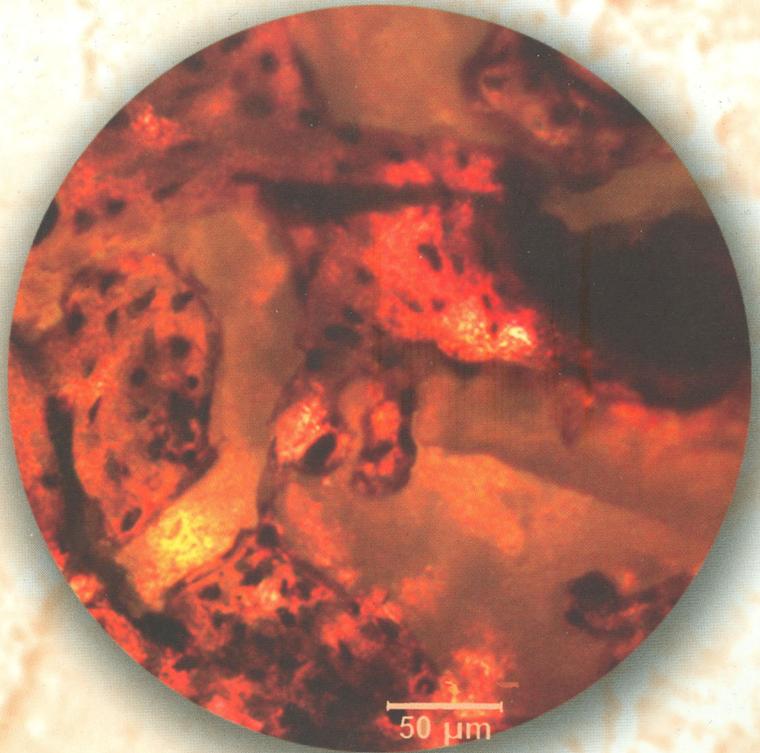




**Sree Chitra Tirunal Institute for
Medical Sciences and Technology**
Thiruvananthapuram



**Annual Report
2005-2006**



Annual Report

2005-2006

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

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Cover Page: *Photomicrograph of new bone formation in rabbit femur around implanted hydroxy apatite ceramic granules developed at the Institute*

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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

Healthcare technology development, clinical services, research and academic activities of the Institute continued at an accelerated pace during the year under review.

Five technologies comprising dental composites, bonding agents and glass filler were transferred to Anabond Stedman Limited, and a new factory for their commercial production started functioning near Chennai. Clinical trials of hydroxyapatite bioglass bioceramic composites for orthopaedic applications and bilayer HAP burr hole buttons for cranioplasty were progressing satisfactorily. Technology transfer agreements were also signed for scaling up and multicentre evaluation of centrifugal blood pumps and field kit for testing antibiotic sensitivity of bovine mastitis milk. Major equipments such as confocal microscope, flowcytometer and LCMSM were being commissioned as part of the Vision 2020 expansion programme, even though construction of new buildings is still awaiting formal sanction from the local authorities.

A large number of devices and materials testing requests were processed during the year bringing in revenue in excess of half a crore of rupees.

The year was marked by steady increase in the quantum of patient care services as well as significant reduction in hospital morbidity and mortality. Special clinics for cardiac dysrhythmias, sleep disorders and pregnant women with epilepsy were among the new initiatives started this year. Computerization of hospital services received a major fillip with the commissioning of the Picture Archival and Communications System (PACS) and the introduction of several new software programmes for streamlining OPD information and dietary services. It was decided to further enhance and extend free and subsidized care to a greater number of patients from April 2006, as part of our concern and commitment to the socioeconomically weaker sections of the society.

A collaborative programme on homograft heart valve was initiated with Medical College, Thiruvananthapuram as a first step towards setting up an organ bank.

Studies to delineate the role of antiepileptic drug induced oxidative stress in inducing teratogenicity and foetal malformations in pregnant women, and studies to isolate and clone human resident adult cardiac stem cells and endothelial progenitor cells from atrial biopsy and peripheral blood for using as cell based therapy are ongoing,

even as the first report of polysaccharides from fungi and bacteria forming immune complexes with naturally occurring anti-B glucoside antibody was published during the year under review.

The Achutha Menon Centre for Health Science Studies (AMCHSS) continued to provide consultancy services to regional, national and international agencies. Several national and international collaborative research programmes on non communicable diseases, tobacco cessation and the social and mental health consequences of tsunami and other disasters were progressing satisfactorily. The Institute's rural health initiative through its ASA programme, the gender programmes, and the academic and training programmes continued to make a difference in the State as well as in the rest of the country. The national and international alumni of the Institute were serving with distinction in many areas of public health.

Shri. Kapil Sibal, Union Minister for Science and Technology visited the Institute, held extensive discussions with members of the faculty and laid the foundation for the National Test Centre.

The Institute played host to a number of international conferences, including the Indo-US Flowcytometry wet workshop and the Association of Commonwealth Universities' Council meeting.

As the Institute completes 25 years of service to the Nation we dedicate ourselves to make even greater contributions to national development with the confidence born out of our past achievements.

HIGHLIGHTS OF THE YEAR

1. Five dental technologies transferred for commercial production to Anabond Stedman Limited, Chennai
2. Technology transfer agreement signed with SIDD Life Sciences Pvt. Ltd, Tamil Nadu for scaling up, pre-clinical safety testing and multi-centre evaluation of centrifugal blood pumps
3. Record revenue from testing and evaluation of biomaterials and medical devices
4. Special clinics for cardiac dysrhythmias and sleep disorders started
5. Picture Archival and Communication Systems commissioned
6. Homograft heart valve programme initiated in collaboration with Medical College, Thiruvananthapuram
7. A programme on adult human cardiac stem cell biology started with the support of the Department of Biotechnology
8. An international study on the social and mental health consequences of the Asian tsunami initiated
9. Indo-US flowcytometry wet workshop and the Association of Commonwealth Universities' Council meeting hosted

BIOMEDICAL TECHNOLOGY DEVELOPMENT

The expansion work under the VISION 2020 programme gained momentum at the Biomedical Technology Wing campus. Purchase of major equipment and recruitment of manpower progressed steadily. The coming two to three years are expected to witness the growth of the Biomedical Technology Wing to its full potential, thereby enabling it to make greater contributions to the national economy over the coming two decades.

Three technology transfer agreements with Indian companies and an MOU with an US based company for co-development of medical devices was signed during the year. Efforts are also underway to transfer the technology for 4 more products. The dental composites entered the market in October 2005 with the commissioning of the new plant in Chennai by M/s Anabond-Stedman. The initial response of dentists has been very good and encouraging. Transfer of 2 dental products to this company is underway. Two products – the fibrin glue transferred to ATMRF in Ahmedabad and the Chitosan based wound dressing to Dynamic Technomedicals of Aluva are awaiting the approval of the DGCI for market release.

The Centrifugal blood-pump, Hemoconcentrator, new model of the Chitra heart valve and Oral insulin delivery system made substantial progress during the year. With the signing of the technology transfer agreements, scale-up, process standardisation, safety and efficacy evaluation are in progress with the support of the industrial partner. These products can be expected to reach the advanced stage of clinical evaluation during 2007.

The second surveillance audit of the quality system was carried out by the audit team of Comite Francais D'Accreditation (COFRAC) of France on 13th and 14th of December 2005. The quality system continues to be maintained at its high standard as attested to by the continuous increase in demand for testing and device evaluation studies.

The initiative on “Tissue Engineering” gained momentum with 3 new projects being sanctioned by funding agencies. The commissioning of major equipment like the confocal microscope and flowcytometer has enabled high quality research to be initiated in this emerging area.

On an overall review, R&D work in the technology wing continued to make good progress with all the divisions and laboratories actively pursuing their objectives under the programme of “*targeted device development*”. These are highlighted in the following sections of this report.

Five M.Tech students, 4 B.Tech students, 3 MDS students and 7 M.Sc students (Biochemistry/ Biotechnology/ Microbiology) from various universities in India completed their short term project work in the areas of biomaterials and biomedical engineering under the guidance of faculty at BMT wing.

PRODUCT DEVELOPMENT AND TECHNOLOGY TRANSFER

(A) ARTIFICIAL ORGANS

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

The Centrifugal blood pump project moved into the technology proving phase with an industrial partner. An agreement for scaling up involving the development of injection moulded components for the pump, fabrication of clinical quality devices, preclinical evaluation to be followed by clinical evaluation was signed with SIDD Life Sciences Pvt. Ltd., Maraimalainager, Tamil Nadu. The industry has applied to TDF for funding this scale-up exercise.

Hemoconcentrator development moved further with the development of the injection moulds being completed by the industrial partner SIDD Lifesciences Ltd., Chennai with TIFAC funding support. Experiments to establish the preclinical safety and efficacy have started with the clinical quality prototypes. The device is expected to enter clinical evaluation during the second half 2006.

Improved Tilting Disc Heart Valve: the project involves the development of an improved tilting disc heart valve with the objectives of reducing thrombotic potential, ensuring MRI compatibility and improved performance characteristics. The project has reached preclinical animal evaluation stage and the clinical trials are expected to begin in 2007. "M/s. TTK Healthcare Ltd., is the industrial partner in this major project."

Development of Coronary Stent Systems: The project aims at the development of a cost effective coronary stent system, both bare metal stents and drug eluting stents and is sponsored under the NMITLI scheme of CSIR, Govt. of India. The design of the first version of the stent has been completed and efforts to identify a vendor and get the prototypes made by laser cutting are in progress.

(B) BIOMATERIALS AND DEVICES

Dental Composites: Following the signing of the technology transfer agreement in 2004 for a family of four materials, comprising chemical cure (self cure), non-

radiopaque light cure, radiopaque light cure composites and primer/resin bonding agent, the technology was transferred to their new subsidiary, M/s. Anabond-Stedman Pharma Research Pvt Ltd.(ASPR). Their new factory was inaugurated at Chennai in June 2005. Training of their personnel, vendor identification and their validation was completed. The product was launched at Chennai and then at Trivandrum in October 2005. The demand for the products has grown steadily and the institute continues to support the industry by constantly helping in sorting out scaling up problems and in improving quality assurance methods.

Radioopaque Glass filler and New Materials:

The radio-opaque glass filler, which was originally imported, has been indigenised with the development of its know-how and transfer to the industry during the year.

Further, the technology for a Single-solution bonding agent (SSBA) is under transfer to the company. This is a fifth generation bonding agent replacing the two-component system currently in use.

Bioceramics: The development of synthetic bone grafts based on hydroxyapatite and bioactive ceramic composites, injectable self-setting cement etc., for various orthopaedic procedures continued. Clinical evaluation of bioactive ceramic composites for various applications is in progress at Department of Orthopaedics, Amrita Institute of Medical Sciences, Cochin. The clinical evaluation of a bilayer HAP burr-hole button for cranioplasty was completed by the Department of Neurosurgery of the institute here.

The clinical trial of Calcium Phosphate Cement for different dental and orthopaedic applications is expected to start during at three centres during the

coming year. Negotiations are on to identify suitable entrepreneurs for transferring the technology for these products.

Polyurethane Based Orthopaedic Casting Tape and Potting Compound:

The programme made good progress in using indigenously available polyurethane raw materials. Prototypes of fast curable and cost effective polyurethane orthopaedic casting tapes were fabricated. These tapes have lower weight, setting time and exotherm and higher strength. On a similar approach, development of a polyurethane potting compound using indigenously available raw materials for use in the fabrication of disposable hollow fiber biomedical devices has been initiated and good progress made. Potting trials are underway to evaluate its properties and suitability.

Wound Dressings:

Dynamic Techno Medicals Pvt. Ltd. Aluva is in the process of getting the approval of the Drug Controller General of India for the Chitosan Wound Dressing before commencing production and market release. In the meantime, silverised Chitosan dressing has been developed with enhanced antibacterial activity. After further safety testing, the product will be ready for clinical evaluation in the year ahead and is intended for application to small sized burns and chronic wounds.

Oral Insulin Delivery:

The development of nanoparticle based oral insulin project under the NMILTI program of CSIR made good progress. Animal evaluation for its safety and efficacy has been carried out. The know-how for the nanoparticle formulation was transferred to the industrial partner, USV Ltd., Mumbai for further scale-up and extended pre-clinical evaluation to establish its safety as per regulatory requirements.

Vascular graft – fluoro-passivation: The program for imparting a fluoro-passivated surface for polyester fabrics aimed at improving tissue and blood compatibility, produced encouraging results. Based on the feasibility study, long-term implantations on large animals are being planned for the current year.

Vascular graft – Permeability: The development of a natural polymer coating for reducing the water permeability of vascular grafts made substantial progress during the year. The process was standardised to a level required for pilot production. Pilot production of 50 grafts in four sizes aimed at preclinical long-term animal studies is in progress.

(C) BIOLOGICAL PRODUCTS

Fibrin Glue: With the completion of the validation process for the viral inactivation methods, the Fibrin Glue project has been completed satisfactorily. The Technology transfer documents are ready for handing over to the Industrial Partner ATMRF, Ahmedabad. A by-product of the project has been the successful development of know-how for the validation process for such viral inactivation studies. This has involved a multi-institutional partnership covering CMC Vellore, NARI Pune and the Institute. A European laboratory had quoted Euro 100,000 for validating the processes for one virus and the complete study requires validation for 4 viruses plus HIV. ATMRF is in the process of obtaining the DCGI clearance for the product.

Thrombin: Preclinical data on the use of human thrombin with fibrin glue has been compiled. After obtaining the Ethics committee clearance, clinical trials at the Neuro surgery and cardiac surgery departments of the institute will be initiated.

Anti-Viper Venom: Lethality dose (LD50) of viper venom was determined in rat models as per the

protocol in international standards. Antibodies purified from chicken egg yolk raised against viper venom have been tested for its efficacy to neutralize the effects of envenomation in animal models. The dose fixation of antibodies is in progress.

Recombinant Transformation Growth Factor alpha (TGF alpha): The initiative to develop recombinant proteins, starting with TGF alpha made good progress. All the assays for its safety and efficacy have been completed and the growth factor found to be efficient in wound healing. The process of purifying the protein to 99% for clinical application is in progress. As a vehicle to apply the protein, various agents like antibiotic creams with the growth factor has been tried. No interference with the antibiotic has been found for the active function of the growth factor. Verification of the healing process in diabetic rats is in progress.

Vascular Endothelial Growth Factor (VEGF): VEGF is one of the most active vascular growth factors having potential applications in cardiology and wound healing. A clone with VEGF gene was selected to isolate the sequence for the active functional domain of protein. Verification of the clone to either amplify or subclone the sequence of interest in an expression vector and develop recombinant protein is in progress.

(D) DIAGNOSTICS AND INSTRUMENTATION

Instrumentation: The development of disposable ECG electrodes progressed, albeit a bit slowly. The new design of the electrode based on a conducting polymer has been finalised. A hydrogel for use as the interface between the sensing element and the skin has been formulated. The concentration of silver chloride has been optimised with respect to the electrode impedance. Prototype electrodes have been

tested as per the AAMI international standard. Biological safety evaluation is being carried and clinical trials are expected to commence soon.

Artefact Free Breathing Monitor: The project made good progress with the development of dual-channel dual-frequency hardware. The thoracic impedance data, recorded using this configuration provided significant reduction in movement artefacts. The work in progress involves fabrication of a standalone-breathing monitor based on this methodology and evaluation of its performance on volunteers.

Early Detection of Cervical Cancer : The probe and the data acquisition system required for the pilot clinical trial was procured from the University of Sheffield, UK - one of the collaborating partners of this project. The software used in this system was developed in the institute. The system has been installed at the Tata Memorial Hospital, Mumbai; the pilot study is expected to be initiated very soon after completing the necessary formalities.

Toxicology: A DBT funded project for the development of an in vitro pyrogen test kit has been completed with the concept being established. The objective is to develop an ELISA method for testing pyrogenicity of a wide spectrum of products, particularly non-endotoxin pyrogens of chemical origin. Validation of the kit for its reproducibility and repeatability is underway.

Division of In-vivo Models and Testing:

Technology for the “Field Kit for Testing Antibiotic Sensitivity of Mastitic Milk in dairy animals” was transferred to Veterinary Biological Institute, Department of Animal Husbandry, Govt. of Kerala. The production of the first batch of 400 kits is at an advanced stage and release for extended field trials is scheduled in June 2006.



MoU signing between our Director and Director, Institute of Animal Health and Veterinary Biologicals, Government of Kerala for technology transfer of field kit for testing antibiotic sensitivity

(E) TECHNOLOGY TRANSFER

The Technology Transfer Cell coordinated the drafting and execution of agreements during the year covering the following products:

- (1) **‘Radiopaque Glass filler’** with M/s. ANABOND STEDMAN Ltd., Chennai on 24-06-2005.
- (2) **‘Centrifugal Blood Pump’** with M/s. SIDD Life Sciences Pvt Ltd., Maralimalai Nagar, Chennai, on 30-09-2005.
- (3) **‘Field Kit for testing antibiotic sensitivity of Mastitic milk on dairy farm animals’** with M/ s. Institute of Animal Husbandry & Veterinary Biologicals, (Govt. of Kerala), Palode, Trivandrum on 15-12-2005.
- (4) **‘MoU for collaboration in Life Sciences & Product Development’** with M/s. NOVAKOS - LLC, Foster City, California, USA, on 02-12-2005.

Negotiations for technology transfers are underway on the following products: -

1. **Single Solution Bonding Agent** for Dental application with M/s. ANABOND STEDMAN Pharma Research Pvt Ltd. Chennai.
2. **Bioactive bioceramic powders for orthopaedic & dental applications** with M/s. KISCO – Basic Health care Products Pvt. Ltd., Punjab & M/s. ANABOND STEDMAN Ltd., Chennai.
3. **Poly Urethane based Orthopaedic casting tapes** with M/s. ANABOND STEDMAN Ltd., Chennai.
4. **Potting Compound** – with M/s. SIDD Life Sciences Pvt. Ltd., Chennai.

TESTING, QUALITY SYSTEM MANAGEMENT AND TECHNICAL SERVICES

(A) TESTING SERVICES

Customer service cell of the institute offers a single window service catering to both external and internal customers. Test requests from customers are processed systematically and reports are issued on a time bound basis. Customers include medical device industries, research institutions, universities & colleges. With growing awareness of the accredited testing services, the volume of requests is consistently increasing as reflected in the table below.

Description	External			Internal		
	2003-04	2004-05	2005-06	2003-04	2004-05	2005-06
Work orders received	205	316	402	241	293	278
Number of test samples handled	955	2181	1096	1035	1311	1148
Income generated in Rs,	4,60,000	10,51,225	11, 82,420	1,79,700	3,83,899	7,11,050

In addition, 16 major studies for the evaluation of materials and devices for the various industries are currently ongoing for an estimated total value of Rs. 46.97 lakhs.

SUMMARY OF TESTING ACTIVITIES:

Bioceramics : X-ray powder diffraction and Vickers micro-indentation hardness.

Biosurface Technology : Water vapour transmission.

Dental Products: Mechanical testing facilities extended (602 samples); MDS college students availed the Thermocycler facility.

Devices Testing: Ageing studies for Hydrocephalus shunts' packing for Hindustan Latex completed; new study on DES for Sahajanand initiated; support for sample preparation and sterilisation for external customers

Histopathology: Gross and histological evaluation of tissue response to materials as per ISO standards – like polymers in muscle, ceramics in bone, dental materials

in pulp and dentine, penile and vaginal irritation tests. Pre-clinical evaluation of devices: drug eluting coronary stents, ureteric stents and CP cements in sheep models.

In-vivo Models & Testing (previously Vivarium): Major devices evaluation studies carried out for industry: Biofunctional evaluation of various drug eluting stents; evaluation of biodegradable ureteric stent for an international customer.

Microbiology: Sterility tests as per USP; monitoring of controlled environments and analysis of water; tests for anti-microbial activity of new biomaterials under development.

Polymer Analysis: Physico-chemical properties of polymeric samples – about 1000 samples analysed using techniques like FTIR, HPLC, DSC, TGA, DTA, UV-VIS, etc.

Polymer Processing: Mechanical testing – tensile, compressive and impact properties of polymers; gas permeability testing of membranes and sheets.

Thrombosis Research: Blood compatibility studies on hemodialyser components for GE; blood/platelet storage bags for Penpol and HLL.

Tissue culture laboratory: In-vitro cytotoxicity test as per ISO 10993-5 (150 samples); cell adhesion and cell material interactions studies using HOS cells.

Toxicology: Testing of materials covering the various tests under ISO 10993, USP, etc – over 270 tests completed; one major GLP study on an ayurvedic formulation carried out. Implementation of Genotoxicity tests – in-vivo micronucleus test and chromosomal aberration studies were standardized and validation is ongoing.

Transmission Electron Microscopy: Services extended to internal and external customers in greater numbers – 79 materials tested

Scanning Electron Microscopy: SEM and EDS tests carried out.

(B) QUALITY SYSTEM MANAGEMENT

The quality system in conformance with ISO/IEC 17025: 1999(E) was maintained and reviewed by regular internal audits and technical meetings. Comite' Francais D'Accreditation (COFRAC) of France conducted their SECOND SURVEILLANCE AUDIT on 13th & 14th of December 2005. The purpose of the surveillance audit was to ensure that the laboratory continued to maintain its technical competence related to the scope of accreditation and to assess the effectiveness of the quality management system. The assessor expressed her appreciation of the standards being maintained and the accreditation by COFRAC has been renewed till Jan-Feb 2007. The ISO/IEC 17025 standard was revised in 2005 and activities to update the system to meet the additional requirements of the new version have been completed.

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

Quality cell: Organisation of regular internal audits (2) and external surveillance audit by COFRAC. Review meetings of the Technical Management committee (3) and the Management Review Committee held. The cell also organised the audits as per OECD GLP procedures for various studies being carried in the wing.

C. TECHNICAL SERVICES

The various service units of the BMT Wing continued to extend their high quality service to the maintenance and support of the different activities, especially meeting the requirements of the quality system.

Engineering services: Repair and modification works in the various laboratories were carried out as per needs. Maintenance of electrical supply, water, sanitation, air-conditioning and incinerator were carried out diligently to ensure uninterrupted supply/availability of the utilities.

IPR & Technical co-ordination: Patents application filing and maintenance in consultation with the institute's patent attorney,

Co-ordinating various visits by college students from within and outside the state.

Organising the institute's stall/exhibits in various technical exhibitions and seminars.

- Patents held (sealed) = 63 Nos.
- Patents filed and pending = 42 Nos.
- Designs held (sealed) = 13 Nos.

Seven new patent applications filed and 12 Patents were granted / sealed during 2005 - 2006.

Precision Fabrication: A number of moulds and dies were fabricated for moulding Silicone rubber components; jigs and fixtures were fabricated to support the testing in various labs like Dental Products, Thrombosis Research, Histopathology, Toxicology, Polymer processing, etc.

Prototype fabrication support was provided to device development projects like Centrifugal blood pump, ECG electrodes, etc.

Technology Proving: The facility was used for:

- Testing of Disposed catheters – for a Delhi based industry.
- Fabrication of Scleral band for TT to Aurolab
- Vascular graft – TT to TTK Healthcare Ltd. Dental composites, etc.

Information Management: A new security system based on a HARDWARE FIREWALL “Fortinet” was implemented. Specification development and procurement for an Enterprise Resource Planning and Management Information System (ERP/MIS) and a Laboratory Information Management System (LIMS) was initiated under the VISION 2020 expansion programme.

Laboratory-animal science (formerly small animal house): Breeding and management of small animals like rabbits, guinea pigs, rats and mice for meeting the requirements for the various toxicological tests and R&D studies. Training of new comers to the Quality system.

BMT wing library: The library has a collection of 9613 books and 5298 back volumes of journals. During the current year, 127 books and 25 standards were added and 69 journal subscriptions continued.

The collection now includes 2065 standards and 275 patent specifications.

The information management system and library automation is based on the UNESCO software, CDS/ISIS. The library information is available to both the wings through intranet.

The library updates all relevant national and international standards regularly as part of the ISO 17025 Quality System. It has also been notified as the Document Archive for the GLP quality platform for medical device evaluation studies.

BIOMATERIALS RESEARCH AND DEVELOPMENT

Bioceramics

Micro and nano-porous bioceramic substrates having capacity to carry drugs and biologics for the treatment of refractory osteomyelitis and osteo-necrosis are being designed and developed. Research in the areas of biomimetic coatings was continued.

Biosurface Technology

Inter-ionic gelation process was adopted for the fabrication of novel oral insulin delivery systems based on Chitosan and polymethacrylic acid with a particle size less than 10 microns. This system displayed excellent insulin incorporation efficiency and pH dependent release. Trypsin inhibitory effect and mucoadhesive property of these novel microparticles was established under in vitro conditions. Further work is in progress.

Chitosan, a thrombogenic polymer, was modified with phosphatidylcholine, galactocerebroside and cholesterol to mimic the cell wall composition of endothelial cells. *In vitro* haemocompatibility studies showed overall reduction in blood cell adhesion to the modified surface; however, due to the swelling nature of chitosan there was increased calcification. Work to improve the material is still on-going.

Nanoparticles of Zinc Calcium Phosphate (ZnCaP) have been synthesized with a particle size less than 100 nm. In vitro insulin release studies of alginate coated nanoparticles demonstrated a sustained release in simulated intestinal fluid with a significantly low (less than 5%) release in gastric fluid. Rendering pH sensitivity to this formulation is under investigation.

Porous ceramic matrices from nanoparticles of calcium phosphate containing zinc and magnesium have been synthesised. Osteoblast-like MG63 cells were cultured on these porous ceramic matrices and cell adhesion and spreading were studied; the osteoblast adhesion and spreading was significant on 5th day and comparable to the hydroxyapatite control. This makes it a promising candidate as a bone tissue-engineering scaffold.

Dental Products

The development of a two-component chemo-mechanical caries removal agent was taken up during the year under industry sponsorship. The product will chemically

soften carious dentine and enable it to be removed easily by the dentist. Results of the initial formulations are very encouraging and a patent has been filed.



On the occasion of the signing of Memorandum of Understanding between SCTIMST and Dr. Toms International on 29th November 2005 for development of a two component chemomechanical dental caries removal agent at Dental Products Lab, BMT Wing, SCTIMST.

Single solution bonding agent: The pulp and dentine test of a single solution-bonding agent was completed using a swine model and the performance compared with an imported bonding agent. Clinical evaluation is to be initiated soon with the help of the industry, who has already absorbed the technology.

Dual-cure resin cement: Resin cements are mainly used fixing metal free ceramic restorations, orthodontic brackets, fixed partial dentures, periodontal splints, porcelain veneers and cementation of metallic or non-metallic endodontic posts. Development of a dual cure resin cement was initiated early in 2005. Physicochemical, biocompatibility and safety evaluation as per ISO10993 & ISO7405 have been carried out. The shear bond strength of brackets bonded using this dual cure resin cement was comparable to that of the currently used imported product. The product will be ready for clinical evaluation, once the histopathology studies are completed soon.

Dual cure dental composite development and evaluation has been completed. Multicentric clinical evaluation is to be initiated soon.

Polymer Analysis Lab

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

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

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

Thermo responsive copolymers containing specific ligands were synthesised and characterized. The interactions of these polymers with C-reactive protein (CRP) were carried out and the results were indicated that such polymers could be optimised for the sensing of CRP. Novel fluorescent polymers capable of binding CRP were also synthesised. The emission features of these polymers were found to vary with the concentration of CRP indicating the feasibility of detection and estimation of CRP. Further work is in progress.

Polymer Chemistry

Work on rapidly gelling polymer system based on gelatin and alginic acid dialdehyde as a potential wound dressing material, tissue engineering scaffold and injectable drug delivery vehicle was completed, with the student submitting her PhD thesis. Under the Indo-French project, “Injectable Adhesive Biomaterials for Vascular Applications” progressed well with the animal evaluation of the adhesive in France. The adhesive was able to seal large aortic incisions in a pig model.

The Amphotericin-B-gum Arabic conjugate was tested for in vivo bioavailability in a rabbit model. Gum Arabic-ampicillin conjugates showed activity against different strains of bacteria. Under the Women Scientist Scheme of DST, preparation and characterization of gels from oxidized gum Arabic and soluble chitosan salts are being continued for applications ranging from tissue adhesives, tissue engineering and drug delivery. The Kerala State Council for Science, Technology and Environment sanctioned a 3-year project on synthesis and characterization of radiopaque polyurethanes.

Polymer Division

Development of dispensable and biodegradable polymeric bone cement for minimally invasive treatment of vertebral compression fractures made good progress. Based on a biodegradable unsaturated polyester and tricalcium phosphate, it sets rapidly to a hard mass with low exotherm and adequate mechanical strength for the repair of trabecular bone defects. Based on this initial work, DST has sanctioned a project for the process optimisation and further development.

Synthesis of oligomeric resins of poly(propylene fumarate-co-ethylene glycol) and poly(propylene fumarate-co-caprolactone diol) were carried out for the development of endoluminal paving material for minimally invasive percutaneous coronary interventions (PCI). Experimental studies to optimise the formulation for the application are in progress.

A project for development of a biodegradable three-dimensional polymeric scaffold and studies on the growth of cardiomyocytes has been initiated with DBT support. The major objectives of the project are development of a biofunctionally active tissue engineered-myocardial patch implant for the treatment of post-ischemic patients, An Indo-German DST-BMBF project “Development of molecularly reinforced biodegradable nanocomposite materials as internal orthopedic fixation devices” has also been initiated.

Polymer Processing Lab

Development of bone graft substitutes for spinal fusion surgery is a DST funded project for developing a suitable composite material. The approach adopted is to incorporate bioactive glass in polybutylene terephthalate matrix and thus making the resultant

composite bioactive. Several formulations have been tried to optimize the bioactive glass concentration in the polymer with respect to the properties. The glass has been synthesized in-house and presently mechanical characterization of the formulations is being carried out.

Efforts to reduce the allergic reactions from natural rubber latex continued. Effect of parameters like the dithiocarbamate-sulphur ratio and storage time on residual ZDEC and sweat-extractable ZDEC were studied. Further work is in progress. A process for producing hydrophilic lubricious coating on

natural rubber latex products was started during the year. Several approaches were tried to get a durable hydrophilic coating, which is also non-cytotoxic. Further testing of a few good ones are in progress.

A feasibility study on the compatibilization of thermo plastic polyurethane and polydimethyl siloxane rubber was carried out. Good compatibilization was achieved using a co-polymer containing ethylene and a derivative of acrylic acid. Microporosity in the blends could be imparted for potential use in various biomedical applications.

BIOLOGICAL RESEARCH

DIVISION OF IMPLANT BIOLOGY

a) Histopathology laboratory:

Research activities in the following areas were continued

- Molecular mechanisms of tissue response to implant debris.
- Cellular and molecular mechanisms of polymer degradation.
- Immune response and polymer degradation.

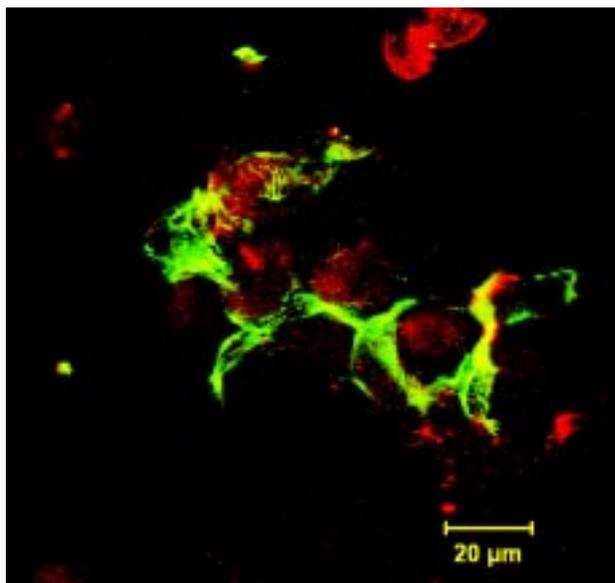
Study of retrieved human implants continued, which included light and Scanning electron microscopy observations on tissue and implant material.

b) Tissue Culture Laboratory

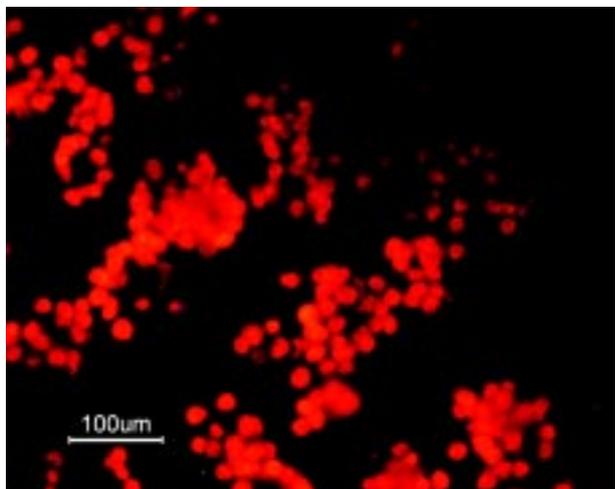
Cell-material interaction studies using different continuous cell lines and primary cells continued. Continuous cell lines included L-929, MG-63, HOS, SIRC, THP1 (macrophages) etc. Primary cells handled being endothelial cells, hepatocytes and corneal cells.

Techniques for isolation and characterisation of limbal stem cells from rabbit and goat were standardised. Nuclear protein p63 is a stem cell marker to identify epidermal as well as limbal epithelial stem cells. p63 negative cells were seen to be interspersed with p63 positive cells. Cells were also stained with ABCG2 transporter protein, another marker detected in cell membrane & cytoplasm of limbal basal epithelial cells.

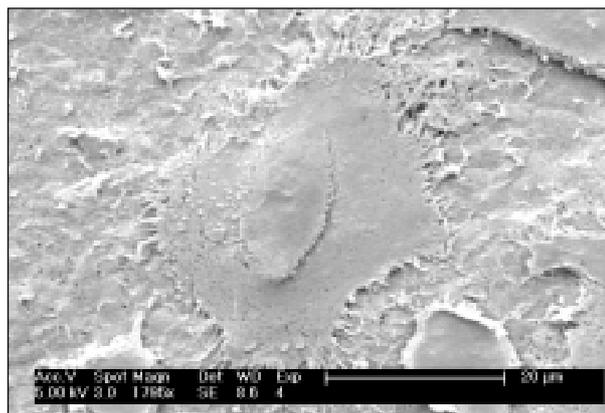
Primary cultures of hepatocytes and endothelial cells have been isolated from different sources and tissues. Among these, rat hepatocytes with human umbilical vein endothelial cells and rat liver sinusoidal endothelial cells have been studied. It has been observed that endothelial cells influence hepatocytes function. This was proved by the enhanced functionality shown by hepatocytes based on their metabolic activity (EROD activity), maintenance of synthetic activity (albumin synthesis), structural & functional polarity (both apical & basolateral), detoxification (conversion of ammonia to urea) etc. These co-culture system can find application in bioartificial liver devices.



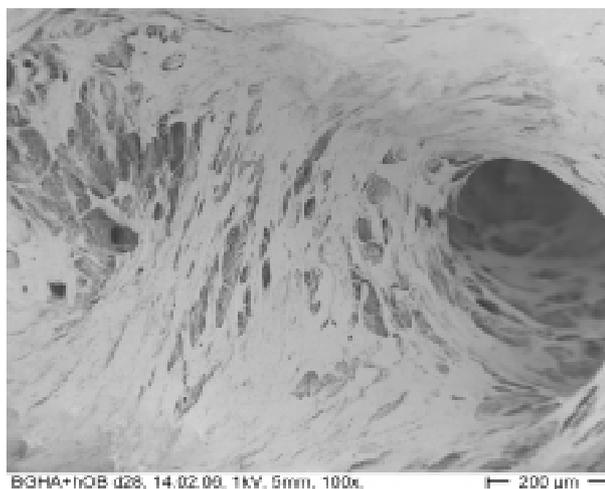
Hepatocytes exhibiting metabolic activity
CD26 – apical polarity (Green)



CD147– Baso-lateral polarity (Red)



SEM micrograph of human osteoclast cells on dense ceramic scaffold, X-ray projections of 3D ta sets stained with FITC conjugated phalloidin for actin and DAPI for nuclei.



Scanning electron micrograph of differentiated human osteoblast cells on bioactive ceramic scaffold depicting cell sheet canopy over the surface without pore bridging and pore occlusion (day 28)

C) *Transmission Electron Microscopy Laboratory (Research)*

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

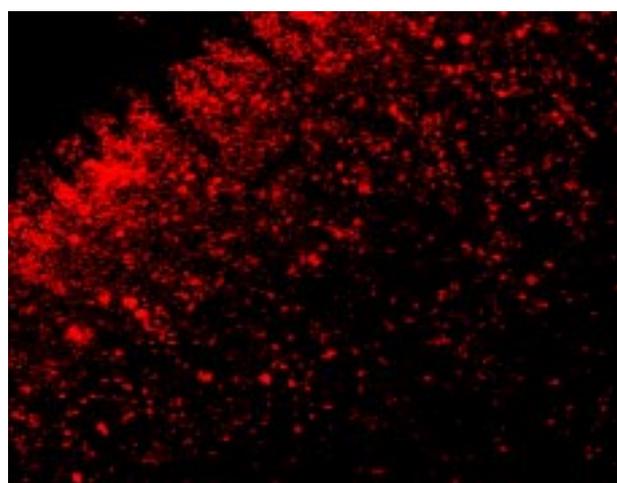
Microbiology

The current research focus is on understanding implant-associated infections, which are due to the formation of bacterial biofilms on the implant devices. Bacteria in biofilms behave entirely differently from their planktonic counterpart and it has been

established that more than 38% genes are expressed differently; with the result that conventional microbiological techniques are incapable of addressing these issues. So effective strategies have to be developed to prevent bacterial adhesion and biofilm formation on implants. Various approaches to identify suitable strategies for its prevention are being initiated. Some of the approaches tried include:

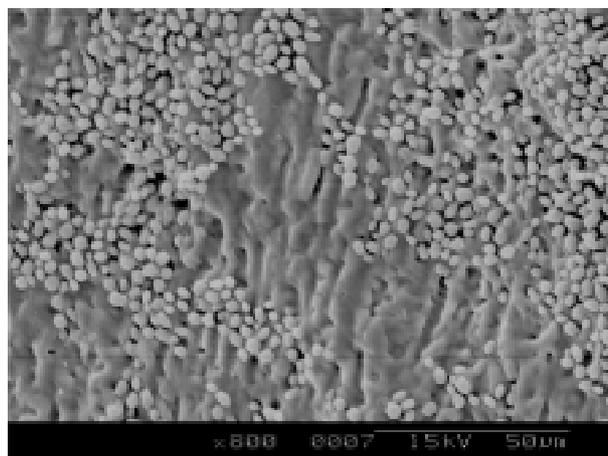
- Surface coating with heavy metals like silver.
- Surface modification to change the charge or hydrophobicity or to create functional groups with intrinsic antimicrobial activity.
- Developing new methods for diagnosis of biofilm infection.
- Development of new biomaterials, which will resist development of biofilm formation.
- Understanding the molecular biology of bacteria in biofilms to develop effective strategies.

To begin with, the delineation of mechanisms of pathogenesis of *Staphylococcus* in development of



Confocal microscopic image of *Staphylococcus epidermidis* biofilm on endotracheal tubes. Propidium iodide staining 63X oil immersion objective used in imaging

implant-associated infection is being carried out. The various approaches adopted are nutrition factor, role of iron and hemagglutinating property.



SEM of LS of Dentine showing dentinal tubules invaded with *C.albicans* biofilm

Molecular Medicine Lab

Molecular basis of temporal lobe epilepsy: Four genes: synaptotagmin, jerky, kininogen and kinesin, for their role in temporal lobe epilepsy are being studied. Synaptotagmin gene has been studied further for its RNA binding ability. C2 domains present in the proteins were expressed separately by cloning the gene. Our preliminary results suggest that the C2A domain has a higher affinity for RNA binding than the C2B domain. Smaller fragments of repeats showed binding affinity in the order poly A > GT repeat > poly C. Synaptotagmin expression in epileptic rat models was tested and found to show a reduction in expression during seizure.

Jerky binding mRNA was isolated and characterized in an attempt to identify the genes associated with Jerky protein binding during seizure. Nedd4 was identified as one of the gene specifically targeted by Jerky for binding. Further studies to analyse and understand the issues involved are in progress.

Kininogen gene was studied for its role in seizure development. It has been found that the gene expression is highest after 72 hours and tapering to a low level on 15th day after seizure. The same pattern was confirmed for its protein expression using a western-blot. The distribution of this protein in brain is being studied by immunohistochemistry.

Kinesin gene was found to over-express during seizure in earlier studies. Kinesin is involved in vesicular transport. The gene was cloned based on differential display results, which suggested an increased expression during seizure period. Northern blot analysis suggested a two-fold increase in gene expression during seizure. The down stream pathways of this protein need to be studied further.

Thrombosis Research Lab

Phenotype of the endothelial cells isolated from the saphenous vein of CVD patients were characterized by m-RNA analysis for expression of various crucial molecules using qualitative RT-PCR and quantitative real time PCR. Out of the 8 subjects studied, 7 were found to have dysfunctional and thrombogenic endothelial cells.

As part of the vascular tissue engineering effort, elastin and collagen IV synthesis by endothelial cells grown on modified fibrin matrix was evaluated. It was observed that incorporation of growth factors into the fibrin matrix up-regulates the expression of mRNA for elastin and collagen IV. RT-PCR studies indicated

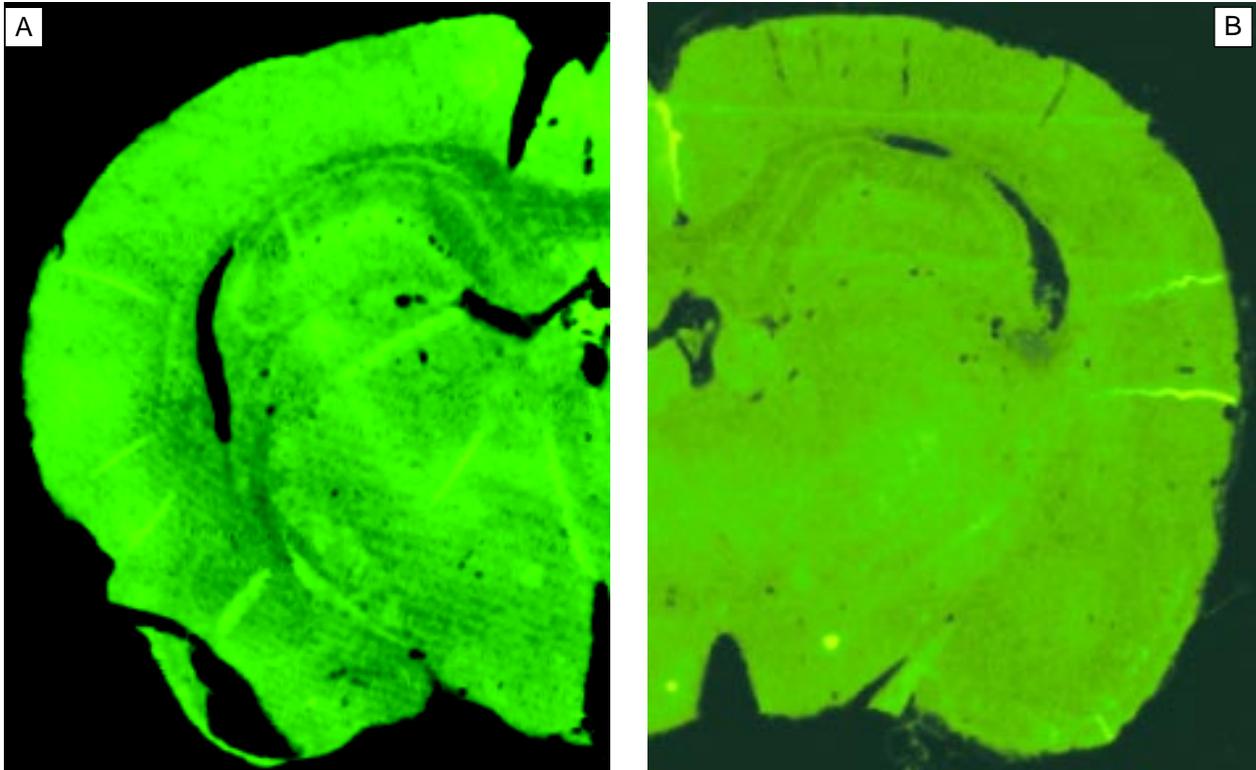


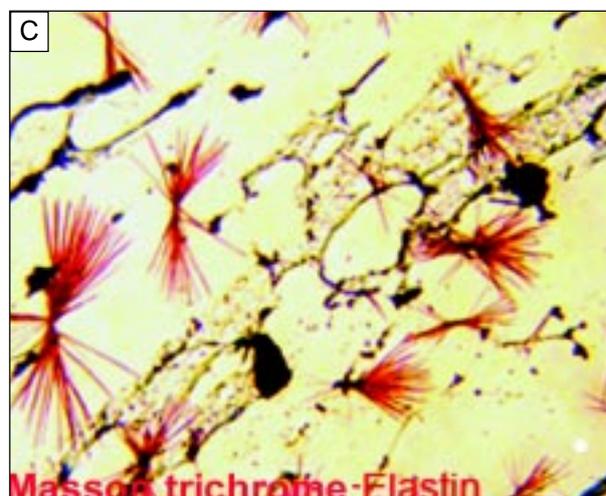
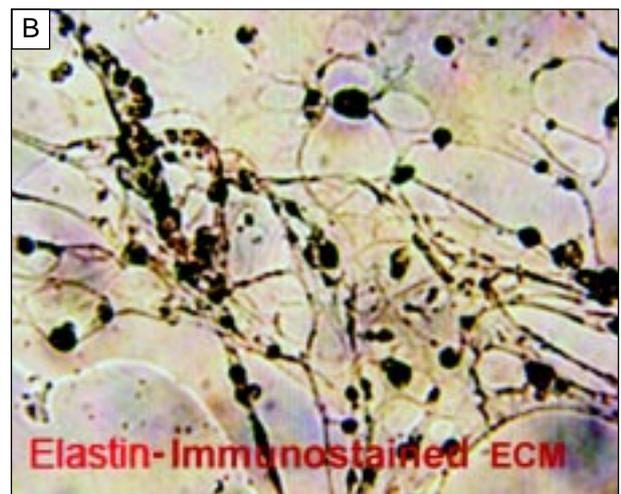
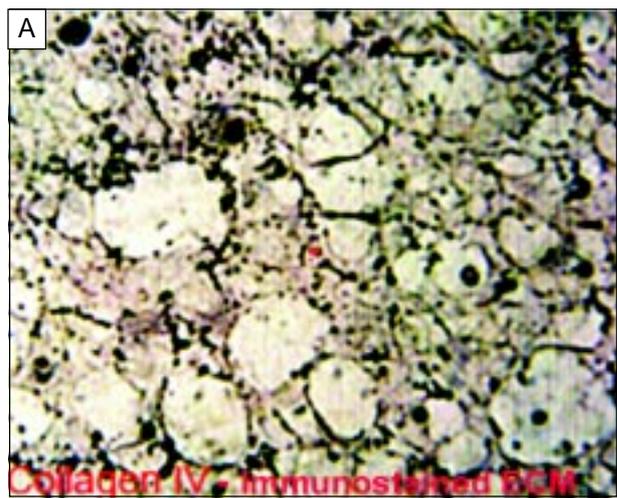
Fig. Control (A) and 4 hour epileptic (B) rat brain sections showing expression of synaptotagmin protein.

that there was no significant up-regulation of Collagen type-1. Deposition of both elastin and collagen by endothelial cells into the extra cellular matrix was proved using immuno-staining by using specific antibodies.

Endothelial cells were grown on the modified fibrin matrix for 6 to 10 days. Cells were lysed to get the

matrix renewed by EC and were stained to identify the matrix molecules.

The results indicate that vascular tissue engineering using the modified matrix is likely to improve the mechanical strength of the construct due to the presence of collagen and increase vascular activity due to the presence of elastin.



(A) immunostaining for collagen IV, (B) immunostaining for elastin and (C) Masson trichrome stain identifying red elastin fibrils. Immuno staining was developed using HRP conjugated secondary antibodies.

PATENTS GRANTED

1. **“A process for the preparation of a composite bioceramic material for biomedical applications”;**
Patent No.196292, Dtd:03-3-2000.
Inventors: HarikrishnaVarma & S. Suresh Babu.
2. **“A biocompatible sponge for absorbing tissue fluids.”**
Indian application No: 2099/MAS/1996; Dtd:26-11-1996.
Inventors: Prabha D. Nair and R. Sivakumar.
3. **“A process for preparing a prepolymer adhesive.”**
Indian Patent No:189911; Dt: 16-03- 1995.
Inventor: M. Jayabalan.
4. **“A Method for preparation of single solution bonding agent for dental applications.”**
Indian Patent Appln No.: 443/MAS/2003; Dt.02-06-2003.
Inventors: V. Kalliyanakrishnan and P. P. Lizymol.
5. **“Process for the preparation of UT methacrylate for dental applications.”**
Indian Patent Appln No: 894/MAS/98; Dtd:24-04-'98.
Inventors: V. Kalliyanakrishnan and P. P. Lizymol
6. **“Alginate dialdehyde crosslinked gelatine & a process for the preparation thereof”.**
Indian Patent Appln No: 921/MAS/2002; Dtd:11-12-2002.
Inventors: A. Jayakrishnan.
7. **“Polyurethane graft polymers and copolymers for the encapsulation and immunoisolation of living cells.”**
Indian Patent Appln No: 853/MAS/2002; Dtd:18-11-2002.
Inventor: Prabha D. Nair.
8. **“Photopolymerisable dental bonding agent - Primer.”**
Indian Patent Appln No: 558/MAS/99; Dtd:13-05-1999.
Inventor: V. Kalliyanakrishnan and P. P. Lizymol.

9. **“Process for immunoisolation of heparin on polyolefin surfaces.”**
Indian Patent Appln No: 853/MAS/2002; Dtd:18-11-2002.
Inventor: Leister Rowsen Moses and Chandra Prakash Sharma
10. **“Venous reservoir.”**
Joint Indian Patent Appln No: 203/MAS/2000; Dtd:13-03-2000.
Inventors: C.V Murali, D.S. Nagesh, G.S. Bhuvaneshwar (all from SCTIMST) and H.Vijayakumar (From SIDD Life Sc. Pvt Ltd, Chennai).
11. **“Membrane oxygenator “.**
Joint Indian Patent Appln No: 1153/MAS/1999; Dtd:29-11-1999.
Inventors: C.V Murali, D.S. Nagesh, G.S. Bhuvaneshwar (all from SCTIMST) and H.Vijayakumar (From SIDD Life Sc. Pvt Ltd, Chennai).
12. **“A process for preparing plasticized poly vinyl chloride (PVC) having improved resitance to leaxh plasticizer.”**
Indian Patent Appln No: 1020/MAS/2001; Dtd:21-12-2001.
Inventor: M. Jayabalan

HEALTH SCIENCE STUDIES

Achutha Menon Centre for Health Science Studies (AMCHSS) has entered its 10th year of existence during 2005-06 and the tenth batch of MPH students was admitted in January 2006. AMCHSS's MPH course seems to have set the tone for good quality public health training programs in the country. Recognizing the importance of good quality public health training programs, similar programs are being planned by many other institutions elsewhere in the country. For example, the Post graduate Institute of Medical Education and Research, Chandigarh has started its MPH program during this year. Our honorable Prime Minister has launched the Public Health Foundation of India on March 28, 2006 at New Delhi. Under this foundation five world class public health institutions will be established at strategic locations of the country to cater to the needs of all the Indian states. All these new initiatives are planning similar courses (DPH, MPH and PhD) with similar syllabi that are already being offered by AMCHSS of our institute. The World Health Organization (WHO) report of 2006 also focuses on the need for strengthening human resources for health in general and for public health in particular. All these developments in India and globally underscores the value of the critical decision of SCTIMST in 1996 to initiate the first MPH program in the country. Continuing excellence in the quality of training program and research in public health is therefore becoming increasingly important for AMCHSS. Convincing the central government and state governments to create career paths for public health professionals is extremely important to increase demand for the training program. This will be one of the major challenges of all the existing and upcoming public health schools in the country.

Eighteen MPH students including three from Nepal supported by the WHO, Nepal graduated in December 2005. The first batch of five DPH students also graduated in 2005. Fifteen MPH students and five DPH students joined in January 2006. One student joined for the PhD program this year. The short course on prevention and control of non-communicable diseases developed by AMCHSS with the support of the WHO is widely accepted. Short courses developed by AMCHSS on making pregnancy safer and gender and medical education were offered in many states of India in the reporting year.

Several research programs were completed during this year. A brief summary of each of the completed and on-going research program is given separately. Research projects completed during the year were 1. Establishment of Sentinel Surveillance

System for Cardiovascular Disease in Travancore Titanium Products LTD Trivandrum, 2 Sentinel Health Monitoring Centres in India, and 3. The Fatherhood Initiative. The ongoing research programs are 1. Athiyannoor Sree Chitra Action (ASA) 2. Banking for better health: Medisave for rural women in Karnataka, India 3. Political decentralization & status of reproductive health in Kerala. 4. Research, training and advocacy for gender sensitization of medical education and capacity building of health professionals for reduction of maternal mortality and morbidity, 5. Stakeholders' perceptions of Institutional Review Boards (IRBs) in India, 6. Tobacco cessation training and research in India and Indonesia, 7. Development of a manual for primary health care institutions in Kerala, and 8. A prospective study in the tsunami affected areas of Kerala.

Faculty members of the AMCHSS worked as consultants for international organizations such as WHO and ADB during this period.

Several workshops and seminars were organized within AMCHSS and other parts of the country.

Dr. V. Raman Kutty joined the faculty team as honorary professor at the AMCHSS in this year.

Status of Ongoing/Routine Activities:

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

Dissertations submitted in December 2005

S. No	Name of the students	Title
1.	Arun Bamne Ramachandra	Role, response and responsibilities of Private Hospitals for HIV/AIDS related activities in Mumbai
2	Minni Khetarpal	Health care seeking behaviour and its determinants for sexually transmitted infections among sexually active adult population in Mumbai metropolis
3	Ladish Krishnan	Nutritional status of children in tribal communities of Wayanad
4	Pramod Singh Gharti	Factors associated with malnutrition among children in rural terai Chhetri of eastern Nepal
5	Lincoln Priyadarshi Choudhury	Assessment of obstetric practices related to prevention of transmission of HIV with special reference to intra-partum period in two districts of Kerala, India
6	Shobha.G	Delays in health seeking among postpartum women in tribal blocks of Gujarat

S. No	Name of the students	Title
7	A. Sukumaran	Geographical mapping of mental retardation and physical deformities and a case control study of mental retardation in Kasaragode Dist. of Kerala
8	Suraj Gurung	Characteristics of private dental practice through provider perspective in the Kathmandu valley, Nepal
9	Jacob Kuruvilla	Dental caries status and its correlates among 15 year old school children in Thiruvananthapuram
10	Sachi Karki	An economic analysis of a community based health insurance scheme in B.P Koirala Institute of Health Sciences, Dharan, Nepal
11	Deepa Susan Daniel	Oral health status and its correlates in a coastal community in Thiruvananthapuram
12	Pratibha Esther Singh	Relevance of trained traditional birth attendants in maternal health case study of Tehri Garhwal district
13	Pyari TT	Correlates of post traumatic stress disorder in tsunami survivors in Kanyakumari district
14	Shailaja	A study on the effectiveness of the school AIDS education program in Trivandrum education district
15	Vishal Khoshla	Prevalence pattern and correlates of alcohol consumption among the undergraduate students of Ludhiana district
16	William Rachna	Reproductive health practices and health seeking behaviour of female sex workers in Tamil Nadu
17	Prasad BM	Quality of private dental care analysis of policy and practice in Karnataka
18	Babu Ram Pokhrel	Prevalence and correlates of tobacco use among health care providers in Dhading and Ham Districts of Nepal

RESEARCH PROJECTS

Completed Projects

Establishment of Sentinel Surveillance System for Cardiovascular Disease in Travancore Titanium Products Ltd, Trivandrum

The project was a part of the national Cardiovascular Disease (CVD) surveillance in the Indian Industry population. Demographic information and risk factors like tobacco use, alcohol use, physical inactivity, diet habits etc. were collected from all the employees (~1500) and their family members of the factory. In addition, height, weight, waist circumference, blood pressure and pulse rate were 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 were collected. Fasting blood sugar, total cholesterol, HDL cholesterol and triglycerides were also estimated in a sub sample of the population. The blood samples were sent regularly for external quality control in the coordinating centre at the All India Institute of Medical Sciences, New Delhi.

Event Registry: One of the activities in the third phase of the project was monitoring of mortality and morbidity among the employees of the factory. All the mortality among the employees was recorded and relevant information regarding the cause of death was collected from the relatives and from death certification. Efforts were made to identify the proportion of mortality due to cardiovascular causes. During a one year period from January 2004 to December 2004 there were nine deaths among the employees. Out of the nine deaths three were due to heart diseases, one due to cancer, three due to accidents and two due to other causes. Accidents and

heart diseases contributed to two thirds of deaths

All employees who were admitted in the previous year were also identified. Information from those who were admitted was collected to understand the proportion of hospital admission due to non-communicable diseases. Among those who completed the forms, 95 employees reported hospital admission during the reporting period (8.8%). Out of the total admissions, 57 (60%) were due to non-communicable diseases. Communicable diseases and other category contributed to 18.9% of cases. Most of these cases were fever, hepatitis, tuberculosis. There was one case of abortion. Accidents contributed to 21.1% of admissions. Most of these accidents were road traffic accidents, although a few of them were due to other causes like falling.

Annual Surveillance: A sub sample of the employees contacted for risk factor survey including blood analysis to understand the changes in risk factors among them after the health education intervention in the factory. Preliminary results showed some reduction in the risk factors of CVD among the employees.

Community Based Intervention: A sample of 2500 adults was identified in a nearby community. Information on Knowledge, Attitude and Practice (KAP) regarding non-communicable diseases was collected from them using a pre-tested structured interview schedule. After the baseline data collection health education was given to the community. There was substantial improvement in the knowledge of risk factors of CVD in the post intervention survey. A similar improvement was seen with regards to the symptoms of heart attack in the post intervention survey. The project was funded by the World Health Organization, India country office, New Delhi.

Fatherhood Initiative (Supported by the MacArthur Foundation)

Fatherhood Initiative. This project was looking into the feasibility of forming a cadre of gender sensitive men in the rural area. The fathers of the children attending the Anganwadis in the area were the target group. The project had a total outlay of Rs.98, 150/- (from the savings of McArthur project), and was started in July 2005. Unfortunately not many fathers got enrolled into the project. Considering the lukewarm response from the community, we decided to wind up the project after doing a couple of in-depth interviews to understand what went wrong in our planning.

Sentinel Health Monitoring Centres in India

The objective of this project was to develop a few sentinel health monitoring centers in India to monitor risk factors of non-communicable diseases. The five centers selected were Dibrugarh in Assam, Vallabghat in New Delhi, Nagpur in Maharashtra, Chennai in Tamil Nadu and Trivandrum in Kerala. Risk factors that were measured under this project were based on the WHO stepwise approach. STEP 1 (based on questionnaire) and STEP 2 (based on physical measurements, height, weight, waist circumference, blood pressure and pulse) of the NCD risk factor survey was completed last year. This year STEP 3 was implemented in a sub sample of the population. From rural, urban and slum population a sub sample of 500 adults each were identified. Blood samples were collected from these selected individuals to find out fasting blood sugar, total cholesterol, HDL cholesterol and triglycerides. We collected 860 samples, 106 samples from urban area, 506 from rural and 248 from slum. The mean fasting blood glucose was found

to be 5.86mmol/L in men and 6.35mmol/L in women with 15.4% of men and 18.6% of women having elevated blood glucose levels. The mean total cholesterol levels were 5.12mmol/L for men and 5.51mmol/L for women with 47.7% of men and 61.3% of women falling in the high-risk category. The mean HDL cholesterol was found to be 1.09mmol/L in men and 1.22mmol/L in women with 19.7% of men and 9.4% of women having low HDL values rendering them high risk for coronary artery disease. We analyzed the biochemical values of the rural respondents separately. This was found to be comparable to the mean values of the total sample showing that rural urban difference in Kerala is minimal as was reported in many previous studies. This project was coordinated by the Indian Council of Medical Research and funded by the World Health Organization, India Country office, New Delhi.

Ongoing Projects

Athiyannur Sree Chitra Action (ASA)

Coordination of Athiyannur Sree Chitra Action (ASA) initiative: This is the ongoing initiative of SCTIMST in collaboration with Athiyannur Block Panchayat. It has a spectrum of activities under its umbrella. Athiyannur block panchayat has a population of 1.86 lakhs and spreads over an area of 60 sq km. We have started our activities in Vengannur, one of the six Grama-Panchayats in the block. Some of the important initiative are, formation of a local voluntary group in the panchayat (called *Friends of Health*) which would act as a liaison between officials and the elected panchayat members; development of community database by the collection and collation of *baseline socio-demographic details* of all the

residents in the area; introduction of innovative health projects in the panchayat plan; development of *community based health surveillance* by incorporating and improving the logistics of the existing health services facilities; conduct of regular specialty clinics in the area etc. Financial support for the initiative is largely met from funded projects, wherever possible. Occasionally institute support is sought to ensure continuity of community activities.

a. Friends of Health Project supported by Swiss Agency for Development and Cooperation, through their local collaborators SDC- CapDeck, was instrumental in laying the foundations of the field work under ASA initiative. With a total outlay of Rs. 4.99 lakhs which was spent over a period of 15 months, we could form a group of local volunteers in the area, organize training for various government functionaries, give public health orientation to the elected panchayat members, give field exposure on panchayati raj and local health system to our MPH students, collect the baseline information of the community. The project was closely linked to the Panchayati raj system and so the recent election to the local bodies has slowed down the programs a bit. Fortunately considering the difficulties, the funding agency has kindly extended the project for three more months and finally it was successfully completed in January 2006.

b. Geographical Information System initiative

The whole of Vengannur Grama Panchayat with its 44,000 population spread over 14.5 sq km area was surveyed by our volunteers. In addition to the socio-demographic information, we have collected the geo-spatial attributes of the households and premises utilizing the upcoming technology of Geographical Information System (GIS). Institute has entered into

a MoU with Centre for Earth Science Studies (CESS) for getting the technical support for getting satellite images and Geographical Position System (GPS) units by paying Rs. 50,000/-. This amount was very nominal considering the input we got from CESS and it has paved way to much more meaningful collaboration in the coming years. The geo-referenced digital maps are ready and the new ward boundaries are being incorporated into the digital map. The whole process is expected to be over by May 2006.

c. Public Health Informatics initiative. As part of the ASA initiative, we were planning to improve the routine surveillance system of the health centres in the area. We got into a working collaboration with Hospital Information System Project-India (HISP-India) group (which has the technical support from the Health Informatics division of University of Oslo, Norway) and a series of deliberations followed. Together we have customized a database, in open source software platforms, and that is being pilot tested in all the 19 CHC/block PHCs in the district. Fortnightly review meetings are conducted to iron out the bottlenecks. An MoU between SCTIMST and University of Oslo is being processed to streamline the collaboration. The draft MoU has been accepted by both sides. Special efforts are taken to capture the outpatient details from the health centres in the ASA area.

d. ASA specialty clinics. Every month, on second and fourth Saturdays, Cardiologists and Neurologists from the institute see the referred patients at the ASA clinic which was set up as part of the initiative. With the sincere support from Cardiology and Neurology Departments, we could ensure regularity and we have conducted the clinic even during institute holidays. Till now we had 222 patients for

Cardiology clinics and 117 for Neurology clinics and a good percentage of the patients are referred to SCTIMST for further investigations or treatment. As part of the clinic we organized two Continuing Medical Education sessions (CMEs) for the doctors in the area. Recently we have introduced a filing system at the clinic to ensure continuity of the records. The present Block Panchayat body also has expressed keen interest in the running of the clinics but many promises are yet to be fulfilled. Some issues needing immediate attention are the restoration of electric supply, furniture, equipments, medicines etc. Dissemination of relevant health information to motivate more people to avail this facility should also be taken up in future.

Banking for better health: Medisave for rural women in Karnataka, India

This is a collaborative project between SCTIMST, and Vijaya Bank funded by the Ford Foundation, New Delhi. Besides, there are three NGO partners at Dharwad, Haveri and Mandhya in Karnataka. Overall objective of this project is to empower rural women to access basic health care. It seeks to establish a medical saving program for rural women in 3 districts of Karnataka. The program will cover women who do not have a bank account in their names and who express their willingness to join the program in 25 backward villages. Basic premise behind this project is that economic empowerment of women through savings habit enhances their chance to seek medical help for their illnesses. The study has three components – research to analyse health care needs of women, intervention in the form of *medisave* account and group health insurance, and evaluation of the intervention to develop a policy package.

Development of a Reference Manual for Primary Health Care Institutions in Kerala

The objective of this project is to develop a reference manual for primary health care institutions in Kerala. Information will be collected from medical officers of primary health centres, district level and state level officers on the types of information that should be included in the manual. District level meetings of medical officers, staff nurses, pharmacists, nursing assistants, and other primary health centre staff and multipurpose health workers and their supervisors were conducted in selected districts of Trivandrum, Ernakulam and Palakkad. A brief questionnaire will be developed and circulated to selected doctors and other paramedical staff in other districts information will be collected from them also. Focus group discussions and in-depth interviews will also be conducted with selected health care providers at various levels to identify the key issues that should be included in the reference manual. Once a draft of the manual is prepared this will be presented in a meeting of experts and comments will be incorporated to update the draft. The final manual will be printed in sufficient numbers and will be distributed to all the primary health care institutions after getting the approval of director of health services.

Impact of the 2004 Indian Ocean Tsunami on People in Affected Regions of India and Sri Lanka: A Longitudinal Study of Mental and Social Health Outcomes and Recovery of Individuals, Families, and Communities

This proposed two-country, three-region population study, to be conducted in Kerala and Tamil Nadu, India and Batticaloa, Sri Lanka, will address gaps in the disaster literature and inform those who work in disaster relief, public health, and health behavior

research on methods to improve culturally appropriate disaster response planning, assessment, and early- and long term intervention to aid future disaster victims. This collaboration between the Achutha Menon Centre for Health Science Studies (AMCHSS), the National Institute of Epidemiology (NIE), Eastern University, Sri Lanka (EUSL), and the University of Southern California Institute for Health Promotion and Disease Prevention Research (USC/IPR), brings together U.S. investigators and researchers from tsunami-affected regions of India and Sri Lanka, thus providing a unique opportunity to study the longitudinal impact of the 2004 tsunami across cultures and countries.

We propose the following specific aims such as develop, pilot test, and refine a survey instrument to assess effects of the tsunami in adults and youth that is culturally and linguistically tailored to each study population, carry out the baseline and two subsequent waves of a longitudinal survey, to assess loss and recovery at the individual, family, & community levels to three years post-disaster, investigate the long-term psychological impact of the tsunami, including depression, anxiety, and post traumatic stress disorder (PTSD) and the personal, social, and cultural determinants that mediate and moderate psychological outcomes, assess changes in health and health behaviors- tobacco use, alcohol consumption, and safe sexual practices, over time, investigate the extent of life disruption and resolution with regard to displacement and changes in work, school, family structure, and the larger social group, assess styles of coping and forms of social support, develop and disseminate recommendations for post-disaster psychosocial interventions based on study findings, disseminate study findings and their implications to appropriate public and private agencies including

local, provincial, and national governments, WHO, and others through appropriate forums (conferences, symposia, meetings, etc.) to inform effective disaster planning.

The study site in Kerala is in the Tsunami afflicted areas (one to six wards) of Alappadu Grama Panchayat in Karunagapally block of Kollam district. Preliminary data on the extent and quantum of affliction is being collated. A couple of site visits have been done by the investigators; discussions were held with the local collaborators and stakeholders. Mainly three activities are planned under this project.

1. Mass psychometric screening of the adults, youths and children in the selected wards in the area using pre structured questionnaire. Around 500 households would be covered in the most affected, moderately affected and not/mildly affected areas in the region. This would be repeated every year for the next three years.
2. Strengthening of the counseling capability of the community by providing technical support to the community level volunteers in the area. Emphasis would be given to the welfare and proper rearing of the children afflicted with the disaster.
3. GPS survey: Using Geographical Position System devices, the geo-spatial mapping area would be done. The pre-disaster and post-disaster distribution of the human habitats would be studied. This would enable the community to understand the eco-cultural ethos in the community and would help in the future welfare planning

Political decentralization & status of reproductive health in Kerala.

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

Research, training and advocacy for gender sensitization of medical education and Capacity building of health professionals for reduction of Maternal Mortality and Morbidity

This project encompasses three major components: (a) a regional level initiative for the gender sensitization of medical education and the health professionals in general, (b) a training program 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 program for medical college teachers, managers and policy makers for the medical education and other medical professionals, (iii) in six states, viz Rajasthan, Gujarat, Maharashtra, Karnataka, Goa and Kerala to follow up the trainees and conduct three days training programs and/or gender based research projects. The second component is for developing a two weeks short training course on "Making Pregnancy Safer". The third component includes many assorted institutional building activities such as organization of seminars, TN Krishnan Memorial Lecture series, publications of the institutions, etc. The project has completed two years.

The short courses developed under this project would be integrated with the MPH program in due course. The WHO-South East Asia Region office supported the first session of short course on the subject with their South East Asia Region participants. The short course for 'Making Pregnancies Safer' for program managers was also conducted as was the second course on 'Gender in Medical Education' for medical educators during the second year of the project. The review of medical textbooks from gender perspective, which was discussed at a national seminar during July 2003, has been revised in keeping with suggestions received from the various discussants and reviewers and published in the April 2005 Women's Studies Issue of the Economic and Political Weekly. A short curriculum for three days for gender sensitization of medical educators was developed and this has been field tested in Mahatma Gandhi Institute for Medical Sciences, Sevagram. The WHO-SEARO has supported

this effort to carry the effort on to sensitive medical educators in three states of which two meetings have already been completed. A study of sexual harassment in the workplace, particularly medical institutions has been completed and a workshop for gender sensitization of Vice Chancellors, Deans, and other senior faculty in medical institutions has also been completed. Surveys of medical institutions in the selected six states and review of the activities of the trainees on the various programs are proceeding.

Stakeholders' perceptions of IRBs in India

This is a study of Institute Ethics Committee members and others involved in reviews of proposals submitted by researchers. It aims to understand the various perceptions of appropriate review processes and their salience. There are three phases to this study, involving a survey of medical institutions in six states as to the functioning of IRBs, the second phase involves an in-depth review of selected IRBs and researchers within those institutions and the third involves discussions of IRB review processes with the last group of stakeholders, the potential participants in various research studies. The duration of the study is 18 months and commenced in July 2005 and presently the survey is on going.

Tobacco Cessation Training and Research in India and Indonesia

This is a collaborative project between Achutha Menon Center for Health Science Studies of SCTIMST, Gadjah

Mada University of Indonesia, and three Universities in the US namely Minnesota, Arizona and University of Missouri Kansas City. The overall objective of this project is to strengthen the capacity for cessation training and research in India and Indonesia. The specific objectives of the project are 1. to develop knowledge capacity through intensive training in state of the art research in tobacco cessation for selected researchers from India and Indonesia (Four researchers are selected from India), 2. foster experimental capacity through formative research focusing on topics essential for the appropriate and successful adaptation of cessation interventions shown to be efficacious in high-income countries and 3. expand educational system capacity through the development of a culturally – tailored tobacco curriculum. The researchers were trained in the US for one week during January 2004. Preliminary data collection from medical students, nursing students, engineering college students, faculty of engineering college and clinicians of medical college is completed. After assessing the demand for tobacco cessation, a few cessation clinics will be organized at appropriate locations. One paper based on preliminary data analysis has been published in the *Journal of Addictive Behaviors*. A concept paper of the project has been accepted in the *Journal of Tobacco Control*. The project is supported by the Fogarty International centre of the National Institutes of Health, USA.

PATIENT CARE

The quantum of work in the hospital wing had considerably increased during the year 2005-06. As per the statistics, when compared to the year 2004-05, the number of patients newly registered in the hospital increased by 6%, the number of follow up cases increased by 7% and admissions increased by 2%. The bed occupancy rate also went up by 3%. However efforts were made to ensure optimum quality of service offered to patients.

The Imageology complex was modified with new air conditioning system, improved waiting area for patients and relatives, special anesthesia room, film viewing and reporting room for doctors and space for accommodating MRI, Ultrasound etc. In order to expand the present infrastructure for patient service, a plan for construction of private wards, faculty block and block for other supportive services was initiated.

In order to reduce the difficulties of patients in the Out Patient Department, the cash counter services were augmented. A new digital X-ray machine was also installed. The strength of staff nurses and Medico Social Worker trainees were increased to support the Out Patient services.

The infrastructure developments in the Hospital constituted installation of two numbers of 500KVA diesel operated generators to augment the essential electric supply and electric connections were extended to all the emergency areas of the hospital. New equipments were also purchased in laundry and physiotherapy departments.

Hospital infection control activities were strengthened with periodical meetings and follow up of the hospital infection control committee. An infection control nurse was appointed to monitor and implement the infection control and biomedical waste management activities.

A decision was made to revise the charging system with effect from 01/04/2006 and to increase the free and subsidized treatment to the poor patients getting treatment from this institute. Accordingly 'A' category patients are given totally free treatment. Subsidy for 'B1' category patients is increased to 70% of hospital bill from 50% of hospital charges and that of 'B' category to 20% and 'C' category to 10% of total hospital bill.

The Telemedicine Services were started on a pilot mode with the help of C-DAC, Trivandrum during the month of December 2005. A Neurologist and a Cardiologist are available on alternate days to provide the consultation to the patients attending to District and a few Taluk hospitals in Kerala.

Our Institute is one of the Tele specialist centers in the Tele health and Medical Education Project, Kerala. The institute has anchored the implementation of this

project and is hoping to expand the horizons of health care while launching of this project. The institute is linked to all the Govt. Medical Colleges, District Hospitals and few Taluk Hospitals in this project. The connectivity is through VSAT and ISDN line.

The network will be utilized for

- Tele consultation
- Tele education
- Virtual classroom teaching
- Connectivity to National and International Institutes
- Live transmission of surgeries performed in the Operation theatre of this institute.



(1) Inaugural function of the ISDN enabled Telemedicine project and Pilot Tele Consultation with Taluk Hospital Quilandy (2) View of the Telemedicine facility at SCTIMST

There are also facilities for recording of CME programmes, transmitting the CME programmes to other hospitals and archiving the information for future use. Indian Space Research Organization and Govt. of Kerala fund the Project. The facility is likely to be used for follow up consultations in large numbers.

Infrastructure for starting homograft valve bank in collaboration with the Department of Forensic

Medicine, Medical College, Trivandrum was established in the Department of Microbiology of the Institute.

Three MHA students from University of Kerala and three MHA students from Mahatma Gandhi University, Kottayam did their project work in the Institute and conducted studies on various topics.

Apprentice Training was given to graduates of Sociology in Medico Social Work and to post graduates of Nutrition and Dietetics. Observer trainees attended the training in the Department of Physiotherapy.

Medical Records

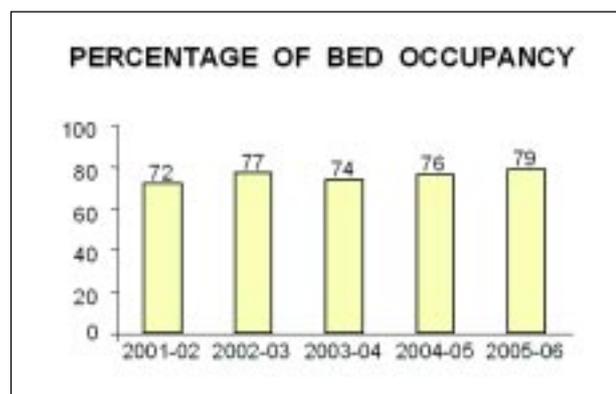
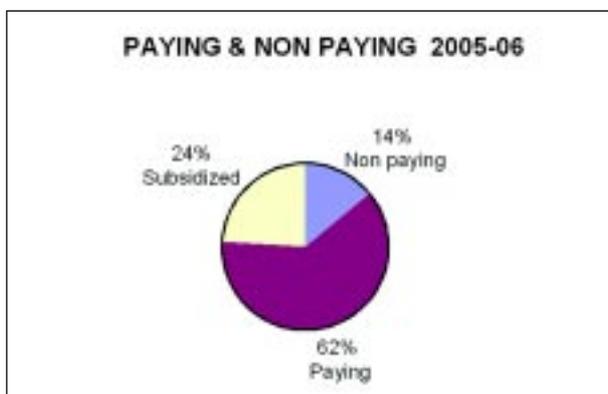
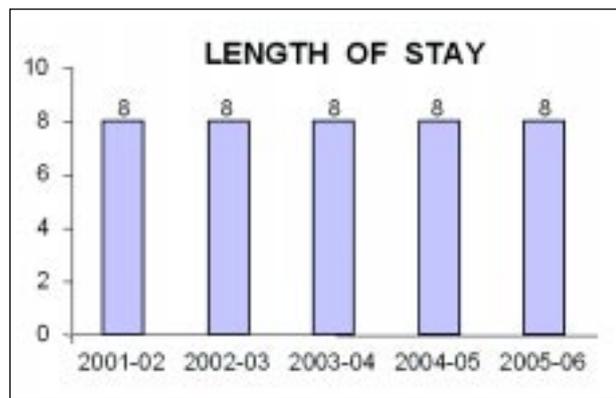
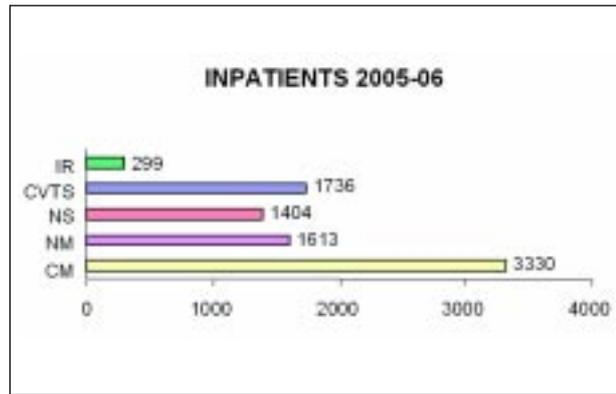
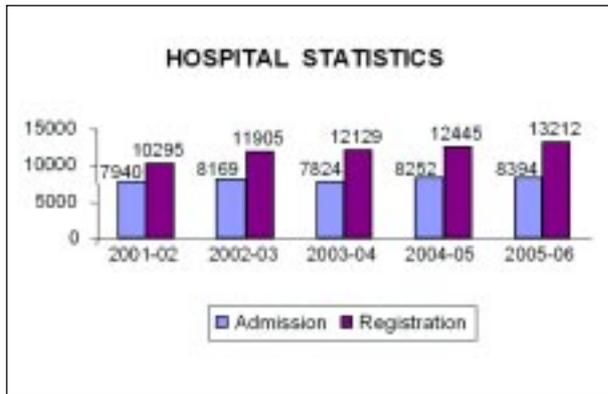
During the year 2005- 2006, the Medical Records Division played an important role in the patients management and hospital administration. The retrieval rate of charts has tremendously increased. The number of registrations and reviews increased by 15% compared to the previous year. Two special clinics, viz “SLEEP CLINIC” in Neurology and ‘PACEMAKER CLINIC’ in cardiology were opened during this year.

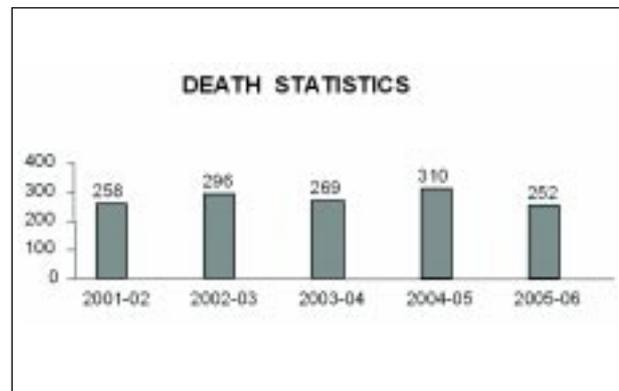
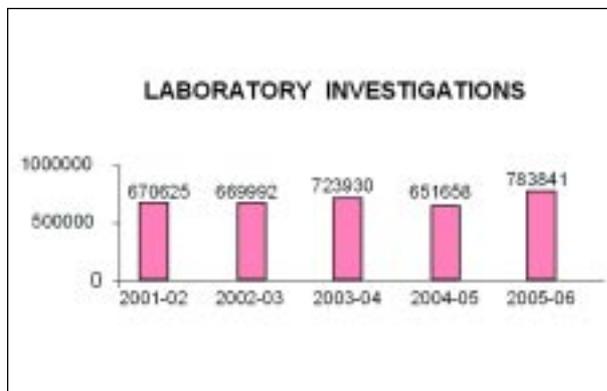
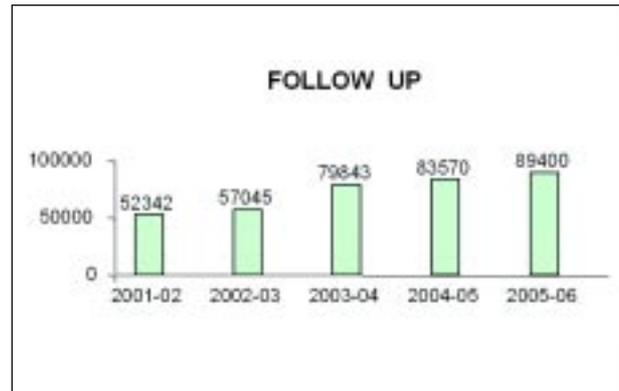
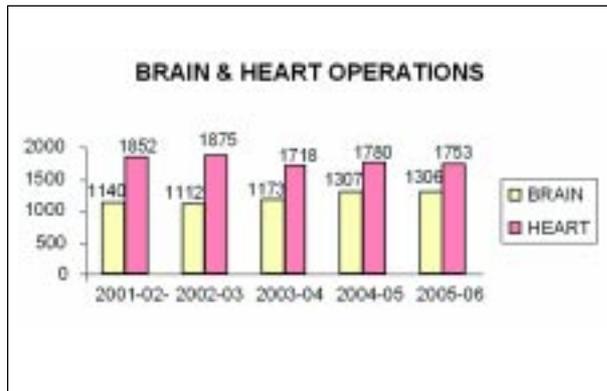
Charts retrieved

(a) Patient’s review	89,400
(b) New registration	13,212
(c) Doctor’s study purposes	8,016
(d) Doctor’s patients correspondence	848
(e) Deactivating	78,400
(f) Charts pruned	5,400

Total	1,95,276
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8382 Discharge Summaries, 3059 operation records and 556 general certificates were typed by MRD Typing pool. SMRO has issued 7207 certificates for financial assistance/ advance and for Train concessions.





IMPORTANT HOSPITAL STATISTICS 2005-06

Sanctioned beds	239
Percentage of bed occupancy	79
Cardiovascular and Thoracic surgery	1,753
Neuro surgery	1,306
New registration	13,212
Repeat cases	89,400
Admissions	8,394
Discharges	8,382
Death	252
Non paying %	14
Paying %	86
Average length of stay	8
Bed turn over rate	35
Percentage of mortality	3
Percentage of post operative mortality	4
Sophisticated investigations	41,315
Lab investigation	7,83,841
X ray	23,491
CT Scan	3,824
MRI Scan	3,298
Physiotherapy	18,120
Holter	672
ECG	26,750
TMT	1,975
ECHO	35,255
Pacemaker implantation	146
EMG	709
EEG	3187
VEEG	474
Perfusion	1348

Physiotherapy

The rehabilitation work of the section was aimed at achieving early independence for inpatients with active and passive physiotherapy. In additions out patients were also given physiotherapy using specialized equipment available in the unit.

Patients treated in Physiotherapy

Patients	Number
Cardiothoracic Surgery	7961
Neurosurgery	2302
Neurology	3033
Outpatients	4824

The Unit also contributed to the teaching & training of observership trainee physiotherapists and post basic Nursing course students and clinical exposure to students of MPT from M.G.University in physiotherapy and rehabilitation.

Anesthesiology

Anesthesia support was given during this year as shown below.

Patients	Number
Cardio-vascular & thoracic surgery	1800
Neurosurgery	1380
Neuro & cardiac radiological procedures	525

Biochemistry

A cell culture facility was fabricated for incorporating assays for cytotoxic, antioxidant, anti-inflammatory, antimetastatic, and antiangiogenic principles of various plant-derived/synthetic compounds. The

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

Clinical Laboratory Services

The central clinical laboratory functions round the clock providing investigative support in clinical chemistry, hematology and clinical pathology. The total number of procedures amounted to over 5.71 lakhs, which was nearly a 10% increase over figures for the previous year. The break-up of investigations is given below:

Nature of investigation	Number
Lipids	15,066
Electrolytes	1,46,691
Enzymes	32,657
Liver function tests	33,618
Blood urea nitrogen	25,947
Glucose	22,118
Blood gas	29,521
Hematology	1,31,717
Coagulation	31,459
Urine analysis	58,445
CSF	1,899
Electrophoresis	170
Miscellaneous	42,046
Total	5,71,354

Biomedical Engineering

As in previous years, the activities of the Biomedical Engineering Division included installation of new equipments, and maintenance of equipment and

utilities, keeping maximum uptime. Total restructuring and expansion of the Imaging Complex to provide improved facilities and comfort for both patients as well as staff was, one of the major achievements of this year. All operation theatres, ICUs, and some other very critical areas were provided with a parallel power supply circuit to ensure uninterrupted power supply. With the installation of two numbers of 500 KVA Stand-by Generator sets stand-by capacity has been increased to 1320 KVA.

A new state-of-the-art **Aria 1000** EPABX was commissioned with digital lines. Mobile phones in Closed User Group (CUG) were introduced in the place of the old Paging system for easy access and immediate communication with all Heads of Departments.

Blood Transfusion Services

Division continues to provide round the clock service to Surgical and Medical specialities .95% of collected units are separated into blood components (20% increase over the previous year) There is an increased trend towards use of specific components (71% RBCs against 5% Whole Blood). User education by Hospital Transfusion Committee had a definite role in creating awareness on blood components usage. Initiative is being taken for irradiated blood and manufacture of blood products. Outreach program of blood component support was extended to nearly forty hospitals without Blood Bank facility in Trivandrum District. Voluntary blood donation is increasing with more and more organizations coming forward to support the cause. Creating awareness among the public on the importance of voluntary blood donation through its health promotional benefits is catching up fast.

ID Gel cards were introduced for better sensitivity for blood compatibility testing. Probability of getting compatible blood units in our patient population with a view to estimate antigen frequency is being studied as part of research initiation for DBBT students

New Initiatives:

- Division is included in the National survey on External Quality Assurance Scheme (EQAS) in Transfusion Medicine conducted by CMC Vellore under the aegis of Indian Society for Hematology & Transfusion Medicine.
- Blood Bank is also part of EQA Scheme in Transfusion Transmitted Diseases organized by KSACS and Dept of Microbiology, MCH Trivandrum.
- Blood Bank is recognized as a center for pre-despatch inspection of Sterile connecting devices to Blood Banks.
- An all Women blood donor forum was initiated in the Community at Manikkal Panchayat in collaboration with Kerala Mahila Samakhya Society.
- Voluntary blood donation increased with mobile collection with more voluntary organization and communities joining for the cause- 53 blood donation and grouping camps resulted in 764 voluntary blood donors.
- Dr Jaisy Mathai nominated as member of State Advisory Body on Anti retroviral treatment program.

Special programs:-

The following programs were carried out in collaboration with TRU of BMT wing for the industry

1. Evaluation of blood bags for red cell and platelet storage lesions
2. Study on leukocyte filter efficiency

Academic

30 Medical officers sponsored by Kerala State AIDS Control Society from DHS underwent training in modern Blood Banking Technology for one month in three batches.

One Medical Officer and 3 technicians from Medical Colleges in the State underwent training in Blood component separation and quality control for 2 weeks

Cardiology

Patient Services during the year are given below

New Patients registered	6898
In patients	3330
ECG Done	26750
2D Echo Doppler studies	35255
Tread Mill tests (TMT)	1975
Transoesophageal Echocardiography (TEE)	250

The following invasive and Interventional Procedures were done.

Coronary Angiogram	1692
Cardiac Catherisation	160
Cardiac Electro physiology study (EPS)	13
Percutaneous Coronary Angioplasty (PTCA)	361
+ Coronary Stenting	
Balloon Mitral Valvotomy(BMV)	169
Coil embolisation of Patent Ductus Arteriosus(PDA)	83
Atrial Septal Defect (ASD) closure by Device	
Blockade	22
Amplatzer	11

Patent Ductus Arteriosus closure with Blockade Device	29
Balloon Pulmonary Valvotomy (BPV)	11
Balloon Aortic Valvotomy(BAV)	8
Balloon Atrial Septostomy(BAS)	17
Implantable Cardioverter Defibrillator (ICD)	1
EPS+ Radio frequency Ablation (RFA)	6
Pacemaker Implantation	148
Pacemaker Biventricular	1
Total Interventions	871
Total Procedures	2736

Three electrophysiology workshops using CARTO system were conducted during the year.

Cardio Vascular and Thoracic Surgery

During this year 1767 Cardio Vascular and Thoracic Operations were performed. The department initiated the multicentric clinical trial of TTK-Chitra Vascular graft. 1408 were open heart procedures.

Cellular and Molecular Cardiology

During the year under review, the division made progress in the four projects initiated last year. These projects were: (i) isolation and cloning of human resident adult cardiac stem cells, (ii) molecular mechanisms in high glucose induced MCP-1 expression in aortic endothelial cells and (iii) the effects of a herbal preparation *Calciguard* on myocardial mechanics (iv) studies on the effects of hypoxia on cardiac fibroblasts. Two new projects initiated were (i) to delineate the molecular mechanisms underlying the resistance of cardiac fibroblasts to apoptosis and

(ii) to determine the genetic component in hypertension and cardiac hypertrophy.

Computer Division

Routine activities involved the software development, hardware maintenance, installation, software maintenance for all the user programs including the PACS client maintenance.

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

New Purchase:

Switch 24 port 10/100/1000 Gbps with fibre uplink – 2Nos.

Mdaemon Mail Software

DVB VSAT Controller for @sctimst.ker.nic.in

Symantec UTM Appliance

Replacement of old PC's & Printers

PC Pentium IV, 256 MB

RAM, 80GB HD – 20 Nos

Printer 80 column 24 pin

TVSE MSP 450 Champion – 15 Nos

Printer HP 3375 Inkjet

– 5 Nos

Major Activities

New Software Developments

Dietary – New GUI based program was developed & implemented for dietary automation and converted old data to the new format.

Information Desk – A very user friendly front desk interface was developed and implemented for recording the daily appointments, querying and lab report printing.

Medical Records - New specific reports and search forms were added.

Physiotherapy – New GUI based program was developed and implemented for their workflow.

Administration – A web based module for the total automation of recruitment was developed and implemented. New GUI based program was developed for administration for their all activities.

Medical Social Worker - A GUI based program for MSW was developed and tested.

Cash Counter - A GUI based programs for cash counters was developed and tested.

SCTNET – (All in one) A web portal was developed and implemented to provide necessary information for their department related activities and personal activities to all employees with their personal authorization to access information with respect to their designation.

Efforts were also made to familiarize the faculty and staff on the best utilization of the machine and software.

System expansion grouped toward closer application with increasing LAN interlinks.

Microbiology

There was an over all increase of about 15% in the number of Diagnostic investigations carried out by the Microbiology laboratory.

Screening of patients samples before surgery for anti HCV also has been introduced. Routine Research on antiviral properties of some known medicinal plants vis-à-vis phytomedicine development made satisfactory progress.

Neurology

Epilepsy Section

New Initiatives during the year were

1. Transmagnetic stimulation for functional localization
2. Sleep disorders program with polysomnography

Designated Activities are given below

1. Total number of Surgeries	:	89
Temporal	:	71
Extra temporal	:	11
Callosotomy	:	3
Hemispherectomy	:	3
Invasive Monitoring	:	6
4. Cortical Stimulation & Mapping (CSMP)	:	15
5. Electrocorticography	:	84
6. Epilepsy Clinic attendance	:	4588
7. Sleep Disorder Clinic attendance	:	8
8. Polysomnography (PSG)	:	5
9. Ward Admissions	:	547
10. VEEG Admissions	:	473
11. SEEG	:	3187
12. Outreach Clinic Attendance	:	1554
13. Group Sessions	:	96

Kerala Registry of Epilepsy and Pregnancy

The Registry is providing comprehensive care for women with epilepsy during pregnancy and preconception period. The registry has provided a vast amount of clinical data that is being analyzed to generate new knowledge base in this field.

New initiatives during the year

1. We carried out a neurocognitive assessment of six year old children of mothers with epilepsy.
2. A new research project on the pharmacogenetic basis of AED induced teratogenesis was initiated in collaboration with the Rajiv Gandhi Centre for Biotechnology. This project is funded by the Department of Biotechnology

Special programmes

Weekly clinic for women with epilepsy

Designated activities

1. Regular counseling for women with epilepsy on marriage, preconception matters and pregnancy
2. Regular screening for fetal malformations among pregnant women with epilepsy

Regular prospective follow up of infants of mothers with epilepsy for any congenital malformations or neurocognitive deficits at 3 months, one year, three years and six years of age

Status of ongoing/routine activities

1. Registry of Pregnancy in women with epilepsy (Funded by ICMR)
2. Collaboration in the International Registry of AED and Pregnancy (EURAP International)
3. Study on oxidative stress in women with epilepsy and its relationship to fetal malformations (in collaboration with biochemistry department, SCTIMST, Funded by KCSTE)

Movement Disorders

PATIENT SEEN AND PROCEDURES UNDERTAKEN

Movement Disorder Clinic attendance	: 1194
Botox clinic attendance	: 71
Deep Brain stimulation	: 10
Pallidotomy	: 13
Post operative assessment clinic	: 74

Neuromuscular Diseases

New initiatives during the year were:

1. Temperature standardization in EMG lab studies
2. Standardization of brain stem auditory potential in infancy, with the aim to detect early deafness in infancy
3. Registry of follow up patients attending the Neuromuscular clinic for the utility of services
4. Computer data base of the biopsy studies in patients with neuromuscular studies
5. Clinico electrophysiological correlation in diabetic neuropathies

Designated Activities

Neuro Muscular Clinic attendance	: 825
Nerve Conduction study	: 545
Needle EMG study	: 354
Nerve biopsy	: 20
Muscle biopsy	: 37
Skin biopsy	: 13
Large Volume Plasma Exchange	: 43
Small Volume Plasma Exchange	: 103
Thymectomy for Myasthenia gravis	: 9
Optometry	: 1482
Evoked Potential Study	: 21

Stroke Section

Designated Activities

Stroke Clinic attendance - 1467

Status of ongoing/routine activities

A Stroke clinic is run once every week, which caters to all aspects of stroke patients. An average of 20-25 patients attend the clinic regularly.

Cognition & Behavioural Neurology (CBNC) Section (includes data on Neuropsychology & Speech Therapy)

CBNC runs a Memory & Neurobehavioral Clinic as a part of Neurology out-patient services. In addition it provides technical support to the Trivandrum Chapter of the Alzheimer's & Related Disorders Society of India in running of their Day-Care Center for Dementia. It also carries out active and collaborative research in the field of cognition and dementia.

New initiatives during the year

A program to set up a collaborative Brain Mapping Unit and a Neurogenetic Unit has been initiated by CBNC.

The speech therapy section, on request from various teaching institutions, has started offering internship programs to graduate students.

Designated activities

Consists of running of the Memory and Neurobehavioural Clinic, providing clinical services related to Speech and Audiometry and Neuropsychology

Status of ongoing/routine activities

Patients seen and procedures undertaken through the Cognitive and Neurobehavioural Program from 1st April 2005 to 31st March 2006:

Memory & Neurobehavioural Clinic Attendance		Patients
Dementia and related problems	-	175
Non-Dementia Patients	-	20
New Patients with Dementia	-	68
Speech Therapy Visits	-	724
Speech Evaluations Visits	-	573
Audiometry Studies	-	214
Neuropsychological Testing	-	1303

Neurosurgery

The total number of cases has remained the same as compared to previous year. The department has seen increasing number of complicated and challenging cases probably related to the increasing neurosurgical facilities available in most of the hospitals in the state government and private sectors, where routine neurosurgical operations are being done. The major areas of focus remained: Neuro-vascular, CP angle, Skull base, Endoscopy, Epilepsy and Movement disorder surgery. Endoscopic neurosurgical procedures have increased compared to the previous year with more emphasis on surgery for CSF rhinorrhea and pituitary tumors, thereby reducing the morbidity associated with more invasive alternatives. A total of 1301 cases were operated with an overall mortality figure less than 3%. The faculty and the students maintained the high standards of the institute in the conferences, symposiums & seminars, with students being awarded best paper for their presentations. 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 meetings every month.

Day to day activities of the department include OPD and the operation theatre functioning five days a week. The weekend is the academic day wherein regular Neuroradiology meetings are held followed by grand rounds and case discussion or seminars. Although the total number of cases remained the same, there has been a reduction of routine and uncomplicated neurosurgical cases. There has been a significant change in trend in management of pituitary tumors with most of them being operated by endoscopic approach. The total number of cases operated during the year 2005-2006 was 1301 and their distribution was as follows:

Vascular	178
Cerebello pontine angle	65
Sellar/ Suprasellar	41
Skull base	53
Epilepsy	96
Movement disorder	26
Stereotactic procedure	15
Endoscopy	128
Posterior fossa tumours	71
Spine	145
CVJ	53
Supratentorial tumours	255
Others	173
Total	1301

Pathology

During the year (April 2005 to March 2006), the division has performed histopathological analysis in 1600 surgical specimens in patients undergoing surgical procedures for neuro and cardiac diseases. Intraoperative tissue diagnosis (frozen section) was

offered in 450 patients. Enzyme histochemical and immunohistochemical studies were performed in 45 muscle biopsies. Immunopathological investigations were performed in 2200 patients. 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 neurosurgery. The division also conducted training programme for (a) D.M students in Neurology from Madras Medical college, Madras (b) Postgraduate students in Pathology from Medical College, Trivandrum and Pushpagiri Medical College, Tiruvalla.

Imaging Sciences & Interventional Radiology

The department is an established center for Diagnostic Imaging and Interventions in Neuro and Vascular diseases and problems of other systems. Department runs its Interventional Radiology OPD, have inpatient admission facility and intensive care management. Department provides imaging facilities of CT, MRI and Ultrasound to the OP patients and inpatients. This is the only department in our Institute, which provides imaging services to each and every one from out side unregistered to the Institute.

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

Department is equipped with State of the art top of the line 1.5T Avanto TIM with Syngo VD 20N

(Siemens) with facilities for doing Diffusion - Perfusion Imaging, MR Spectroscopy and Functional Imaging, MR Angiography (both neuro and peripheral angiography). For fMRI following paradigms are being used: motor, sensory; Language: Verbal fluency, Semantic fluency, Passive listening, Memory and, Music.

Thus department provides excellent imaging services with currently available latest technologies in MRI. Helical CT, colour Doppler, Portable colour Doppler, CR system, PACS are the other equipments in the department which makes it an advanced department.

PACS is linked with HIS. CT Angio, 3D CT, Virtual Endoscopy, Virtual Angioscopy, Vascular Doppler, Transcranial Doppler and MRI of Epilepsy, Stroke, Brain Tumours and Spine are routinely done.

Department provides various interventional radiology services. Various vascular lesions of the brain, spine, peripheral vascular diseases etc are routinely treated in the department. Various invasive procedures done are listed under interventional procedure in the Table.

Investigation Procedures Done during the year are as follows:

A. DIAGNOSTIC PROCEDURES

No.	Procedures	No. of Cases
1	Plain X-rays	27016
2	MRI Scans	3298
3	CT Scans	3824
4	US Scans	3099

B. INVASIVE DIAGNOSTIC PROCEDURES

No.	Procedures	No. of Cases
1	Peripheral Angio & Aortogram	160
2	4 Vessel Angiogram	480
3	Spinal Angiogram	13
4	Renal Angiogram	8
5	Bronchial Angiogram	6
6	Venogram	4
7	Sinogram	2
8	Miscellaneous	15

C. INTERVENTIONAL PROCEDURES

Interventional Procedures	Total (No. of cases/ Procedures done)
Cerebral AVM embolisation - Glue	45 (95)
Cerebral AVM embolisation - Ony	2 (3)
CCF	10 (14)
Thrombolysis	10
Tumor Embolisation	4
Uterine Artery Embolisation	11 (14)
Vein of Galen	2 (4)
Vertebroplasty	20 (25)
PTA	65 (70)
Subclavian PTA	3
Vertebral PTA	1
Thrombectomy	2
Percutaneous Biopsies	50
Carotid Stenting	5
Cutting Balloon PTA	2 (4)
IVC Stenting	1
IVC Filter	1

SMA Stenting	1
Renal Stenting	3
Spinal Embolisation	8
Iliac Stenting	2
Wada	4
Aneurysm Coiling	5
Brochogram	1
Bronchial artery Embolisation	6
Intra cranial DAVF	6 (8)
Intracranial stenting & coiling	1
GI Bleeding angioand Embolisation	5
Pulmonary Embolisation	5
Chemoembolisation	3
Balloon Occlusion test	4
Renal Embolisation	6
Total	375

D. INTERVENTIONAL RADIOLOGY SERVICES:

i. OP Registrations	- 239
ii. IP Admissions	- 299
iii. Interventional Radiology Procedures	- 375

A total of 375 Interventional Radiological procedures were done. Two hundred ninety nine patients were admitted under interventional radiology.

New Initiative During the Year were as follows:

New procedures have been introduced for diagnosis & treatment:

- a. CCF embolisation via cutdown of superior ophthalmic vein and direct puncture of facial vein.

- b. Functional MRI with motor, visual, auditory & music paradigms.
- c. Cardiac MRI – Morphology of congenital heart disease in difficult cases

The main objective of this study is to develop temporal lobe epilepsy model in rabbits using kainic acid or pilocarpine and to use single voxel proton magnetic resonance spectroscopy (MRS) and chemical shift imaging to examine metabolic abnormalities and cell death mechanisms in the temporal lobe of kainic acid/pilocarpine induced epilepsy of differing severity in rabbits during seizure. Initial efforts will be to develop a clear lateralization of the temporal lobe epilepsy in rabbits by employing the currently available localization methods like long echo, short echo, stimulated-echo acquisition mode (STEAM), point resolved spectroscopy (PRESS), quantitative, phase encoded metabolites etc. Development of newer protocols will be tried to improve the signal intensity of overlapping multiplets in the spectra. Histopathological evaluation of the seizure site during the standardization of the animal model. The temporal lobe will be studied for metabolic changes in particular the formation of lactate, tissue pH, high energy phosphate levels etc. using single and multivoxel MR spectroscopy. As a final stage study, similar examinations on the epilepsy models and subsequently treated with melatonin is also proposed.

1. Preparation of fluorescence spectroscopic database from patients having oral cancer, leukoplakia and sub mucous fibrosis based on their habits of smoking, alcohol intake, pan chewing etc. is in the final stage.

CLINICAL RESEARCH

Biochemistry

1. ELISA for serum immunoglobulin A:

Serum IgA level are significant in diabetes, nephropathy and cardiovascular disorders. An ELISA method was developed for quantitation of serum IgA level using the extraordinary affinity of the plant lectin jacalin for this immunoglobulin. The assay could detect IgA as low as 5 ng.

2. Serum immune complexes involving IgA and Lp(a):

Many pathogenic bacteria and viruses secrete neuraminidase enzyme which can desialylate glycoproteins. Using immobilized lectin jacalin, it was demonstrated that O-glycosylated serum proteins, mainly IgA1 gets incorporated into circulating immune complexes as a result of desialylation. It was also demonstrated that these immune complexes are formed between IgA1 and the serum anti-T antibody that is specific for desialylated O-glycosylated proteins.

3. Serum anti b glucoside antibody (ABG) forms immune complexes with fungal polysaccharides:

Purification and properties of ABG has recently been reported from this laboratory. Presently, in vitro studies showed that serum immune complexes formed on addition of fungal [*C.albicans*] polysaccharides involve ABG, along with mannose-binding lectin from serum.

4. Oxidative stress in women with epilepsy and fetal malformation:

(Collaborative project with Dept.of Neurology). Over 10% of offspring of women with epilepsy have congenital malformations, which is more than four times that observed in general population. This emphasizes the importance of fetal genotype and its interaction with various environmental factors. Antiepileptic drug-induced excess oxidative stress may be one of the mechanisms contributing to teratogenicity, which has not been adequately examined. The overall objective of the study is therefore to investigate the role of oxidative stress in the mediation of unfavorable outcomes in pregnancies of women with epilepsy. As part of this study, clinical and demographic details were collected from a few pregnant women with epilepsy

attending the Kerala registry of epilepsy and pregnancy program of our Institute. Blood samples were collected from epileptic pregnant women as well as matched controls to quantitate the various biochemical parameters to assess the oxidative stress status.

5. Lipoprotein(a) and atherosclerotic/thrombotic diseases:

Lipoprotein(a) consists of LDL-like core particle and a covalently linked glycoprotein, apo-(a), of variable size having structural similarity to plasminogen. Although a role for lipoprotein(a) in atherosclerotic and thrombotic diseases has been postulated the exact mechanisms by which lipoprotein(a) is atherogenic is less clear. Since purified lipoprotein(a) is a prerequisite for structural characterization and other biological studies to understand the pathways associated with its entry in the vascular cells, a new simple method "electroelution of lipoprotein(a) from native polyacrylamide gels" has been developed for purification of lipoprotein(a), after isolation from serum by sequential ultracentrifugation. In vitro characterization of purified lipoprotein(a) using HRP-conjugate of galectin-1 demonstrates that apo-(a) present exclusively in lipoprotein(a) bears O-linked oligosaccharides, which are strong ligands for galectin-1 in contrast to the carbohydrate chain present in apo-B of LDL particle. This indicates the role of lectin-carbohydrate in anchoring lipoprotein (a) in vessel wall.

6. sd LDL phenotype and ischemic heart disease risk:

Although elevated serum cholesterol, especially LDL-cholesterol is established as a major risk factor for the development of coronary heart disease (CHD), our recent study failed to demonstrate a strong relationship between increased serum cholesterol and the prevalence of CHD. To improve the early detection

and treatment of heart disease, attention has recently been focused on the metabolic syndrome, characterized by an increase in the proportion of smaller and denser LDL (sd LDL) particle, as well as several other emerging risk factors that are not measured with the routine lipid profile. New studies on LDL have linked LDL particle size, a predominance of sd LDL, to the subsequent development of heart disease. It is suggested to play an important role even in vasospastic angina, but the method to quantitate it is too laborious for clinical use. A rapid method has been therefore standardized for the routine assay of sd LDL using heparin-manganese precipitation and quantitation of sd LDL-cholesterol in the supernatant, which can be incorporated into clinical practice as a screening test to improve the ability to predict heart disease risk.

Blood Bank

1. Effect of leukodepleted blood on post operative complication in CABG patients

Allogeneic blood transfusions have been associated with impaired outcome in surgical patients including immunomodulatory effects. Hence WBC reduction of cellular blood components has become a widely acclaimed method to decrease complications like recurrent febrile non haemolytic transfusion reactions, HLA alloimmunisation and transmission of CMV infection. Hampered wound healing increased risk of anastomotic leakage and post operative infections have been related to perioperative transfusions. Randomized trials among recipients of WBC reduced blood in CVTS have been reported with lower frequency of postoperative bacterial infections and other adverse effects. Aim of the study is to find out if there is any beneficial role of leukofiltration on postoperative complications in patients undergoing

CABG and accordingly formulate transfusion guidelines for patients in CVTS.

2. Blood component Separation unit

Objective of the unit as envisaged in guidelines of KSACS is ensuring blood safety through voluntary blood donation, component separation and its use, quality programs at all levels from collection, processing, testing to distribution of blood and components. We are providing blood component support to hospitals in and around Trivandrum where there is no Blood Bank/blood component facility. Each request is processed based on individual patient's need and this provides clinician education in choosing appropriate component for the patient. Feed back of transfusion is possible through return of transfusion reaction forms. All data are computerized for easy accessibility and monitoring.

Cellular and Molecular Cardiology

1. Isolation and cloning of human resident adult cardiac stem cells and endothelial progenitor cells

The study is aimed at developing a strategy for isolation and expansion of human adult resident cardiac stem cells and endothelial progenitor cells from atrial biopsy and peripheral blood samples respectively, for potential use as cell-based therapy for myocardial infarction and /or end stage heart disease in humans. The samples were obtained from patients aged between 50-59 years with ischemic heart disease undergoing coronary artery bypass grafting after obtaining their written consent.

Cardiac stem cells (CSCs): 25 isolations have been done so far. Both enzymatic (8) as well as non-

enzymatic (17) methods were attempted at. Compared to the enzymatic method, non-enzymatic method was found to be more feasible. Characterization of the isolated cells (1,25,000 cells/ml/sample) for stem cell specific anti-human ckit antibody expression was performed using Magnetic Activated Cell Sorting (MACS). The MACS separation of the isolated phase bright cells using anti-human ckit antibody showed the presence of some ckit positive cells (25,000 cells/mL), suggesting a possibility that the isolated cells may be stem cells. Cell identity of the MACS sorted cells was confirmed by staining with Hoescht 33258 (Fig: -2), which stained the nucleus blue and confirmed the presence of cells after magnetic selection steps. The cells stained negative for Vimentin & Factor VIII expression ruling out the possibility for fibroblast and endothelial cell contamination among the isolated cells (Fig: -3). The expression for other stem cell specific markers like lin, MDR-1 etc are yet to be done.

Endothelial progenitor cells (EPCs): Out of the 16 isolations done so far, three gave characteristic cluster forming units (CFU) of endothelial progenitor cells (Fig: -4). The isolated cells (5×10^6 cells/ml) were characterized by conducting immunocytochemical staining using antibody against von Willebrand factor (Fig: -5). The cells were able to passage and maintain for 2 weeks. The subcultured cells were also stained positive for vWF expression. The cells have to be further characterized for CD133, VEGFR2, CD31 and CD34 expression.

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

Monocyte Chemoattractant Protein (MCP-1) is a chemokine, which plays an important role in the

adhesion and migration of monocytes to the endothelial cells, an early critical event in atherogenesis. Several studies have reported increased expression of MCP-1 in type 2 diabetes and suggested that increased MCP-1 expression may contribute to the increased risk for atherosclerosis in type 2 diabetes. Objectives of our studies are to determine whether high glucose concentration up regulates MCP-1 gene expression in aortic endothelial cells and to delineate the molecular mechanisms involved in the induction of MCP-1 gene expression in aortic endothelial cells. Endothelial cell cultures were established after isolating the cells from aortae of male Sprague Dawley rats. Studies carried out during the year reveal that high ambient glucose can cause inhibition of cell proliferation and decrease in cell viability in a dose dependent manner. High ambient glucose also leads to increased MCP-1 expression in aortic endothelial cells.

3. Functional evaluation of immortalized porcine endocardial endothelial cells

Endocardial Endothelial Cells (EECs) were immortalized by transfecting primary endocardial endothelial cells with the mammalian expression vector for LZRS-hTERT-IRES-GFP containing the full-length human telomerase reverse transcriptase (hTERT) and carrying puromycin resistance gene. The transfected cells have been continuously passaged without evidence of altered morphology and the hTERT expressing clones have achieved a passage number 5 to 6 times that of parental cells. The transfected cells have the typical endothelial cobblestone pattern at confluence and exhibit contact inhibition ruling out the possibility of malignant transformation of cells. The cells express the endothelial cell marker Factor VIII-associated antigen and retain the capacity to scavenge oxidized LDL, a

feature characteristic of endothelial cells and macrophages and absent in other cell types of the heart. Negative immunostaining for desmin ruled out the possibility of the presence of both smooth muscle cells and myocytes in the culture. The transfected cells were functionally similar to primary cells as assessed by nitrite release by these cell types in response to proinflammatory agents, tumor necrosis factor- α and bacterial lipopolysaccharide. The immortalized cells exhibit a distinct survival advantage over primary cells, as these cells have a higher growth rate in reduced serum percentage of 5%. Upon transfection of hTERT, telomerase protein expression was detectable in the EECs. To rule out the possibility of spontaneous transformation of EECs, we have demonstrated mRNA expression of hTERT by RT-PCR. There was also evidence for the expression of telomerase catalytic subunit in the immortalized cells in comparison with normal primary EECs and cancer cell lines.

4. Determination of genetic component in hypertension and cardiac hypertrophy

Left ventricular hypertrophy is the first visible sign of cardiac damage in hypertensives and a leading predictor of cardiac complications such as myocardial infarction, arrhythmia and sudden death. Hypertensive heart disease develops in response to mutually shared genetic determinants, environmental risk factors and hemodynamic and non-hemodynamic mechanisms. The primary determinants of hypertension and the morbid sequelae remain unknown in a vast majority of subjects. Ethnic variation in the prevalence and consequence of hypertension necessitates a population-based assessment. The proposal is designed to examine the prevalence of cardiac complications in hypertensives by retrospective analysis of data, determine the genetic component in hypertension and hypertrophy,

and identify biomarkers associated with cardiac complications in hypertensives. The observation of this study is expected to help in the preclinical identification of susceptible individuals and provide opportunity to tailor therapy to specific underlying abnormalities.

5. *‘Cardoguard tablet - delineation of molecular mechanism of action and its efficacy in the regression of ventricular hypertrophy.’*

The mechanism of action and efficacy of an Ayurvedic antihypertensive preparation in the regression of ventricular hypertrophy is being examined in spontaneously hypertensive rats. *Cardoguard* tablet is a new anti-hypertensive combination drug prepared by Nagarjuna Herbal Concentrates Ltd. In addition to the reduction of blood pressure, an ideal anti-hypertensive drug is expected to exert beneficial effects on the heart by prevention and regression of ventricular hypertrophy without compromising myocardial function. The myocardial response to this drug has not been characterized. The major objective of this project is therefore to study the effect of the drug on myocardial mechanics and examine using *in-vitro* and *in-vivo* models, the effectiveness of the drug in the regression of myocardial hypertrophy. A clear understanding of the mechanism of action and the cardiac consequences of the preparation is expected to facilitate commercialization and international acceptance of the product.

6. *Molecular mechanisms in cardiac fibrosis*

In view of the important role of cardiac fibroblasts in the maintenance of the structural and functional integrity of the myocardium, there has been increasing interest in factors that impact upon their function.

Regulation of cardiac fibroblast activity by different pathophysiologic stimuli has been a subject of incisive investigations in this laboratory over the past several years.

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

Cardiac fibroblasts contribute to multiple aspects of myocardial function and pathophysiology. Regulation of cardiac fibroblast activity by different pathophysiologic stimuli has been a subject of intensive investigations in this laboratory over the past several years. During the current year, the effects of hypoxia on cell cycle events in cardiac fibroblasts and expression of pro-inflammatory cytokines in these cells engaged the attention of the Division. Investigations were also initiated to delineate the molecular mechanisms underlying the resistance of cardiac fibroblasts to apoptosis.

B. *Regulation of cell cycle events in cardiac fibroblasts by hypoxia*

Using an *in vitro* cell culture model, hypoxia was shown to delay G₁-S transition in cardiac fibroblasts, which was reversed upon re-oxygenation. The role of pRB, p21 and p27 in hypoxia-induced delay in cell cycle progression was in focus during the year.

C. *Cardiac fibroblasts as a source of pro-inflammatory cytokines*

Cardiac fibroblasts were shown to be a source of pro-inflammatory mediators such as TNF- α , IL-1b, IL-4, IL-6, PGE₂ and ICAM-1. Hypoxia, an important component of myocardial ischemia, caused a significant increase in the expression of TNF- α and ICAM-1 in these cells. Stimulation of TNF- α production by hypoxia was redox-dependent. A significant increase in the production of PGE₂ and ICAM-1 by

these cells was observed in response to substance P, a neuropeptide known for its pro-inflammatory role in other tissues. The signaling pathways involved in augmented cytokine expression in cardiac fibroblasts in response to pro-inflammatory stimuli were under investigation. Together, the findings are consistent with the postulation that cardiac fibroblasts may contribute to an inflammatory cascade within the heart under conditions such as myocardial ischemia and infarction.

D. Survival mechanisms in cardiac fibroblasts

Cardiac fibroblasts, unlike cardiac myocytes and fibroblasts of non-cardiac origin, are resistant to apoptosis but the underlying mechanisms are unknown. During the past year, a project was initiated to evaluate the expression of anti-apoptotic proteins in these cells under basal and hypoxic conditions.

Imaging Sciences and Interventional Radiology

Projects and Research Programme: Following projects are running in the Department:

1. Development of spectroscopic protocol for magnetic resonance spectroscopy and chemical shift imaging of temporal lobe epilepsy in rabbits

2. International Collaboration:

A. Indo- Italian Collaboration

‘Characterization of brain tumors using advanced MR imaging techniques’

Italian Collaborator:

Prof. Giuseppe Scotti
Prof. and Head
Dept. of Neuroradiology
Scientific Institute & University
Hospital San Raffael, Via Olgettina,
6020/ 32 Milan,
Italy.

Indian Collaborator:

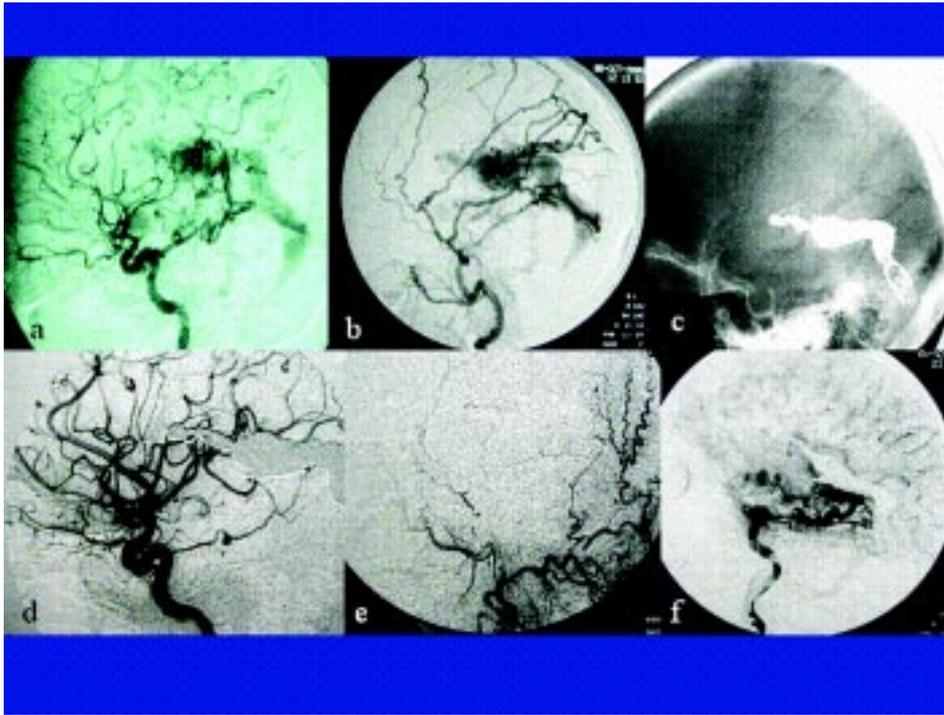
Prof. A. K. Gupta
B. ‘Diffusion Weighted Imaging and other Magnetic Resonance based Imaging Modalities in Human Stroke’.

Italian Collaborator

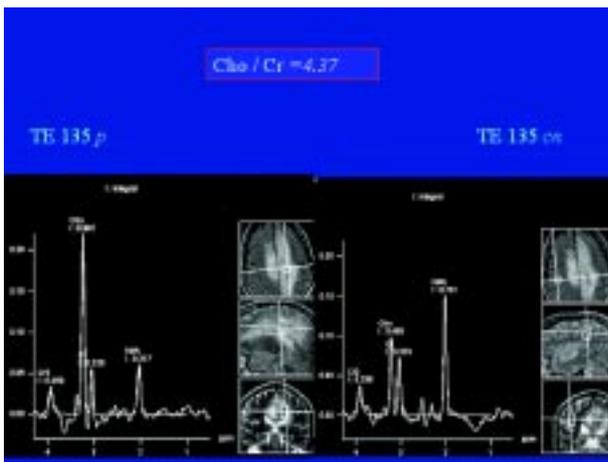
Dr. Marco Fiorelli,
Dept. of Neurological Sciences
University of Rome ‘La Sapeinza’ Rome, Italy.

Indian Collaborator

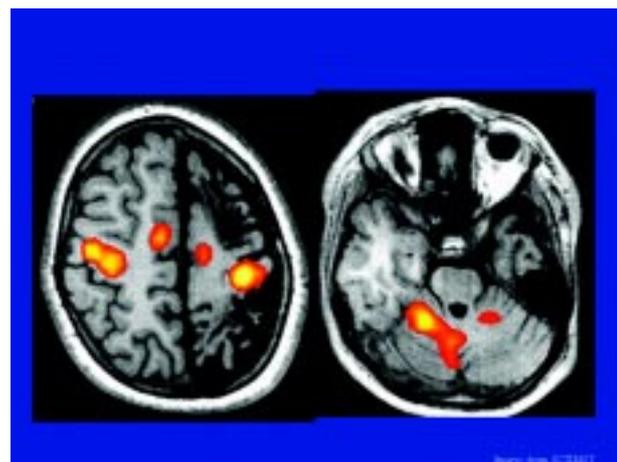
Dr. A. K. Gupta



Intracranial Dural Fistula located at level of free edge of tentorium fed by dural branches of external carotid and draining in deep venous system. a. Right Internal Carotid Angiogram showing hypertrophied dural branches from internal carotid artery. b. Selective right external artery angiogram showing hypertrophied meningeal branches from middle meningeal artery ending into the fistula. c. After coiling of the fistula coils are seen in the internal cerebral vein, vein of galen and straight sinus. d,e and f. Post coiling right internal and external angiogram shows total disappearance of the fistula.



Spectroscopic image in tumour area and normal area in same patient



Stimulation of Brain area after finger tapping to localize the motor area

Pathology

During the year, the division was actively involved the following ongoing research projects.

(A) Immunological studies in myasthenia gravis: In this project, tumor- specific antigen in patients with myasthenia gravis with thymoma were isolated and characterized. We observed antigenic similarities between skeletal muscle antigens (31-kDa Titin) and tumor- specific antigen in patients with myasthenia gravis. Demonstration of circulating antigen in the immune complexes of patients with myasthenia gravis was applied not only in the diagnosis but also in the prognosis of the disease.

(B) Isolation and characterization of major lipid antigens from the liquid cultures of *M tuberculosis*: During the year the following lipid antigens from the liquid cultures of *M tuberculosis* were isolated (a) total glycolipid (b) Trehalose 6,6'-dimycolate (TDM-cord factor) (c) Lipoarabinomannan (LAM) (d) Phosphoinositol mannosides (PIM). These lipids of *M tuberculosis* play a significant role in the immunopathogenesis and prognosis in patients with tuberculosis.

(C) 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 (CSF) specimens in patients with tuberculous meningitis. This direct immunocytochemical method is simple, rapidly reproducible and can be used as an adjunct in the early laboratory diagnosis of tuberculous meningitis particularly in patients in whom bacteriological methods do not yield positive results for *M tuberculosis* in the cerebrospinal fluid

specimens. Department of Science and Technology- New Delhi has approved a research project 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 and is presently awaiting financial grants.

(a) Molecular pathogenesis of malignant glioma submitted to DBT New Delhi. (c) Proliferative markers in non-functioning pituitary adenomas (submitted to ICMR).

(D) Mucoïd vasculopathy:

As part of a project funded by STEC Kerala (KSCSTE) a modified technique was standardized for getting better yield of serum glycosaminoglycans for analysis. Investigations showed increased levels of serum glycosaminoglycans, rather than hyperlipidemia in patients with coronary and cerebrovascular diseases, particularly in those with aneurysms showing myxomatous lesions. The test may be used as a screening test for mucoïd vasculopathy and metabolic syndrome.

In excised valves from patients with rheumatic heart disease, large deposits of mucoïd material with a paucity of inflammatory infiltrates and Aschoff bodies have been found suggesting an association of rheumatic heart disease with mucoïd vasculopathy in cases from Kerala. Similar features had been described in autopsy studies carried out on acute rheumatic fever rampant in Europe and North America in the early half of the last century.

A modification of Prof. G. Romhanyi's technique using combinations of nicotine and pyridine for

recolorization of museum specimens resulted in stable natural red colour even after 19 years. The technique shows that these compounds have hitherto unreported direct tissue binding effects and may be used to understand the pathogenesis of tobacco-related diseases.

Neurology

Epilepsy Section

A Case-control study for epilepsy risk factors and a project on Bioequivalence of valproate preparations are being undertaken in the section.

Kerala Registry of Epilepsy and Pregnancy

The following studies are undertaken by the registry.

1. Screening for fetal malformations in women with epilepsy
2. Developmental assessment of infants at three months, one year, three years and six years of age
3. Study on oxidative stress in women with epilepsy and its relationship to fetal malformations (in collaboration with biochemistry department, SCTIMST, Funded by KCSTE)
4. Pharmacogenetic studies on AED induced teratogenesis (In collaboration with Rajiv Gandhi Center for Biotechnology, Trivandrum, funded by DBT)

Movement Disorders Section

Two clinical trials being conducted by the section are given below:

1. A 16-week, Double blind, Placebo-Controlled, Randomised, Parallel Group, Multicentre, International Study to Evaluate the Efficacy and

Safety of 40 mg/day KW-6002 (istradefylline) and that of Entacapone versus Placebo as treatment for Parkinson's Disease in patients with Motor Response Complications on Levodopa Therapy and

2. A long-term, multicentre, open-label safety study with oral 20 or 40 mg/d doses of KW-6002 (Istradefylline) as treatment for parkinson's disease in patients with motor response complications on levodopa therapy.

Neuromuscular Diseases Section

The national project on the "Acute Flaccid Paralysis Surveillance" in collaboration with the World Health Organisation (WHO) is ongoing. More centers catering to paediatric health care have been recruited into this study to increase the study population.

Stroke Section

As a part of the WHO SEARO project, the Trivandrum Stroke Registry undertook the population-based study in urban and rural Trivandrum to ascertain the incidence, risk factors and the disability due to acute stroke between April 2005 and September 2005. The study was completed successfully and the results are being analyzed. The preliminary report has been submitted to the WHO. A study on the knowledge, attitude and practice (KAP) of stroke among 1000 persons in both urban and rural areas has also been completed. The results of these studies will help in planning prevention strategies and stroke rehabilitation.

Intramural projects in the section are as follows:

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

2. Prevalence of early seizures and outcome in patients with acute stroke

Cognition & Behavioural Neurology (CBNC) Section (includes data on Neuropsychology & Speech Therapy)

A collaborative research initiative with the departments of Radiology, SCTIMST, and Computer Sciences, Kerala University, was initiated by CBNC to set up a Brain Mapping Unit, the first of its kind in India and a Neurogenetic Unit.

Intramural Projects in the section are

1. Evaluation of aphasia in stroke and establishing a clinico-radiologic correlation for aphasia.
2. Design and Evaluation of a neuropsychological battery for the study of Semantic Memory in Indian subjects.
3. Computerization of Neuropsychological Tests (a collaborative work with industry).

Neurosurgery

Research programmes:

1. Role of mucoid vasculopathy in the etiopathogenesis of cerebral aneurysms (Continuing)
2. Genetics of SAH; Role of Endoglin gene polymorphism. (Completed and has been sent for publication)
3. Human trial of hydroxyapatite Burr hole caps (continuing)

Collaborative programmes:

Drug trial: Epicentric therapy for gliomas “an international multicentric study for treatment of recurrent cerebral high-grade gliomas with AP 12009” project. The principal investigator for the trial from our centre is Prof Suresh Nair (Continuing)

MAJOR EQUIPMENTS PURCHASED DURING THE YEAR

CO₂ incubators for tissue culture work
Thermal cycler
Microfuge for PCR
Aestiva S/5 Anesthesia Machine
S/5 Anesthesia inhalation gas monitor
Entropy
ICU ventilators
Hand held vascular doppler
Intraoperative ultrasound
CMC irrigation cautery
Up gradation of the Sonaka CUSA apparatus
Table top Eppendorf centrifuge for serology lab
Blood Bank refrigerators received from NACO installed
State of the art anesthesia machines
Modern ventilators
Activated Clotting Time (ACT) Analyzer
Incubating fibroscope
UV-VIS spectrophotometer
Inverted microscope
Single tube luminometer
Micro ultra centrifuge
Blood collection monitor
Intra-view transcranial Doppler
Colour Doppler ECHO machines
One handheld Doppler
Patient warmer systems
Bipolar cutting coagulating machine
Electrosurgical unit
Total Performance System (TPS)
CUSA unit
Heart lung machine
Cardiac ablation system
GEL Documentation system
Defibrillators
Fiber optic light sources
Multimedia projector
Aria 1000 EPABX

Mobile phones in Closed User Group (CUG)
A Biosafety cabinet, Luminometer, Inverted Microscopes.
Operating tables.
Valleylab electro cautery systems.
Luxtec head lights.
Luxtec head camera systems.
Stent graft fatigue test system
Micro Particle size analyser
Digital microscope
Package testing system
Surface thickness measuring system
Anaesthesia care station Datex-Ohmeda
ABL555 Blood gas analyser
Microscope with Fourier transform infrared spectroscopy
Malvern, nanoparticle size analyser
Deep freezer
Dental thermocycler
Fourier transform spectrophotometer
Confocal microscope (Zeiss)
Minibioreactor
Multiplate fluorescent analyzer
Upright microscope
Frequency response analyser
Electrical safety analyser
High speed digital camera
Data acquisition system
Triple quadruple liquid chromatograph- mass spectrometer.
Liquid chromatograph
Parr polymer reactor
Gel permeation chromatography
Ultracentrifugal mill
Compression moulding hydraulic press
Impact tester
CNC electrical discharge machine
CNC Lathe
Fluorescent aided cell sorter (FACS)
Real time PCR
Surgical micrometer
Intra oral X ray

ACADEMIC ACTIVITIES

Division of Academic Affairs

Students enrolment

The student strength for DM/MCh degrees and Post Doctoral Certificate Courses during the year was 71. The Master of Public Health degree programme has 32 scholars and the Master of Applied Epidemiology programme 29 scholars. The Institute has, as of now, 46 students for the PhD programme, 27 scholars for the Diploma in Nursing programme and 33 scholars for the various Diploma programmes.

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

DM (Cardiology)

Ragesh. P
Shanmuga Sundaram.R.
S.VK.R.Krishna
Haridasan. V.
Remash. K.
Shajeem. O.
Shomu Rajendrasingh Boharo
Pradeep Kumar
Sumanta Shekhar Padhi
Anees. T
Sanjay. G.
Sachin Nayyar

DM (Neurology)

Ajith Cherian
Atma Ram
Deepak Gupta
Chandra Mohan Singh
AtamPreet Singh
Shiva Kumar. R.
Thomas Chemmanam

Ramesha. K.N.
Vidya. M.V.
Raghavendra. S.
Mini. S.
Sapna Erat Sreedharan

DM (Cardiac Anaesthesiology)

Arun Vijayakumar
Bhupesh Kumar
Ganesh. S.

DM (Neuro Anesthesiology)

Smitha. V.
Sriganesh. K.
Shashi Rao

DM (Neuro Radiology)

Arvinda. H. R.
Periakaruppan.AL
Sandeep Kumar Burathoki
Hima.S.Pendharkar

MCh (Cardiovascular & Thoracic Surgery)

Varghese. T. Panicker
Sanjay Gandhi
Vivek Babu. B.
Arul Dominic Furtado
Adil Sadique
Ritwick Raj Bhuyan
Malempati Amresh Rao
ArunKumar Haridas
Vivek. V. Pillai
Suraj Kumar Pradhan
Prashanth. Y.M.
Neerav Bansal
Gagandeep Singh Nagi

MCh (Neurosurgery)

Ganesh Divakar
Naren. N. Nayak
Vikas.V.
Vishal Jain
Amitabh Gupta
Rajiv Agarwal
Nilesh Radheshyam Agarwal
Gulzar Gupta
Jayanand Sudhir. B
Gopalakrishnan. C.V
Dilip.M
Manmeet Singh.S.Chhabra

PDCC (Anaesthesiology)

Subramanian. C.
Sivakumar. P
Sivashanmugam. T.
Sudhakar. C.
Sanjeeb Patro

PDCC (Radiology)

Somasundaram
Raja Nazeer Shaikh

Post DM / MCh Fellows

Bijulal. S
Nayil Khurshid Malik
Rathore Chathurbhuj Gopal Sing

Post-Doctoral Fellows in Biomedical Technology

Deepti Simon
Nishad.A

Diploma in Cardiac Nursing (Session 2005)

Abija V. S.
Resmi P I.

Deepa Kumari. V P
Remya R.Chandran.

Diploma in Cardiac Nursing (Session 2006)

Snigdha Francis
Priya L.
Timy Santhipalan
Resmi. M. I.
Bindhu. V T.
Asha. A.
Bismi.T.Manikuttan
Aswathy. L.B.
Rani.R.Nath
Lekshmi. J. S.

Diploma in Neuro Nursing (Session 2005)

Sheeba Mol.S.
Devi. R.Mohan
Deepa.G.
Jyothi Lekshmi. P R.
Sible George
Kavitha
Rajalekshmi

Diploma in Neuro Nursing (Session 2006)

Darsana Rani Vasanthan
Anjana. P
Shima. P A.
Soumya. S. S.
Sini. S.S
Ambily. V. V.

Diploma Programme (Session 2005)

Prasad.K
Sethu Parvathy. V K.
Aneesh.S.
Niju Jacob
Pradeep.M.J.

Anila Aravind
Sumesh.T.M.
Lalitha R.S.
Geo Joseph
Nishad. V.U.
Anchana Unni.
Asha Krishna.R.O.
Ragesh. D.V.
Sajitha. K.S.
Krishnaraj.K.M.
Shibin. C.V.

Diploma Programme (Session 2006)

Mansoor.K.
Indu.S.Asokan
Midhun.S.V
Anees.C.A.
Sreevidya.M.
Manju. R.S.
Vipindas.PH.
Ampily.R.
Rupesh.V K.
Munavar. T. K.
Krishnaprasad.R.
Gopalakrishnan.P S.
Sapna Varghese
Deepasree.C. S.
Divyamol.V S.
Rijesh. S.R.
Arun kumar. S.

PhD Candidates

Biji BalaKrishnan
Elizabeth.K.Abraham
Bijoy Chellan
Asha.S.Mathew
Leena Kuruvilla

Krishna Prasad. C.
Anil Kumar P. R.
Bernadette.K.Madathil
Sailaja.G.S.
Nishi. K.K.
Priyanjana Prabhakar
Anuradha
Sunitha. S.S.
Sapna. S.
Siddharth Banerjee
Godwin. S.K.
Edwin Sam. A.
Pradeep Kumar. A.S.
Sajeesh. S.
Viji Mary Varghese
Anu Paul
Aghila Rani. K.G.
Manna Jose
Arun. U
Neethu Mohan
Kaladhar. K.
Divya. P
Vandana Shankar
Arun. B.
Sumith R.Panicker
Manitha.B. Nair
Sailesh Mohan
Sumi. S
Dr. P Manickam
Anie. Y
Josna Joseph
Sangeetha Mohan
Sreeja Purushothaman
Suboj Babykutty
Priya. P. S.
Deepa. D.
Sudhakar

Anu.S. Nair
Anumol Jose
Dawlee. S
Umashankar

**Master of Public Health Students
(Enrolled in January 2005)**

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

**Master of Public Health Students
(Enrolled in January 2006)**

Simy Mathew
Sudeep Kumar
Muhammed Shaffi
Manjunatha. R.
Divya Bhagianadh
Maitraye Basu
Shah Amar Nirranjan
Doshi Riddhi Prakash
Abhay Kumar Bohera
Shibu Vijayan
Manoj Swaminathan
Allen Prabhaker ugargol
Pratap Kumar Jena
Rekha.M. Ravindran
Sheethal Joy

Diploma in Public Health Students (Enrolled in January 2006)

Dr. Patel Harshadbhai Babarbai
Dr. Patel Chandrakant Raiyabhai
Dr. Pranami Dipak Bijolbhai
Dr. Patel Nilamkumar Jivanlal
Dr. Jani Nayankumar Popatlal

Master of Applied Epidemiology Students Enrolled in January 2005

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

Master of Applied Epidemiology Students Enrolled in January 2006

Prabhdeep Kaur
Dipankar Maji
Shymili Rudra
Rama Bhunia
Ibungochouba Singh. S.
Balraj Singh
Purnamala Devi
PK.Mohapatra
Shyam Sundar Singh
J.Manjunatha
Sobhan De
Sharmishtha Mitra
Prasun Kumar Das
Somrojit Ningombam
Sushil Chander

Surender.N.Gupta
R.K.Tilotama Devi
Pawan Kumar Sachan
Ramasamy. K.
N.V. Sumathi

List of successful candidates for DM/MCh

Name of candidates	Degree	Speciality
Purandare Harshad. R.	MCh	Neurosurgery
Venkata Srinivasa Rao	MCh	Neurosurgery
Raghavan.S.Iyengar	MCh	Neurosurgery
Komal Prasad.C.	MCh	Neurosurgery
Sanjay Theordore. A.C.	MCh	CVTS
Sameet.A.Pathak	MCh	CVTS
Rajnish Duara	MCh	CVTS
Chandrabhanu Parija	MCh	CVTS
Syam. K.	DM	Neurology
Sajith. S.	DM	Neurology
Sudheeran. K.	DM	Neurology
Praveen Kumar. R.	DM	Neurology
Edwin Francis	DM	Cardiology
Mukundan.C.	DM	Cardiology
Bijulal. S.	DM	Cardiology
Vinod Thomas	DM	Cardiology
Jayadevan. E. R.	DM	Neuroradiology

List of successful candidates Post Doctoral Certificate Programme

Name of candidates	Specialty
Mangesh Sudhakar Rao.C.	Anaesthesiology
Deepa Navkar	Anaesthesiology
Sathyajeet Misra	Anaesthesiology
Bikash Sahu	Anaesthesiology
Bobby Devasia	Radiology
Sunil Rajendran	Vascular Surgery

List of successful candidates for Diploma Programme

Name of Candidates	Speciality
Anu Susheel	Cardiac Lab Technology
Rupesh Kumar. R.	Cardiac Lab Technology
Arun John	Cardiac Lab Technology
Shana.N.Nair	Neuro Technology
Sajeesh. P	Neuro Technology
Babunath. B.	Medical Imaging Technology
Jan Paul	Medical Imaging Technology
Raghurajan. M	Medical Imaging Technology
Ambli.R.	Medical Records Science
Damodara Sarma. E.	Operation Theatre Technology
Mumthas. K.	Operation Theatre Technology
Sindhu. M. S.	Blood Banking Technology
Vimal Raj. R.	Blood Banking Technology
Sujith. V. M.	Clinical Perfusion

Library

Library has a collection of 21991 books and 19014 back volumes and subscribes to 184 periodicals. 376 books and 406 back volumes are added during the year 2005-06.

Nursing Education

The Institute has initiated two Diploma Programmes in Speciality Nursing of 2 years duration each in the year 2005. Out of the 10 nurses who have joined for the Diploma Programme in Cardiovascular and Thoracic Nursing 4 are continuing the second year of the programme whereas six out of nine students are continuing the second year of the Diploma Programme in Neuro Nursing. During the year 2006 sixteen registered nurses have joined for these two programmes.

Four Neuro nursing students attended the 26th annual conference of the Society of Indian Neuroscience Nurses held at Vizag, during December 2005. They presented four papers, 3 posters and participated in Neuro written quiz. The students secured prizes for paper presentation, poster presentation and quiz.

Nursing students from various universities undergoing various programmes viz BSc Nursing, MSc Nursing, and Certificate in Nursing Administration utilized the clinical field of this Institute as part of their curriculum.

EXTERNALLY FUNDED RESEARCH PROJECTS

ACHUTHA MENON CENTRE FOR HEALTH SCIENCE STUDIES

NEWLY INITIATED PROJECTS

Sl. No.	Title	Principal Investigator	Funding Agency
1.	Development of Reference Manual for Primary Health	Dr. K. R. Thankappan Dr. Manju Nair	Department of Health Services
2.	A Longitudinal Study in the Tsunami Affected Areas of Mental and Social Health Outcomes and Recovery of Individuals, Families and Communities in Kerala	Dr. K. R. Thankappan Dr. Biju Soman	University of Southern California
3.	HIV/AIDS Project	Dr. D. Varatharajan	IHCIR, Karolinska

ONGOING PROJECTS

1.	Political Decentralisation and status of Reproductive Health in Kerala	Dr. Mala Ramanathan	Tides Foundation
2.	Research, Training and Advocacy for Gender Sensitization of Medical Education and Capacity Building of Health Professionals for Reduction of Maternal Mortality and Morbidity.	Prof. K. Mohandas & Dr. Mala Ramanathan	MacArthur Foundation
3.	Tobacco Cessation Research and Training in India and Indonesia	Dr. K. R. Thankappan	University of Minnesota
4.	Stakeholders' Perceptions of IRBs in India	Dr. Mala Ramanathan	Harvard School of Public Health
6.	Friends of Health (FoH) project in Venganoor Grama Panchayat - ASA initiative	Dr. Biju Soman	CAPDECK
7.	Non-communicable Diseases	Dr. K. R. Thankappan	WHO
8.	Banking for Better Health: Medisave for Rural Women in Karnataka, India	Dr. D. Varatharajan	Ford Foundation

Sl. No.	Title	Principal Investigator	Funding Agency
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COMPLETED PROJECTS

1.	Situational Analysis of MTP Services in India	Dr. Mala Ramanathan Dr. P. Sankara Sarma	CEHAT, Mumbai
2.	Establishment of Sentinel Surveillance System for Cardiovascular Disease in Travancore Titanium Products LTD Trivandrum	Dr. K. R. Thankappan	WHO
3.	Sentinel Health Monitoring Centres in India	Dr. K. R. Thankappan	WHO
4.	Workshop on Integrating Gender in Medical Education	Dr. Mala Ramanathan	WHO
5.	Industrial Participation in Public Health Care Provisions in Tamil Nadu- A Case Study	Dr. D. Varatharajan	World Bank

HOSPITAL WING

NEWLY INITIATED PROJECTS

Sl. No.	Title	Principal Investigator	Funding Agency
1.	Development of Spectroscopic Protocol	Dr. Jayasree R. S.	DST
2.	Open Label Safety Study, Prtocol 6002 INT 01	Dr. Asha Kishore	Quintile Spectral
3.	Dose Ranging Study to Evaluate the Safety and Efficacy Olmesartan Medoxonil in Childeren and Adolaescents with hypertension	Dr. J. M. Tharakan & Dr. Krishnakumar	Quintile Spectral
4.	Effect of Leukodepleted Blood on Post Operative Complication in CABG patients	Dr. Jaisy Mathai	Hindustan Latex Limited.
5.	Determination of Genetic Component in Hypertension and Cardiac Hypertrophy	Dr. Renuka Nair	STEC
6.	Brain Mapping and Basic Neurogenetic Unit	Dr. P.S. Mathurnath	CBNC

ONGOING PROJECTS

1.	Investigation of Serum and Urinary Mucopolysaccharides in Patients With Coronary Artery and Cerebrovascular Disease.	Dr. Sandhyamani	KSCSTE
2.	Group Interactions in Psycho-social Care in Epilepsy	Dr. Jayachandran	Indian Epilepsy Association
3.	Indian Registry of Epilepsy and Pregnancy Coordination	Dr. Sanjeev V. Thomas	Indian Epilepsy Association
4.	A 24-week, Multi-center, Randomized, Double-blind, Placebo-controlled Evaluation of the Efficacy, Safety and Tolerability	Dr. P. S. Mathuranath	CBNC

Sl. No.	Title	Principal Investigator	Funding Agency
5.	Indian Registry of Epilepsy and Pregnancy	Dr. Sanjeev V. Thomas	European Registry
6.	Blood Component Separation Unit	Dr. Jaisy Mathai	Kerala State AIDS Control Society
7.	Angiotensin II in the pathogenesis of Myocardial Lesions in Magnesium Deficiency	Dr. K. Shivakumar	ICMR
8.	Antiviral Principles from Indian Medicinal Plants & their Possible Use to Make Blood Transfusion Safe and as Antiviral Drugs.	Ms. Molly Antony	Terumo Penpol
9.	Evaluation of the sub-types of Dementia in the Cognitively Impaired Elderly Subjects in Urban Kerala	Dr. P. S. Mathuranath	STED
10.	Diffusion Weighted Imaging and Other Magnetic Resonance Based Imaging Modalities in Human Stroke	Dr. A. K. Gupta	DST
11.	Studies on an Anti-viral Properties of Some Known Medicinal Plants vis-à-vis Phytomedicine Development	Ms. Molly Antony	DST
12.	Immunological Evaluation in Myasthenia gravis	Dr. Annamma Mathai	KSCSTE
13.	Registry of Pregnancy in Women with Epilepsy	Dr. Sanjeev V. Thomas	ICMR
14.	Pro-inflammatory Cytokine Expression in Cardiac Fibroblasts in Response to Hypoxia: Modulation by Substance P	Dr. K. Shivakumar	DBT
15.	Pilot study for Homograft Harvesting	Dr. Krishnamanohar	STEC

Sl. No.	Title	Principal Investigator	Funding Agency
16.	A Multi National, Multi-Center, Open-label, Active-controlled, Randomized Parallel-group Dose-finding Study to Evaluate the Efficiency and Safety of Two Doses of AP 12009 in Adult Patients with Recurrent High Grade Glioma, Administered Intratumorally as Continuous High-flow Microperfusion Over a 7-day period Every Other Week (study protocol no: AP 12009-G004)	Dr. Suresh Nair	SIRO CLINPHARM
17.	<i>Cardoguard</i> Tablet- Delineation of Molecular Mechanism of Action and its Efficacy in the Regression of Ventricular Hypertrophy Research Programme	Dr. Renuka Nair & Dr. A.C. Fernandez	DST and Nagarjuna Herbal Concentrates Ltd.
18.	Identification of Mycobacterial Tuberculosis by In-situ Hybridisation and Demonstration of Mycobacterial Antigen in the CSF Cytospin Smears by an Immunocytochemical for the Early laboratory diagnosis of Tuberculous meningitis (TMB)	Dr. V. V. Radhakrishnan	DST
19.	Tele-Health & Medical Education	Dr. Jawahar	STED
20.	Study of Oxidative Stress in Women with Epilepsy and its Relationship to Fetal Malformations	Dr. Sanjeev V. Thomas	KSCSTE
21.	Studies on Matrix Metalloproteinase (MMP) Gene Transcription by Nitric Oxide Mechanism of MMP Gene Induction in Human Colon Cancer Cells	Dr. Srinivas. G	DBT
22.	Organisation of a Comprehensive Stroke Care Programme	Dr. K. Radhakrishnan	KSCSTE

Sl. No.	Title	Principal Investigator	Funding Agency
23.	A 16 week Double-blind, Placebo-controlled, Randomized, Parallel- group, Multi-centre, International study to Evaluate the Efficiency and Safety of 40mg/day Istradefylline (KW6002) and that of Entacapone versus Placebo as Treatment for Parkinson's Disease in Patients with Motor Response Complications on Levodopa Therapy	Dr. Asha Kishore	Quintile Spectral
24.	Molecular basis for plumbagin as an anti tumor and chemosensitizing agent in human breast cancer cells	Dr. G Srinivas	DST
25.	Mechanisms of Anticancer Activity of Emodin /Aloe Ernodin:Effects on Cell Growth, Angiogenesis and Metastasis in Human Colon Cancer Cells	Dr. G Srinivas	DAE, BRNS
26.	A 24-week, Multi-center, Randomized, Double-blind, Placebo-controlled Evaluation of the Efficacy, Safety and Tolerability of Donepezil Hydrochloride(E2020) in Patients with Dementia Associated with Cerebrovascular Disease	Dr. P. S. Mathuranath	Sreenath Clinical
27.	Assessing Feasibility of Setting up a Population- based Stroke Registry in a Defined Population: The Trivandrum Stroke Registry	Dr. K. Radhakrishnan	WHO
28.	Modulation of High Glucose Induced Monocyte Chemo attractant Protein-1 (MCP) Gene Expression in Aortic s Endothelial Cells	Dr. C. C. Kartha	KSCSTE
29.	Adult Human Resident Cardiac Stem Cell and Endothelial Progenitor Cells: Detection of Optimum Conditions for their Therapeutic Use	Dr. C. C. Kartha	DBT

Sl. No.	Title	Principal Investigator	Funding Agency
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COMPLETED PROJECTS

1	Detection and treatment of cancer using laser based techniques	Dr. A. K.Gupta	DAE-BRNS
2.	Neuronal control of cardiac growth: Does substance P-regulate cardiac fibroblast function	Dr. K. Shivakumar	DST
3.	Femoropopliteal bypass graft with reversed saphenous-A retrospective study of 110 patients operated upon over 10 years	Dr. M. Unnikrishnan	STED
4.	Leukocyte and platelet deposition in atherosclerotic plaques: role of sugar specific adhesion to endothelial lectin galectin-1 and prospects of its inhibition by human erythrocyte membrane oligosaccharides	Ms. Sangeetha S. R. Dr. A. S. Appukuttan	ICMR

BIOMEDICAL TECHNOLOGY WING**INDUSTRY SPONSORED PROJECTS****NEWLY INITIATED**

Sl. No.	Title	Principal Investigator	Funding Agency
1.	Development of a two component chemomechanical dental caries removal agent	Dr.V. Kalliyana Krishnan	Dr. Toms Health concepts, Calicut

ONGOING PROJECTS

1.	Biofunctional evaluation of Paclitaxel eluting coronary stent-Preclinical evaluation in Porcine model	Dr. PR. Umashankar	Sahajanand Medical Technologies Pvt. Ltd, Surat
2.	Biofunctional evaluation of Sirolimus eluting coronary stent-Preclinical evaluation in Porcine model	Dr. PR. Umashankar	Sahajanand Medical Technologies Pvt. Ltd, Surat
3.	Preliminary evaluation of a biodegradable polymer ureteric stent in porcine model	Dr. PR. Umashankar	Nanyang Technology University, Singapore
4.	Biofunctional evaluation of New Design SS, Cobalt Chromium and Heparin-Sirolimus stent-Part evaluation in porcine model	Dr. PR. Umashankar	Sahajanand Medical Technologies Pvt. Ltd, Surat
5.	Pilot level production of HAP granules	Dr.H.K.Varma	Dynamic Techno Medicals Pvt.Ltd., Alwaye

COMPLETED PROJECTS

1.	Development of new sizes of TTK Chitra Heart Valve Prosthesis	Mr.Muraleedharan CV	M/s. TTK Healthcare Ltd, Chennai
2.	Development of test system for hydrocephalus shunts	Mr.Muraleedharan CV	M/s. Hindustan Latex, Trivandrum
3.	Development of Hemoconcentrator	Mr. D.S.Nagesh	SIDD Life sciences, Chennai

BIOMEDICAL TECHNOLOGY WING**NEWLY INITIATED PROJECTS**

Sl. No.	Title	Principal Investigator	Funding Agency
1.	Development of coronary stent system.	Muraleedharan CV	NMITLI, CSIR
2.	Bioengineered cell sheet for corneal application	Dr.T.V. Kumary	DBT
3.	Resorption and Remodeling of novel bioceramics	Dr.Annie John	DST-DAAD
4.	Protonic study of cytokines and adhesion molecule expression in relation to long term clinical failure of orthopedic devices	Dr. Mira Mohanty	DST-DAAD
5.	Development of thermoresponsive copolymers as sensing elements for C- Reactive protein	Dr.K. Sreenivasan	LSRB (DRDO)
6.	Development of Smart Biomaterials For Cardiovascular Tissue Engineering	Dr. Prabha D. Nair	DBT
7.	Islet immunoisolation with xenotransplantation and stem cell regeneration to islets as strategies for treatment of diabetes	Dr. Prabha D. Nair	DBT
8.	Development of Left Ventricular Assist Devices	D.S. Nagesh	VSSC
9.	Synthesis and characterization of radiopaque polyurethanes for medical applications	Dr. A. Jayakrishnan	KSCSTE
10.	Development bioactive bone graft substitutes for spinal fusion surgery	Dr. Roy Joseph	DST

Sl. No.	Title	Principal Investigator	Funding Agency
11.	Delineating mechanism of biofilm formation in urinary catheters: characterisation of role of <i>E.coli</i> secretory proteins and influence of environmental signals	Dr. A. Maya Nandkumar	KSCSTE
12.	Differential expression of rat brain mRNA during seizure development	Dr. Anoopkumar Thekkuveetil	DST

ONGOING PROJECTS

1.	Development of improved tilting disc heart valve	Muraleedharan CV	PATSER, DSIR
2.	Oral Delivery of Delivery	Dr. Chandra P. Sharma	NMITLI, CSIR
3.	Langmuir-Blodgett Monolayer on Polymer Substrates: Blood Compatibility	Dr. Chandra P. Sharma	DST
4.	Immune mechanisms of polyurethane degradation	Dr. Mira Mohanty	LSRB, DRDO
5.	Quantitative immunophenotyping of inflammatory cells in biocompatibility assessment of materials	Dr. Mira Mohanty	DST
6.	Development of an in vitro co culture system of hepatocytes and endothelial cells for Bioartificial Liver	Dr. T V Kumari	KSCSTE
7.	Ultrastructural study of the interface between bone and bioactive ceramics – pre-clinical evaluation	Dr. Annie John	KSCSTE
8.	Bone regeneration in a diabetes-induced rat model	Dr. Annie John	DST

Sl. No.	Title	Principal Investigator	Funding Agency
9.	Bone regeneration in large segmental defects using tissue engineered new generation bioceramic scaffold	Dr. Annie John	LSRB, DRDO
10.	Development of artefact free breathing monitor based on impedance pneumography	Dr. Niranjana D. Khambete (Co PI)	DST
11.	Clinical evaluation of non-invasive Cardiac output monitor	Dr. G. D. Jindal (BARC, Mumbai, PI) Dr. Niranjana D.	DST
12.	Process optimisation and development of dispensable and biodegradable polymeric bone cement for minimally invasive treatment of bone diseases	Dr.M.Jayabalan	DST
13.	Development and studies on novel biodegradable polymeric materials as functionally active cardiac implant	Dr.M.Jayabalan	DBT
14.	Development of molecularly reinforced biodegradable nanocomposite materials as internal orthopedic fixation devices.	Dr.M.Jayabalan	DST-BMBE
15.	Development of an In vitro pyrogen test kit: Evaluation of pyrogenicity using human whole blood	Dr. P.V. Mohanan	DBT

COMPLETED PROJECTS

1.	Injectable adhesive biomaterials for vascular applications	Dr. A. Jayakrishnan	Indo-French Centre, New Delhi
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SCTIMST TECHNOLOGY DEVELOPMENT FUNDED PROJECTS

NEWLY INITIATED PROJECTS

Sl. No.	Title	Principal Investigator	Duration
1.	Coating and Characterisation of Vascular grafts with hydrogel derived from oxidised alginate and gelatin	Dr. Roy Joseph	1 year
2.	Clinical Evaluation of Calcium Phosphate Cement in Dentistry	Dr. Manoj Komath	18 months
3.	Development of Silverised Chitosan Wound Dressing	Dr. Chandra P. Sharma	1 year
4.	Development of glass ionomer cements (polyalkenoate cements) for restorative, core build up and luting applications	Dr. V. Kalliyana Krishnan	1 year
5.	Development of image processing software for FMRI images	Dr. Keshavadas	1 year
6.	Standardization and evaluation of genotoxicity studies	Dr. P.V. Mohanan	1 year

ONGOING PROJECTS

1.	Development of materials for bio-electrodes	Dr. Niranjan D. Khambete	1 year
2.	Technology development for polyurethane potting compound based on indigenous raw materials	Dr. M. Jayabalan	2 years

COMPLETED PROJECTS

1.	Flouro passivation of polyester fabric for improved tissue compatibility : A Feasibility Study	Dr. Roy Joseph	1 Year
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Sl. No.	Title	Principal Investigator	Duration
2.	Preclinical Evaluation of Calcium Phosphate Cement	Dr. H.K. Varma	1 year
3.	Pulp and dentine evaluation of a single solution bonding agent	Dr. V. Kalliyana Krishnan	6 months
4.	Toxicological evaluation of a dual cure dental composite	Dr. V. Kalliyana Krishnan	1 year
5.	Technology development for orthopaedic casting tapes using indigenously available	Dr. M.Jayabalan	1 year
6.	A process for producing hydrophilic lubricious coating on natural rubber latex products	Dr. P. Ramesh	1 year

SCIENTIFIC PUBLICATIONS

ACHUTHA MENON CENTRE FOR HEALTH SCIENCE STUDIES

Chapters in books

Alvarez-Castillo F, Ravindran TKS and de Pinho H. Priority-setting. In Ravindran TKS and De Pinho Helen (eds). *The Right Reform? Health sector reform and sexual and reproductive health*. Witwatersrand School of Public Health, Johannesburg 2005.

Ravindran TKS. Module on Gender-Based Violence. In *Integrating poverty and gender in health programs: A source book for health professionals*, Manila, World Health Organization Western Pacific Region, 2005.

Ravindran TKS and De Pinho Helen (eds). *The Right Reform? Health sector reform and sexual and reproductive health*. Witwatersrand School of Public Health, Johannesburg 2005.

Ravindran TKS. *Introduction: Health sector reform and sexual and reproductive health*. In Ravindran TKS and De Pinho Helen (eds). *The Right Reform? Health sector reform and sexual and reproductive health*. Witwatersrand School of Public Health, Johannesburg 2005.

Ravindran TKS, Maceira D. *Health financing reforms*. In Ravindran TKS and De Pinho Helen (eds). *The Right Reform? Health sector reform and sexual and reproductive health*. Witwatersrand School of Public Health, Johannesburg 2005.

Ravindran TKS, Weller S. *Public-private interaction in health*. In Ravindran TKS and De Pinho Helen (eds). *The Right Reform? Health sector reform and sexual and reproductive health*. Johannesburg, Witwatersrand School of Public Health, Johannesburg 2005.

Ravindran TKS. *Private-public partnerships in South Asia in the context of MDGs*. In *Public-private sector partnerships for reproductive health: Strategies for meeting the Millennium Development Goals*. Society for International Development (SID), Rome 2006.

Varatharajan D. Towards an equitable and efficient health care system in India. Is it a zero-sum game? In: Manohar Rao MJ, Kalyankar VG, Tilak JBG, Annigeri VB (eds). *Indian Economy: Education, Health and Development, Essays in honor of PR Panchamukhi*. Himalaya Publishing group Mumbai 2005: 295-316.

Journals

Bhatia MR, Yesudian CAK, Gorter A, Thankappan KR. Demand Side Financing for Reproductive and Child Health Services in India. *Economic and Political Weekly* 2006;41: 279-284.

Mala R, Sarma PS, Sukanya R, Viswam SP. Sexual Harassment in the Work Place: Lessons from a Web-based Survey. *Indian Journal of Medical Ethics*. 2005;13:47-50.

Mohan S, Sarma PS, Thankappan KR. Access to pocket money and low educational performance predict tobacco use among adolescent boys in Kerala, India. *Preventive Medicine*. 2005; 41:685-692.

Pradeepkumar AS, Mohan S, Gopalakrishnan P, Sarma PS, Thankappan KR, Nichter M. Tobacco Use in Kerala: Findings from three recent studies. *The National Medical Journal of India*. 2005;18:148-153.

Ramakrishna GS, Sarma PS, Thankappan KR. Tobacco use among medical students in Orissa. *National Medical Journal of India*. 2005;18: 285-289.

Raman Kutty V. Pediatrics: Should gender be an issue? *Economic and Political Weekly*. 2005;40:1847-1850.

Singh G, Sinha DN, Sarma PS, Thankappan KR. Prevalence and Correlates of Tobacco Use among 10-12 Year old School Students in Patna District, Bihar, India. *Indian Pediatrics*. 2005; 12: 805-810.

BIOMEDICAL TECHNOLOGY WING

Journals

Abraham EK, Ramesh P, Joseph R, Kumary TV, Mohanan PV, Remakumary VM. Relationship between in vitro cell culture cytotoxicity and sweat-extractable dithiocarbamates in natural rubber latex gloves. *Journal of Rubber Research*, 2005; 8:103-119.

Abraham EK, Ramesh P, Joseph R, Mohanan PV, Remakumary VM. Release of dithiocarbamates into sweat from natural rubber latex surgical gloves *Rubber Chemistry and Technology*, 2005; 78: 674-681.

Annie John, Varma HK, Kumari, Nisha VR and Narayanan D. Cytocompatibility studies of a novel bioactive glass coated porous hydroxyapatite bioceramic for use as a bone substitute. *Key Engineering Materials* 2005; 284-286: 317-320.

AnilKumar PR, Varma HK, Kumary TV. Rapid and complete cellularization of hydroxyapatite for bone tissue engineering. *Acta Biomaterialia*. 2005; 1: 545-552.

Anshup J, Sai Venkataraman, Chandramouli Subramaniam, Rajeev Kumar.R, Suma Priya, Santhosh Kumar TR, Omkumar RV, Annie John and Pradeep T. Growth of gold nanoparticles in human cells. *Langmuir* 2005; 21:11562 -11567.

Asha S Mathew, Sreenivasan, K, Mohan, PV, Kumari, TV and Mira Mohanty. Polyurethane degradation in the biological Milieu. *Trend in Biomaterials & Artificial Organs*. 2006;19:115-121.

Biji Balakrishnan, Mira Mohanty, Fernandez AC., Mohanan PV, Jayakrishnan. Evaluation of the effect of Incorporation of dibutyl cyclic adenosine monophosphate in situ forming hydrogel wound

- dressing based on oxidised alginate and gelatin. *Biomaterials* 2006; 27:1355-1361.
- Biji Balakrishnan, Mira Mohanty, Umashankar PR and Jayakrishnan A. Evaluation of an in-situ forming hydrogel wound dressing based on oxidised alginate and gelatin. *Biomaterials* 2005; 32: 6335-42.
- Biji Balakrishnan, Lesieur.S, Labarre.D, Jayakrishnan A. Periodate oxidation of sodium alginate in water and in ethanol/water mixture: a comparative study, *Carbohydrate Research*, 2005; 340:1425-1429.
- Biji Balakrishnan, James NR and Jayakrishnan A. Tween 20-modified poly(vinyl chloride) exhibits enhanced blood-compatibility, *Polymer International* 2005; 54: 1304-1309.
- Biji Balakrishnan, Mohanty M, Umashankar PR, Jayakrishnan A. Evaluation of an *in situ* forming hydrogel wound dressing based on oxidized alginate and gelatin, *Biomaterials*, 2005; 32: 6335-6342.
- Balakrishnan B, Mohanty M, Fernandez AC, Mohanan PV and Jayakrishnan A. Evaluation of the effect of incorporation of dibutyl cyclic adenosine monophosphate in an *in situ* forming hydrogel wound dressing based on oxidized alginate and gelatin, *Biomaterials*, 2006; 27: 1355-1361.
- Dawlee.S, Sugandhi A, Biji Balakrishnan, Labarre D, Jayakrishnan A. Oxidized chondroitin sulphate-cross-linked gelatin matrices: A new class of hydrogels, *Biomacromolecules*, 2005; 6: 2040-2048.
- Manitha B Nair, Varma HK, Kumary TV, Suresh Babu and Annie John. Cell interaction studies with novel Bioglass coated Hydroxyapatite porous blocks. *Trends Biomater. Artif. Organs*, 2006; 19: 108-114.
- Manoj Kumar T., Paul W., Kuriachan MA., Sharma CP Bioadhesive, pH Responsive Micromatrix for Oral Delivery of Insulin. *Trends in Biomaterials and Artificial Organs*. 2005;18:198-202.
- Menon KV and Varma HK. Radiological Outcome of Tibial Plateau Fracture treated with Percutaneously introduced Synthetic Porous Hydroxyapatite Granules. *European Journal of Orthopaedic Surgery and Traumatology* 2005;15:205-213.
- Mohanan PV, Muraleedharan CV, Bhuvaneshwar GS, Derangere F, Sampeur Y and Suryanarayanan R. 'Evaluation of the Skin sensitization potential to the Titanium coated with Diamond like carbon material'. *Toxicology International, special issue* 2005;3-4.
- Joseph R, Martyn MT, Tanner KE, Coates PD. Interfacial stick-slip transition in hydroxyapatite filled high density polyethylene composite. *Bulletin of Materials Science*, 2006; 29: 85-89.
- Joseph R, Tanner KE. Effect of morphological features and surface area of hydroxyapatite on the fatigue behavior of hydroxyapatite - polyethylene composites. *Biomacromolecules*, 2005; 6: 1021-1026.
- Kalliyana Krishnan V, Lizymol PP, Kumari TV, Tharun A. Rauf, Thomas MM. Development and Evaluation of a Single Solution Bonding Agent as a Dental Adhesive. *Journal of Polymer Materials J Polym Mater* 2005; 22:145-152.
- Krishna Prasad C and Lissy K. Krishnan. Effect of passage number and matrix characteristics on differentiation of endothelial cells cultured for tissue engineering. *Biomaterials* 2005; 26: 5658-5667.
- Nirmala R James, Jayakrishnan A. Polyurethanes with radiopaque properties, *Biomaterials* 2006; 27: 160-166.

Paul W, Sharma C.P, Bioceramics, Towards Nano-enabled Drug Delivery: A Mini Review, *Trends in Biomaterials and Artificial Organs*. 2005;19:7-10.

Pradeesh TS, Sunny MC, Varma HK, and Ramesh P. Preparation of microstructured hydroxyapatite microspheres using oil in water emulsions. *Bull. Mater. Sci.*, 2005; 28(5): 383–390.

Sailaja GS, Kumary TV, Yokogawa Y and Varma HK. In vitro mineralization and cell adhesion on surface modified poly(2-hydroxy ethyl methacrylate-co-methyl methacrylate). *Key Engineering Materials* 2006; 309-31:493-496.

Sajeesh S, Sharma CP. Inter-polymer complex nanoparticles based on polymethacrylic acid-chitosan for oral insulin delivery. *Journal of Applied Polymer Science* 2006; 99: 506-512.

Sajeesh S, Sharma CP. Novel pH responsive polymethacrylic acid-chitosan-polyethylene glycol nanoparticles for oral peptide delivery. *Journal of Biomedical Material Research: Applied Biomaterials* 2006; 76B:298-305.

Sandeep G, Varma HK, Kumary TV, Suresh Babu and Annie John. Characterisation of novel bioactive glass coated hydroxyapatite granules in correlation with in vitro and in vivo studies. *Trends Biomater. Artif. Organs*, 2006;19:99-107

Sharma CP. Biomaterials and Artificial Organs: Few Challenging Areas. *Trends in Biomaterials and Artificial Organs*. 2005;18:148-157.

Sini H, Mohanan PV and Devi KS. Studies on the insecticidal activity, cytogenecity and metabolism of fatty acid rich fraction of *Hydnocarpu laurifolia*. *Toxicological and Environmental chemistry* 2005; 87: 91-98.

Sreerekha PR and Lissy K. Krishnan. Cultivation of Endothelial Progenitor Cells on Fibrin Matrix and Layering on Dacron/PTFE Vascular Grafts. *Artificial Organs* 2006; 30: 242-249.

Sreenivasan K. Surface imprinted polyurethane film as a chiral discriminator, *Talanta*, 2006; 68: 1037-1040.

Varma HK Suresh Babu S. Synthesis of apatite by citrate gel pyrolysis method. *Ceramic International* 2005; 31:109-114.

HOSPITAL WING

Book

Kartha CC and Joy Vithayathil (Eds.). *Disease diagnosis and treatment: Recent trends* (A collection of essays in Malayalam). State Institute of Languages, Trivandrum 2005, 177pp. ISBN 81-7638-377-5.

Chapters in books

Kesavadas C, Thomas B. Functional Magnetic Resonance Imaging. In: Radhakrishnan K. ed. *Reviews in Indian Neurology* Sree Chitra Tirunal Institute for Medical sciences and Technology, Trivandrum 2005; pp 219-242.

Mathuranath PS. A critical assessment of the role of neuropsychological tests in dementia diagnosis. In: Radhakrishnan K, editor. *Reviews in Indian Neurology*. Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum 2005;191-218.

Nair S, Kachhara R. Monopolar and bipolar coagulators. Nair S. Surgical management of Arnold Chiari malformations. In R.Ramamurthi, K Sridhar, MC Vasudevan (eds). *Textbook of Operative Neurosurgery*. BI Publications, New Delhi 2005; 951-961.

Nair S, Kachhara R. Monopolar and Bipolar coagulators. In R.Ramamurthi, K Sridhar, MC Vasudevan (eds). *Textbook of Operative Neurosurgery*. BI Publications, New Delhi 2005; 59-61.

Nair S, Menon G, Rao BRM, Rajesh BJ, Muthuretnam T, Mathew A, Easwer HV, Bhattacharya RN. Intramedullary spinal cord glial tumors: management philosophy and surgical outcome. In T Kanno & Y Kato (eds). *Minimally Invasive Neurosurgery and Multidisciplinary Neurotraumatology*. Springer-Verlag, Tokyo 2006; 36-46.

Radhakrishnan K. Indications for surgery in epilepsy. In: *Textbook of Operative Neurosurgery, Volume II*. Ramamurthi R, Sridhar K, Vasudevan MC (eds), New Delhi: B.I. Publications 2005; 709 –13.

Wadia NH, Vas CJ, Mathuranath PS. Alzheimer's Disease and Other Dementias. In: Wadia NH (ed). *Neurological Practice: An Indian Perspective*. First edition. Elsevier, New Delhi 2005; 381-408.

Journals

Ashalatha R, Kesavadas C, Rajesh B, Radhakrishnan VV, Radhakrishnan K. Dysembryoplastic Neuroepithelial tumor in the third ventricle with mesial temporal sclerosis- an unusual association. *Neurology Asia*. 2005; 10: 127-129.

Ashalatha R, Moosa A, Gupta AK, Krishna Manohar SR, Sandhyamani S. Cerebral Aneurysms in atrial myxoma-an unusual, delayed complication. *Neurology India*. 2005; 53: 216-218.

Ashalatha R, Moosa A, Gupta AK, Krishna Manohar SR, Sandhyamani S. Cerebral aneurysms in atrial myxoma: a delayed, a rare manifestation. *Neurology India*. 2005; 53: 216-218.

Bak TH, Crawford LM, Hearn VC, Mathuranath PS, Hodges JR. Subcortical dementia revisited: similarities and differences in cognitive function between progressive supranuclear palsy (PSP), corticobasal degeneration (CBD) and multiple system atrophy (MSA). *Neurocase*. 2005;1:268-273.

Bhuyan RK, Theodore S, Syamkrishnan KG, Koshy T, Neelakandhan KS. Right pulmonary artery compression by trans esophageal echocardiographic probe. *Indian Journal of Thoracic and Cardiovascular Surgery*. 2005; 21:194.

Bodhey NK, Purkayastha S, Gupta AK. Posterior fossa tuberculous abscess mimicking as mass lesions: MRI features. *Rivista di Neuroradiologia*. 2005;18:180-184.

Bodhey NK, Gupta AK, Neelakandhan KS, Unnikrishnan M. Early sternal erosion and luetic aneurysms of thoracic aorta: report of 6 cases and analysis of cause-effect relationship. *European Journal of Cardio-thoracic Surgery*. 2005; 28:499-501.

Bodhey NK, Gupta AK, Purkayastha S, Kesavadas C, Krishnamoorthy T, Kapilamoorthy TR, Thomas B. Embolization of craniofacial vascular malformation. *Rivista di Neuroradiologia*. 2005;18:349.

Bodhey NK, Gupta AK, Varma DR, Purkayastha S, Sonwalkar HA. CT Angiographic demonstration of the agenesis of ICA with transsellar cavernous collateral and PCA aneurysm. *Rivista di Neuroradiologia*. 2004; 17: 664-667.

Bodhey NK, Gupta AK. Delayed frontal lobe malignancy in a child treated for medulloblastoma. *Revista di Neuroradiologia*. 2005;18:376-380.

Bodhey NK, Purkayastha S, Gupta AK. Neuroimaging in leptomeningeal carcinomatosis: The importance of Gadolinium Enhanced MRI. *Rivista di Neuroradiologia*. 2005;18; 381-384.

- Bohora S, Namboodiri KK, Krishnamoorthy KM. Thrombus at the junction of the inferior vena cava and right atrium: a contraindication for transfemoral percutaneous mitral commissurotomy. *Heart*. 2006; 92: 694.
- Devasia B, Samuel AS, Kesavadas C. Lipomatous Cortical Dysplasia with Callosal lipoma- a rare association. *Pediatric Radiology* 2006; 36:83.
- Dora SK, Tharakan JM, Ajith Kumar V, Namboodiri KKN, Nair KK. Spontaneous automaticity of atrio fascicular accessory pathway. *Europace*. 2006; 8: 140-143.
- Dora SK, Varma PK, Parija C, Nair KK, Sreedhar R, Neelakandhan KS, Tharakan J: Polymorphic ventricular tachycardia after radiofrequency maze procedure: Report of two cases. *Journal of Thoracic and Cardiovascular Surgery*. 2005; 129: 446-447.
- Firosh Khan S, Ashalatha R, Syam K. Periodic EEG Pattern in Neuro-Dengue – A Novel Observation. *European Journal of Neurology*. 2005;12:1009-1010.
- Firosh Khan S, Ashalatha R, Thomas SV, Sarma PS. Emergent EEG is helpful in neurology critical care practice. *Clinical Neurophysiology*. 2005;116: 2454-2459.
- George A, Mathuranath PS. Primary Progressive Aphasia. *Neurology India*. 2005; 53: 162-166.
- George A, Ruchir D, Sylaja PN, Mathew, Mathuranath PS. Pattern and Rate of Recovery from Aphasia following Stroke: A prospective 1-year follow-up study. *The Journal of the Indian Speech and Hearing Association* 2004: 80-85.
- Gupta AK, Purkayastha S, Varma DR, Kapilamoorthy TR, Thomas B. High-Flow Traumatic Carotico-Jugular Fistula Manifesting as Venous Hypertensive Encephalopathy. *Interventional Neuroradiology*. 2005; 11: 261.
- Gupta AK, Purkayastha S, Krishnamoorthy T. Percutaneous retrieval of intravascular broken catheter fragments. A novel technique using a balloon. *Interventional Neuroradiology*. 2005; 1:149.
- Gupta AK, Purkayastha S, Unnikrishnan M, Vattoth S, Krishnamoorthy T, Kesavadas C. Hyperperfusion syndrome in balloon angioplasty, stenting and bypass surgery of arteries supplying the brain. *Journal of Neuroradiology*. 2005; 32: 352-358.
- Gupta AK, Varma DR, Bodhey NK, Purkayastha S. Embolization of choroid plexus arteriovenous malformation. A case report. *Rivista di Neuroradiologia*. 2005; 18:113 – 116.
- Gupta AK, Vattoth S, Kapilamoorthy TR, Purkayastha S, Vijaichandran. Cutting balloon angioplasty in Type I aortoarteritis. *Rivista di Neuroradiologia*. 2004; 17: 693-698.
- Harikrishnan S, Anand S, Sivasubramoniam S, Mahadevan KK, Kumar A, Titus T, Tharakan JM. Long-term outcome of patients undergoing balloon mitral valvotomy in pregnancy. *American Journal of Cardiology*. 2005; 95:1504-1506.
- Harikrishnan S, Bhat A, Tharakan JM, Titus T, Kumar A, Sivasankaran S, Krishnamoorthy KM. Percutaneous transvenous mitral commissurotomy using metallic commissurotome: long-term follow-up results. *Journal of Invasive Cardiology*. 2006; 18: 54-58.
- Harikrishnan S, Dora SK, Tharakan JM. Brugada syndrome. *International Journal of Cardiology* 2005; 102: 539-541.

- Harikrishnan S, Nair KK, Tharakan JM, Titus T, Krishnamoorthy KM, Ajith Kumar VK, Sivasankaran S. Percutaneous transmitral commissurotomy in juvenile mitral stenosis – comparison of long term results of inoue balloon technique and metallic commissurotomy. *Catheterisation and Cardiovascular Interventions*. 2006; 67: 453-459.
- Harikrishnan S, Narayanan KKN, Sivasubramonian S. Sizing balloon-induced tear of the atrial septum. *Journal of Invasive Cardiology*. 2005; 17: 546-547.
- Harikrishnan S, Rajeev E, Nair KK, Tharakan JM. Retrieval of friable catheter fragments. *International Journal of Cardiology*. 2006; 106: 282-284.
- Harikrishnan S, Rajeev E, Tharakan JM, Thomas T, Ajith K, Sivasankaran S, Krishnamoorthy KM, Santhosh D, Krishnakumar N, Namboodiri KK. Acute phase reactants predict mitral regurgitation following mitral valvuloplasty. *International Journal of Cardiology*. 2005 Dec 12; [Epub ahead of print].
- Harikrishnan S, Stigimon J, Tharakan JM. Intracranial aneurysms, coronary aneurysms and descending aortic coarctation—unreported association. *International Journal of Cardiology*. 2005; 99: 329-330.
- Harikrishnan S, Tharakan JM, Titus T, Ajith Kumar VK, Sivasankaran S, Krishnamoorthy KM, Dora S, Nair KK, Namboodiri KKN. Ventricular septal rupture following myocardial infarction. Long-term survival of patients who did not undergo surgery. Single-centre experience. *Acta Cardiologica*. 2005; 60:403.
- Harikrishnan S, Titus T, Tharakan JM. Septal defects after percutaneous mitral valvotomy—all are not innocent. *Journal of the American Society of Echocardiography*. 2005; 8: 183-184.
- Jacob A, Moorthy TK, Thomas SV, Sarada C. Compression of the deep motor branch of the ulnar nerve: an unusual cause of pure motor neuropathy and hand wasting. *Archives of Neurology*. 2005; 62: 826-827.
- Jacob A, Sarada C, Thomas SV. Painless injuries in a child : Hereditary sensory and autonomic neuropathy. *Annals of Indian Academy of Neurology*. 2006; 9:39 – 41.
- Jaisy Mathai : Irradiated Blood Components. *Indian Journal of Medical Research*. 2005; 122; 371-373.
- Jayasree RS, Bushiri MJ, John A, Nayar VU. Temperature dependant Raman spectra of Nonaaqua lanthanoid(Pr) single crystal. *Spectrochimica Acta*. 2006; 64: 518-524.
- Kapilamoorthy TR, Marco Fiorelli, Gupta AK, Kesavadas C, Krishnamoorthy T, Bozzao L. Leukoariosis- A short review. *Rivista di Neuroradiologia*. 2005;18: 205-211.
- Kartha CC. Book Review: Stress: From Burnout to Balance by Vinay Joshi. *Current Science*. 2005; 89: 402-403.
- Kartha CC. Guest Editorial: Anguish of a medico. *Current Science*. 2005; 89: 725-726.
- Kesavadas C, Sonwalker H, Thomas B, Gupta AK, Radhakrishnana VV. Atypical MR appearance of Desmoplastic Infantile Ganglioglioma. *Pediatric Radiology*. 2005; 35:1024-1026.
- Kishore A, Lang AE. Normalization of voice in spasmodic dysphonia during transient global amnesia. *Movement Disorders*. 2005; 20:1228-1229.
- Kishore A, Madegowda R, Anand A. Mutational screening of the Parkin gene among South Indians with early –onset Parkinson’s disease. *Journal of*

- Neurology, Neurosurgery and Psychiatry*. 2005; 76: 1588-1590.
- Koshy T, Gayatri P, Manikandan S, Rathod RC. Depth of insertion of left sided double lumen end bronchial tube and a height based formula based on breath sounds over left upper lobe in Asian (India) patients- a prospective study. *Anesth Analg* 2005; 100(suppl): SCA 104.
- Koshy T, Trivedi D, Nair S. Intrapleural morphine vs. bupivacaine vs. combination of both for post thoracotomy pain- a prospective study. *Anesthesia and Analgesia* 2005;100(suppl): SCA 38.
- Koshy T. One lung ventilation-strategies to make it work- *Anaesthesia Update* 2005;12:16-33.
- Manju L, Nair RR. Reduction of perfusate magnesium alters inotropic response of papillary muscle to ion channel modulators. *Magnesium Research*. 2005; 18: 163-169.
- Menon G, Nair S, Bhattacharya RN, Iyengar R, Rao BRM, Rajesh BJ, Muthuretnam T, Mathew A, Easwer HV. Brainstem cavernomas: Experience with 25 patients. *Indian Journal of Cerebrovascular Surgery*. 2005; 1: 68-73.
- Menon G, Furtado SV, Nair SN, Bhattacharya RN, Rao BRM, Easwer HV, Muthuretnam T, Mathew A. Intracranial aneurysms in children and adolescents. *Indian Journal of Cerebrovascular Surgery*. 2005;1:80-84.
- Nair KK, Harikrishnan S, Tharakan JM. Cholesterol embolization syndrome. *Heart*. 2005; 91: 214.
- Nair S, Menon G, Muthuretnam T, Mathew A, Prasad M, Rao BRM, Easwer HV, Rajesh BJ, Bhattacharya RN. Spontaneous intracerebral haemorrhage: Still a surgeon's dilemma. *Indian Journal of Cerebrovascular Surgery*. 2005; 1:100-106.
- Nair S, Menon G, Muthuretnam T, Rao BRM, Rajesh BJ, Abraham M, Easwer HV, Prasad M, Bhattacharya RN. Management issues in bilateral vestibular schwannomas. *Progress in Clinical Neurosciences*. 2005; 20: 69-82.
- Namboodiri KKN, Bohora S. Clenched fist appearance in endomyocardial fibrosis. *Heart*. 2006; 92:720.
- Namboodiri KKN, Shomu B, Tharakan JM. Carbamazepine-induced sinus nodal dysfunction. *Annals of Indian Academy of Neurology*. 2006; 9: 36-38.
- Neema PK, Manikandan S. Tracheostomy and its variants (Review article). *Indian Journal of Anaesthesia*. 2005; 49:8.
- Neema PK, Tambe S, Unnikrishnan M, Varma PK, Rathod RC: Surgical interruption of PDA in a child with severe aortic stenosis - Anesthetic considerations. *Journal of Cardiothoracic and Vascular Anesthesia*. 2005;19: 485-486.
- Neema PK, Vijayakumar A, Manikandan S, Rathod RC: In response – use of CSF drainage during single-stage transmediastinal repair of ascending/descending aortic aneurysms. *J Cardiothoracic and Vascular Anesthesia*. 2006; 20:126-127.
- Panda S, Radhakrishnan VV, Radhakrishnan K, Rao RM, Sarma PS. Electro-clinical characteristics and postoperative outcome of Medically refractory tumoral temporal lobe epilepsy. *Neurology India*. 2005; 53: 66-71.
- Pendharkar HS, Bodhey NK, Gupta AK, Purkayastha S, Sandhyamani S, Burathoki SK. Metachronous malignant fibrous histiocytoma of skull: A case report. *Rivista di Neuroradiologia*. 2005; 18: 175-179.

- Pendharkar HS, Bodhey NK, Gupta AK, Purkayastha S, Sandhyamani S, Burathoki SK. Metachronous malignant fibrous histiocytoma of skull. A Case Report. *Rivista di Neuroradiologia*. 2005; 18: 175-179.
- Pulikkunnel ST, Thomas SV. Neural tube defects: pathogenesis and folate metabolism. *Journal of Association of Physicians of India*. 2005; 53:127-135.
- Purkayastha S, Bodhey NK, Gupta AK, Kesavadas C. MRI features of tubercular spinal arachnoiditis. A case report. *Rivista di Neuroradiologia*. 2005;18:386-389.
- Purkayastha S, Bodhey NK, Gupta AK, Kesavadas C, Pendharkar HS. Effect of bromocriptine therapy in pituitary adenoma: An empty sella' appearance. *Rivista di Neuroradiologia*. 2005; 18:221-225.
- Purkayastha S, Gupta AK, Kapilamoorthy TR, Bodhey NK, Thomas B. Aneurysmal bone cyst of skull. A report of two cases. *Rivista di Neuroradiologia*. 2004;18: 623-626.
- Purkayastha S, Gupta AK, Varma DR, Kapilamoorthy TR. Proatlantal intersegmental arteries of external carotid artery origin associated with vein of Galen malformation. *American Journal of Neuroradiology*. 2005; 26: 2378-2383.
- Purkayastha S, Gupta AK, Jayadevan ER. Persistent trigeminal artery associated with intracranial vertebral artery: Fenestration in a patient with carotid-cavernous fistula. A case report. *Rivista di Neuroradiologia*. 2005; 18: 246-248.
- Purkayastha S, Gupta AK, Jayadevan, Bodhey NK. Cerebral AVM embolized through persistent primitive hypoglossal artery. A case report. *Interventional Neuroradiology*. 2005; 11: 241-246.
- Purkayastha S, Gupta AK, Kapilamoorthy TR, Kesavadas C, Thomas B, Krishnamoorthy T, Bodhey NK. Percutaneous vertebroplasty in the management of vertebral lesions. *Neurology India*. 2005; 53:167-173.
- Purkayastha S, Gupta AK, Sonwalkar HA, Bodhey NK. Duplicate origin of the right vertebral artery in a patient with stroke. *Rivista di Neuroradiologia*. 2004; 17: 661-663.
- Purkayastha S, Gupta AK, Varma DR, Radharishnan VV. Chordoid Meningioma Mimicking Tuberculoma. *Rivista di Neuroradiologia*. 2005; 18: 64 –68.
- Purkayastha S, Jayadevan ER, Kapilamoorthy TR, Gupta AK. Suction thrombectomy of thrombotic occlusion of subclavian artery in a case of Takayasu's arteritis - a case report. *Cardiovascular and Interventional Radiology*. 2006: 29:289–293.
- Purushotham S, Manohar SR, Sivasubramaniam S, Neelakandan KS. Submitral left ventricular aneurysm: the location of the circumflex Coronary Artery in relation to the aneurysm influences the surgical approach & outcome. *Journal of Thoracic and Cardiovascular Surgery*. 2005; 129: 1175-1177.
- Qurwshi SA, Sivasankaran S. Role of sentis in Congenital heart disease. *Expert Review of Cardiovascular Therapy*. 2005; 3: 261-269.
- Radhakrishnan K, St. Louis EK, Johnson JA, McClelland RL, Westmoreland BF, Klass DW. Pattern-sensitive epilepsy: electroclinical characteristics, natural history, and delineation of the epileptic syndrome. *Epilepsia*. 2005; 46: 48-58.
- Sahu B, Koshy T. Anaesthetic management in patients on long term steroid therapy. *Anaesthesia Update* 2005; 12: 7-12.
- Sandhyamani S, Sindhu JK, Sriramachari S. Recolorization of museum specimens: a modification

- of Romhany's technique based on pyridine/nicotine hemochromogen reactions. *Virchows Archiv*. 2005; 447: 94-98.
- Sapna S, Ranjith SK, Shivakumar K. Cardiac fibrogenesis in magnesium deficiency: A role for circulating angiotensin II and aldosterone. *American Journal of Physiology-Heart and Circulatory Physiology* February 10, 2006; doi:10.1152/ajpheart.01185.2005 (E-publication).
- Sivasankaran. S, Sharland GK, Simpson JM. Dilated cardiomyopathy presenting during fetal life. *Cardiology in the Young*. 2005;15:409-416.
- Somarajan S, Ashalatha R, Syam K. Moya Moya Disease: An unusual clinical presentation: a Case report. *Journal of Association of Physicians of India*. 2005; 53: 49-51.
- Sonwalkar HA, Gupta AK, Purkayastha S, Bodhey NK, Krishnamoorthy T. Takayasu arteritis with multiple intracranial aneurysms. *Interventional Neuroradiology*. 2005;10:249.
- Subramonium A, Johnson J, Antony M, Thamby SV, Raveendranath M, Abraham TK, Shanmugam J, Rajasekharan S, Nair GM. Screening of selected traditional medicinal plant extracts for antiviral and antifungal properties. *Biomedicine* 2005; 48-54.
- Sukumaran S, Krishnamoorthy T, Thomas SV. Split-hand/split-foot malformation associated with maternal valproate consumption. *Neurology India*. 2005; 53: 251-252.
- Thomas B, Eyssen M, Peeters R, Molenaers G, Van Hecke P, De Cock P, Sunaert S. Quantitative diffusion tensor imaging in cerebral palsy due to periventricular white matter injury. *Brain* 2005;128: 2562-2577.
- Thomas B, Kesavadas C. Focal Splenial Hyperintensity in Epilepsy. *Journal of Neurology, Neurosurgery and Psychiatry*. 2006; 77: 202.
- Thomas B, Krishnamoorthy T, Purkayastha S, Gupta AK. Isolated left vein of Labbe thrombosis. *Neurology*. 2005; 65:1135.
- Thomas B, Krishnamoorthy T. Migrating intraventricular cysticercus during MRI. *Neurology*. 2005; 65: 1321.
- Thomas B, Purkayastha S, Vattoth S, Gupta AK. CT Cisternography of Paradoxical Cerebrospinal fluid Rhinorrhoea after operation for acoustic neuroma. *Rivista di Neuroradiologia*. 2005; 18:555-558.
- Thomas B, Purkayastha S, Vattoth S, Gupta AK. CT cisternography of paradoxical cerebrospinal fluid rhinorrhea after operation for acoustic neuroma. *Rivista di Neuroradiologia*. 2005; 18:555-558.
- Thomas B, Sunaert S, Thamburaj K, Wilms G. Spurious absence of signal on 3D time-of-flight MR angiograms on 1 and 3 tesla magnets in cerebral arteries associated with a giant ophthalmic segment aneurysm: the need for alternative techniques. *JBR-BTR*. 2005; 88:241-244.
- Thomas B, Sunaert S. 'Winking Frog Sign' - A new sign demonstrating the Wallerian degeneration of pyramidal tract in brainstem on diffusion tensor Imaging. *Rivista di Neuroradiologia*. 2005; 18:76-77.
- Thomas B, Sunaert S. Diffusion Tensor imaging: Technique, Clinical and Research Applications. *Rivista di Neuroradiologia*. 2005; 18: 419-435.
- Thomas SV, Koshy S, Nair CR, Sarma PS. Frequent seizures and polytherapy can impair quality of life in persons with epilepsy. *Neurology India*. 2005; 53: 46-50.

Thomas SV. Management of epilepsy and pregnancy. *Journal of Postgraduate Medicine*. 2006; 52: 57-64.

Varkey B, Sarada C. Clinical features and outcome of Acute Disseminated Encephalomyelitis (ADEM): An outlook from South India. *Annals of Indian Academy of Neurology*. 2006; 9: 20-24.

Vattoth S, Purkayastha S, Jayadevan ER, Gupta AK. Bilateral Cerebral venous angioma associated with varices- a case report and review of literature. *American Journal of Neuroradiology*. 2005; 26: 2320-2322.

Vinayan KP, Biji V, Thomas SV. Educational problems with underlying neuropsychological impairment are common in children with Benign Epilepsy of Childhood with Centrotemporal Spikes (BECTS). *Seizure*. 2005;14: 207-212.

HONOURS, AWARDS AND RECOGNITIONS

Dr. Ajayakumar SRF received the Young investigator travel award to attend the 26th International Epilepsy Congress, Paris, 2005

Dr. T. V. Anilkumar was elected as Fellow of the National Academy of Veterinary Sciences, New Delhi.

Ms. Asha S Mathew, Ph D Student, Histopathology Laboratory was selected for the Young Scientists Reviewing Programme conducted by the Journal Biomaterials, in June 2005 and qualified as a recognized reviewer of the journal.

Ms. Bernadette K Madathil, Ph D Student, Histopathology Laboratory was awarded the Jawaharlal Nehru Memorial Fund Scholarship for Doctoral Studies. The work entitled "Proteomics of orthopedic wear debris induced inflammation" was undertaken under this scholarship at the Protein and Proteomic Center, Department of Biological Sciences, National University of Singapore, Singapore from June 2005 to January 2006.

Mr. Bijoy Chellan, PhD Student received the best poster presentation certificate and cash award for the paper "O-glycosylation in human lipoprotein (a), may mediate its selective accumulation within the arterial wall" at the conference on "Heart research 2006", at Madras, January 2006.

Dr. P.K. Dash was elected as Secretary of Trivandrum City Branch of ISA.

Dr. Jayanand Sudhir won the Best Paper award in the conference of Annual conference of Kerala Chapter of NSI held in Cochin.

Dr. A. Jayakrishnan was awarded Distinguished Alumnus Award of Indian Institute of Technology, Madras for the year 2005 in the category of Academic Excellence.

Dr. Jaisy Mathai was nominated as a member of State Advisory Body on Anti retroviral treatment program.

Dr.R.S. Jayasree was awarded the Women Scientist Fellowship of Department of Science and Technology, Government of India.

Dr. C Keshavdas received Derek Harwood Nash Scholarship for the visit and study on Pediatric Neuroradiology at the Department of Pediatric Neuroradiology, Hospital for Sick Children, University of Toronto, Canada for a period of six weeks (22nd May to 2nd July 2005).

Dr.C Keshavdas received Dr.Ashoke Mukharjee Memmorial Award, 2006 for the paper on “Presurgical evaluation in Seizure patients with brain lesions using “In-Line BOLD”fMRI” at the Annual Conference of Indian Radiological and Imaging Association, Chennai in Jan 2006.

Dr.C. Keshavdas received SNR Travel Fellowship for the paper on “Post Ictal MR imaging – Pictorial Essay and Proposed classification” to attend Symposium Neuroradiologicum at Adeleide, Australia, March 2006.

Prof.C.C.Kartha was elected as a Fellow of International Academy of Cardiovascular Sciences (Canada).

Prof.C.C.Kartha was nominated as a member of the Task Force on Chronic Diseases Biology, Department of Biotechnology, Government of India.

Dr. A. Kuruvilla received ICMR International Fellowship Award for visiting the Epilepsy Research Institute, University of Melbourne, Melbourne, Australia from 14 Nov. to 12 December 2005.

Leena Kuruvilla, PhD student won the Nirmal Ganguly award for young scientists for the best paper presented during the Joint Annual Meeting of the Indian chapters of the International Society of Heart Research and International Academy of Cardiovascular Sciences.

Ms. Lynda V. Thomas, Ph D student, LPA, won the best student paper presentation award for the paper titled “A novel tissue engineered blood vessel substitute for small diameter vascular graft” presented at the 12th Annual conference of the Vascular society

of India, VSICON 2005, 10-12 Nov, 2005, at Trivandrum

Dr. P.K. Neema was elected to the National Executive Council of IACTA. He has also been inducted into the Editorial Boards of Indian Journal of Anesthesia and Current Medical Trends.

Prof. V. V. Radhakrishnan has been conferred the Fellowship of the National Academy of Medical Sciences (FAMS) at the annual conference of National Academy of Medical Sciences, Ahmedabad in December 2005.

Ms. Sailaja G.S won the best scientific paper award for Biomimetically modified poly(2-hydroxy ethyl methacrylate-co-methyl methacrylate) microspheres for bone augmentation at the National conference on Ceramics for Medical Applications, held at IIT Chennai during September 16-17, 2005.

Dr. C P Sharma became the council member of the Asia- Pacific Region of the Tissue engineering and Regenerative Medicine International Society (TERMIS).

Dr.PK.Sinha got 2 (Rukmani Pundit award & Bhojaraj award) awards during annual conference of ISA- at Kolkatta held in December 2005.

SCTIMST Blood Bank received the award for the Best Blood Bank in the State for 2005 instituted by Kerala State Blood Transfusion Council.

Dr. Thomas Koshy was elected to the National Executive Council of IACTA and as President of Trivandrum City Branch of ISA.

VISITORS

ACHUTHA MENON CENTRE

Dr. Birger Forsberg, Division of International Health (IHCAR), Department of Public Health Sciences, Karolinska Institute, S-171 77 Stockholm, Sweden visited the Centre during 19-22nd November 2005 to hold discussions with health economics faculty and students on possible future collaborations with the Karolinska Institute and the World Bank, New Delhi.

Dr. Jonathan Simon, Associate professor Department of International Health, School of Public Health, Boston University, Boston, Massachusetts 02118 2335 USA visited AMC during February 2006 to hold discussions with AMC faculty on his ongoing health economics projects.

Dr. Richard A Cash, Professor, Department of Public Health, Harvard University has visited this center and gave lectures on “Introduction to Epidemiology” and “Infectious Diseases” to the MPH/DPH scholars of this center during January to March 2006.

BMT WING

Hon. Minister of State for Science and Technology Mr. Kapil Sibal visited BMT wing on 2nd September 2005 and visited the various laboratories.

Dr. Suraj Bhan, Secretary, Department of Biotechnology visited BMT wing in May 2005 in connection with Tissue Engineering Workshop/ Brainstorming and DBT’s Bioengineering initiative.

Prof. R.K. Rao from University of Tennessee, Memphis, USA visited the BMT wing during 9-12th of October 2005.

Prof. Gundu Rao from University of Minnesota visited BMT Wing in August 2005

Dr. Robert D Eagling and Dr. Graham McCann from Royal Society of Chemistry, Cambridge, UK visited BMT wing in Feb 2006.

Dean and Professors from Simon Frazier University, Canada visited the BMT wing on 16th January 2006.

Dr. Dawn Walker and Dr. Steven Wood, Department of Medical Physics and Clinical Engineering, The University of Sheffield, UK visited BMT wing.

Prof. Shervanti Homer-Vanniasinkam, Professor of Surgery and clinical Sub Dean, University of Leeds, U.K visited BMT wing and interacted with staff during Nov 10-14th, 2005.

Prof. Subbu Venitaraman, and Prof. Yeo Joon Hock, NTU, Singapore visited BMT wing in connection with evaluation of medical devices.

HOSPITAL

Dr. Arvind Bhatia, Consultant Neurosurgeon from Narayana Neurosciences Center, Bangalore, visited the Epilepsy Program from August 6th to 20th to learn about presurgical evaluation and surgical treatment of epilepsies.

Mr. Alexander Ben Weshun, medical student (observer) from Cardiff University, England visited the Epilepsy Program from August 1st to 28th.

Dr. Amlan Mandal, Consultant Neurologist, (observer) from Armenian Chrch Trauma Centre, Kolkata visited the Epilepsy Program from January 30th to 11th February.

Ms. Anika Weitz, psychology student and observer from Germany visited the Epilepsy Program from November 1st 2005 to 31st January 2006.

Dr. Cheolsu Shin, MD, Associate Professor, Department of Neurology and Epilepsy Section, Mayo clinic, Rochester, MN, USA visited the Epilepsy Program from 8th February to 14th February. He participated in VEEG sessions and case discussions and delivered a lecture on "Vitamin D and Epilepsy".

Dr. Dhanwark Mattke, immediate past Secretary of International Association of Group Psychotherapy from Germany visited the R. Madhavan Nayar center on 23/11/05.

Dr. Elaine Wyllie and Dr. Deepak Lachhwani, Pediatric Epilepsy Programme, Cleveland Clinic, Cleveland, USA visited the R.Madhavan Nayar Centre on January 30, 2006. During this period they participated in a discussion on medically refractory epilepsies.

Dr. Francesco Scaravilli Professor of Neuropathology, University of London visited the department of Pathology during the first week of March 2006 and he also gave a talk on "Neuropathology of HIV infection and its evolution following HAART".

Dr. Gireesh Mirle, MD, Pulmonologist visited Epilepsy Program from 12/03/05 to 14/12/05. He supervised the setting up of Sleep Lab and gave a lecture on "Sleep and Cardiovascular disease mechanism and clinical implications".

A Kuwait Medical delegation consisting of five senior Doctors from the Ministry of Health Kuwait visited the institute.

Dr. Leif Wiklund, M.D., Ph.D, Neurologist, University Hospital, Uppsala, Sweden visited Epilepsy Program on 23.01.06.

Dr. Leif Wiklund, M.D., Ph.D., Neurologist, Uppsala University Hospital Uppsala, Sweden visited the department from 21 Jan 2006 to 25 Jan 2006 and gave a lecture on "Von-Hippel Lindau disease-Genetics and clinical aspects on 24 Jan 2006.

Dr. K. Mishra, MD. M.S., A.B.M.S, Professor of Neurology, Integrative Medicine Program, UCLA, California, visited Epilepsy Program on 16.01.2006.

Dr VL Ray, Director National Plasma Fractionation Center, Mumbai, Sri Viswas Mehta, Principal Health Secretary, Govt. of Kerala, Dr RK Saran, Consultant AIIMS New Delhi, Dr KT Shenoy, Professor Dept.of

Gastroenterology, MCH Trivandrum, Dr NK Hema, Addl. Project Director of KSACS, Dr C Raghavan, Addl Director (Blood Safety) KSAC and Dr TV Velayudhan, Deputy Director, Training KSAC visited blood transfusion services department.

Dr. Rukshen Veerasoorya, Adelaide, Australia, visited department of cardiology and conducted a workshop in cardiac electrophysiology.

Dr. Sivanarayana, MD, DM, practicing neurologist from Vijayawada, A.P and a Chitra alumni visited the center from 13.02.06 to 25.02.06. He attended the

VEEG sessions, Epilepsy Clinics, Patient Management Conferences and intraoperative ECoG sessions

Dr. Swapan Mukhopadhyaya, Lecturer, Division of Paediatric, Neurology, Institute of Child Health, Kolkata, Consultant Neurologist, (observer) from AMRI Hospital visited the Epilepsy Program from March 15th to 28th March.

Dr. Thomas Peter, Professor & Head, Department of Electrophysiology, CSMC, UCLA, Los Angeles, USA visited the Department of Cardiology and conducted a course in Arrhythmia.

VISITS ABROAD OF FACULTY MEMBERS

Dr. Annie John visited Max Bergmann centre for Biomaterials, University of Technology, Dresden, Germany - September 17, 2005 to October 19, 2005.

Dr. S. Harikrishnan Completed a 6 months fellowship at the Leads Teaching Hospital, Leads, United Kingdom as a commonwealth fellow.

Dr. S. Dinesh Nayak spent a three weeks at the Department of Clinical Neurophysiology, King's College Hospital, London, UK, in February-March, 2006 and completed a study on interictal epileptiform discharges during chronic intracranial EEG monitoring in patients with medically refractory epilepsy.

Dr. A. Jayakrishnan visited the Faculty of Pharmacy, University of Paris (sud), France in connection with the in vivo experiments on arterial closure using the surgical adhesive developed in the Indo-French project during October 2005.

Dr. C Keshavdas visited the Department of Pediatric Neuroradiology, Hospital for Sick Children University of Toronto, Canada for a period of six weeks(22nd May to 2nd July 2005).

Dr. Lissy Krishnan visited the Petit Biongeering laboratory in Georgia Tech Institute, Atlanta,USA, Vascular Tissue engineering division, Biomedical Engineering School, University of Minnesota, and the Polymer lab in the School of Engineering at Virginia Commonwealth University during June 2005.

Dr. Lissy K.Krishnan attended a 5 days course on Science Technology Innovation Policy held by J.F. Kennedy School of Government, Harvard University USA, during Nov 27-Dec 2, 2005. Following the program at Harvard she visited Human and Automation Lab in MIT, Cambridge, and Industries such as Segway, Polycom and Genzymes (Biotech & Tissue Engineering), in Boston USA. She was selected for the program and was sponsored by the Indo-US Forum, Department of Science & Technology, Govt. of India.

Dr. Mira Mohanty attended the 3rd international conference on materials for advanced technology and 9th international conference on advanced materials (ICMAT-ICAM 2005) in Singapore, during 3-8 July 2005.

Dr. Niranjana Khambete visited UK for three weeks on British Council Young Scientist Exchange Scheme.

Dr. Santhoshkumar Dora, Asst. Professor joined back in the department after a one year fellowship in Electrophysiology at Edar Medical Centre, UCLA, Los Angeles, USA.

Under the MOU with Indira Gandhi Memorial Hospital Maldives and the Govt. of Republic of Maldives, Dr. Harikrishnan and Prof. J.M. Tharakan from the department of cardiology went IGMH to support their cardiology service.

Dr. C.P. Sharma visited University of Tennessee Health Center, Memphis, Louisiana State University, Baton Rouge, and Wichita State University, USA during May 1 to May 9, 2005.

Dr K Shivakumar spent three months from mid-July 2005 in the Laboratory of Cardiovascular Science, NIA/NIH, Baltimore, USA.

Dr. K. Sreenivasan visited Dep. of Farmacia y Tecnologia Farmaceutica, University of Santiago de Compostela, Spain as an Invitation Fellow.

Dr. PR. Umashankar visited Centre for Research in Interventional Imaging, INRA, Jouy en Josas, France as part of an Indo-French project. He gave an invited talk on animal evaluation of Drug eluting coronary stent at Centre d'Etudes Pharmaceutiques, University of Paris South, Chatenay-Malabry, France on 3rd November 2005.

FUNCTIONS, WORKSHOPS AND CONFERENCES

ACHUTHAMENON CENTRE FOR HEALTH SCIENCE STUDIES

A two-day seminar was organized for the 15 scholars and one faculty from the School of Public Health, Harvard University, USA.

A seminar on “New Patent Act: Implications for Drugs & Pharmaceutical Products Sector through Case Studies” was conducted on 29 April 2005.

A workshop on “Gender Mainstreaming in Medical Education“ was conducted from 7 to 8 April 2005.

A basic training on “Ethical Issues in Health Research in India” was conducted from 8 to 13 August 2005.



A memorandum of understanding was signed between Simon Fraser University, Canada and SCTIMST, Trivandrum



Dr. M.S. Valiathan inaugurates the workshop on Gender Mainstreaming in Medical Education

A one day training program on “Tobacco Cessation” was conducted on 14 November 2005.

A short course on “Prevention and Control of Non-Communicable Diseases: Turning Epidemiology into Practice” was conducted from 27 February to 3 March 2006 in collaboration with the WHO, Geneva.

A lecture by Dr. Anil Kaul, University of Oklahoma on “Public Health and Technology Assessment “ was held on 8 February 2006.

A workshop on “Tobacco Cessation for Health Professionals in Kerala Health Service” was conducted on 25 February 2006.

BIOMEDICAL TECHNOLOGY WING

An Indo-US Cytometry Workshop on “Monitoring of Stem Cell Phenotype, Proliferation and Apoptosis” was conducted during Feb 5-12, 2006 at SCTIMST jointly with the Department of Pathology at the University of Miami Miller School of Medicine.

Report on 6th Indo-US Cytometry Workshop “Monitoring of Stem Cell Phenotype, Proliferation and Apoptosis”

The 6th Indo-US workshop was jointly conducted by the Bio Medical Technology Wing of the Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), Trivandrum, India and the Department of Pathology at the University of Miami Miller School of Medicine. While the major portion of workshop fund was provided by Indo-US Science & Technology Forum, UICC, Geneva has awarded a Reverse ICRETT travel grant for the participation of these three faculty members and NIH, USA has awarded travel supports for three faculties from USA.

Background, Concept and Purpose: There are several ways in which human stem cells can be used in basic

and clinical research. However, there are many technical hurdles between the promise of stem cells and the realization of these uses, which will only be overcome by continued intensive stem cell research. Studies of human stem cells may yield information about the complex events that occur during human development. A primary goal is to identify how undifferentiated stem cells become differentiated.

Stem cells, directed to differentiate into specific cell types, offer the possibility of a renewable source of replacement cells and tissues to treat diseases such as Parkinson’s and Alzheimer’s, spinal cord injury, stroke, burns, heart disease, diabetes, osteoarthritis, and rheumatoid arthritis. The promise of stem cell therapies is an exciting one, but significant technical hurdles remain that will only be overcome through years of intensive research and training of emerging scientists.

A variety of rapid methods have been developed for characterization and identification of stem cells. Some of the earlier methods for identification of stem cells depended on the use of specific antibodies such as the CD 34, which identify stem cells based on the expression of a specific marker while other recent techniques identify stem cells by their capacity to efflux fluorochromes such as Hoechst 33342 dye. Most of these techniques heavily depend on the use of laser flow cytometers capable of carrying out multiparametric analysis of light scatter and multicolor fluorescence of labeled antibodies. Most of these techniques have been recently standardized and protocols such as ISHAGE have been established to reduce variability and enhance compatibility of data generated by different labs. As most of the work on stem cell biology and procedures has been developed by researchers in the United States and Canada, the objective of the collaborative program was to give

opportunity to a large number of Indian researchers who are interested in learning the latest methods from the expert foreign faculties. We have assembled a distinguished panel of researchers well known in the analytical cytometry field and stem cell research to teach at this workshop.

Foreign faculty

Dr. Nagesh S. Mhatre, BioImagene, Inc, USA, Dr. Awtar Krishan (US coordinator), University of Miami, USA, Dr. Sherry Shariatmadar, University of Miami, USA, Dr. Michael G. Ormerod, Reigate, UK, Dr. Ronald Hamelik, University of Miami, USA, Dr. Scott Cram, University of California, Dr. Indresh Kaur, MD Anderson Cancer Hospital, University of Texas, USA, Dr. T. Vincent Shankey, Advanced Technology Centre, Beckman Coulter, USA, Ms. Raquel Cabana, NPE systems, USA, Dr. Anil Kaul, University of Oklahoma, USA, Dr. Martin Adelman, Beckman Coulter Intl., Switzerland, Dr. Veena Kapoor, NIH, USA, Mr. Michael Keeney, London Health Sciences Centre, Ontario, Canada, Dr. William G. Telford, NIH, USA, Dr. Diana Lopez, University of Miami, USA, Dr. Swami Padmanabhan, Roswell Park Cancer Institute, USA.

India

Dr. H. Krishnamurthy, NCBS, Bangalore, Dr. Sumeet Gujral, TMH, Mumbai, Dr. Gopal Pande, CCMB, Hyderabad, Dr. Shyamala Mani, National Brain Research Centre, Haryana, Dr. Satish Totey, Manipal Hospital, Bangalore, Dr. Vivek Tanavde, Reliance Life Sciences Pvt. Ltd, Mumbai, Dr. Paresh Jain, BD Science India, Dr. Arvinder Singh, Dakocytomation India, Dr. P. Balakrishnan, Ph.D, YRG CARE, Chennai, Dr. Annie John, Dr. Kumari T.V. (Org. Secretary) and Dr. Lissy K. Krishnan (Indian Coordinator), from SCTIMST, Trivandrum.

Four well-known researchers who supervise large clinical stem cell transplantation and flow cytometry labs at the University of Western Ontario in Canada (Mr. Michael Keeney), MD Anderson Cancer Center in Houston (Dr. Indresh Kaur), Jackson Memorial Medical Center, (Dr. Sherry Shariatmadar) and Mr. Ronald Hamelik (University of Miami Medical School) were important faculties who taught and run the wet labs at the workshop. Sophisticated high caliber flow cytometers and cell sorters from BD Science, Beckman Coulter, NPE systems and Guava Technologies were used for wet lab



Inaugural function of the Indo-US Cytometry Workshop

demonstrations and these companies had deputed their expert application specialists during the entire workshop period to interact with the participants.

Mid level scientists and Ph.D. students from various national institutes and universities from all over India who attended the wet lab workshop, were selected based on their curriculum vitae and research specialties. All the participants (total 50) expressed, through the feedback forms they have filled up at the end of the workshop, their satisfaction in learning at the workshop and suggested that these kinds of workshops should be conducted more often at different geographical locations in India to give opportunities to more emerging scientists.

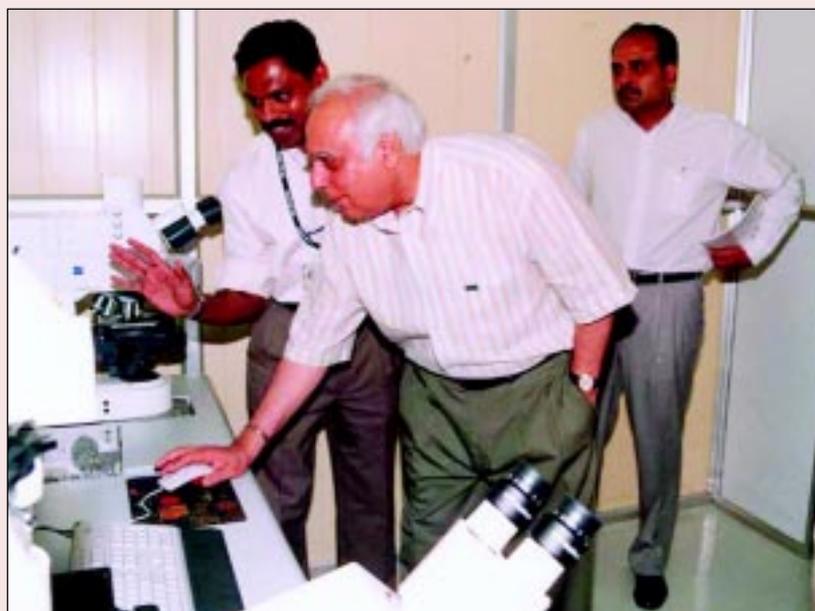
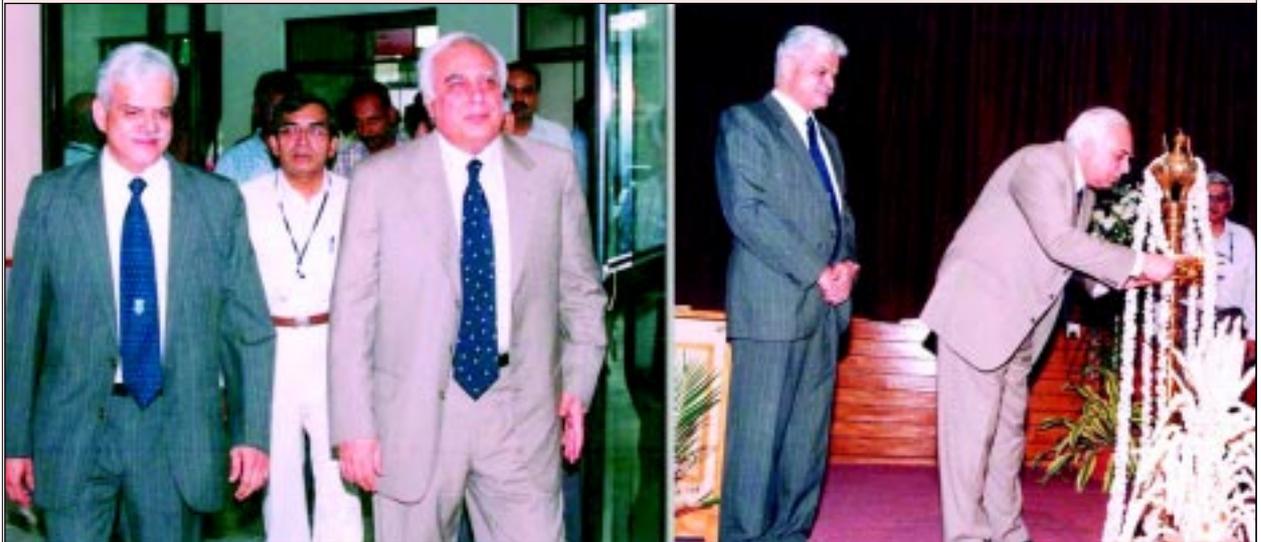
A two day workshop on “Risk Management of Medical Devices” was organized by IIPC during 5-6, October 2005 at BMT Wing.

A dental check up camp was organized by the Dental Products Lab in association with Pratyusha Dental Clinic, Trivandrum on 4th June 2005 for the employees of BMT Wing.

A one week training programme on Animal Handling was organized for the PhD students by the Division of Laboratory animals.



*Visit of the Honourable Minister for Science and Technology
Shri. Kapil Sibal*



HOSPITAL WING

A follow up meeting of the State level program on Donor motivators was organized as a Training of Trainers (TOT) at SCTIMST on 24/03/06. Dr K Mohandas, Director of the Institute presided and Dr Rajan Khobragade, Additional Secretary, Health & Family welfare Govt. of Kerala inaugurated the function. Kerala Literary Mission has shown interest in spreading the message through their organizational network.



Inauguration of Training for Trainers Program for blood donor motivation

Regular Blood Donors were felicitated on June 14th- The World Blood Donors Day.



His Excellency R L Bhatia, Governor of Kerala inaugurates the 1st State Voluntary Blood Donor Motivators Conference.



Dr Jaisy Mathai receiving the Best Blood Bank Award 2005 given by Kerala State AIDS Control Society and Kerala State Blood Transfusion Council from Hon.Minister for Health & Family Welfare.

A Workshop was conducted for Blood Bank Technicians in the State in association with Kerala State AIDS Control Society on 26 and 27 of July 2005.

A Cardiac electrophysiology workshop and Arrhythmia course were conducted in the Department of Cardiology by Dr. C Thomas Peter, Prof and Head, Department of Electrophysiology, CSMC, UCLA, Los Angeles, USA in April 2006.

National Epilepsy Day was observed by arranging a meeting of 100 Epilepsy Surgery patients on 17th November. Mr. K. Viswanathan, Director Mitra Nikethan, Community Development Centre, Trivandrum was the chief guest. Dr. K. Radhakrishnan, Professor and Head, Neurology presided over the function. Mrs. Rajeswari Menon, R. Madhavan Nayar Trust, Ernakulam released the News letter 'Pratheeksha'. Dr. Immanuel Thomas, Professor of Psychology, University of Kerala gave a talk on "How to improve your memory" and the patients shared their experience following epilepsy surgery during the program.

The R. Madhavan Nayar Centre For Comprehensive Epilepsy Care organized “National Workshop on Medically Refractory Pediatric Epilepsies (NEW 2006)”. Nearly 100 delegates participated in the workshop held at Achutha Menon Centre Auditorium, January 28-29, 2006. The international faculties were Dr. Ellaine Wyllie and Dr. Deepak Lachhwani of the Cleveland Clinic, Cleveland, OH, USA. Dr. Ranjani Gamage and Dr. Sunil Pereira from National Hospital, Colombo, Sri Lanka acknowledged by presenting a plaque of honour the help rendered by R.Madhavan Nayar Centre in developing the epilepsy surgery program at Sri Lanka.

The CBNC organized, in association with the Alzheimer’s & Related Disorders Society of India, a National Dementia Conference, DEMCON-2005 from 12-14 November 2005. It had 12 international faculties. Nearly 180 delegates including overseas delegates attended the conference.



Chief Minister, Sri Oommen Chandy inaugurating DEMCON 2005

A workshop on Advanced Airway management was conducted at the annual conference South zone of ISA held at Trivandrum Aug 2005. Another workshop on Cardiopulmonary resuscitation was organized at

annual conference of Eastern Zonal of ISA during Sept.2005.

Two Workshops Vaporisers and Lung isolation techniques, were organized during the annual national workshop of RSACP at CMC Vellore in July 2005.

A Cardiac electrophysiology workshop using electroanatomic mapping system (CARTO) was conducted in the Department of Cardiology by Dr. Mohan Nair, New Delhi in June 2005.

A Cardiac electrophysiology workshop using electroanatomic mapping system (CARTO) was conducted in the Department of Cardiology by Dr. Rukshen Veerasoorya, Adelaide, Australia in December 2005.

A Cardiac electrophysiology workshop and Arrhythmia course were conducted in the Department of Cardiology by Dr. C Thomas Peter, Prof and Head, Department of Electrophysiology, CSMC, UCLA, Los Angeles, USA in April 2006.

The Association of Commonwealth Universities (ACU) held its Council meeting at the Sree Chitra Tirunal Institute for Medical Sciences and Technology on 4-7 April 2005.

Established in 1913, the ACU is the oldest international organization of Universities in the world. It has a current membership of about 500 members from across the Commonwealth. With more than 150 Universities in the organization, India has the largest number of members in the Association. The ACU has its headquarters in London.

The principal objective of the Association is the promotion of member-Universities internationally and the maintenance of close collaboration and cooperation among the member-universities to



His Excellency R L Bhatia, Governor of Kerala inaugurates ACU Vice Chancellors Meeting

promote the growth of higher education. The ACU also maintains links with other national and international associations of universities.

Major policy decisions were taken during the 4-day meeting at Trivandrum. These includes:

- The expansion of the ACU's networks
- The development of the HIV/AIDS programme
- The development of a distributed structure to the organization
- The development of the ten-year partnership programme of the ACU and the Association of African Universities, Renewing the African University. The programme, costs US\$8 billion over ten years, has endorsed by the Commission for Africa.

The meeting was inaugurated by His Excellency the Governor of Kerala at 6 PM on 4th April 2005 at the Achutha Menon Centre for Health Sciences Studies Auditorium of the Sree Chitra Tirunal Institute for Medical Sciences and Technology.

The meeting was held for the first time in Kerala was attended by Vice Chancellors from Australia, Bangladesh, Cameroon, Guyana, India, Kenya, Malawi, Mauritius, Nigeria, Pakistan, South Africa, Sri Lanka and the United Kingdom.

VSICON 2005 12th Annual Conference of Vascular Society of India was Organized by the Department of Cardio Vascular & Thoracic surgery during 10-13th November 2005. The conference was attended by more than 200 delegates from both India and abroad.

The Theme of Conference Vascular surgery- Glorious insights into the Past the Present and the Future, was envisaged to provide universal interest and attention of the multidisciplinary team members striving to infuse excellence in patient care. 105 papers were accepted for free paper presentation.

Prof. M.S. Valiathan inaugurated the conference. He spoke about the relevance of Vascular Surgery in the modern era in view of demographic transition and need for vascular specialty to district level as well as develop a tissue engineered small diameter vascular graft.

CONFERENCES ATTENDED BY STAFF

INTERNATIONAL CONFERENCES

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Mrs. Aley Alexander	25 th International Epilepsy Congress	Paris Aug, 2005	Poster on cognitive and quality of life outcome after surgery for medically refractory epilepsy.
Dr. Annie John	The NIAMS-ASBMR Scientific Meeting, <i>Bone Quality: What Is It and Can We Measure It?</i>	Bethesda Maryland, USA May, 2005	Poster: Osteogenesis and Osseointegration of Rabbit Tibial Bone with Fibrin Glue Coated and Uncoated Bioactive Calcium Phosphate Ceramics.
	Midwestern Tissue Engineering Conference (MTEC-2005) organized by Case Western Reserve University	Cleveland, Ohio, USA April, 2005	In vivo evaluation of osteogenic potential of fibrin glue coated bioactive calcium phosphate ceramics.
Dr. Asha Kishore	16 th International Congress on Parkinson's disease and related disorders	Berlin June, 2005	Scientific Paper
Dr. R. N. Bhattacharya	13 th World Congress of WFNS	Marrakesh (Morocco) June, 2005	Surgery: Definitive treatment for cerebral arteriovenous malformations.
			Minimally invasive surgery for anterior circulation aneurysms.
Dr. Bejoy Thomas	Symposium Neuroradiologicum	Adelaid, Australia March, 2006	MR imaging in dysembryoplastic neuro epithelial tumors.

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
			fMRI data coregistration on 2D flair compared to 3D flash images-technical considerations and clinical applications.
			Pre – surgical evaluation in seizure patients with brain lesions using ‘in-line bold’ fMRI.
			MRI, H1, MRS and DW1 in cysts and cyst like infective lesions of the brain.
Dr. Biju Soman	37 th Conference of the Asia-Pacific Academic Consortium for Public Health (APACPH)	Taiwan Nov, 2005	Need for disaster preparedness with community participation; Lessons from Tsunami in Kerala, India.
Dr. S. Dinesh Nayak	King's Masterclass on Videotelemetry	London, UK Feb, 2006	Interictal and ictal EEG during videotelemetry.
Dr. S.K. Dora	1 st Asia Pacific Atrial Fibrillation Conference	Seoul, South Korea Dec, 2005	Vein of Marshall Activity in sustained atrial fibrillation.
Dr. A.K. Gupta	Symposium Neuroradiologicum	Adelaid, Australia March, 2006	Transarterial and transvenous treatment of caroticoavernous fistula.
			Long term follow up study of intracranial AVM treated by endovascular embolisation.

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr.A.K. Gupta	World Federation of Therapeutic and Inter- ventional Neuroradiology	Venice, Italy Oct, 2005	Combined performance of 3D TOF & CE MRA in detecting intra cranial aneurysm:-technical perspective.
			Percutaneous vertebroplasty in the management of vertebral lesions.
			Technical aspects of time of flight (TOF) and phase contrast (PC) MR. angiography and its clinical applications in the evaluation of intra cranial venous system.
			Pre operative embolization of craniofacial vascular malformation.
			Endovascular treatment of cerebral dural arterio venous fistulas
			Direct puncture embolisation of head and neck tumors.
			Thrombolysis in dural sinus thrombosis.
			Intra-arterial thrombolysis in stroke and procedure related complications.
			Embolization of spinal arterio venous malformations.

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
			Stenting of subclavian artery- Indian experience.
Dr. A.K. Gupta	Symposium Neuroradiologi-cum	Adelaid, Australia March, 2006	Role of carotid artery stenting in stroke management.
			Endovascular treatment of hypervascular head and neck tumors.
			Complications of neuro inter- vention related procedures
Dr. Jaisy Mathai	Conference of International Society of Blood Transfusion	Bangkok, Thailand Nov 2005	Effect of applied muscle tension (AMT) on blood donation experience.
			First time and repeat blood donors - target group for donor motivation: A comparative study
Dr. K. Jayakumar	Annual Conference of American Association of Thoracic Surgeons	San Francisco April, 2005	Participant
Dr. CC. Kartha	Annual conference of the North American chapter of the International Society for Heart Research	New Orleans, USA May 2005	Poster on 'TNF-a depresses endocardial endothelial cell mediated proliferation of cardiac fibroblasts'- Invited Participant.
Dr. C. Kesavadas	Symposium Neuroradiologicum	Adelaid, Australia March, 2006	Post ictal MR imaging – pictorial essay and proposed classification.

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
			Intra cranial tuberculosis – pical and atypical MR imaging features.
			Proton MR spectroscopic imaging of the mesial temporal lobe.
			Comparison of functional bold MRI imaging using 12-channel and 4-channel head coil.
			Clinicoradiological correlation of aphasic syndromes
Dr. C. Kesavadas	American Society of Neuroradiology	Toronto, Canada, May, 2005	Hippocampal Malrotation in patients with Epilepsy
Dr. T V Kumary	12 th International conference	Singapore Dec, 2005	Foetal liver as an alternative cell on Biomedical Engineering source for adipose tissue engineering.
Dr. A. Kuruvilla	American Association of Neuromuscular and Electrodiagnostic Medicine (AANEM)	California, USA Sep, 2005	Participant
Dr. Lissy K. Krishnan	Regenerate 2005	Atlanta, Georgia, USA June, 2005	Development of Progenitor Cell Sheets on Fibrin Scaffold for Vascular Tissue Engineering
Dr. Lissy K. Krishnan	5 days course on Science Technology Innovation Policy	J.F Kennedy School of Government, Harvard University USA, Nov, 2005	Participant

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. Lissy K. Krishnan	Conference on Coagulation Testing Quality at the Mayo Clinic	Rochester, USA June, 2005	Participant
Dr. Mala Ramanathan	Psychosocial Issues and Ethics in Medical Education Bi-regional Meeting of WHO-SEARO	Bangkok, June, 2005	Resource person
Dr. Manju Nair	Training of Facilitators Workshop on community based pesticide action network conducted by the Pesticide Action Network – Asia & the Pacific	Malaysia, 2005	Participant
Dr. Manju Nair	Workshop on safe motherhood and abortion at Chulalongkorn University	Thailand Jan, 2006	Participant
Dr. PS. Mathuranath	Symposium Neuroradiologicum	Adelaid, Australia March	Clinicoradiological correlation of aphasic syndromes.
Dr. Mira Mohanty	3 rd International conference on Materials for Advanced Technology and 9 th international conference on Advanced Materials(ICMAT-ICAM 2005)	Singapore July, 2005	Evaluation of fabrics obtained from tropical silkworm <i>Antherea Mylitta</i> & <i>Bombyx Mori</i> for potential use as scarf folds for dominal wall defects.
Dr. K.Mohandas	International Seminar on Reforming Health Social Security	Tokyo, Japan June, 2005	Participant
	International Advisory Committee of the University of Mauritius	Mauritius May, 2005	Chair

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. D.S. Nagesh	3rd International Conference on Materials for Advanced Technologies (ICMAT 2005) & 9th International Conference on Advanced Materials (ICAM 2005)	Singapore, July 2005	Invited talk
Dr. M. D. Nair	World Congress of Neurology 2005	Sydney Nov, 2005	Hereditary Motor Sensory Neuropathy A Clinical and Electro physiological Study.
Dr. P. K. Neema	24th Annual symposium -update in anesthesiology, surgery and perioperative medicine	St Thomas US Virgin Island, Jan 2006.	Blood conservation in cyanotic patients undergoing cardiac surgery Tetralogy of Fallot and Anesthesiologist.
Dr. S. Purkayastha	Symposium Neuroradiologicum March	Adelaide Australia	Percutaneous pmma vertebroplasty in the management of vertebral lesions. Endovascular treatment of scalp cirroid aneurysms.
Dr. Ravi Mohan Rao	Investigators meeting for the glioma project "Intramural delivery of AP 12009"	Regensberg, Germany	Participant
Dr. K. Radhakrishnan	Epilepsy Update	Mauritius, July, 2005.	Participant
	<i>Neurologica</i> : International Symposia 2006	Kuala Lumpur, Malaysia, Feb, 2006	Difficult to Control Epilepsies

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
	25 th International Epilepsy Congress	Paris, Aug, 2005	Participant
	Symposium Neuroradiologicum	Adelaid, Australia March	Pre – surgical evaluation in seizure patients with brain lesions suing 'in-line bold' fMRI.
Mrs. C. Radhakumary	12 th International conference on Biomedical engineering	Singapore Dec, 2005	Poly Ethylene Glycol Grafted Chitosan as a Potential Biomaterial. Temperature responsive PVA- PNiPAAm copolymer for Biomedical application.
Dr. Ravimohan Rao	Annual conference of Japanese Neurosurgical society	Yokohama Oct, 2005	Participant
	WFNS cadaver dissection workshop	Keio University Tokyo, Sep, 2005.	Participant
Dr. C.P Sharma	30 th Anniversary meeting and Exposition, Society for Biomaterials	Memphis, USA April, 2005	Lipomat- A novel solid lipo some based drug delivery system – Concept proving approach. Effect of Calcium, Zinc, and Magnesium on the attachment and spreading of osteoblast Like Cells onto Ceramic Matrices.
Dr. Sanjeev. V Thomas	26 th International Epilepsy Congress	Paris, 2005	Participant

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. N. Suresh Nair	13th world congress of WFNS meet	Marrakesh (Morocco) June, 2005	Surgery for Petroclival meningiomas: Miles to go before we sleep.
Dr. N. Suresh Nair	Neurocon 2006	OMAN, Muscat March, 2006.	Management issues in Vestibular schwannomas" in developing countries.
Dr. N. Suresh Nair	Investigators meeting for the glioma project "Intratumoural livery of AP 12009"	Regensburg deGermany, March, 2006	Participant
Dr. PN Sylaja	Symposium Neuroradiologicum	Adelaid, Australia March	Clinicoradiological correlation of aphasic syndromes.
Dr. K.R. Thankappan	37 th Annual Conference of the Asia-Pacific Academic Consortium for Public Health	Taiwan Nov, 2005	Prevalence of Hypertension in Kumarakom, Kerala, India: Baseline results of a community - based intervention program.
Dr. Thomas Koshy	22 nd Annual national conference of College of Anesthesiologists, of Srilanka	Srilanka Jan, 2006	Weaning and extubation of a myasthenic after thymectomy. Hypoxia during one lung ventilation.
Dr. D. Varatharajan	International Workshop on Core Competencies for Public Health April, 2005 Education	Thailand	Participant

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Dr. D. Varatharajan	Fourth Global National Health Accounts (NHA) Symposium	Spain July, 2005	Development and status of NHA in India.
Dr. D. Varatharajan	Fifth World Congress of the International Health Economic Association (IHEA)	Spain, July, 2005	<p>Coping with the success: An economic assessment of the Sri Lankan health system.</p> <p>Reactivating the primary health centres through industrial partnership in Tamil Nadu, India.</p> <p>Organisational and functional dynamics of non-government in-patient facilities in a sub-district of Kerala.</p> <p>Role of government and competition in drug price differential for 12 commonly used drugs in Kerala.</p> <p>Appraising government health care expenditure in Kerala using NHA framework.</p> <p>A participatory and autonomous model of drug distribution to government healthcare centres in Tamilnadu, India.</p>

CONFERENCE ATTENDED BY STUDENTS

INTERNATIONAL CONFERENCES

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
PR Anilkumar	8th Annual Tissue Engineering Society International Conference & Exposition (TESI)	Shanghai, China Oct, 2005	Chaired one student session on Stem cells. Cellularization of scaffolds using In vitro 3-D tissue constructs.
Asha S Mathew	19th European Conference on Biomaterials [ESB 2005]	Sorrento, Italy Sep, 2005	Poster: In vivo activation of macrophages: potential role in degradation of polyether urea urethane.
Asha S Mathew	SEM workshop conducted by the Royal Microscopical Society	Sorrento, Italy Sep, 2005	Participant
Bernadette K Madathil	3 rd international conference on materials for advanced technology and 9 th international conference on advanced materials (ICMAT-ICAM 2005)	Singapore, July, 2005	Poster: Light and Electron microscopic study of tissue response to particulate orthopedic implant material.
Hima Penderkar	Symposium Neuroradiologicum	Adelaid, Australia March, 2006	Juvenile nasopharyngeal angiofibroma endovascular management. Ethanol: its efficacy in management of brain arteriovenous malformations.

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
Leena Kuruvilla	Annual meeting of the North American chapter of the International Society for Heart Research	New Orleans, USA, May, 2005	Poster on 'TNF- α depresses endocardial endothelial cell mediated proliferation of cardiac fibroblasts'.
Leena Kuruvilla	Heart Foundation Conference and Scientific Meeting	Sydney, Australia March, 2006	Endocardial Endothelium Regulates Cardiac Fibroblast Function.
A. Mathew	Symposium Neuroradiologicum	Adelaid, Australia March, 2006	Pre – surgical evaluation in seizure patients with brain lesions suing 'in-line bold'fmri.
S. Raghavendra	Symposium Neuroradiologicum	Adelaid, Australia March, 2006	Post ictal mr imaging – pictorial essay and proposed classification.
D. Ruchir	Symposium Neuroradiologicum	Adelaid, Australia March, 2006	Clinicoradiological correlation of aphasic syndromes.
Sandeep Burathoki	Symposium Neuroradiologicum	Adelaid, Australia March, 2006	Complications of neuro intervention related procedures. Intra cranial tuberculosis – typical and atypical mr imaging features.
G.S. Sailaja	Bioceramics-18 Dec, 2005	Kyoto, Japan	In vitro mineralization and cell adhesion on surface modified poly(2-hydroxy ethyl methacrylate-co-methyl methacrylate).

Name of the participant/ Speaker	Name of the Conference	Date & Venue	Title of the paper/ Participant's Status
C.Thomas	Symposium Neuroradiologicum	Adelaide, Australia March, 2006	Post ictal mr imaging – pictorial essay and proposed classification.
C. Thomas	Symposium Neuroradiologicum	Adelaid, Australia March, 2006	Combined performance of 3D TOF & CE MRA in detecting intra cranial aneurysm: - technical perspective.

STANDING COMMITTEE

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Poojappura, Thiruvananthapuram
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University of Kerala, Thiruvananthapuram
4. Prof. K. Radhakrishnan
Dean & Head of the Dept. of Neurology
SCTIMST, Thiruvananthapuram
5. Dr. S. K. Mahajan
Former-Head, Agriculture & Molecular Biology
Division, BARC, Mumbai - 400 085
6. Prof. J. M. Tharakan
Head of the Dept. of Cardiology
SCTIMST, Thiruvananthapuram
7. Dr. A. Jayakrishnan
Scientist 'G' BMT Wing, SCTIMST
Poojappura, Thiruvananthapuram
8. Prof. Jayaprakash Muliyl
Principal, Christian Medical College, Vellore
2. Dr. G. S. Bhuvaneshwar
Head, BMT Wing
SCTIMST, Poojappura,
Thiruvananthapuram
3. Dr. Viswas Mehta I A S
Principal Secretary to the Government of Kerala
Health & Family Welfare,
Thiruvananthapuram
4. Shri. K.N. S Nair
Head, Engineering Maintenance Division,
VSSC (Retd)
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5. Sri. Chandrasekharan Nair (Ex-Officio
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Financial Advisor & Chief Accounts Officer
SCTIMST, Thiruvananthapuram
6. A member to be co-opted by the Director
as and when necessary

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

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4. Vice Chancellor
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Thiruvananthapuram
5. Sri. P. Chandrasekharan Nair (Ex-Officio
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Financial Advisor & Chief Accounts Officer,
SCTIMST, Thiruvananthapuram

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

Junior Staff Selection Committee

1. Dr. S.J. Douglas Linsby (w.e.f 01.07.2004)
Medical Superintendent,
SCTIMST, Thiruvananthapuram
2. Dr. G. S. Bhuvaneshwar
Head, BMT Wing
SCTIMST, Poojappura,
Thiruvananthapuram

3. Shri. P. B. Sourabhan
Deputy Director (Admn)
SCTIMST,
Thiruvananthapuram
4. Mrs. Vijayamma Harikrishnan
Nursing Superintendent
SCTIMST,
Thiruvananthapuram
5. Dr. R. Shankar Kumar
Professor,
Cardio Vascular and Thoracic Surgery
SCTIMST,
Thiruvananthapuram
6. Representative of Academic Wing of the
Institute nominated by the Director of the
Institute

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SCTIMST, Poojappura,
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4. Dr. S.N. Pal
Director (Engineering)
HSCC (India) limited
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5. The Executive Director
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7. Prof. Ramachandra Rao
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Director, Institute of Armament Technology
PUNE- 411025
8. Dr. C. P. Sharma
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BMT Wing,
SCTIMST
Poojappura, Thiruvananthapuram
9. Shri. O. S. Neelakantan Nair
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Kowdiar,
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7. Dr. Amar Jesani
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8. Dr. S.N. Pal
Director (Engineering)
HSCC (India) limited E-6 (A), Sector -1 ,
NOIDA (U.P)-201301

Ethics Committee

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Former Prof. of Pharmacology & Director
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Government of Kerala,
R.G. 286, Thriveni, Ulloor
Thiruvananthapuram - 695 011
9. Dr. K. Mohandas
Director
SCTIMST, Thiruvananthapuram
10. Dr. G.S. Bhuvaneshwar
Head, BMT Wing
SCTIMST, Poojappura, Thiruvananthapuram
11. Dr. Anoop Kumar T. (Member Secretary IEC)
Scientist 'E', Molecular Medicine,
SCTIMST, BMT Wing, Poojappura
Thiruvananthapuram-12

12. One faculty from SCTIMST by rotation from any of the s wings
(Dr. Mala Ramanthan, Associate Professor, AMCHSS

Technology Transfer Committee

1. Dr. Placid Rodriguez, (Former Director – IGACR),
Flat 2B,
“Adithya Apartments”,
38, Balakrishna Road,
Valmiki Nagar,
Chennai – 600 041.
2. Mr. V. P. Balagangadharan,
Deputy Head,
Technology Transfer & Industry
Co-ordination Division,
V.S.S.C.,
Thiruvananthapuram- 695022,

3. Dr. Gopala Pillai G.C.,
(Former Managing Director, KINFRA)
Chairman and MD, FACT, Udyogamandal,
Kochi - 683 501.
4. Dr. P. Parameswar Iyer,
Principal Research Scientist
Centre for Scientific & Industrial Consultancy
Indian Institute of Science,
Bangalore- 560012
5. Dr. G. S. Bhuvaneshwar,
Head, BMT Wing (Ex-officio member)
SCTIMST, Thiruvananthapuram
6. Sri. P. Chandrasekharan Nair (Ex-officio)
Financial Advisor & Chief Accounts Officer,
SCTIMST, Thiruvananthapuram
7. Er. D. Ranjit
Member-Secretary (Ex-officio)
Engineer ‘F’, Technology Transfer Cell
BMT Wing, SCTIMST,
Thiruvananthapuram-12

DEPARTMENTS AND PERSONNEL

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Dean

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Registrar

Sundar Jayasingh, MA, MBA, DLL

Assistant Registrar

Library

S. Jayachandra Das, BSc, MLISc

Librarian-cum-Documentation Officer - B

(Librarian-in-Charge)

T. Sudha, M.A, MLISc.

Librarian-cum-Documentation Officer - A

Nursing Education

P. P. Saramma, BSc, MN

Lecturer in Nursing

Public Relations

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

Public Relations Officer

Achutha Menon Centre for Health Science Studies

Dr. K.R. Thankappan, MD, MPH

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Additional Professor

Dr. T.K. Sundari Ravindran, PhD

Honorary Professor

Dr. V. Raman Kutty, MD, MPhil, MPH

Honorary Professor

Dr. Mala Ramanathan, MA, PhD

Associate Professor

Dr. D. Varatharajan, MSc, PhD

Associate Professor

Dr. Biju Soman MD, DPH

Assistant Professor

Dr. Manju R Nair MBBS, MPH

Scientist C (Adhoc)

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Secretary to the Director

PB. Sourabhan, MA, LLB, PGDMM, DCA

Deputy Director (Administration)

S. Chandrasekharan Nair

Financial Advisor & Chief Accounts Officer

(On deputation) contract from 13.08.2004

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

Administrative Officer Gr I

P.V. Chandrasekharan BSc, SAS

Internal Audit Officer (On deputation)

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Administrative Officer Gr II

C. Gopinathan, BSc, LLB, SAS

Accounts Officer Gr I

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Accounts Officer Gr I

C.R. Mohandas, BCom

Accounts Officer Gr II

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Stores & Purchase Officer Gr II

P. Gopalakrishnan Nair, BA

Stores & Purchase Officer Gr II

B. S. Anil Kumar, BA

Security Officer

K. Prasanna Kumar B.Com, DEE

Security Officer

S. Venkitachalam Iyer, BCom

Pool Officer

Construction Wing

PN. Ramachandran BSc (Engg.)

Construction Engineer (Contract) from 09.12.2004

G. Gopinatha Kurup

Junior Engineer (Civil)

BIOMEDICAL TECHNOLOGY WING

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Head

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Dr. G.S. Bhuvaneshwar, M.S., Ph.D

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Engineer F & in-charge, Device Testing Laboratory

Mr. D.S. Nagesh, M.Tech

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

Mr. S. Balram, M.Tech

Engineer E

Mr. V. Vinod Kumar, B.Tech

Engineer B

Mr. V. Arun Anirudhan, B.Tech

Engineer B

Mr. Sujesh Sreedharan, M.E

Engineer B

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Scientist D

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Jr. Scientific Officer

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Jr. Scientific Officer

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Engineer B

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Scientist F & in-charge

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Veterinary Scientist D & in-charge

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Engineer G & in-charge

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Junior Engineer

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Scientist G & in-charge

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Scientist F & in-charge Tissue Culture Laboratory

Dr. Annie John, Ph.D

Scientist D & in-charge TEM

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Scientist D & in charge Confocal Microscopy and Experimental Pathology

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Engineer E & in-charge

Laboratory-animal Sciences Division

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Scientist F & in-charge

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Scientist D & in-charge

Molecular Medicine

Dr. T. Anoopkumar, Ph.D
Scientist E & in-charge

Polymer Analysis

Dr. Prabha D. Nair, Ph.D
Scientist G & joint in-charge

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

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Jr. Scientific Officer A

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Scientist G & in-charge

Polymer Division

Dr. M. Jayabalan, Ph.D
Scientist F & in-charge

Polymer Processing Laboratory

Dr. Roy Joseph, M.Sc, M.Tech., Ph.D
Scientist D & joint in-charge

Dr. P. Ramesh, M.Tech., Ph.D
Scientist D & joint in-charge

Mr. M. C. Sunny, B.Sc., AIC
Jr. Scientific Officer

Precision Fabrication Facility

Mr. O.S. Neelakantan Nair. B.Sc (Engg.)
Engineer-G, Leader

Mr. V. Ramesh Babu, M.Tech
Engineer D & in charge

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

Quality Cell

Mr. D.S. Nagesh, M.Tech
Engineer F & Quality Manager

Dr. P. Ramesh, Ph.D
Scientist D

Technology Proving Facility

G.S. Bhuvaneshwar, M.S., Ph.D

D.S. Nagesh, M.Tech
Engineer F

Technology Transfer & Co-Ordination Cell

D. Ranjit, B.E
Engineer F & in-charge

Thrombosis Research

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

Toxicology

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

HOSPITAL WING

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

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

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

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

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

Anaesthesiology

Dr. K. Mohandas, MD, FRCA
Professor & Director of the Institute

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

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

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

Dr. Thomas Koshy, MD
Additional Professor

Dr. Shrinivas V. Gadhinglajkar, MD
Additional Professor from 1.10.05 after 1 year leave.

Dr. Prasantakumar Dash, MD
Additional Professor

Dr. P.K. Neema, MD
Associate Professor

Dr. S. Manikandan, MD
Assistant Professor

Dr. P.K. Sinha, MD
Assistant Professor

Dr. P. Gayatri, MD, FRCA
Assistant Professor

Dr. P.R. Suneel, MD
Assistant Professor

Dr. K.P. Unnikrishnan, MD
Assistant Professor

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

Dr. Pradeep Bhaskar, MD
Adhoc Consultant from 14.11.2005

Biochemistry

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

Dr. N. Jayakumari, PhD
Professor

Dr. G. Srinivas PhD
Scientist C

K. I. Annamma, BSc
Junior Scientific Officer

B. Sasikumar, MSc
Junior Scientific Officer

Biomedical Engineering

K. Vijayakumar, BSc, BSc (Engg.)
Engineer & Head

Koruthu P Varughese, BSc (Engg.), PGDEDT, PGDCA, MBA
Engineer

G. Mohanlal, BSc (Engg.), MBA
Engineer

B. Madhusoodanan Pillai, BSc (Engg.), PGDCA, MBA
Scientist/ Engineer

N. Sivanandan
Junior Engineer(Electrical)

Blood Transfusion Services

Dr. Jaisy Mathai, MBBS, DCP
Scientist F and Head

Dr. P.V. Sulochana, MBBS
Scientist F

Dr. S. Sathyabhama, MBBS
Scientist E

Cardiology

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

Dr. Thomas Titus, MD, DM
Professor

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

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

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

Dr. S. Harikrishnan, MD, DM
Associate Professor

Dr. Santhoshkumar Dora, MD, DM
Assistant Professor

Dr. Krishnakumar Nair
Assistant Professor

Dr. Narayanan Namboodri
Assistant Professor

Dr.M.S.Harikrishnan
Assistant Professor (Adhoc)

Cardiovascular & Thoracic surgery

Dr. K.S. Neelakandhan, MS, MCh, FAMS
Professor & Head (Retired w.e.f 30.09.2005)

Dr. K. Jayakumar, MS, MCh
Professor & Head w.e.f 01.10.2005

Dr. R. Sankar Kumar, MS, MCh
Professor

Dr. K.G. Shyam Krishnan MS, MCh
Professor

Dr. M. Unnikrishnan, MS, MCh
Professor

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

Dr. Manoranjan Misra, MS, MCh
Assistant Professor

Dr. Baiju S. Dharan, MS, MCh
Assistant Professor

Dr. Sameeth Pathak, MS, MCh
Adhoc Consultant from 17-01-2006.

Dr. Rajneesh Duara M.S
Adhoc Consultant from 17-01-2006.

Dr. Apurba Kumar Sharma, MS, MCh
Assistant Professor (till Aug 2004)

Cellular and Molecular Cardiology

Dr. C.C. Kartha, MD, FNASc, FASc, FAMS, FIACS
Professor & Head

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

Dr. K. Shivakumar, PhD
Scientist-F

Computer Division

G. Geetha, MTech (Computer Science)
Scientist F

Medical Records

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

N.G. Thampi MA, B.M.R.Sc
Medical Records Officer

P.J. Varghese
Assistant Medical Records Officer

Microbiology

Smt. Molly Antony, MSc, DMV
Scientist E

Dr. Muralidhar K. Katti, M. Sc, PhD, FISCD
Associate Professor

Neurology

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

Dr. MD. Nair, MD, DM
Professor

Dr. C. Sarada, MD, DM
Additional Professor

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

Dr. Asha Kishore, MD, DM
Additional Professor

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

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

Dr. S. Dinesh Nayak MD, DM
Associate Professor

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

Dr. P.N. Sylaja, MD, DM
Assistant Professor

Dr. Ashalatha R., MD, DM
Adhoc Consultant

Dr. Rajesh Iyer, MD, DM
Adhoc Consultant

Neurosurgery

Prof. R N. Bhattacharya, MS, MCh
Professor & Head

Dr. S. Suresh Nair, MCh Neurosurgery
Professor

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

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

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

Dr. S. Muthu Retnam, MS, MCh Neurosurgery
Assistant Professor resigned w.e.f 01.12.2005

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

Dr. H.V. Easwer, MCh Neurosurgery
Assistant Professor

Dr. Mukund Prasad, MS, MCh, Neurosurgery
Adhoc Consultant

Pathology

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

Dr. S. Sandhyamani, MD, FAMS

Professor

Dr. Annamma Mathai, PhD

Scientist C

Radiology

Dr.A.K.Gupta, MD, PDCC

Professor & Head

Dr.T.R.Kapilamoorthy, DMRD, MD

Additional Professor

Dr.C.Kesavadas, DMRD, MD

Associate Professor

Dr. Bejoy Thomas, MD, DNB

Assistant Professor

Dr. Krishnamoorthy, MD, DNB, DM

Assistant Professor

Dr. Narendra.K.Bodhey, MD, DNB

Assistant Professor

Dr. Sukalyan Purkayastha, MD, DNB, DM

Assistant Professor

STAFF WELFARE MEASURES

For the overall advancement in cultural, educational, financial and health aspects of the staff and their family members, we have a well run subsidized canteen, Staff Benevolent Fund, Cultural Society, Co-operative Society, full fledged staff clinic etc., apart from provision to avail different loans for housing, conveyance, marriage, treatment etc. of staff and their dependants. Institute also takes care for the personality development of personnel through different skill development programmes.

RESERVATION IN APPOINTMENTS

The policy of Govt. of India and guidelines received from the Department of Science & Technology from time to time is scrupulously followed and implemented with regard to reservation in appointment

OFFICIAL LANGUAGE POLICY

The Institute actively participates in the activities of the official language implementation committee of Thiruvananthapuram and takes appropriate initiatives to promote the official language in the Institution. The staff members are also given necessary training.