference of the Indian Academy of Neurology	Visakpathanam Sep, 2003	Primary lateral sclerosis & syphilis Tumefactive demyelination
Dr. Rajesh Kumar J.	The 52nd Annual Conference of the Neurological Society of India	Chandigarh Dec, 2003	Corpus callosotomy for lennox gestaut syndrome: A review of 12 cases
Dr. Ravi K.M.	51st Annual Conference of Indian Society of Anesthetist	Bhubaneswar Dec, 2003	Post-operative hypothyroidism in a patient after cornary artery bypass grafting
Dr. Somesh Desai	The 52nd Annual Conference of the Neurological Society of India	Chandigarh Dec, 2003	Surgical outcome for occipital lobe epilepsy
Dr. Sonwalkar H.	Annual Conference of Neurological Society of India	Chandigarh Dec, 2003	Endovascular management of spinal dural arteriovenous malformations
Dr. Srinivas N.	Neuropedicon 2003	Lucknow Nov, 2003	A retrospective analysis of hypothalamic gliomas
Dr. Sunil F.	Neuropedicon 2003	Lucknow Nov, 2003	Pediatric aneurysms: 25 years experience

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
			Melanotic neurectodermal tumor in infancy: A rare case
Dr. Varma D. R.	Annual Conference of Neurological Society of India	Chandigarh Dec, 2003	Hippocampal malrotation in medically refractory epilepsy
Dr.Robert Mathew	Annual Conference of the Indian Academy of Neurology	Visakpathanam Sep, 2003	Language in primary progressive aphasia
Mr. Arun Kumar M.P.	6th Annual Conference of ISVIR & ISNR,	Chandigarh Oct, 2003	Carotid stenting role of technologist
Mr. Johnson C.	6th Annual Conference of ISVIR & ISNR	Chandigarh Oct, 2003	Technical Aspects of TOF M.R Angiography and its clinical applications in intracranial and extracranial vasculature
Mr. Renjith M.C.	44th Annual Conference of Association of Microbiologists of India	Dharwad Nov, 2003	Evaluation of antibacterial properties of silver oxide coating in prevention of bacterial adhesion and biofilm formation
Mr. Sanoj Varghese	6th Annual Conference of ISVIR & ISNR	Chandigarh Oct, 2003	Surface coil used in CSF Rhinorrhea
Mr.Suresh Kumar	30th National Annual Conference of Indian Association of Clinical Psychologists	Thrissur Jan, 2004	Burden assessment of caregivers of dementia patients
Ms. Anisha T. K.	National Laser Symposium	Kharagapur Dec, 2003	Characterization of human breast and oral tissues by synchronous luminescence spectroscopy

Name of the participant/ Speaker	Name of the Conference	Date&Venue	Title of the paper/ Participant's Status
Ms. Annamma George	36th ISHACON 2004	Mysore Jan, 2004	Patterns and rate of recovery from aphasia following stroke: A prospective 1-year follow-up study
Ms. Biji Balakrishnan	XIVth National Congress on Biomaterials and Artificial Organs	Mumbai Dec, 2003	Chemical modification of poly (vinyl chloride) with poly (ethylene glycol) to improve its blood compatibility
Ms. Biji Balakrishnan	WoundCon 2003 organized by the Indian Society of Wound Management	Chennai Feb, 2003	Participant
Ms. Jayasree R. S.	6th Annual Conference of ISVIR & ISNR	Chandigarh Oct, 2003	Fluorescence spectroscopy as a photonic pathology method for tissue diagnosis - experimental study
Ms. Jayasree R. S.	National Laser Symposium	Kharagapur Dec, 2003	Diagnosis of different human mediastinal tissues using fluorescence spectroscopy - preliminary study
			Sectroscopic characterization of human mital valve
Ms. Neethu Mohan	XIVth National Congress on Biomaterials and Artificial Organs	Mumbai Dec, 2003	Polysaccharide scaffold for tissue engineering
Ms. Nishi K.K.	XIVth National Congress on Biomaterials and Artificial Organs	Mumbai Dec, 2003	Preparation and in vitro evaluation of primaquine-conjugated gum arabic microspheres
Ms. Sangeetha S.R.	10th FAOBMB Congress, IISc	Bangalore Dec, 2003	O-linked rather than N-linked human heart galectin-1 recognition of glycoproteins including serum IgA1

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Ms. Shiny Velayudhan	Advances in Polymer Technology (APT-04)	Kochi Jan, 2004	Dynamic mechanical analysis of hydroxyapatite filled polymer composite for craniofacial applications
Dr. Amitabh Gupta	Annual Conference of NSI, Kerala Chapter	Calicut Feb, 2004	Role of 3 D CTA in complex cerebral aneurysms
Dr. Iyengar R.	Annual Conference of NSI, Kerala Chapter	Calicut Feb, 2004	Central Neurocytoma a review of 15 cases
Dr. Komal Prasad	Annual Conference of NSI, Kerala Chapter	Calicut Feb, 2004	Hypothalamic hamratomas in children : surgical outcome
Dr. Nirmala R.James	Advances in Polymer Technology	Cochin	Participant
Dr. Rajiv	Annual Conference of NSI, Kerala Chapter	Calicut Feb, 2004	CP angle AVM: review of 3 cases
Dr. Srinivas N	Annual Conference of NSI, Kerala Chapter	Calicut Feb, 2004	Hyopthalamic gliomas: surgical outcome
Ms. Nishi K. K.	Advances in Polymer Technology	Cochin Jan, 2004	Participant
Ms. Sailaja G.S.	Advances in Polymer Technology	Cochin Jan, 2004	Synthesis of novel hydroxyapatite microspheres with interconnecting porosity for controlled drug delivery
Ms. Sailaja G.S.	16th Session of Kerala Science Congress	Kozhikode Jan, 2004	Novel biodegradable composite system for bone regeneration

STANDING COMMITTEES

Academic Committee

1. Prof. K. Mohandas (Chairman)
   Director, SCTIMST, Thiruvananthapuram
2. Dr. G. S. Bhuvaneshwar
   Head, BMT Wing, SCTIMST
   Poojappura, Thiruvananthapuram
3. Prof. B. Ekbal, Vice Chancellor
   University of Kerala,
   Thiruvananthapuram
4. Prof. C. C. Kartha,
   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
   BMT Wing, SCTIMST, Poojappura
   Thiruvananthapuram
8. Prof. Jayaprakash Muleyil
   Christian Medical College, Vellore

Building Committee

1. Prof. K. Mohandas (Chairman)
   Director, SCTIMST, Thiruvananthapuram
2. Dr. G. S. Bhuvaneshwar
   Head, BMT Wing, SCTIMST
   Poojappura,
   Thiruvananthapuram
3. Secretary to the Government of Kerala
   Health & Family Welfare
   Thiruvananthapuram
4. The Civil/Construction Engineer
   ISRO, Vikram Sarabhai Space Centre
   Thiruvananthapuram
5. Sri. P. Vijayakrishnan (Ex-Officio Convenor)
   Financial Advisor & Chief
   Accounts Officer SCTIMST,
   Thiruvananthapuram
6. A member to be co-opted by the Director
   as and when necessary

Finance Committee

1. Prof. K. Mohandas (Chairman)
   Director, SCTIMST,
   Thiruvananthapuram
2. Prof. V. S. Ramamurthy,
   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. Prof. B. Ekbal
   Vice Chancellor,
   University of Kerala,
   Thiruvananthapuram

5. Sri. P. Vijayakrishnan (Ex-Officio Convenor)
Financial Advisor & Chief Accounts
Officer, SCTIMST, Thiruvananthapuram

Senior Staff Selection Committee

1. Prof. K. Mohandas (Chairman)
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. P.V. Ramanarayanan (Ex-officio)
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. Arthur V. Lal
Scientist F, BMT Wing, SCTIMST
Poojappura, Thiruvananthapuram

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

Ethics Committee

1. Mr. Justice S. Sankarasubban (Chairman)
Judge, High Court of Kerala, Kochi

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

3. Prof. K. A. Kumar, Professor of Psychiatry
Medical College, Thiruvananthapuram

4. Dr. G.S.Bhuvneswar
Head, Biomedical Technology Wing

5. An external expert on device technology
(to be identified and nominated by the
Director each time)

6. Director of the Institute

Technology Development Committee

1. Prof. K. Mohandas (Chairman)
Director, SCTIMST, Thiruvananthapuram

2. Dr. G. S. Bhuvaneshwar
Head, BMT Wing, 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

Technology Transfer Committee

1. Dr. S. Varadarajan (Chairman)
President, Indian National Science Academy,
New Delhi - 110 002

2. Dr. S. Sivaram
Dy. Director,
National Chemical Laboratory,
Pune - 411 008

3. Shri. S. B. Krishnan,
Secretary, Technology Development Board
Dept.of Science & Technology
New Delhi - 110 016

4. Shri. C. Venugopal,
Head, Technology Transfer Division
V.S.S.C., I.S.R.O,
Thiruvananthapuram

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

Prof. K. Mohandas, MD
Director

Academic Division

Dr. K. Radhakrishnan, MD
Dean

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

Mr. Sundar Jayasingh, MA, MBA, DLL
Assistant Registrar

Library

Mrs. S. Jayaprabha, BA, MLISc
Librarian-cum-Documentation Officer

Mr. Jayachandra Das, BSc, MLISc
Librarian-cum-Documentation Officer

Mrs. L. Sabitha, BSc, MLISc.
Senior Librarian-cum-Documentation Assistant

Mr. N. Suresh, B.Com., MLISc.
Librarian-cum-Documentation Assistant-C

Mr. Joy Vithayathil, B.Sc., MLISC.
Librarian-cum-Documentation Assistant-B

Mrs. T. Sudha, MA, MLISc.
Librarian-cum-Documentation Assistant-B

Mr. C. Anilkumar, MCom., MLISc.
Librarian-cum-Documentation Assistant-A

Nursing Education

Sr. P. P. Saramma, BSc, MN
Instructor in Nursing

Public Relations

Mrs. 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. Amar Jesani, MBBS
Programme Coordinator (Adhoc)

Dr. V. Mohanan Nair, MBBS, MPH
Scientist C (Adhoc)

Dr. R. Sukanya, MBBS, MD
Scientist C (Adhoc)

Administration

Dr. K. Mohandas, MD
Director

Mr. V. Ambujakshan Nair, BCom, LLB
Secretary to the Director

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

Mr. P. Vijayakrishnan, BSc, FCA
Financial Advisor & Chief Accounts Officer

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

Mr. R. Ramachandran, SAS
Internal Audit Officer (On deputation)

Mr. I.T. Edwin, BA
Administrative Officer Gr II

Mr. C. Gopinathan, BSc, LLB, SAS
Accounts Office Gr I

Mr. A.Santhakumari, MCom
Accounts Officer Gr I

Mr. C.R. Mohandas, BCom
Accounts Officer Gr II

Mr. R.Sreekumar, BSc, PGDMM
Purchase Officer Gr I

Mr. M. Sudhakara Sharma, BA
Stores & Purchase Officer Gr II

Mr. P. Gopalakrishnan Nair, BA
Stores & Purchase Officer Gr II

Mr. B. Joseph, BA
Security Officer

Mr. B. Radhakrishnan Nair, BA
Security Officer

Mr. S. Venkitachalam Iyer, BCom
Pool Officer
Construction Wing

Mr. C. Rajmohan, BE (Civil)
Construction Engineer

Mr. 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, Devices Testing Laboratory

Mr. D.S.Nagesh, MTech
Engineer F & in-charge Modelling & Prototyping Laboratory

Mr. V.Vinod Kumar, BTech
Engineer B

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

Bioceramics & SEM Laboratory

Dr. P.R.Harikrishna Varma, MSc, PhD
Scientist D & in-charge

Dr. Manoj Komath, MSc, 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, MBA
Engineer E & in-charge (on leave)

Dr. Annie John, MSc, PhD
Scientist C (acting in-charge)

Dental Products Laboratory

Dr. V.Kalliyana Krishnan, MSc, PhD
Scientist F & in-charge

Dr. P.P.Lizymol, MSc, PhD
Scientific Assistant B

Engineering Services

Mr. O.S.Neelakantan Nair, BSc (Engg.)
Engineer G & in-charge

M1r. V.Ramesh Babu, BE
Engineer D

Mr. K.P.R.Bhas, Dip.Electl.Engg
Assistant Engineer B

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

Implant Biology

Dr. Mira Mohanty, MD
Scientist G & in-charge

Dr. T.V.Kumary, MSc, PhD
Scientist F & in-charge Tissue Culture Laboratory

Dr. Annie John, MSc, PhD
Scientist C, Histopathology Laboratory (on leave)

Instrumentation Laboratory

Dr. Niranjan D.Khambete, MTech, PhD
Engineer D & in-charge

Microbiology

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

Molecular Medicine

Dr. T.Anoopkumar, MSc, PhD
Scientist E & in-charge

Polymer Analysis

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

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

Mr. P.R.Hari, BSc, AIE
Jr. Scientific Officer A

Mrs. C.Radhakumari, MSc
Scientific Assistant B

Polymer Chemistry

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

Polymer Division

Dr. M.Jayabalan, Msc, 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, MBA
Engineer E (on leave)

Technical Co-ordination Cell

Mr. D.Ranjit, BE
Engineer F & in-charge

Technology Transfer Cell

Mr. D.Ranjit, BE
Engineer F in-charge

Technology Proving Facility

Mr. D.S.Nagesh, MTech
Engineer F & in-charge

Thrombosis Research Unit

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

Toxicology & Animal House

Dr. A. C. Fernandez, MSc, PhD
Scientist E & in-charge of Animal House

Dr. P. V. Mohanan, MSc, PhD
Scientist C & in-charge of Toxicology

Vivarium

Dr. G.Arthur Vijayan Lal, BVSc
Veterinary Scientist G & in-charge

Dr. P.R.Umashankar, MVSc
Veterinary Scientist C

HOSPITAL WING

Dr. P. V. Ramnarayanan, MS, MCh
Medical Superintendent
Dr. S.K.Jawahar, MBBS
Asst. Administrative Medical Officer
Smt. Vijayamma Harikrishnan, RN, RM, BSc (N)
Nursing Superintendent
Smt. Sudhamaniamma, MSc (N), PGDHRM
Deputy Nursing Superintendent

Anaesthesiology

Dr. K. Mohandas, MD
Professor & Director of the Institute
Dr. R.C. Rathod, MD
Professor & Head
Dr.Raymond Douglas Latimer, MBBS, FFARCS, MA
Honorary Professor
Dr. (Mrs) Rupa Srinivas, MD, Dip.NB
Additional Professor
Dr. Thomas Koshy, MD
Additional Professor
Dr. Srinivas V.Gandhinhaljkar, MD
Associate Professor
Dr. Prasant Kumar Dash, MD
Associate Professor
Dr. Raghunath Sreedhar Nalgirkar, MD
Associate Professor
Dr. P.K. Neema, MD
Associate Professor
Dr. S. Manikandan, MD
Assistant Professor
Dr. P. K. Sinha, MD
Assistant Professor
Dr. P. Gayathri, MD, FRCA
Assistant Professor
Dr. P. R. Suneel, MD, PDCC
Assistant Professor
Dr. K. P. Unnikrishnan, MD
Assistant Professor
Dr. Pradeep Bhaskar, MD
Ad-hoc Consultant
Mrs. K. V. Bhuvaneswary
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Biochemistry

Dr. K. Subramonia Iyer, PhD
Professor and Head

Dr. P.S. Appukuttan, PhD
Professor

Dr. N. Jayakumari, PhD
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Shanta A. George, MSc
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B. Sasikumar, MSc
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Biomedical Engineering

K.Vijayakumar, BSc, BSc (Engg.)
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G. Mohanlal, BSc (Engg.), MBA
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B. Madhusoodanan Pillai, BSc (Engg.), PGDCA, MBA
Scientist/Engineer D

N. Sivanandan
Junior Engineer (Electrical)

Blood Transfusion Services

Dr. Jaisy Mathai, MBBS, DCP
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Dr. P.V. Sulochana, MBBS
Scientist F
Dr. S. Sathyabhama, MBBS
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Dr. Thomas Titus, MD, DM
Professor
Dr. V. Ajithkumar, MD, DM
Additional Professor
Dr. S. Sivasankaran, MD, DM, DIP NB
Additional Professor
Dr. K M. Krishnamoorthy, MD, DM
Assistant Professor
Dr. S. Harikrishnan, MD, DM
Assistant Professor
Dr. Santhoshkumar Dora, MD, DM
Assistant Professor
Dr. Krishnakumar
Assistant Professor
Dr. Narayanan Namboodri
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Cardiovascular & Thoracic surgery

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Professor & Head
Dr. K. Jayakumar, MS, MCh
Professor (Adhoc)
Dr. R. Sankar Kumar, MS, MCh
Professor
Dr. K.G. Shyam Krishnan MS, MCh
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Additional Professor
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Mr. Suresh Kumar B.
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Medical Records

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Mr. P.J. Varghese
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Professor
Dr. C.Sarada, MD, DM
Additional Professor
Dr. Sanjeev V.Thomas, MD, DM
Additional Professor (on leave)
Dr. Asha Kishore, MD, DM
Additional Professor
Dr. P.A. Suresh, MD, DM
Additional Professor (on leave)
Dr. Abraham Kuruvilla, MD, DNB,DABN (Cl/N Ph)
Assistant Professor
Dr. Joseph Cheriyan P.,MD, DM,DNB
Assistant Professor (On leave)
Dr. P.S. Mathuranath, DM
Assistant Professor
Dr. P.N. Sylaja, MD, DM
Assistant Professor
Dr. Ashalatha R, MD, DM
Adhoc Consultant
Dr. Samhita Panda, MD, DM
Adhoc Consultant
Dr. Rajesh Iyer, MD, DM
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Dr. Muthu Retnam S., MS, MCh
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Dr. Mathew Abraham, MS, FRCS,MCh
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Dr. Sukalyan Purkayastha
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