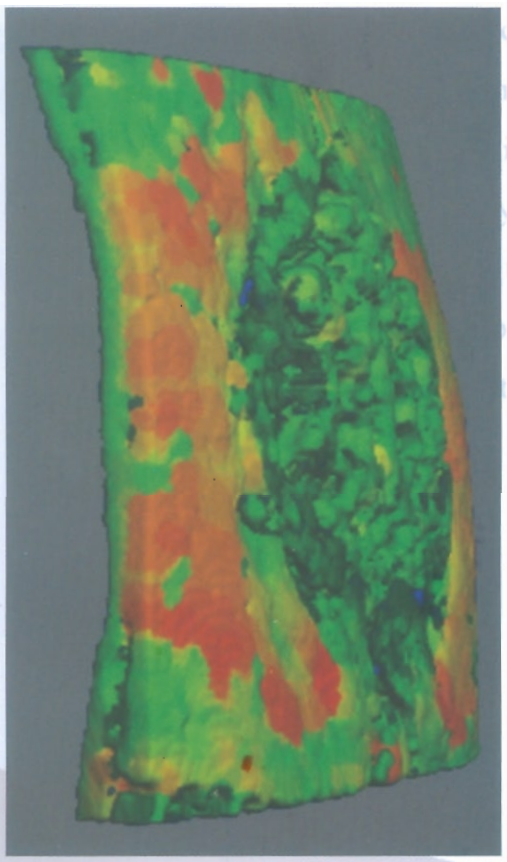
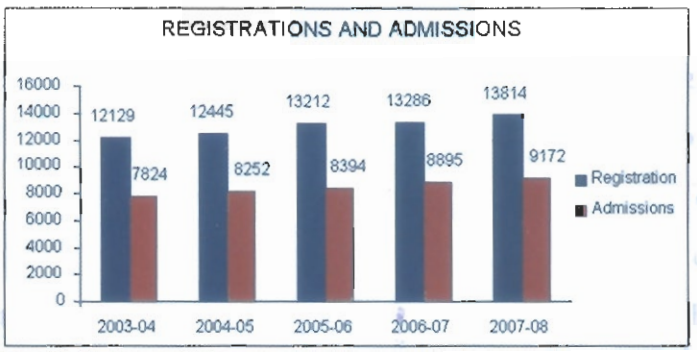
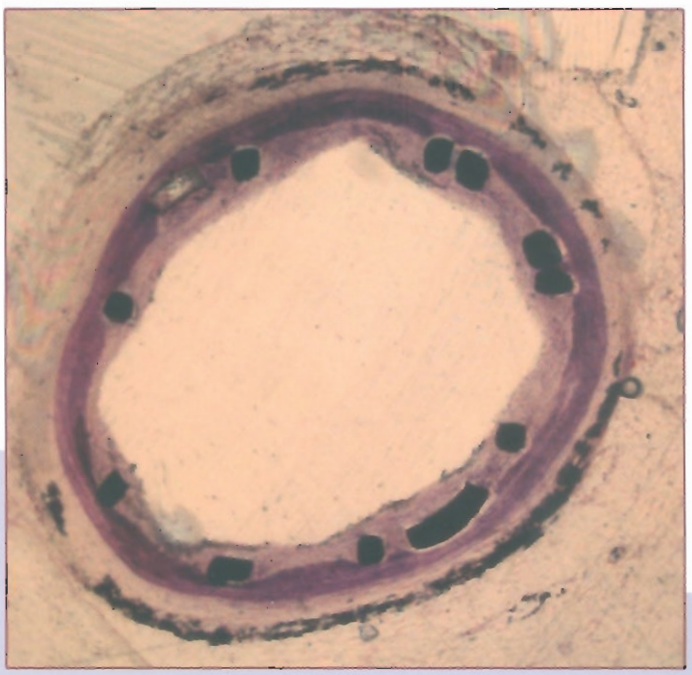
Annual Report 2007-08

HIGHLIGHTS OF THE YEAR







Sree Chitra Tirunal Institute for Medical Sciences & Technology, Thiruvananthapuram 695 011

Annual Report

2007-2008

SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY

THIRUVANANTHAPURAM - 695 011
KERALA, INDIA

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ORIGINS

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

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

The concept and achievement of uniting technology and medical sciences within a single institutional framework was regarded sufficiently important by the Government of India to declare it as an *Institute of National Importance* by an Act of Parliament in 1980.

The objectives of the Institute as laid down in the Act are

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

INSTITUTE BODY

Prof. R. Chidambaram
Principal Scientific Advisor to the Govt. of India, 318, Vigyan Bhavan Annexe
Maulana Azad Road, New Delhi - 110 011
President

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Shri. P.C. Thomas
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Director, National Judicial Academy, Bhopal

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Head, Biomedical Technology Wing, SCTIMST, Thiruvananthapuram - 695 012

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Head of Cardio Vascular and Thoracic Surgery, Sree Chitra Tirunal Institute for Medical Sciences
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OVERVIEW

The Institute continued to maintain its steady progress in all its mandated spheres of activity, with a few new initiatives, augmentation of the existing programmes and consolidation of the ongoing expansion programmes.

Notable among the new initiatives were the establishment of the Indo-Russian Centre for Biomedical Technology, the MoU signed with the IIT-Madras and the Christian Medical College, Vellore to start joint masters and doctoral programmes in clinical engineering and biomedical technology, and the proposed DBT funded Centre of Excellence in Tissue Engineering. The joint degree programmes, set to commence in July 2008, is a unique attempt to address the growing need for clinical engineers in India as well as to create a cadre of research oriented engineers for healthcare technology R&D. The Achutha Menon Centre for Health Science Studies (AMCHSS), having pioneered a welcome trend in public health training in the country, initiated a community oriented research and intervention project, even as it continued its other major efforts in research and training in a variety of socio-economic and behavioural aspects that impact on health. Other initiatives during the year included sleep disorders programme, telemedicine, basic research in the domain of regenerative medicine and a study of molecular genetics of benign childhood epilepsy.

Two new products – bio-ceramic bone graft and single solution bonding agent – were successfully launched in the market by our industrial partners, and two other technologies – for bioactive ceramic composite and a field kit for detection of antibiotic sensitivity in mastitis in bovines – were transferred for commercial production. Two Memoranda of Understanding for collaboration were signed, one with the Vikram Sarabhai Space Centre for their human space flight project, and another with an industrial firm for developing haemostatic chitosan material which could prove useful in managing battle field injuries. The first reassessment audit of the quality system was completed with additional tests being added to the already accredited ones. The infrastructure expansion to meet the *Vision 2020* requirements at Biomedical Technology wing, after a lull, picked up momentum.

Patient care services witnessed modest increases in in-patients, the number of surgical and investigative procedures and substantial rise in radiological and cardiological interventions. There was further improvement in efficiency as shown by reduced hospital stay, lower mortality and augmented bed occupancy rates. The Institute

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was also able to cater to a larger number of socio-economically disadvantaged patients. Commissioning of a state-of the-art cardiac catheterization laboratory and acquisition of a poly somnograph, a fully automated EIA system with LIS linkage and several other monitoring, diagnostic and therapeutic equipments helped to modernize and expand hospital services.

The year also saw the consolidarion of a number of measures instituted over the last couple of years to upgrade and expand the patient care and the R&D functions of the Institute.

On the academic front, the Institute registered steady progress with all the students performing well in the examinations, several of them presenting papers at national and international conferences, and quite a few winning awards and accolades. A new course, M Ch in Vascular Surgery, commenced this year.

The year 2007 – 2008 was thus a year of consolidation, further progress and fresh avenues of endeavour for the Instirute as it relentlessly marched towards the goals that it has set itself for the decade.

HIGHLIGHTS OF THE YEAR

- The Indo- Russian Center for Biomedical Technology inaugurated.
- Memorandum of Understanding signed with Indian Institute of Technology, Madras and Christian Medical College, Vellore to start joint training programs of MTech in Clinical Engineering and PhD in Biomedical Devices Technology.
- Bioceramic bone graft products launched in the market by the industrial partner M/s Basic Healthcare Products Pvt. Ltd., Chandigarh.
- Tehnology for bioactive ceramic composites for dental applications transferred to M/s Dorthom Medi Dents Pvt Ltd., Coimbatore.
- Memorandum of Understanding signed with Vikram Sarabhai Space Center for joint development of bioinstrumentation related to human space flight project.
- Department of Biotechnology sanctions a Center of Excellence in Tissue Engineering at the Institute.
- Achutha Menon Center faculty wins a globally competitive award of US $ 6,90,000 from Oxford Health Alliance for the project "Community Interventions for Health".
- Achutha Menon Center celebrates its tenth anniversary by organizing a successful conference on "Emerging Issues in Public Health".
- A sleep disorder program initiated in the Department of Neurology.
- MCh in Vascular Surgery started.

BIOMEDICAL TECHNOLOGY DEVELOPMENT

The year 2007-08 was largely a period of consolidation, with earlier initiatives coming to fruition. The Indo-Russian Centre for Biomedical Technology was inaugurated on 10th January 2008 followed by a one-day seminar aimed at identifying areas of collaboration. The centre will be located at the Biomedical Technology Wing of the Institute. Based on the seminar deliberations, the areas identified for focus initially are:

1. **Medical Instrumentation**: Diagnostic instrumentation including imaging for early detection and screening of non-communicable diseases (cardiovascular disease, cancer, diabetes, hypertension).
2. **Medical Devices**: Cardiovascular devices (therapeutic devices e.g. heart valve, centrifugal pump, IVAD, etc. (SCTIMST being strong in this area.)
3. **Biomaterials:** Dental materials, Controlled Drug Delivery and other promising materials with special applications in clinical medicine.
4. **Orthopaedic and dental implants:** Metallic implants (S.S. and titanium)

The second major initiative is the joint training programmes with IIT Madras and Christian Medical College, Vellore. An MOU was signed on 28th Nov 2007 by the three major institutions for Academic and Research collaboration; and specifically for offering an M. Tech programme in Clinical Engineering and PhD in Biomedical Technology. The program is slated to commence in July 2008 with the first batch selection and admission being coordinated by IIT Madras.

The M.Tech in Clinical Engineering will be a joint degree, aimed at providing trained engineers for equipment management in hospitals – especially in ensuring equipment safety during its lifecycle, while minimising costs to the hospital. Such programs are already available in the developed countries; but this will be the first such course to be offered in the country.

Other aspects of consolidation covered the major equipment purchases of the previous year and additional floor area that became available as a result of the VISION 2020 expansion programme. The major equipments after installation and validation, started getting fully utilised and the scope of testing serives was consequently expanded. The availability of the extra laboratory space as a result of the addition of two floors has enabled further growth of the new initiatives taken in Tissue engineering and targeted device development. More details of these are given in the later sections of this report.

PRODUCT DEVELOPMENT & COLLABORATION

The year witnessed successful market launch of two products – (1) Bioceramic Bone graft products, which was approved by the DCG(I) and the industrial partner M/s Basic Healthcare Products Pvt. Ltd., Chandigarh started marketing in Dec 2007 and (2) The single-solution bonding agent transferred to M/s. Anabond Stedman Research Pharma Ltd., (ASPR) Chennai was commercialised and the initial feedback from dentists was highly encouraging.

Two new technology transfer agreements were signed during the year – (1) Bioactive Ceramic Composite (HABG) to Dorthom Medi Dents Pvt., Ltd. Coimbatore and (2) Field Kit for detecting antibiotic sensitivity in Mastitis to Institute of Animal Health and Veterinary Biologicals, (IAHVB), Trivandrum. The seed marketing of first product has been initiated with the material provided by the institute. Kerala Government has sanctioned the manufacture and distribution of one lakh milk test kits across the state in the present year.

Two other MoUs were signed during the year – one with VSSC, Trivandrum on "Design studies, development and testing of sensors and systems for crew health monitoring" as a two-year programme for joint development of bioinstrumentation related to the human space flight project. The other was an industry sponsored project for developing "Microparticles based haemostatic chitosan material" with M/s India Sea Food Ltd, Cochin. It is expected that these haemostatic materials will benefit our armed forces in managing battlefield injuries.

The preclincial evaluation of the new model of the Chitra Heart valve has been sucessfully completed. The animal implantation results are very encouraging with reduced tissue growth. Clinical trials are expected to start this year, once approval of the DCG(I) and the Institute's ethics committee are obtained. A unicentric clinical trial of the Hemoconcentrator has shown excellent performance of the device. The Centrifugal blood-pump, the LVAD (joint project with VSSC) and the Oral insulin delivery systems made substantial progress during the year.

The Tissue Engineering initiative took a major step forward with the sanctioning of a Centre of Excellence by the Department of Biotechnology in Dec 2007, with a nucleus of 4 projects. Together with the four other tissue engineering projects that are already ongoing, this initiative in an emerging area of research made excellent progress.

QUALITY MANAGEMENT SYSTEMS AND SERVICES

The first reassessment audit (required once in 5 years) of the quality system was carried out by the audit team of Comité Francais D'Accreditation (COFRAC) of France on 18th and 19th of March 2008. During the year, 3 new blood compatibility tests were validated and covered in the audit. With minimal non-conformities raised by the auditors, the final approval of the COFRAC Council for extension of accreditation for another term of 5 years is expected in June-July 2008.

A major policy decision taken during the year was to apply Quality Management Systems to all aspects and areas of the BMT Wing. As a result, three Quality circles were formed for effective implementation in the areas of — (a) Design Control (ISO 13485) (b) Technical Services (ISO 9000) and (c) Laboratory–animal management (AAALAC).

The major initiative on the implementation of GLP based quality system for preclinical safety studies of devices made substantial progress with a number of industry sponsored studies being carried out under this program. An INDO-US Symposium on Good Laboratory Practice with Emphasis on Medical devices was organised in March 2008 to enable the development of guidelines for our National GLP Compliance Monitoring Authority. This will enable the authority in the implementation of GLP for medical device safety evaluation in the country.

The report highlights the overall growth in the support provided to the medical devices industry in terms of new technologies transferred, old technologies supported and testing and evaluation services rendered. R&D projects made steady progress. The following sections give more details on all these aspects of work carried out during the year at the Biomedical Technology Wing of the institute.

PRODUCT DEVELOPMENT, TECHNOLOGY TRANSFER & INDUSTRIAL LINKAGES

Successful Commercialisation

Basic Healthcare Products Pvt. Ltd, Chandigarh received the license from DCG(I) for manufacturing and commenced marketing of Bone Graft products. This was a sequel to the technology transfer completed in the previous year. This is the first manufacturing facility to receive a license for manufacturing bioceramic implants in India.

Products / packaging - of Basics Healthcare

Single Solution Bonding Agent: Anabond Stedman Pharma Research Ltd., Chennai commenced the marketing of this product under the brand name Stedbond S. Initial reports indicate that it is well accepted in the market.

Product / Packaging -Single Solution Bonding Agent (SSBA)

NEW TECH TRANSFER AGREEMENTS

Technology Transfer cum pilot production agreement for Bioactive Ceramic Composite (HABG) for dental applications was signed on 22nd November 2007 between Institute and M/s DORTHOM Medi Dents Pvt Ltd, Coimbatore. This technology will result in the market availability of advanced graft materials for periodontal and other dental applications. The company has already commenced marketing the product with seed material provided by the institute.

Technology Transfer Agreement Signing with M/s Dorthorm MediDents Pvt Ltd.

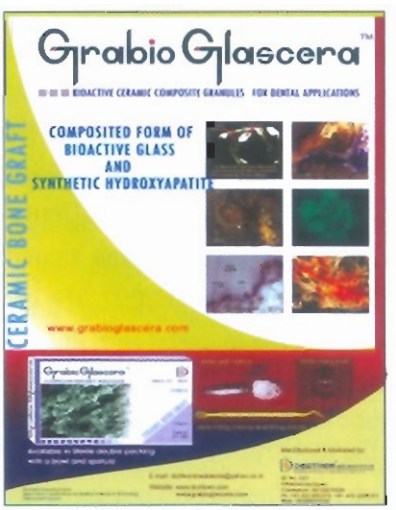


Photo of Product / Packaging - HABG Granules

The Licence agreement for Field Kit For Detecting Antibiotic Sensitivity of Mastitis in farm animals with Institute of Animal Health and Veterinary Biologicals, (IAHVB), Palode, Trivandrum was signed in July 2007. This was a follow-up of the successful field trial of 1200 kits during 2006 as reported in the previous annual report. Government of Kerala has approved the production and distribution of 1 lakh kits during 2008-09 by the Institute.

Product / Packaging - Field kit

ARTIFICIAL ORGANS

The year witnessed steady progress in the development of critical cardiovascular devices in Division of Artificial Organs, which consists of the Devices Testing and Modelling & Prototyping laboratories.

DEVICES TESTING LABORATORY

Development of Improved Tilting Disc Heart Valve : The project involves the development of an improved tilting disc heart valve with objectives of reducing thrombotic potential, ensuring MRI compatibility and improved performance characteristics. The preclinical evaluation has been completed with the results from the large-animal experiments being very promising. The documentation for obtaining Institute's ethics

committee clearance and approval from the DCGI is ongoing. The product is expected to reach clinical trials during 2008. In parallel, M/s. TTK Healthcare Ltd. is working on getting enough valves ready for commencement of the clinical trials.

Improved Tilting Disc Heart Valve

Development of Coronary Srent Systems: The development of a coronary stent system for PTCA stenting under the prestigious CSIR's NMITLI program made good progress. Various tests systems required for the detailed in vitro evaluation have been installed and validated. The design validation using finite element analysis and other analytical studies has been completed. Prototyping and vendor qualification are progressing now.

MODELLING & PROTOTYPING LAB

Hemoconcentrator: Following the technology transfer to M/s SIDD Lifesciences Pvt Ltd, Chennai, one set of clinical trials have been completed at the Madras Medical Mission, Chennai. Further clinical trials are awaiting approval of the institute's ethics committee.

Centrifugal Blood pump for cardio-pulmonary bypass reached the advanced stage of final development validarion with the know-how already transferred to SIDD Life Sciences Pvt Ltd., Chennai. This scale-up and commercialisation phase has received financial support from Technology Development Board (TDB). Improvements to the precision plastic injection moulds are in progress, based on prototype tests carried. Vendor development for the drive unit and flowmeter are also on-going. The product should enter clinical trial phase during before the end of 2008.

Left Ventricular Assist Device (LVAD): the joint development a Left Ventricular Assist Device with Vikram Sarabhai Space Centre, Trivandrum made steady progress. The first phase testing using fresh bovine blood to assess blood damage has been completed using 5 prototypes designed and fabricated by VSSC. With the encouraging results obtained, the project will now move into the 2nd phase involving animal evaluation, for which an application has been submitted to CPCSEA, New Delhi for approval.

BIOMATERIAL AND BIOLOGICAL PRODUCTS

Bioceramics

Technology for the preparation of Bioactive Ceramic Composite (HABG) for dental applicarion was transferred to M/s Dorthom MediDents Pvt. Ltd., Coimbatore. The Agreement was signed with the Company on 22nd November 2007. The company has started marketing the material with the seed material provided by the institute.

Following the tech transfer last year, Basic Healthcare Products Pvt. Ltd, Chandigarh received the license for manufacturing Bone Graft Products from DCG(I). This

is the first manufacturing facility to receive license for manufacturing bioceramic implants in India. Hands-on training in the production of bioactive ceramics for two weeks was provided to the personnel deputed by the industry. Marketing by the company started in December 2007.

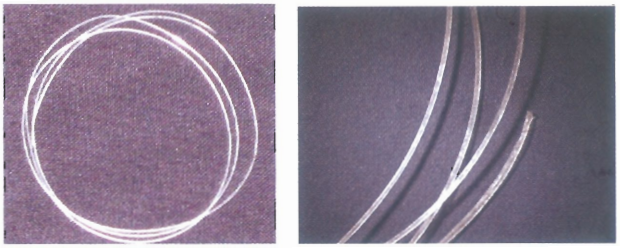
Technology of Calcium Phosphate Cement (Chitra-CPC) for dental applications is ready for commercialization after successful clinical trials. Negotiations for technology transfer, with companies are progressing.

BIOSURFACE TECHNOLOGY

Oral Insulin Delivery: The development of insulin loaded nanoparticles for oral insulin delivery made progress with the completion of oral toxicity studies on the capsules prepared by the industrial partner, USV Ltd., Mumbai. Results obtained on repeated dose 90 day 'oral toxicity' study carried out as per OECD guidelines has shown the polymeric nanoparticles to be safe. Following project review by the monitoring committee, the third phase of the project is being taken up for completion of pre-clinical safety studies in 2 years.

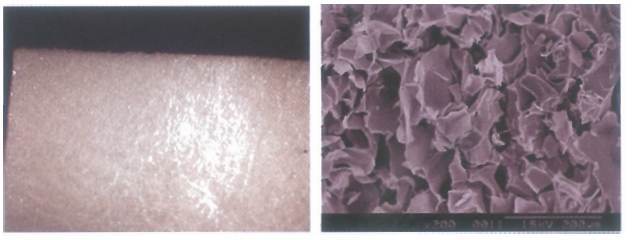
Second Generation Wound Dressing Material based on silverised chitosan has been developed. The sample with 0.08 g/cm silver passed the Intracutaneous reactivity test. The Sensitisation test is ongoing. The sustained release of silver ions from these dressings has been confirmed by Inductive Coupled Plasma spectroscopy.

Bioresorbable Chitin Sutures: development of Chitin based sutures as a potential biodegradable suture has been initiated. Sutures were prepared by dissolving chitin in trichloroacetic acid and extruding it in acetone



Bioresorbable chitin sutures

Porous Chitosan sponges and Microparticles as Surgical Haemostat: an industrial project has been initiated for the development of chitosan haemostatic powders (microparticles) sponsored by India Sea Foods, Cochin. The basic procedure for the preparation of uncrosslinked chitosan microspheres in the range of 50-100 microns was standardized. The optimization of the Freeze Drying process for creating porosity is progressing. The heavy metal content and endotoxin content are being evaluated. The cytotoxicity of the particles and the haemostatic potential evaluation is being planned. The chitosan sponges prepared have been found to absorb 20% to 40% body fluid.



Optical and SEM micrograph of chitosan sponge

Chitosan Wound healing gels: Basic formulation is being optimized based on stability tests. Only ingredients that are approved for pharmaceutical application - (topical use) are used in this Gel Preparation. The following studies are progressing:- (i) accelerated stability studies (in environmental chamber) to evaluate shelf life; (ii) wound healing on animals.

DENTAL PRODUCTS LAB

Dental Composites: Technology transfer documents related to dental composite technology (4 Nos) were handed over to M/s. Anabond Stedman Pharma Research Ltd., Chennai in a function on 10 July 2007 at BMT Wing campus, while the first royalty payments was received from the industry. They also commenced marketing the Single solution bonding agent under the brand name Stedbond S. Initial market feed is very positive.

Glass Ionomer Cement: Glass ionomer cements for restorative, luting and core build up applications were developed and characterised. Working and setting times, film thickness, compressive strength, trace metal analysis and sorption and solubility studies were evaluated as per international standards. Products with different shades were also made. M/s. ASPR, Chennai has shown interest in absorbing the technology and terms for technology transfer have been finalised.

Development of an Intrauterine Device: The development of a drug releasing intrauterine device commenced in January 2007 in collaboration with Hindustan Latex Ltd., Trivandrum. Prototype of a silicone drug releasing core matrix was developed during the year and the properties compared with that of imported control. Detailed analysis using toolmakers microscope and Micro computerised tomography (Micro CT), spectroscopic studies using FT-Raman and FT-IR spectroscopy, thermal degradation studies, mechanical property evaluations, curing characteristics and elution profile of the drug release were carried out. A new HPLC system was installed, which was used to standardise the drug elution profile. The project is on schedule so far.

Chemo-mechanical Dental Caries removal system: The two-component non-invasive chemo mechanical dental caries removal system was successfully completed with all the necessary toxicological evaluations being completed. This included buccal mucosal test, dermal irritation test and closed patch test for delayed hypersensitivity. In addition, genotoxicity test was also carried out. The product cleared all the tests. The product is awaiting clinical evaluation subject to ethical committee clearances.

LABORATORY ANIMAL SCIENCES

Development of a biodegradable and eco-friendly paper pulp based small animal bedding material has been initiated with a paper-pulp manufacturing unit in Kerala. It is hoped that this can replace the conventional rice-husk that is being used, leading to the availability of a more absorbable and eco-friendly material.

POLYMER DIVISION

Polyurethane potting compound development based on indigenous raw materials made progress with trials being carried out at M/S SIDD Life sciences Pvt. Ltd, Chennai. The CTI potting compound that was tried, performed well in terms of penetration of hollow fibre bundles and non-wicking. An institute funded project for scaling-up of the compound and its extended validation for use in critical devices like membrane oxygenators has been initiated in collaboration with the Modelling and Prototyping Lab.

Dispensable and Biodegradable Bone Cement: Development of the dispensable and biodegradable HT-poly propylene fumarate bone progressed. The candidate bone cement sets rapidly to hard mass with low exotherm and attains the mechanical strength required for the repair of trabecular and vertebral bone. The

degradation, which starts after a definite period of time, produces only bio-assimillable byproducts. The adhesion and growth of osteogenic cells on the ingredients of bone cement was investigated using human osteo sarcoma cell line (MG-63). The test for delayed hypersensitivity in guinea pigs revealed no adverse reactions, while the tissue compatibility was successfully studied by intramuscular implantation in rabbits. Functional evaluation was tested in vivo in femoral-bone repair in a rabbit animal model. The histopathological analysis of the retrieved implants revealed formation of new bone on endosteal and periosteal aspect with reduction of implant size. Material is in ditect contact with new woven and laminar bone on all sides as well as inside the implant. Genotoxicity was studied using Ames test . These studies show that the HT-poly (propylene fumarate) resin based-bone cement is a most promising injectable material for orthopaedic applications.

THROMBOSIS RESEARCH UNIT

Fibrin Glue: The technology proving facility of the Institute is being upgraded with Class 100 areas to enable the development of a scaled-up process technology for this product, which has shown great promise in clinical trials. Procedure for cryoprecipitate preparation, viral inactivation and product validation in terms of FVIII content, protein content were standardized to meet the requirements of EP specifications. SOPs for scale up of fibrin glue components and cryoprecipitate for FVIII are ready.

DIVISION OF IN VIVO MODELS & TESTING

The successful completion of the field trials during 2006 led to the signing of the technology transfer agreement for the Milk Test Kit in July 2007. With the approval and sanction of funds by the Government of Kerala, the Institute for Animal Husbandry and Veterinary Biologicals is now gearing up to produce 1 lakh kits per annum. Efforts to transfer the technology to other states and make it available all over the country have been initiated.

INSTRUMENTATION LAB

Progress in the development of disposable ECG electrodes was rather slow during the year due to technical difficulties in scaling-up. Efforts have been initiated to bring-in an industrial partner, who can carry out the scale-up and then start clinical evaluation jointly with us. A potential partner has been identified and discussions have been initiated. More progress is expected in the coming year.

Bio-impedance measurements: This program aims to develop instrumentation for electrical impedance measurements in respiration monitoring and early detection of cervical cancer. A major design revision of the hardware as well as software was undertaken during the year. Firstly, the hardware was upgraded to be energy efficient and suitable for battery operation. Secondly, SPICE based circuit simulation studies were carried out to validate the methodology for multi frequency complex impedance measurements. Data acquisition software was developed to acquire data on a hand held computer (Simputer) and store the impedance data on a PC. These circuits are being now assembled into prototypes for clinical trials.

LABORATORY FOR POLYMER ANALYSIS

C-reactive Protein Measurement: Fluorescent polymers containing ligands for C - reactive protein was found to pick up selectively C-reactive protein from serum. The methodology is undergoing optimization to tailor it as a novel approach for the estimation of this clinically relevant molecule.

TECHNOLOGY TRANSFER & PROJECT COORDINATION

Technology Business Division

Interactions with medical device industries and academic institutions, both within and outside the country, continued to increase in the areas of medical device evaluations, collaborative research and development. The Technology Business Division played an active part in building up these relationships and partnerships. The main focus of the division is on (a) Technology transfer and related activities b) Industry sponsored and collaborative research and (c) Customer Service for testing. Two new technology agreements were signed during the year.

The division coordinated support to industrial partners to ensure that technology transfer activities are completed on time to their satisfaction. Some the important initiatives are:

Coordination with M/s Basic HealthCare Pvt ltd, Punjab on technology absorption of Bone graft technology and establishing facilities.

The final technology transfer document of the SSBA project was handed over to ASPR officials on 16th January 2008 at BMT Wing. Discussions with the company on licensing other dental products under development such as Glass Ionomer cement made progress.

Negotiations were carried out with industries such as Carborandum Universal for licensing HAP powders, Lakshmi Technologies for ECG electrodes etc.

New MOUS & NDAs: Important MOUs and NDAs signed with industrial partners and institutions are:

MoU on "Design studies, development and testing of sensors and systems for crew health monitoring" with M/s VSSC, Trivandrum on 19th March 2008. This is a two year programme for joint development of bioinstrumentation related to human space flight project of VSSC

MOU signed between SCTIMST, IIT Chennai and CMC, Vellore on Academic and Research collaboration, specifically for offering an M. Tech programme in Clinical Engineering and Ph D in Biomedical devices was signed on 28th Nov 2007.

Confidentiality and Non Disclosure agreements were screened by the division before their signing with a few industrial partners availing medical device evaluation services.

Industry Sponsored and Collaborative research : An MOU for a sponsored project for developing "Microparticles based Haemostatic chitosan material" was signed with M/s Sea Food Ltd, Cochin on 12th July 2007.

Training to industry personnel - An orientation training on Biomaterials and Medical Devices was organized from 24th to 26th March 2008 for the staff of M/s HCL Technologies Ltd, Chennai under the aegis of the Industry-Institute Partnership Cell

Preclinical Test Data Review Services- a paid consultancy service for reviewing the preclinical test data for regulatory submission was initiated as part of support to the Expert committee on Cardiovascular Devices constituted by the DCG(I). A number of medical device companies availed the services.

QUALITY MANAGEMENT SYSTEMS, TESTING & TECHNICAL SERVICES

Quality Systems

With the completion of 5 years approaching in July 2008 from the initial assessment date, Comite' Francais D'Accreditation (COFRAC) of France carried out a REASSESSMENT in March 2008. During this audit, the scope of accreditation was expanded with the addition of 3 new tests. The final approval of COFRAC Council for the extension of accreditation for another 5 years is awaited.

COFRAC LOGO

A major policy decision taken during the year was to extend Quality Management to all divisions of the BMT Wing. As a result three Quality circles were formed for effective implementation in the areas of -- (a) Design Control on ISO 13485 (b) Technical Services on ISO 9000 and (c) Laboratory-animal management on AAALAC guidelines.Our industrial partners need to implement ISO 13485 quality management systems, if they wish to obtain CE marking for their device and market them abroad. One aspect of this standard is the requirement for Design control and Risk analysis during the stages of device design, development and testing.

Calibration Cell

The Calibration Cell addresses the equipment calibration, maintaining traceability in measurements and reference material requirements of the BMT Wing. During the last year the Cell carried out 245 calibrations. Of these, 200 were directly related to the testing services under the scope of COFRAC accreditation.

The accreditation of the calibration cell with the National Accreditation Board for Testing and Calibration Laboratories (NABL), New Delhi is in progress. Preparation of in house reference materials (RM) for various biological evaluations are prepared regularly and maintained in the Cell. A new TDF project has been initiated to validate commercially pure titanium (CP Ti) as RM in bone implantation studies.

Quality Cell

Activities of the Quality cell include the implementation, maintenance and improvement of the Quality Management Systems to assure that the facilities, equipment, personnel, methods, practices, records and its control are in conformance to the requirements of the standards. Test and/or calibration are planned, performed, monitored, recorded, archived and reported accordingly.

Two training programmes were organised -

1 GLP training was imparted to twenty four personnel on 16th & 17th August 2007.

2 ISO/IEC 17025:2005 Quality Management System & Internal Auditor Training for twenty personnel were conducted on 21st, 22nd & 23rd April 2008

Training Cell

New comers to BMT Wing are given an introductory training in Quality system procedures during the last week of every month. A three-week training on safety testing of medical devices and Quality assurance practices as per International standards was organized for two WHO fellows from Sri Lanka and the report sent to WHO and the National Drug Quality Assurance Laboratory, Sri Lanka.

Training to 6 Animal Attenders from Institute of Veterinary Biologicals and Animal Health on animal handling, cleaning and care and management of animals was extended. Training in animal handling, care and management was provided to an animal house personnel from M/S Nagarjuna for one week during Feb 2008.

Testing Services

The scope of COFRAC accredited tests was expanded with the addition of 3 tests in the area of in vitro blood compatibility testing. With this, the most important tests required for the blood compatibility evaluation of biomaterials and medical devices as per ISO 10993 standards are covered. This area of expertise and service is probably unique, not only in the country but in South Asia.

New Tests Added To The Scope of Accreditation in March 2008

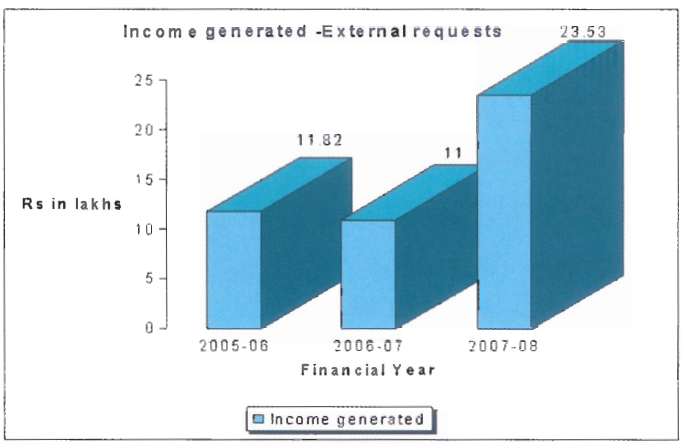
Sl. No	Nature of test	Reference	Laboratory
1	Complement Activation (C3a, C5a, CH50)	ISO 10993-4 Table 3 & 4, B.6	Thrombosis Research
2	Platelet Activation by 1. P selectin 2. CD41& CD61 (GPIIb / IIIa) 3. Platelet micro particles	ISO 10993-4 Table 3 & 4, B.4.4	Thrombosis Research
3	Haematology- Haemoglobin	ISO 10993-4 C.6.1.2.1	Thrombosis Research

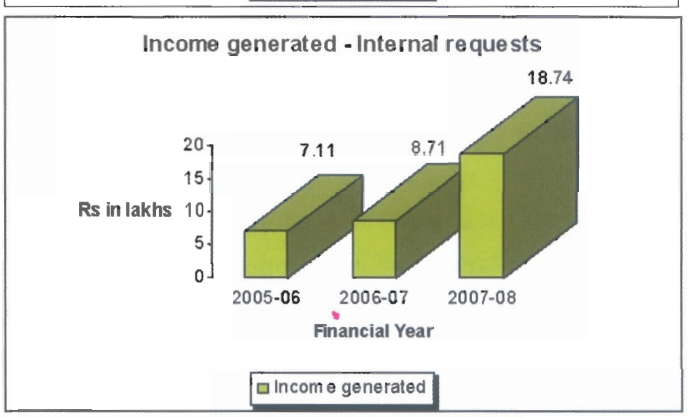
Customer Service Cell- Testing & Evaluation Activity

The Customer Service Cell (CSC) is the nodal point for all the Biomaterial testing and Medical Device evaluation services offered to medical device industries, research institutions, and academia as well as internal customers. It also makes available the necessary information and assistance for proper selection of tests and offering reasonable access to the laboratories

The demand for biocompatibility testing of medical devices as per the ISO/IEC 10993 continued to increase especially from external customers. With the increasing awareness on quality and testing requirements for devices, the year saw a greater demand for accredited test reports.

Description	External			Internal		
	2005-06	2006-07	2007-08	2005-06	2006-07	2007-08
Work orders	402	381	465	278	233	299
No. of test materials handled	1096	1385	1728	1148	802	813
Income (Rs)	11,82,420	11,01957	23,52,881	7,11,050	8,70,950	18,73,869





Study Based Device Evaluation services: - In addition, the customer service cell also coordinated the various study-based projects for industrial customers for various device evaluations. The study budget for the present financial year amounted to Rs 45.70 lakhs. There was a greater demand for accelerated ageing studies of devices during the year.

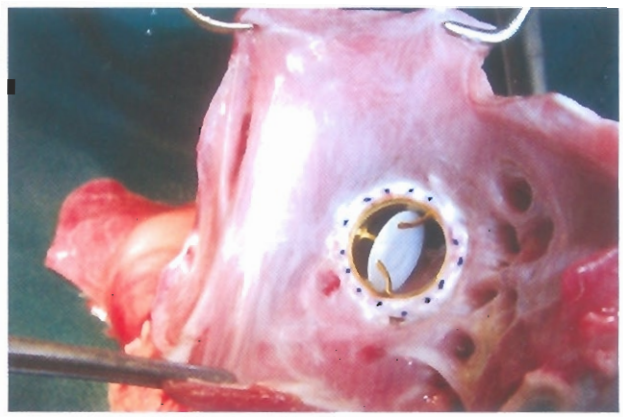
SUMMARY OF TESTING SERVICES OFFERED BY VARIOUS LABORATORIES

Bioceramics: Two tests are offered - X-Ray Powder Diffraction and Vicker's Microindentation Hardness Test.

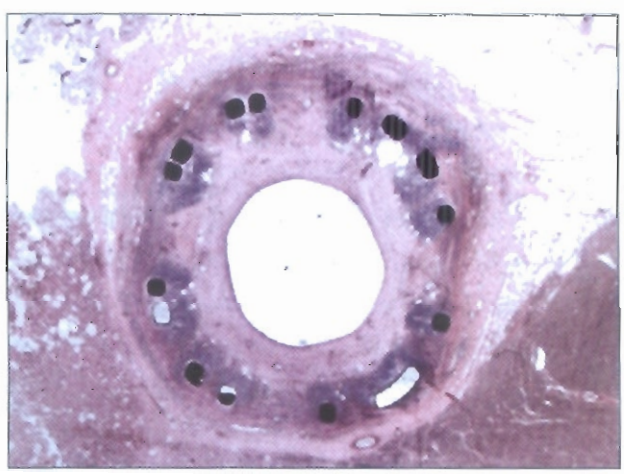
Dental Products: Testing support on major equipment like FT-Raman Spectrometer, FT-IR, Dental Thermocycler, UTM and Micro CT were extended to internal and external customers during the year.

Devices Testing: Three accelerated ageing studies for industries were completed and five new studies taken up during the year. The laboratory also supported the testing activities of the BMT Wing by providing service on sample preparation, cleaning, packaging and sterilisation of the materials from customers.

Histopathology laboratory: The laboratory has facilities for routine as well as a wide range of specialized techniques for evaluation of biocompatibility of various materials as per international standards, as well as pre-clinical evaluation of medical devices as per approved protocols. The laboratory is well equipped for evaluation in soft and hard undecalcified tissues, with and without materials. The laboratory received a record number of samples for evaluation of biocompatibility and in large study based requests for evaluation in pre-clinical studies from both Indian Industry and research groups and International research groups. Student based studies from IIT, Kharagpur and Dental colleges as well as study of tissue response around clinically retrieved implants were carried out.



Mechanical Heart Valve



Coronary Drug Coated Stent

In vivo Models & Testing: Major device evaluation studies carried out under the new GLP system of quality assurance were (1) Two industry sponsored studies for the evaluation of drug eluting stents in porcine coronary artery model for their safety and efficacy (2) Preclinical evaluation of the new improved Tilting Disc Heart valve in an ovine and a porcine model. This new valve model is being jointly developed with TTK Healthcare Ltd, Chennai. With the completion of the animal evaluation, the device is now ready for clinical trials.

Microbiology: The division offers routine sterility testing as per United States Pharmacopoeia and the recently accredited Ames' Test (Salmonella typhimurium reverse mutation Assay) as per ISO 10993. The division also offers services for routine Microbiological monitoring of controlled environments in various labs and water used in the campus for animal drinking and other areas. Support was extended Antimicrobial activity and bacterial adhesion studies of materials being developed by other laboratories. Other tests conducted include spore viability and culture and sensitivity.

Modelling and Prototyping Lab: ETO sterilisation services were extended to the Hospital wing and BMT Wing regularly. With the shutting down of the PANBIT irradiation facility for refurbishing, the volume of services increased substantially during the year.

Polymer analysis: The laboratory generated good revenue during this period by extending its analytical facilities to external organization and other divisions of the BMT Wing.

Polymer Processing: test offered include mechanical properties (tension, compression, impact properties, dynamic mechanical analysis) and Gas permeability through sheets and films.

Scanning Electron Microscopy: The facility has been expanded with the installation of an Environmental Scanning Electron Microscope. The routine support extended is SEM and EDS analysis.

Thrombosis Research Unit: Major customers during the year were M/s Sahajanand Medical Technologies, Surat & Meril Lifesciences Pvt Ltd, Vapi, Gujarat for hemocompatibility testing of their coronary stents. Four new tests were standardized and added to the scope of accredited tests including Complement activation. Facilities and expertise available were extended to a large number of patients from various hospitals of Trivandrum for testing platelet function, as this test is not routinely available elsewhere in the city. Proficiency testing of haematology branch program has been initiated under the RCPA program with good results.

Tissue culture laboratory: In vitro cytotoxicity test as per ISO 10993-5, 1999, and for cell adhesion and cell material interaction, studies were carried out. Methods used included direct contact, test on extract and indirect contact for evaluation of cytotoxicity and use of HOS cells and MTT assay. Continuous procurement, storage, revival and maintenance of cells ensured efficient functioning of the entire system.

Toxicology: As in the previous years, the division extended its testing services to various external and internal customers covering a wide range of tests conforming to ISO 10993, USP and ASTM standards. GLP based studies for a collagen based biomaterial, and 90 day repeat dose oral toxicity for an oral insulin formulation were carried out.

Transmission Electron Microscopy laboratory: TEM sample processing and evaluation of tissue and inorganic (micro- and nano- particles) samples (61), which also included the evaluation of the ultra-structural scenario of the tissue response to materials, were carried out for various customers.

TECHNICAL SERVICES

The 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.

Devices Testing: The division continued to support the information management activities of the BMT Wing. The implementation of an Enterprise Resource

Planning and Management Information System (ERPMIS) is in the final stages. The customisation of the software for meeting the specific needs of the campus are in progress now. The campus network BMTLAN is being further upgraded to meet the growing demands of the expansion, new hostel, etc.

Engineering Services: Division provided routine and emergency maintenance works under areas of Electrical, Plumbing, PANBIT, telecommunication, Incinerator and Air conditioning. The division carried the infrastructure establishment for Polymer & Toxicology block floor expansion activities in the various segments. Supervision and coordination of the construction of the new Canteen & Hostel blocks are being carried out. Soil testing for proposed Sleep Study Centre and new Faculty Hostel was also arranged.

IPR & Technical Co-Ordination: Patents application filing and maintenance in consultation with the institute's patent attorney are the major responsibilities. The cell coordinates the visits by a large number of college student groups from various technical colleges in South India. During the year, 6 New Patent applications were filed and 5 of the older ones were granted / sealed. The status of patents held by the institute and those filed and pending as on 31 March 2008 is:

Patents held (sealed) = 72 Nos.
Patents filed and pending = 45 Nos.
Designs held (sealed) = 13 Nos.

Division of Laboratory-Animal Science is responsible for the breeding, care and management of small animals and ensures consistent supply of quality animals for both testing and research. This requires housing, husbandry, and maintenance of micro as well as macro environment and documentation of small laboratory animals according to CPCSEA and ISO 10993 Part- 2 standards. Assistance is provided to researchers for orbital bleeding of rodents, harvesting tissues from animals, etc.

The division extends support for the timely conduct of Institutional Animal Ethics Committee (IAEC) meetings covering documentation, communication with scientists and with CPCSEA for major issues in connection with all animal experimentation of the Institute. Training in Care and Management of Experimental animals is regularly conducted for MSc/ PhD/ BVSc students and staff joining in various projects.

Details of Animals Supplied for Testing and Research during 2007-2008

Species and strains used		TESTING	RESEARCH	Total
Rats	Wistar	124	572	696
	Sprague Dawley	40	157	197
Mice	Swiss Albino	324	155	479
	BALB/c	Nil	230	230
Guinea pigs (Hartley)		180	35	215
Rabbits (New Zealand White)		261	15	276

Laboratory for Confocal Microscopy and Experimental Pathology: Confocal microscopy service was extended to the various departments and divisions of the Institute. Training for new users including research students and faculty was organised. A confocal microscopy club was started to encourage interactions, exchange ideas and techniques for better use of this major equipment. Routine histopathology service was extended to research studies and students.

Precision Fabrication Facility: A number of moulds and dies were fabricated for moulding various components and test samples; jigs and fixtures were fabricated to support the testing in various labs. Some of the important designing and fabrication jobs carried out include tissue stabilizer prototypes, flow chambers for Microbiology and blood compatibility testing, a rabbit restrainers set up for examining the rabbit eye using slit lamp, 1000 nos. of 1mm titanium pins as control material for implantation test, etc. The division extended the dimensional analysis support for the IUD components for the industry sponsored project.

LIBRARY

The library has a collection of 9943 books and 5498 back volumes of journals. During the current year, 209 books and 200 back volumes were added and 65 journals were subscribed. The collection includes 2165 standards specifications and 275 patent specifications. The library has accounts with Patents Information System, Nagpur, NISCAIR, DELNET and STN-Easy for the easy retrieval of information.

The information management system and library automation is based on the UNESCO software, CDS/ISIS and bar coding has been implemented. he library information and the CD-ROM collection are available to both the wings through intranet. As a part of support to the Quality Systems, the library updates all relevant national and international standards and maintains an archival cell for storing and retrieval of documents related to Quality Systems. During this year 49 standards specifications were added to the collection of the library.

PATENTS

1. "A process for the preparation of immunoadsorbent matrix for hemoperfusion". Patent Appln. No: 210688, Inventors: Dr. Chandra P Sharma, P. R. Hari and Willi Paul.

2. "A resin for use in a dentine bonding agent". Patent Appln. No: No. 557/MAS/1999 ; Dt : 14/06/2007 Inventors: Dr. V. Kalliyanakrishnan and Dr. P.P. Lizymol.

3. "Blood Oxygenator". Patent Appln No. 1153/MAS/1999; Dt: 11/05/2007.

4. "A Process for the preparation of a Photopolymerizable Dentine Bonding Agent". Patent Appln No. 558/MAS/1999; Dt: 11/05/2007.

5. "Venous reservoir with integral Cardiotomy Reservoir for Blood Oxygenator". Patent Appln No. 203/MAS/2000; Dt: 11/05/2007.

BIOMEDICAL RESEARCH AND DEVELOPMENT

Bioceramics

Current research program and new initiatives in technology development are:

1. Micro and nano porous bioceramic substrates having capacity to carry drugs and biologics for the treatment of refractory osteomyelitis and osteonecrosis.
2. Bone filler cements containing calcium sulphate and calcium phosphate, which are superior in resorption characteristics and having the capacity for drug delivery.
3. Coating of hydroxyapatite layers on to titanium implant surface using Pulsed Laser Deposition technique to increase the integration with bone.
4. Silica-based biosensors for the detection of markers in blood for diagnostic applications.
5. Magnetic nanoparticles for radiological and therapeutic applications.

Biosurface Technology

Polymethacrylic acid based micro and nanoparticles were prepared and their application towards oral insulin delivery evaluated. Different polymer combinations were tried to enhance the physico-chemical properties of these particles. Methacrylic acid-vinyl pyrrolidone, methacrylic acid-ethylene glycol microparticles were developed recently and polymer composition were optimised to achieve better protein loading and release properties. Further protease inhibition, muco-adhesion, divalent-ion binding properties of the microparticles was investigated under in vitro conditions.

In order to enhance the insulin stability and absorption, several modification strategies were proposed. Some novel hydrophobic/hydrophobic derivatives were synthesised and their insulin complexes prepared. Chemically modified insulin with polyethylene glycol based polymers was also prepared as part of the investigation. Biological activity of PEGylated insulin was evaluated using ELISA technique. Further studies are planned with modified insulin entrapped polymeric particles. Efforts are on to develop an in vitro cell culture system based on caco 2 cells to evaluate the intestinal permeability of oral insulin delivery systems.

An attempt has been made to develop protein like polymeric nanoparticles and characterized it by its thermo-responsiveness and photo-sensitiveness. 2D monolayer studies of the synthesised polymer were carried out. Further immobilization of these nanoparticles over a polymeric substrate was carried out and their thermoresponsive properties studied. Utilisation of these novel nanoparticles and pendant polymers are

being attempted towards drug targeting and improvement in the circulation time of liposomes.

Dental Products

Polymer scaffolds for tissue engineering: biodegradable polymer scaffolds for small diameter vascular graft were prepared in the laboratory and characterised. Their tensile strength, elongation, modulus, burst strength, compliance, porosity were measured. Rate of degradation in different mediums are being evaluated. This is a joint project with Thrombosis Research Unit.

FT-Raman spectroscopic studies on atherosclerotic plaques: Preliminary studies on quantitative distribution of chemical constituents in atherosclerotic plaques in blood vessels were carried out using FT-Raman spectroscopy. Characteristic Raman-shifts were observed with increasing degree of plaque formation. Further studies are in progress.

Devices Testing Lab

Presealed Vascular Graft: Based on the demand from Vascular surgeons for presealed vascular grafts, R&D work progressed. Two pilot programs were initiated in collaboration cooperation of the division of Polymer Processing – (1) aimed at the feasibility of using flouro-passivation and (2) hydrogel preclotting have been successful. A project has been submitted for external funding for carrying out the comprehensive preclinical evaluation of this new graft model.

Instrumentation and the Devices testing labs continued to support the Department of Imaging Sciences & Interventional Radiology in the standardization of event related_fMRI technique for developing spike triggered fMRI. This program focuses on the activation of specific brain areas by providing cognitive or motor stimuli in synchrony with the MRI scans. The hardware for the 'synchro-box' was designed and developed. A few experiments carried out on volunteers using this software gave promising results. Further refinements are being carried out so that this set-up can be used on patients after obtaining approval from the ethics committee.

In-vivo Models and Testing

De-cellularised animal tissue: A novel technique for non-detergent based de-cellularisation of animal tissue was developed. This technique produced de-cellularised collagen/elastin matrix with adequate mechanical strength with a good potential for cardiovascular application. This acellular matrix is non-cytotoxic to L929 cells and allowed myofibroblast in-growth with less inflammatory response and minimum calcification in rat subcutaneous implantation model at 70 days. Further work is progressing under a DBT funded project.

Polymer Analysis Lab

Thermo responsive copolymers as sensing elements for C-reactive proteins: An important milestone achieved is the synthesis of fluorescent polymers capable of binding selectively C-reactive protein (CRP) from blood plasma and serum. The quantification based on the variation in fluorescence emission is extremely sensitive and could potentially used for the detection and estimation of CRP.

Molecularly Imprinted Polymers: several polymeric formulations were synthesised and characterized and were found to bind glucose effectively. Current efforts are directed to optimise these polymers for the sensing of glucose. In another project, several thermo responsive copolymers were synthesised and characterized. Strategies were attempted to functionalize these polymers further with biomolecules such as collagen. Other molecularly imprinted polymers were synthesised with the aim of

releasing drugs in response to external concentration of marker molecules, which are specific to diseases. It is hoped that this effort will ultimately pave the way rowards the development of intelligent drug delivery systems capable of modulating the drug release in the presence of certain molecules only.

Another programme initiated during this period is the design of novel materials using the concept of 'Layer by Layer (LbL)' approach. Micro/nano capsules with high drug loading capability were synthesised. This concept was also used to modify the surfaces of polymers such as PMMA to enable it to retain drugs and to improve biocompatibility.

Polymer Division

Functionally active myocardial patch implant: Different PPF-PEG-PCL /acrylamide /alginate hydrogels were synthesised and their physical properties evaluated for use as scaffolds for tissue engineering of myocardial patch implants. The growth, proliferation and migration of cardiac cells on these scaffolds were evaluated and found to be promising.

Biodegradable molecularly reinforced polymeric nano composite bone fixation devices: Experimental dynamic compression bone plates were prepared by reinforcing the biodegradable poly(propylene fumarate) with hydroxyapatite micro-particles. Physico chemical, mechanical, biodegradation properties and biomechanical stability were optimized to obtain a cured composite.

Polymer Processing Lab

Bone graft substitutes for spinal fusion surgery: The aim is to develop a new composite material that has bioactivity (both osteoconductive and osteoinductive properties) and mechanical and biological compatibility with the host bone tissue. The approach consists of synthesizing composite materials from bioactive glasses and polymers of adequate modulus and good processing-ability. The compositions that have been prepared are being studied for mechanical and biological properties.

Microporous polymeric membranes for medical applications: This is a collaborative project with Rubber Technology Center, Indian Institute of Technology, Kharagpur. The aim of the project is to develop a microporous membrane from compatible blends of thermoplastic polyurethane (TPU) and poly dimethyl siloxane rubber (PDMS), which can be developed further to use as a substitute for human duramater and as a non-biodegradable scaffolds in tissue engineering. The initial objective is to study the biostability of the polyurethanes blends. The blends will be characterised for phase compatibility, improvement in strength and performance properties by using modern sophisticated tools and techniques.

Latex covers for ultra sound probes: The aim of the project is to develop ultrasound probe covers based on appropriate non-toxic natural rubber latex formulations. Molded prototype covers passed the cytotoxicity, acute systemic toxicity and intra-cutaneous irritation tests.

Polymer-Ceramic nanocomposites for bone tissue engineering: The aim project is to fabricate hybrid nanocomposites as potential scaffolds, which mimic the complex nano-structured architecture of bone by electrostatic co-spinning of polymers with nanohydroxyapatite. The project has just been sanctioned and work has been initiated.

TISSUE ENGINEERING AND BIOLOGICAL RESEARCH

New Initiatives

DBT Centre of Excellence in Tissue Engineering was sanctioned in Dec 2007 for a period of 5 years. The Strategic goals of the Centre are:

1. To build and support an integrated team who can ensure the achievement of the mission, incorporate the latest developments in biology and provide for the long-term stability of its programs.
2. Develop the core, enabling technologies critical to implement tissue engineering solutions on a clinically relevant scale and as appropriate, so as to be available of -the-shelf.
3. Partner with industry to serve the varied needs of the medical device industry and to implement enabling technologies through effective technology transfer
4. Develop and deliver innovative educational initiatives for scientists and engineers, who will provide leadership in emerging medical device and biology based industries and universities.

Four core projects have been sanctioned, involving three laboratories of the BMT Wing and will form the foundation for its development.

Project Title	Laboratory / Division	Principal Investigator
Tissue Engineering of Cartilage using biomimetic scaffolds under dynamic conditions	Laboratory for Polymer Analysis	Dr. Prabha D Nair
Differentiation of foetal progenitor cells and fabrication of a prototype for bioartificial liver	Tissue Culture Lab	Dr. T. V. Kumari
Bone Tissue Engineering using adipose stromal cells on 3D porous bioactive ceramic scaffolds	Transmission Electron microscopy Lab	Dr. Annie John
Cell-based Tissue -engineered Fabrication of Osteochondral Constructs		

Histopathology Laboratory

Four studies were completed during the year, viz.,

1. Immune mechanisms of polyurethane degradation: The study involves the qualitative and quantitative in vivo investigation into immunological cell response to polymers with reference to polyurethane degradation. The results of this in vivo long-term study suggest that poly (ether urethane) urea undergoes surface degradation over long-term residence in the tissue and the persistence of immune cells at the interface as well as on the material over this time period pointed to a definite cell-material interaction. The study highlights the relationship among polymer surface changes, histology and immuno-histochemical identification of cells at the tissue-material interface.

2. Quantitative immunophenotyping of inflammatory cells in biocompatibility assessment of materials showed a definite presence of lymphocytes at late time periods post implantation around materials known to have long term clinical failure, as compared to clinically problem free and useful materials. Immunophenotyping of cells around implants in addition to evaluation of routinely stained sections for biocompatibility at late time periods will help in prediction of immunotoxicity in long term implants.

3. Molecular mechanisms of cellular response to particulate form of Cobalt Chromium Alloy: An investigative study using in vivo and in vitro models showed the transition of fibroblast cells into a hypoxia like state, suggesting the possibility of a hypoxic environment leading to excessive fibrosis seen at later time periods in the in vivo study. This study has shown the changes in cellular protein profile of fibroblasts grown with Cobalt-Chromium alloy particles using the proteomic platforms. The results are significant in view of the recent return in use of metal on metal total hip implants.

4. Cellular and molecular mechanisms of polymer degradation - The in vitro and in vivo studies of interactions of macrophages with the biomaterial, poly (ether urethane) urea [PEUU] investigated the role of a signaling molecule in survival and activation of macrophages on polyurethane. It delineated the active nature of macrophages adhered onto PEUU with implication of the role of JNK phosphorylation in this activation.

Ongoing studies are:

1. Immune response and regulation of fibrosis around implants- an in vivo and in vitro investigation of cell-material interactions between silicone and macrophages and fibroblasts with reference to material degradation.

2. Study of retrieved human implants, which include light and scanning electron microscopy observations on tissue and implant material.

Microbiology

Delineating mechanisms of biofilm formation in urinary catheters- characterization of the role of E.coli secretory proteins and influence of environmental signals. Four different biofilm reactor models were designed and prototypes made. They are being evaluated for ease of handling and repeatability of results in assay of biofilm development. Meanwhile the E.coli strains isolated from

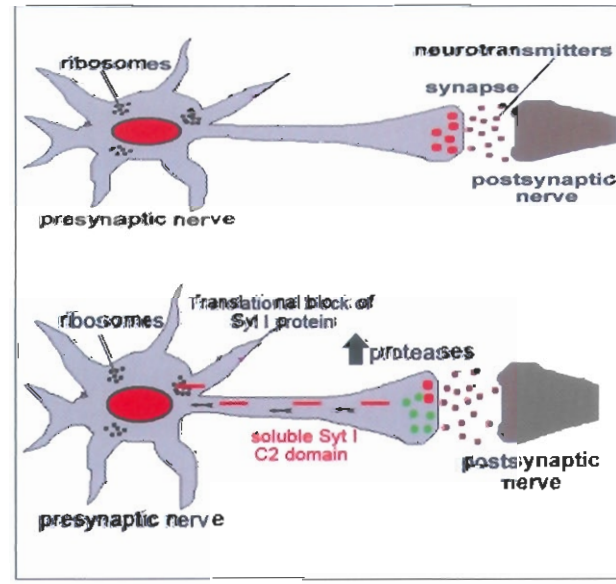
Foley's catheters retrieved from patients were characterised and studied for their biofilm formation. Biofilm producers were further studied for their antibiotic sensitivity, presence of plasmids and growth on Congo red agar medium. Their ability to produce slime, the extraellular mucopolysaccharide was assayed by crystal violet assay and the role of environmental signal like glucose is being estimated at present.

Tissue engineered hybrid artificial lung model for testing pollutants and drugs: The pulmonary epithelium is uniquely situated so that it has a large surface area exposed to air facilitating efficient diffusion directly ftom air to blood. This site hence provides immense possibilities for understanding molecular pathology of alveolar diseases, development of novel treatment methodologies and as testing system for drugs, chemicals and pollutants. The enzymatic dissociation and selection of the different lung cell types were standardised. To develop a heterotypic co-culture model the epithelial and fibroblast cell were used and the culture conditions standardised. Meanwhile various scaffolds were synthesised in the collaborating laboratory and their ability to support alveolar pneumocytes was studied. Furher work is in progress.

Molecular Medicine Lab

Recombinant proteins for clinical application: Some growth factors such as Transformation Growth Factor alpha (TGF alpha) and Vascular Endothelial Growth Factor (VEGF) were found to augment wound healing in cases of burns, diabetes wounds, and chronic ulcers. Recombinant human TGF alpha and VEGF have been prepared using prokaryotic expression systems. The recombinant protein was found to enhance the healing property by around 20-30%. Experiments are underway to evaluate its stability and release kinetics using various polymeric substrates with the aim of using these growth factors in wound dressing material with enhanced healing.

Regulation of Synaptotagmin I expression in neurons: Synaptotagmin I (Syt I), a presynaptic protein is essential in the Ca2+-dependent neurotransmitter release pathway and allows the formation of a ternary complex of soluble N-ethylmaleimide sensitive factor attachment receptors (SNAREs). Both mRNA and protein expression of Syt I teach a constant level during the early stages of development independent of synaptic vesicle formation. Recent reports have reopened the question of activity dependent regulation of Syt I expression in neurons. Work here has identified that Syt I protein can interact with the 3' untranslated region (3'UTR) of its own mRNA. The C2A domain in Syt I plays a critical role in this interaction. The presence of two C2 domains was found to increase the affinity for its RNA binding while the C2B domain alone did not recognize Syt I transcript. These and other results obtained during the year, suggest that the selective recognition and



Figures of Presynaptic Nerve

binding of Syt I 3'UTR by the C2A domain can modulate the expression of Syt I protein and thus effectively regulate synaptic function.

Gene expression variations in seizure model: In epilepsy research, effect of gene expression variations accompanying seizure in bringing about long-term changes in the neuronal network is understood to be the driving force towards seizure susceptibility. Using a pilocarpine model of seizure in rat and microarray analysis, the gene expression changes during early phase of epileptogenesis were monitored. Seizures triggered substantial over-expression of several genes involved in signal transduction, neuronal activities and signalling cascade. Genes involved in transcriptional and translational regulations as well as protein synthesis machinery were also over-expressed. The data suggest that a significant number of genes transcribed during status epilepticus are maintained even after seizure had passed, probably to be translated into proteins at a later time point. Further research in this area is in progress.

Laboratory for Polymer Analysis

A Joint Indo-US Centre on Stem cells and Tissue engineering was initiated in Jan 2007 as reported last year. Under the program, Dr. Prabha D. Nair and Ms Lynda V Thomas from SCTIMST and Dr. Vibha Choudhary and Mr Shinsmon Jose from MAHE have visited the US partner sites and carried out collaborative research activities during February- March 2008. Reciprocal visits of the US scientists are planned for August to September 2008. Several biomaterials synthesised and characterised at SCTIMST were explored for suitability of working with mesenchymal stem cells at SCTIMST, MAHE India and GTEC, USA. Embryonic stem cells were investigated at MAHE in conjunction with the biomaterials. Advanced physicochemical characterisation of biomaterials was explored at UWEB, USA. Materials were also electrospun to form membranes and tubular scaffolds and their morphology examined with SEM. Cytocompatibility of electrospun biomaterials to SMCs were also assessed.

The project on Smart biomaterials for cardiovascular tissue engineering was completed by March 2008. Novel biodegradable polyester materials in several compositions were synthesised and evaluated for their characteristic physicochemical properties and cell growth characteristics. The materials with properties matching the requirements of a native blood vessel were identified and fabricated in various shapes and sizes with different porous structures. Future work will be towards exploring the same in vivo.

Islet Immuno Isolation with Xeno'Transplantation and Stem Cell Regeneration to Islets as Strategies for Treatment of Diabetes: Pancreatic ductal stem cells and pancreatic progenitor cells were isolated from mouse pancreas and characterized for their specific markers. Bone marrow mesenchymal stem cells (BMSC) could be differentiated in to insulin producing cells (IPC). Different types of 3D scaffolds were prepared and characterized for their physico chemical properties and biocompatibility with bone marrow mesenchymal stem cells and mouse pancreatic islets. In the immunoisolation strategy, porcine islets were encapsulated in IPN capsules and transplanted in to diabetic rats for reversal of diabetes without immunosuppressive drugs. Preliminary xenotrans- plantation experiments show favourable results of restoration of normal glycaemia for more than a week.

Cartilage tissue engineering: Work was mainly focused on evaluation of two novel 3D scaffolds for chondrocyte culture and in vitro regeneration of cartilage. The scaffolds were found to promote the secretion of cartilage specific matrix molecules like collagen type II and glycosaminoglycans in vitro culture. A specific growth factor combination was identified to have a better chondrogenic response in mesenchymal stem cell differentiation to chondrocytes. The Semi IPN scaffold enhanced the stem cell differentiation to chondrocytes in presence of these growth factor combinations in vitro.

In an ongoing DBT funded program on lung tissue engineering which is a collaborative effort with Microbiology lab, several biomaterials were prepared to support the co-culture of alveolar epithelial and fibroblast cells. A hyaluron hybrid graft copolymer was identified as a better biomaterial for the co-culture studies.

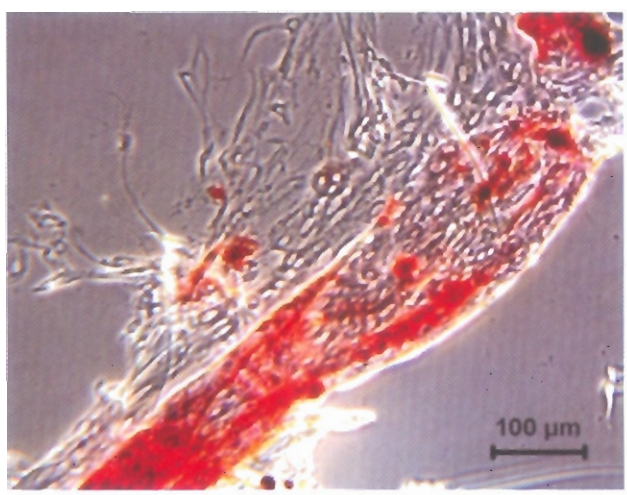
Biopolymer composites for medical applications: The objective of this program was to synthesise blood compatible 'modified chitosan' membranes without sacrificing the permeability properties of virgin chitosan membranes for application in hemodialysis. The permeability of these membranes for the low molecular weight solutes like urea, creatinine and glucose were found to be superior to commercial cellulose films while being impermeable to albumin. The membranes are also found to be haemo and cytocompatible.

Chitosan was also assessed for its potentiality in the development of controlled release systems and for its propensity for targeting drugs to specific sites. A natural-synthetic polymer hybrid matrix, chitosan-g-PMMA with enhanced bioactivity was prepared. The results of the above studies have been published in refereed international journals.

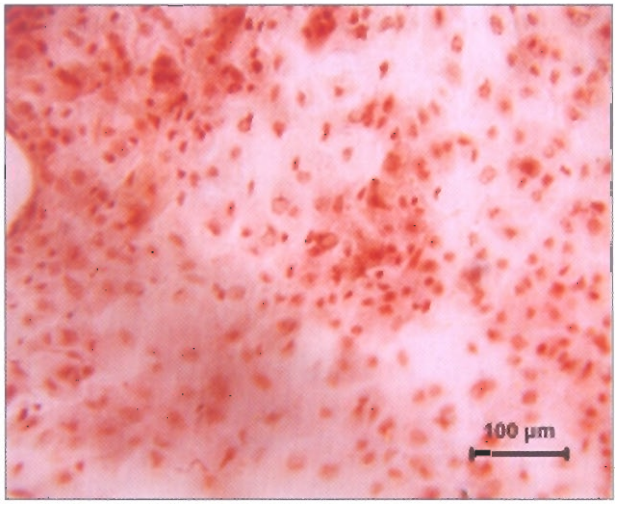
Effect of plant derived growth factors: A systematic effect of different extracts of plant Hemigraphis alternata and the in vitro effect of Hemigraphis alternata in proliferation and migration of fibroblast cells and endothelial cells was studied to assess their wound healing activity. Aqueous extracts were non-toxic to cells while the ethanolic extracts were toxic even at a low concentration. The potential of this protein fraction in the differentiation of mesenchymal stem cells to other lineages and as a growth factor in tissue engineering are under investigation.

Tissue Culture Laboratory

Corneal tissue engineering: Three dimensional organotypical construct was prepared using on thermoresponsive culture surfaces. The cell adhesion and temperature responsiveness were evaluated using different cell lines like L929, NRK and SIRC. Primary culture of corneal cells on thermoresponsive culture surface was established and 3D multilayered synthetic cell sheets were retrieved within 5-7 days. Cells in the in vitro tissue construct expressed intact tissue



Neutral red staining of corneal cell sheet treated with chemical (3% SDS, 5 min) showing feasibility of in vitro construct as an organotypical model. Viable cells stained red and non viable cells remain unstained



Neutral red staining showing viable (red) cells of corneal cell sheet on 30 min exposure to sterile deionized water

architecture and characteristic protein expression of cytokeratin-3/12. Since the in vitro manufactured synthetic corneal tissue retains the structure and function of corneal tissue, a feasibility study was conducted to understand the use of such tissues as organotypical model for toxicity evaluation. Further work in this direction is in progress.

Another major project is development of in vitro corneal cell sheets for ocular surface regeneration. A pilot experiment was initiated to develop limbal stem cell deficiency model in rabbit to assess the efficacy of these corneal cell sheets. Initial results were very encouraging and further experiments are in progress.

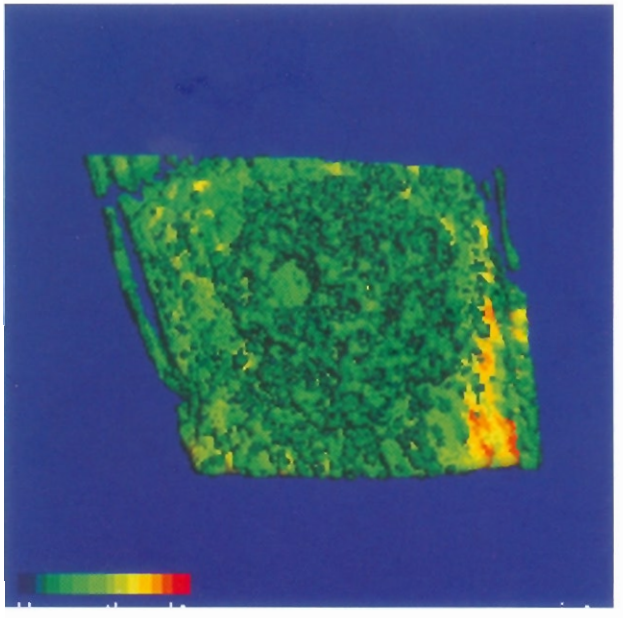
Thrombosis Research Unit

Vascular Tissue Engineering: The aim is development of a small diameter vascular graft from biodegradable polymer, which is mechanically compatible with blood vessel having in-vitro compatibility with blood. Porous PCL scaffolds were fabricated in sheet and tubular forms and characterised for mechanical properties. By changing the polymer to porogen ratio, the pore characteristics could be regulated. Hybrid scaffold using biomimetic matrix components showed better cytocompatibility with endothelial cell adhesion, growth, and survival. This tubular scaffold is now undergoing further development towards the construction of a full tissue engineered graft.

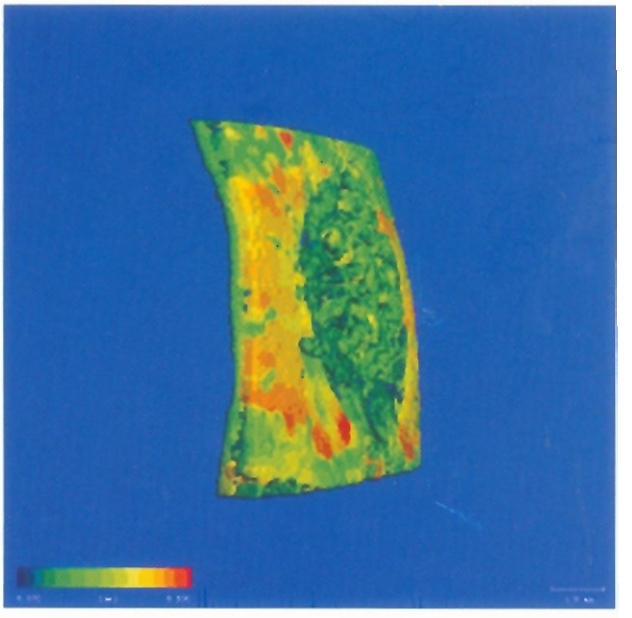
Adult stem cells for neuronal regeneration: The research program seeks to incorporate developmental signals into fibrin for use in cell biological studies and as a regeneration matrix. The current work is focused on exploring the use of a biomimetic matrix with bound adhesion molecules and growth factors for differentiation of circulating neuronal progenitors into dopamine secreting neurons.

Transmission Electron Microscopy Laboratory

Bone Tissue Engineering : The focus of this research program is on the biological evaluation (in vitro and in vivo) of the various bioactive ceramics developed in the Institute for orthopaedic applications. Stem Cell research on bone marrow-derived mesenchymal stem cells and their differentiation into the cells of the bone lineage have been successfully achieved on these bioactive ceramics and fabricating them into living bone constructs. The aim is to use these as biological substitutes for the enhanced repair of large-segmental bone defects. Adipose rissue derived mesenchymal stem cells and their differentiation into the cells of bone and cartilage lineage is the new area of research initiated.



3D-Micro CT image - HASi
(ceramic implant alone)



3D-Micro CT image - Tissue-engineered rat bone marrow-derived stem cells/ceramic construct implanted at the calvarial defect of diabetic rats (4 weeks post-implantation). New bone formation is depicted by the orange colour (density plot) at the defect site.

HEALTH SCIENCE STUDIES

The Achutha Menon Centre for Health Science Studies (AMCHSS) completed 10 years of its activities in training, research and consultancy in health science studies. The Centre organized a national conference on emerging issues in public health during Jan 10-13, 2008 to commemorate its 10th anniversary. The honorable minister for health and family welfare, government of Kerala Smt. P K Sreemathy inaugurated the conference. More than 250 public health experts from all over India and a few from foreign countries such as the USA, UK, Australia, New Zealand, Thailand, Nepal, Sri Lanka and Bangladesh participated in the conference. Many of the MPH graduates of our institute participated in the conference.

The demand for the training program (both MPH and DPH) has been increasing consistently. Commissioner and secretary Health, Government of Gujarat personally visited the Centre and met the director requesting him to take more candidates for the DPH training program. The secretary was extremely happy with the performance of the doctors trained from this institute. Two of our MPH students were selected for field placement in the University of Southern California during the months of November and December 2007.

Bulletin of the World Health Organization carried a special issue on public health training and our Centre was the only institution from India covered in this issue. There is an increasing demand for guidance from our institute for new MPH programs within India and abroad.

The Centre was awarded a major research grant of US $ 6,90,000 by the Oxford Health Alliance, a UK based organization, for the project entitled "Community Interventions for Health". This was awarded based on a global competition along with three other projects one each in China, Mexico and the United Kingdom. Another achievement was a continuation grant of US $ 500,000 from the Fogarty International Centre of the National Institutes of Health USA, for the project titled "Building Capacity for Tobacco Cessation in India and Indonesia". In addition there was another grant for building capacity for public health education in developing countries. Two Asian institutions (BRAC University School of Public Health, Bangladesh is the second institution) will benefit from this grant. The European partners in this partnership are Karolinka Institutet Sweden, University of Amsterdam, Netherlands and the London School of Hygiene and Tropical Medicine UK. A few externally funded research projects were completed this year and many others are ongoing.

RESEARCH PROJECTS

Completed Projects

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

This was a collaborative project between SCTIMST, and Vijaya Bank funded by the Ford Foundation, New Delhi. Besides, there were three NGO partners at Dharwad, Haveri and Mandhya in Karnataka. Overall objective of this project was to empower rural women to access basic health care. It established a medical saving program for rural women in 3 districts of Karnataka. The program enrolled women who did not have a bank account in their names and who expressed their willingness to join the program in 25 backward villages. Basic premise behind this project was that economic empowerment of women through savings habit enhances their chance to seek medical help for their illnesses. Three components of the project were – 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. The project was undertaken in three districts - Dharwad, Haveri, and Mandya in Karnataka. In each district, 200 women were identified and enrolled in the medisave program. Evaluation of the program showed that the practice of savings for health related purposes increased and there was also an increase in health care seeking.

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

The objectives of the project, supported by the MacArthur Foundation and the WHO-SEARO, were to work in the field of medical education, research and advocacy, focusing on medical schools, associations of health professionals and also NGOs. The major achievements of this project were a review of medical texts published in a special issue of the Economic and Political Weekly (April 30, 2005) and a study of sexual harassment in the workplace published in the Indian Journal of Medical Ethics (April-June 2005). Two courses of two weeks duration on Gender mainstreaming in medical education – for medical educators and Making Pregnancies Safer for program personnel were developed and three rounds of training were completed. The project also developed a shorter three-day gender sensitisation curriculum for medical educators and conducted six rounds of training in Karnataka, Gujarat, Goa, Maharashtra and Kerala. Senior faculty, Deans, Vice-chancellors and policy makers were also sensitised on the need for gender mainstreaming in medical education as part of the advocacy initiative. This project was completed in March 31, 2008.

Last year a review was done on the experiences and consolidation of lessons learned. Planning for the next stage of this initiative jointly with a core group of those who have been a part of this initiative during the past few years, including development of architecture for the structure of an alliance for mainstreaming gender in the training of health professionals. Development of a detailed project proposal for the next stage of this project was done through deliberations at a meeting held in July 2007, followed up with deliberations over e-mail for several months.

There are three publications from this project, of which the first draft has been completed, and the final version will be completed within the next couple of months:

1. Gender-mainstreaming in medical education: A case study from India
2. Training manual for a 3-day course for medical educators on gender, health and gender mainstreaming medical education
3. Training manual for a 2-week course for medical educators on gender, health and gender mainstreaming medical education

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

The project undertaken for the Kerala State Health Services Department, funded by the European Commission Sector Reforms Cell was to develop a reference manual for the Primary Health Care Institutions in Kerala. The structural framework, content and layout of the manual were completed through a participatory process, through three regional workshops and stakeholder meetings with the various categories of staff of the Health Services Department at Trivandrum, Ernakulam and Palakkad districts. In addition to the regional workshops, self-administered questionnaires were sent to fourteen institutions in five districts, which were randomly selected. Experts were then identified to develop the specific contents of each topic and an initial draft was prepared. Two experts in the field a former director of health services and a former district medical officer sent this initial draft for review. The comments received from these experts were then incorporated and the draft manual was updated. The final version of the manual has been sent for printing and the printed manual will be sent to various primary health care institutions in Kerala soon.

Ongoing Projects

Athiyannur Sree Chitra Action (ASA)

This is the ongoing initiative of SCTIMST in collaboration with Athiyannur Block Panchayat. With the successful completion of the pilot phase in Vengannur grama panchayat, we are extending the initiative to all the other five grama-panchayats in the block. The community is using geographic Information System (GIS) maps along with the collected socio-demographic details for their monthly review meetings at health sub-centers. AMCHSS also use the data for teaching MPH students and for other research programs of the institute. With the support of Centre for Earth Science Studies (CESS), Trivandrum, a computer based information portal for the area has been developed, which would be handled over to the Panchayat soon.

The second phase of ASA initiative is getting partial funding from the Women Component Project (WCP) of Government of India, so we have launched a massive women empowerment program in the community. Empowerment of women for community based participatory interventions in health: Up scaling an ongoing initiative with a special focus on women in the community where women health volunteers are given hands on practical training to map their environments, health status, and their determinants and learn to identify critical gaps and identify priorities for action. In addition to training in collecting health information field training is planned to systematically build a community based surveillance system and have an ongoing process of monitoring of health status of their families and environment. The training program is ongoing.

SCTIMST shall provide technical expertise and advice for proper documentation of these processes and shall help them to infer rationally from the varied pieces of information for definite action. In this process the socio-demographic details and global positioning system (GPS) parameters of the entire population (1.86 lakhs) spread over an area of 60 sq km and covering six administrative divisions (six grama-panchayats) would be collated and computerized in a systematic way. This will help both the community and SCTIMST in future evaluation of various community based initiatives.

ASA specialty clinics

Cardiology clinics were conducted on every fourth Saturday in the designated clinic at Community Health Center (CHC) Vizhinjam. In January '07, the clinic had to be postponed by a week due to logistic reasons but that was done with prior notice to the concerned. A total of 175 patients (125 new and 50 repeat cases) referred by the local practitioners had availed the services of our cardiologists at the clinic and of them around 83 patients were advised to come to SCTIMST for further check up. Four among these referred cases had already undergone surgical intervention in our cardiology department.

ASA coordinators from the collaborating departments viz. cardiology, neurology and AMCHSS had reviewed the situation on July 18, 2007 and decided to reduce the frequency of Neurology clinics, for the time being, to optimize resources. Thus Neurology clinics were conducted on every month till September 2007 and on every second month afterwards. A total of nine Neurology clinics were conducted and 65 patients (44 new and 29 repeat cases) referred by the local practitioners availed services of our Neurologists at the clinic. Of them eleven patients were advised to come to SCTIMST for further check ups. Grama Panchayat authorities in the area are increasingly requesting us to rotate the location of ASA clinics to the two Block-PHCs and three Mini-PHCs in the block for better access to their people.

Community Interventions for Health (CIH)

This project will adopt a quasi-experimental design with one target intervention community and one comparable control community. Each community would be defined by geographic region. The control community is similar to the intervention community as delineated by predefined eligibility criteria including size, socio-economic status, and ethnic composition. In addition to the community setting, the project will implement an intervention program in community schools and workplaces. All schools in the intervention area would be included in the project. The objectives of the project are the following

1. To determine the effectiveness and feasibility of a shared core of evidenced-based interventions directed at three major risk factors viz. tobacco use, unhealthy diet, and physical inactivity targeting adults and children.
2. To detail the process involved in implementing, monitoring, and assessing feasible and sustainable comprehensive community interventions at a community level and at the level of the multi-national coordinating group.
3. To compare the cost-effectiveness of comprehensive community interventions across the range of participating countries.

During the early design and development of this project hereafter referred to as Phase I, Oxford Health Alliance (the funding agency) facilitated the

development of the comprehensive intervention project now known as CIH which involved an 18-month planning process that originally conceived a very large global intervention study of 15 developed and developing countries involving 25 communities. The design and scope and instrumentation along with the identification of the research priorities and teams in each of the countries have been completed. Phase I of the project was completed already, when proposals were invited from all over the world for community action to prevent chronic diseases (Capcod).

Currently in Phase II and III of CIH, the field trial and pilot study in four countries (India, China, Mexico and the United Kingdom) will proceed with field testing and piloting the CIH project

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

This two-country, three-region population study, in Kerala and Tamil Nadu, India and Batticaloa, Sri Lanka, addresses 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.The baseline survey of the entire households (1289 in number) in the selected wards 4, 5 and 10 of Alappadu Grama Panchayat in Karunagapally block has been successfully completed using the Household Data Tracking Form (HDTF). In addition to socio-demographic and tsunami related information, we had collected geographic positioning systems (GPS) parameters of the households and public facilities in the area. The establishment of a field office at Alappad helps in the local liaison with the community apart from helping in field monitoring of the project. On January 14-15, 2008 a review meeting of the project was conducted at AMCHSS in which representatives from the other collaborating institutes like NIE (India), USC/IPR (USA), EUSL (Sri Lanka) had shared their experiences and charted out future plans. We are launching the second phase of survey in April 2008 wherein detailed psychosocial aspects of a randomly selected sample of subjects (1200 adults and 900 adolescents) in the area will be collected for research purpose.

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

The Indian Council of Medical Research (ICMR) coordinates this project. The overall objective of this project is to conduct a survey of the risk factors of non-communicable diseases in all the states of the country in a phased manner. The actual survey will be conducted in each state by an implementing agency identified by the state government. Five regional centers are already identified by the ICMR to provide technical support to the states for conducting the survey and to ensure quality of the survey. AMCHSS has been identified as one of the regional centers and

will have to provide technical support to five states of India during the project period of three years. In addition to providing technical support to these five states the Centre will have to collect data independently on 10% of the sample households surveyed by the state agencies to ensure quality of data. Last year the survey of Kerala was started and that of Karnataka will be started soon.

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

This study is part of the ethics fellowship program of the Harvard School of Public Health's Program for Ethical Issues in International Health Research and financed by a grant from NIH. The objectives of the study were to examine the perceptions of various stakeholders with respect to oversight mechanisms for health research in India. The study involved in-depth interviews with researchers and IRB members in selection institutions in India, a survey of IRBs in six states in the country and focus group discussions with community members about their perceptions of the existing oversight mechanisms in the country. Most of the fieldwork for the survey and the community perceptions has been completed. The study of the community perceptions indicated that potential participants in research recognize the need for independent review of research as a mechanism of protection offered to them. They also clearly defined the notion of compensation as health care in the case of health hazards and compensation for other harms. The analysis of the other stakeholders' perceptions is ongoing.

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 were started in SCTIMST, and two private hospitals in Malappuram district. These clinics were started as pilot project and the results of these projects are being analyzed. One paper on this project has been published in the journal "Tobacco Control" and another one in addictive behaviors. Other papers are being written for different journals. The Fogarty International Centre of the National Institutes of Health, USA, supports the project.

PATIENT CARE

The hospital wing continued to provide patient care services to maximum number of patients at affordable rates during the year 2007-2008. The number of patients getting registered, the number of patients admitted to the hospital, number of follow up consultations in OPD etc have increased considerably compared to the previous years.

Bed occupancy rates and Bed turn over increased which indicated optimal utilization of hospital beds. Free and subsidized treatment offered by the Institute to the poor and low socio economic group of patients increased during the year (62.56% to 64.29%).

It is also noted that 22% of the patients availing services of the Institute are non-Keralites. Out of the 22% of these patients, 17.3% are from the state of TamilNadu, 4% from states other than Kerala and Tamil Nadu and 0.7% from outside India. Therefore it could be stated that the patient population was widely distributed in various parts of India and abroad. The hospital signed the Memorandum of Agreement with Ex Service Men Contributory Health Scheme, a medical scheme for the treatment of Ex Service men by the Govt. of India and this Institute was empanelled in this scheme. A similar arrangement was also made this year for treatment of patients referred by Nuclear Power Corporation of India Ltd.

In order to improve the infrastructure in the hospital, consistent efforts were made. A new state of the art Cath lab in the Dept. of Cardiology was commissioned during the year. A four-bedded Intermediate Intensive Care Unit was set up in the Dept. of Cardio Vascular and Thoracic Surgery. The revamping of the Air Conditioning system for the hospital is in the final stage. Measures were also taken for improving the quality of water supplied to theatres, Cath labs, CSR etc. In order to improve the service delivery of diet to the patients, hot food cabinets are planned. The old hospital lifts were replaced. Televisions were provided to the wards for transmitting educational and entertainment programmes to patients.

Infection Control Activities were evaluated periodically and appropriate measures were taken. In order to have centralized collection and management of Hospital waste, the Bio Medical waste management was outsourced. More than 100 patients from remote centers utilized the Telemedicine facility in the Institute. Mavelikkara Taluk Hospital, a peripheral Telemedicine Centre having connectivity with this Institute was inaugurated during the year. This Institute was included in the Kerala State Wide Area Network (KSWAN) as one of the referral centers for providing rural Telemedicine service to the District of Malappuram, Kerala. Training programme for staff working in the field of Telemedicine in other hospitals was also arranged.

The Homograft project for harvesting heart valves received Ethics Committee approval for clinical application of antibiotic preserved homografts in Cardio vascular Surgery. Measures are taken for procurement of the Cryopreservation equipments required for the project. Apprentice trainees were given training in CSR technology, Medico Social Worker cum Receptionist, Dietary *etc*. MHA students from Kerala University, MG University and Amrita Institute of Medical Sciences had done their project work in Hospital Administration.

HOSPITAL STATISTICS

	2005-06	2006-07	2007-08
Registrations (New Out patients)	13,212	13,286	13,814
Follow up consultations	89,400	99,263	1,01,164
Admissions	8,394	8,895	9,172
Discharges	8,382	8,891	9,157
Deaths	252	236	213
Free & Subsidized Treatment to patients	59%	62.56%	64.29%
Average length of stay	8 days	7 days	8 days
Bed turn over rate	35 Pts	39 Pts	40 Pts
Bed occupancy rate	79%	73%	80%

Medical Records

Medical Records Department continued to have a vital role in maintenance of quality patient care, assisting academic, research activities and sharing responsibility in efficient management of services.

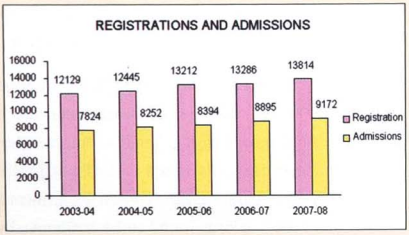
Considerable increase in New registration, Admissions, Repeat cases, Bed turn over, Bed occupancy rate and Number of operations recorded while the death rate has declined to 2.32% from 2.65% of previous year.

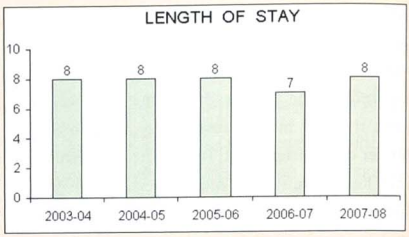
As a measure of space management, 8,000 records were pruned, 75,000 less active records were screened and shifted to AMC record storage facility. Another one lakh very inactive records stored in BMT wing were screened by representatives from clinical departments, out of that 5,000 records found to be academically useful are preserved.

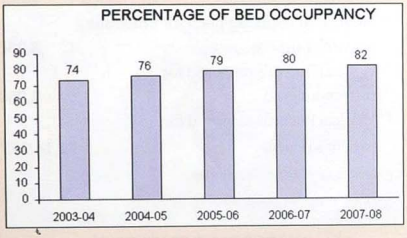
* Financial assistance certificate issued : 3,263
* Treatment/attendance certificates issued : 2,800
* Medical Records supplied for academic / research purpose : 8,250
* Medical Records retrieved for correspondence : 2,700
* Medical Records retrieved for patient's review : 1,14,263

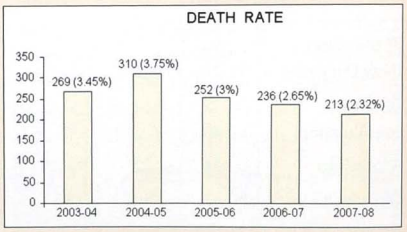
IMPORTANT STATISTICS

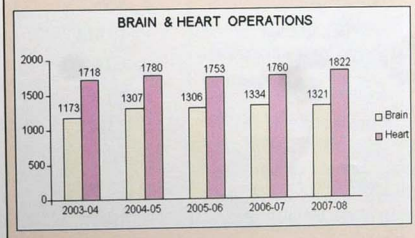
Sanctioned Beds	: 239
Bed occupancy	: 82%
New Registration	: 13,814
Repeat cases	: 1,14,263
Admissions	: 9,172
Discharges	: 9,157
Deaths	: 213
Death rate	: 2.32%
Average length of stay	: 8 days
Bed turn over	: 38
Paying cases	: 85.02%
Non-paying cases	: 14.98%

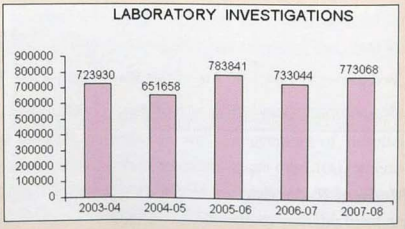

REGISTRATIONS AND ADMISSIONS
16000
14000
12000
10000
8000
6000
4000
2000
0
12129
7824
12445
8252
13212
8394
13286
8895
13814
9172
Registration
Admissions
2003-04
2004-05
2005-06
2006-07
2007-08

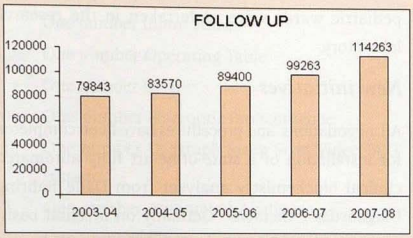

LENGTH OF STAY
10
8
6
4
2
0
8
8
8
7
8
2003-04
2004-05
2005-06
2006-07
2007-08

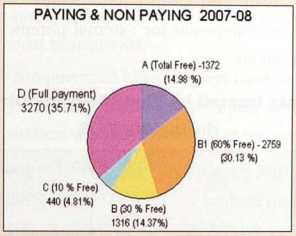

PERCENTAGE OF BED OCCUPPANCY
90
80
70
60
50
40
30
20
10
0
74
76
79
80
82
2003-04
2004-05
2005-06
2006-07
2007-08

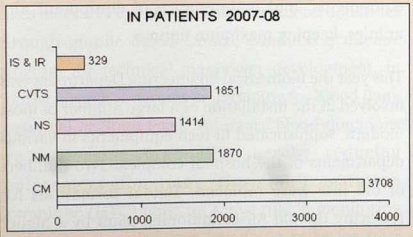

DEATH RATE
350
300
250
200
150
100
50
0
269 (3.45%)
310 (3.75%)
252 (3%)
236 (2.65%)
213 (2.32%)
2003-04
2004-05
2005-06
2006-07
2007-08

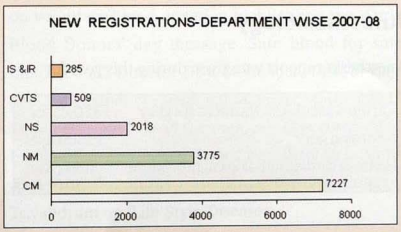

BRAIN & HEART OPERATIONS
2000
1500
1000
500
0
1173
1718
1307
1780
1306
1753
1334
1760
1321
1822
Brain
Heart
2003-04
2004-05
2005-06
2006-07
2007-08


LABORATORY INVESTIGATIONS
900000
800000
700000
600000
500000
400000
300000
200000
100000
0
723930
651658
783841
733044
773068
2003-04
2004-05
2005-06
2006-07
2007-08


FOLLOW UP
120000
100000
80000
60000
40000
20000
0
79843
83570
89400
99263
114263
2003-04
2004-05
2005-06
2006-07
2007-08


PAYING & NON PAYING 2007-08
A (Total Free) -1372 (14.98 %)
B1 (60% Free) - 2759 (30.13 %)
B (30 % Free) 1316 (14.37%)
C (10 % Free) 440 (4.81%)
D (Full payment) 3270 (35.71%)


IN PATIENTS 2007-08
IS & IR
329
CVTS
1851
NS
1414
NM
1870
CM
3708
0
1000
2000
3000
4000


NEW REGISTRATIONS-DEPARTMENT WISE 2007-08
IS &IR
285
CVTS
509
NS
2018
NM
3775
CM
7227
0
2000
4000
6000
8000

Physiotherapy

The rehabilitation work of the Section was aimed at Critical Care in Intensive Care Units (ICUs) and achieving early in dependence for in-patients with active and passive physiotherapy. In addition, out-patients were also given physiotherapy using the specialized equipment for external phrenic nerve stimulation etc.

Patients treated by Physiotherapy Division during 2007-08

1. Cardiac Surgery	: 5698
2. Neuro medical	: 3981
3. Neuro surgery	: 2819
4. Pediatric cardiac surgery	: 4329
5. Out patients	: 1745

The Unit also contributed to teaching and training of observership trainees, physiotherapists and post-basic Nursing course students in Physiotherapy and rehabilitation.

Anesthesiology

Anesthesia support was given during this year for

Cardio-vascular & thoracic surgery	1850 cases
Neurosurgery	1100 cases
Neuro & cardiac radiological procedures	680 cases

Biochemistry

The department of biochemistry comprises of mainly two wings: (a) The Central Clinical Laboratory where patients samples are analyzed round the clock for Hematology, Clinical Pathology, and Biochemistry parameters and (b) Research laboratories where externally funded research Programmes and Ph.D Programmes are undertaken. During the year the department had seven Ph.D students. The central clinical laboratory employing about 20 staff members undertook close to 6.19 lakhs clinical investigations during the year. In addition, assays of serum hexosaminidase A and B and aryl sulfatases from pediatric wards were undertaken in the research laboratory.

New initiatives

All negotiations and procedures have been completed for installation of a state-of-he-art fully automated clinical biochemistry analyzer from Dade Behring Diagnostics / Siemens Germany on a rental basis. Another state-of- the- art fully automated clinical chemistry and electrolyte analyzer (OLYMPUS AU 400) has been purchased and awaits installation.

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.

This year the Biomedical Engineering Department was involved in the installation of a large number of most modern, sophisticated hi-tech equipments in various departments of the hospital complex. Two numbers of old lifts were replaced. Tender formalities for replacing the old Air-conditioning plant by a higher capacity Hi-tech unit, replacement old interventional Radiology catheterization lab by a bi-plane flat panel detector system, are over.

Some of the major installations are listed below.

1. One number 1250 KVA Transformer
2. One number HD11 Colour Doppler Echo machine

3. One number fully automated Immuno Assay System
4. One number Surgical Diode Laser
5. Two numbers of MP 60 Touch Screen Monitors
6. One State of the Flat Detector Cardio Vascular Angiography System
7. One number Infant Warmer
8. One number Operating Table
9. One number IABP
10. One number Fiberoptic Bronchoscope
11. One number Ceegraph Sleep Scan Video EEG system
12. One number Automated Analyser
13. One number Electro Surgical Unit.
14. One number BIPAP Vision Noninvasive Ventilatory Support System
15. One number Magnetic Stimulator

Blood Transfusion Services

Division besides providing round the clock service, takes measures to enhance voluntary blood donations through mobile blood camps, conducts academic program for technical manpower development, in house research programs and training for Blood Bank personnel at State level. Voluntary blood donations are increasing gradually, thereby reducing replacement donations. Hospital Transfusion Committee (HTC) plays an active role in monitoring transfusion practice and arranging talks for user education. We regularly participate in CMC-External Quality Assessment Scheme in Immunohaematology and HIV testing.

New Initiatives

- Pre and post donation counseling for blood donors.
- Motivating donors for repeat voluntary blood donations by creating public awareness on the health beneficial aspects of blood donation.
- Standardised donor units for Hb content of bag and a Hb based transfusion policy was introduced for increasing Hb level from each transfused unit of blood, thereby avoiding repeat transfusions.
- A computerized blood request form designed by Computer Division with inputs from HTC members was made available at the user end.
- Installed BEST 2000, a fully automated EIA system with LIS linkage

Special Programs

World blood donors' day was celebrated on June 14th 07. 100 voluntary donors & donor organizers were felicitated on the occasion. Director Dr K Mohandas inaugurated the program followed by inaugural address. Dr K Shylaja Addl Project Director Kerala State AIDS Control Society gave the keynote address on voluntary blood donation highlighting the World Blood Donors' day message 'Safe blood for safe motherhood'. Director Dr K Mohandas, Dr K Shylaja and Mr Govindaraj, Regional Manager State Bank of Tranancore gave away the mementoes & certificates. Inaugural session was followed by talk by Dr U Anuja Asst Prof, Community Medicine, Medical College, Trivandrum on 'Life Style Diseases'.

Status of Ongoing/Routine Activities

Five mobile camps are arranged monthly at community/offices/colleges for blood collection. The program consists of awareness classes, blood grouping and donation. As there is nearly 100% blood component separation, we are able to support hospitals in and around Trivandrum where there is

no Blood bank or blood component facility, without increasing our yearly collections. This is due to better awareness on the part of clinicians on optimal use of blood. Study on serum ferritin levels in regular donors and non donors have found that regular blood donation can reduce serum ferritin levels, which is known to prevent many pathological conditions including CAD. Ongoing study on blood donors has identified donors with high haematocrit levels and they are advised to donate regularly to avoid risks associated with high Hct. Another ongoing study is on demographic risk factors associated with undetected hypertension in blood donors. This has highlighted the need for life style modification. Health screening and health education of deferred donors with hypertension has been found to be useful as an early interventional strategy.

Blood Components Prepared 2007-08

RBC	5667
FFP	3135
Platelets	1276
Plasma	1207
Cryo	47
LF-RBC	30

Cardiology

During 07-08, there was a significant increase in the outpatient attendance and 7227 new patients registered in Cardiology Dept. 3700 patients were treated as in patients. This was an all-round increase in outpatient related investigation including ECG, exercise stress tests, 2D echo Doppler studies, Holter, HUT tests & transesophageal echo studies.

The Dept. of Cardiology organized an advanced Pediatric Intervention Work shop on 9th & 10th Jan, 2008, with Dr. Saqueel A Qureshe, Consultant in pediatric Cardiology, Guy's Hospital & Dr. R. Krishnakumar, Consultant in Pediatric Cardiology, A.I.M.S, Kochi as the Course directors. Several difficult to manage cardiac lesions were treated by interventional techniques during the workshop.

The department acquired a state of the art single plane flat panel digital cardiac cath lab, which was commissioned in Nov. 07, and this has facilitated uninterrupted cath lab services for primary angioplasty even during the busy routine schedule of cathlab procedure.

Several electrophysiological studies and radio frequency ablations of difficult to treat arrhythmia were performed utilizing the newly acquired ENSITE electro anatomic mapping system during the year.

During the year, several DNB and DM students from other institutes, attended the academic programmes of the department.

Invasive and Interventional Procedures during 2007-2008

	2007-08
DIAGNOSTIC	
Coronary Angiography	1493
Cardiac Catheterization	103
EPS	37
TOTAL – Diagnostic	**1633**
INTERVENTIONAL	
PTCA	500
ASD DEVICE CLOSURE	117
BAS	14
BAV	3
PTMC	168

BPV	17
CAG	1569
CAG + CATH	163
CATH	124
PDA COIL CLOSURE	25
PDA DEVICE CLOSURE	59
PTCA	273
PPI	151
ICD	**7**
EPS + RFA	210
EPS	40
TOTAL PROCEDURES	3440

Cardio Vascular and Thoracic Surgery

In comparison to the year 2006-2007, during the year 2007-2008, the total number of procedures performed has increased by **11.9%**. The total number of cases performed during the previous year was 1634.

Surgical Procedures 2007-2008

	Open Heart	Closed Heart (Beating Heart Vascular & thoracic Operations)	
Adult Surgery	1001	250	1251
Paediatric Cardiac	470	113	583
Total Cases			**1834**

Upgradation of the IMICU

The intermediate care ICU adjacent to the adult cardiac surgical ward was upgraded to a self-sufficient intensive unit facilitating earlier mobilisation of patients from the main CSICU.

Initiation of M.Ch Vascular surgery programme

A three-year M.Ch vascular surgery program was introduced into the curriculum, with the first student joining in January 2008

Computer Division

Routine activities involved in the areas of Graphical User Interface based Software development, Installation, Web Site updates, Training for students, Hardware maintenance, and Software maintenance of all the user programs including the PACS client maintenance. Maintaining 12 higher end servers with a remarkable uptime of 99.9995% and around 760 computer hardware devices including Servers, PCs, Thin Clients, Printers , Routers, Wireless Access Points and Switches. Division made major progress with the expansion of system environments.New Purchases-Hardware

Major Activities

New Software Developments

- Salary , Pension & PF – New GUI based program developed & successfully implemented for Salary Processing ,Pension Process , PF and converted old data to the new format.
- Procedure- Package Charging – New GUI based program was developed and implemented for calculating the charges for various procedures for doing timely revision of In Patient charging system.
- Pharmacy Purchase/Store - New GUI based program was made for Pharmacy tender processing, quotation entry, order processing, receipt of medicines, issue to wards etc.

BME – New GUI based program was made for the automation of BME department.

Blood Bank - Detailed program was made for the total automation of Blood Bank from Blood Donor details entry, blood collection & issue and for inventory management.

Main Store/Sub Store – New GUI based program was made for the inventory management in main store, BME store, BMT store and for all department sub stores.

SBF – GUI based program was made for recording the entries under SBF scheme.

Investigation Entry – GUI based program for recording the investigations done at various departments for patient billing.

Microbiology Lab Entry – New GUI based program was made for entry of results for all type of tests done in Microbiology Department.

Cardiology Cath Lab Reporting – New GUI based program was made for recoding the cath lab entries with inventory for automatic billing.

Radiology Report Viewing – Program option was made to view the requests / reports sent to HIS from PACS System.

Symantec Endpoint Security – All units in the network were upgraded and installed with new antivirus/firwall software from M/S Symantec called 'Endpoint Security'.

New Proposals

- Storage & Tape - Tender was prepared for the purchase of 20 TB SAN storage & tape backup system.
- Biometric System for attendance recording – Tender was prepared for an attendance recording system.

Microbiology

There is an overall increase in the diagnostic investigations of the department noticeable especially in screening samples for Hepatitis C antibodies.Detection of Free T3 and Free T4 levels has been added on in the Thyroid profile tests. Nephalometry has been introduced in the diagnostic lab and High sensitivity CRP, Rheumatoid factor and Antistreptolysin O antibodies are now quantitated by Nephalometry resulting in more accurate and rapid reporting.

Neurology

Epilepsy Section

The R. Madhavan Nayar Center for Comprehensive Epilepsy Care saw an increase in number of outpatient attendance, video-EEG admissions and the number of EEGs performed. For the first time since the program began, 100 epilepsy surgeries were performed in one calendar year. The number of intracranial EEGs also increased by 40%. More numbers of extratemporal surgeries were performed. Two out-patient clinics are run, on Wednesdays and Fridays. The rural outreach epilepsy clinics on the first and third Sundays of every month also functions smoothly. Two epilepsy surgeries are carried out every week. All aspects of epilepsy care are provided, including psychosocial counseling and occupational therapy.

New initiatives during the year

1. Transcranial magnetic stimulation for functional localization
2. Sleep disorders program with polysomnography
3. EEG-Functional MRI

DESIGNATED ACTIVITIES IN THE DEPARTMENT OF NEUROLOGY

Total number of Surgeries	=103
Temporal	= 73
Extra temporal	= 26
Callosotomy	= 0
Hemispherectomy	= 4
VNS Implantation	= 2
Invasive Monitoring	=14
Cortical Stimulation & Mapping (CSMP)	= 6
Electrocorticography	=103
Epilepsy Clinic attendance	=5461 cases
Sleep Disorder Clinic attendance	= 30 cases
Polysomnography (PSG)	= 8 cases
Ward Admissions	= 743 cases
VEEG Admissions	= 587 cases
SEEG	= 3377 cases
Outreach Clinic Attendance	= 1233 cases
Group Sessions	= 2485

Research programmes and collaborative programmes

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

2) Mutational Analysis of JRK/JH8 gene in Refractory Mesial Temporal Lobe Epilepsy

3) Phase 111 trial of a new antiepileptic drug, Brivaracetam titled 'A multicenter, double-blind, parallel-group, placebo-controlled, randomized study: evaluation of the efficacy and safety of brivaracetam in subjects (=16 to 70 years old) Partial Onset Seizures' (Protocol N01252, UCB, Belgium) has begun

4) A multi- level wavelet approach for automatic detection of epileptic spikes in the EEG during prolonged video-EEG monitoring, in collaboration with REC, Kozhikode

Cognition & Behavioural Neurology Section

The section provides clinical services to patients with cognitive problems and dementia. It also works to provide technical support to the activities of the ARDSI. The section also carries our research in the field of Cognition and Behaviour.

Research programmes and collaborative programmes

Establishment of the Brainmapping Unit and the Neurogenetic Unit supported by expansion grant of SARD from KSCSTE.

Speech Evaluation -939	
Speech therapy	- 449
Audio Evaluation	- 299
Neuropsychological Testing	- 775
IQ Assessments	- 97
Counselling Sessions	- 233
Memory & Neurobehavioural Clinic Attendance	- 189
New Patients with Dementia	- 52

Kerala Registry Epilepsy Pregnancy Programme

New initiatives during the year

Molecular genetic study of benign childhood epilepsy in collaboration with Columbia University, USA, Funded by NIH

Stroke Clinic

1. In addition to the routine services, various services at the OPD level have been streamlined – speech and physiotherapy and occupational therapy (full time stroke occupational therapist is likely to get appointed)

2. Comprehensive stroke care: including acute stroke care (intensive care facility and thrombolytic therapy), Intermediate stroke care and continued care including adequate monitoring of treatment, rehabilitation through speech therapy, physiotherapy and occupational therapy.

3. Patient management conference: routine multidisciplinary meeting once in two weeks to make final decision on management of difficult cases.

Steps to reformat services into a comprehensive care program are in progress

New initiatives during the year

Transcranial Doppler studies including embolic detection has been made routine in the evaluation of stroke patients. Around 400 cases were done in the last year.

Neuro-Muscular Division

Plasma exchange	34
MG	12
GBS	13
CIDP	4
ADEM	4
Devic's	1
Immunoglobulin Therapy	6
Nerve conduction studies	925
EMG	478
VEP	95
BAER	31
Muscle biopsy	68
Nerve biopsy	36
Neuro muscular clinic attendance	633
Nerve conduction study	846
Needle EMG study	468
Skin biopsy	10
Genetic study	09
Large volume plasma exchange	184
Small volume plasma exchange	68
Thymectomy for myasthenia gravis	18
Other investigations	
Optometry	1716
Visual evoked potential study	113
Brainstem auditory evoked potential study	42

Ongoing Activities

Collaborates as a nodal center for the "Acute Flaccid Paralysis Program" of the National Polio Surveillance Project funded by WHO

Collaborates with the Neurology department of KS Hedge Medical Academy, Mangalore in the study on "The prevalence of Campylobacter jejuni infection as an antecedent event in Guillain – Barre Syndrome"

New Ventures

Clinical and MRI correlations in subsets of Multiple Sclerosis patients.

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

Clinical profile of patients with MUSK positive Myasthenia Gravis

Other In House Ventures

Clinico electrophysiological correlation in Diabetic Neuropathies

Temperature standardization in EMG lab studies

Standardisation of F wave parameters in nerve conduction studies

Family and genetic studies in Myotonic dystrophy patients

Autonomic function studies in Diabetic neuropathy patients

Mortality studies in the neuro medical ICU

Standardization of Brain stem Auditory potential in infancy, with the aim to detect early deafness in infancy

Registry of follow up patients attending the Neuromuscular clinic, for the utility of services Computer data base of the biopsy studies in patients with neuromuscular studies

MOVEMENT DISORDERS

Movement Disorder Clinic attendance	–	1305
Botulinum toxin clinic attendance	–	101
Radiofrequency lesioning surgeries	–	6
Deep brain stimulation surgeries	–	10
DBS programming sessions	–	67
International clinical trials	–	10

Research programmes and collaborative programmes

1. "Analysis of neuroprogenitor cells in the peripheral blood mononuclear fraction of Parkinson's disease patients" collaboration with BMT Wing, SCTIMST
2. Collaboration with Jawaharlal Nehru center for Advanced Scientific Research, Bangalore on the " genetics of PD and other familial parkinsonian syndromes.

Neurosurgery

The major areas of operative focus were Neuro-vascular, Cerebello pontine 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. Minimally invasive procedures were performed with aid of neuronavigation equipment. We also started spinal instrumentation procedures routinely. A total of 1308 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. Three candidates successfully completed their MCh training and four new residents joined the department.

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

The total number of cases operated during the year 2007-8 was 1308 and their distribution is as follows.

Vascular	151
Skull base	282
Epilepsy	101
Movement disorder	18
Spine	249
Tumours	375
Others	233
Total	**1308**

Pathology

During the year (April 2007 to March 2008), the division has performed histopathological analysis in 1600 surgical specimens in patients undergoing surgical treatment for neuro and cardiac diseases. Intra-operative tissue diagnosis (frozen section) was performed in 430 patients. Enzyme histochemical and immunohistochemical studies were performed in 56 muscle biopsies. Immunopathological investigations were performed in 2200 cases. Apart from the service oriented diagnostic work, the department also conducted fortnightly teaching programmes (case demonstration, CPC and seminars) for the postgraduate students in neurology and neuro-surgery. The division also undertook training programmes for postgraduate students in Pathology from Medical College, Trivandrum, Kottiyam and AIMS Kochi.

Imaging Sciences & Interventional Radiology

Department of Imaging Sciences & Interventional Radiology has been 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 patients on OPD basis in addition to the inpatients.

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, Functional Imaging, Diffusion tensor imaging, Fiber tractography and MR Angiography (both neuro and peripheral angiography). For fMRI paradigms for motor, sensory; Language: Verbal fluency, Semantic fluency, Passive listening, Memoryand, Music are being used. 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 advanced techniques available in the department. PACS is linked with HIS. CT Angio, 3D CT, Virtual Endoscopy, Virtual Angioscopy, Vascular Doppler, Transcranial Doppler and MRI of Epilepsy, Stroke, Brain Tumours and Spine are routinely done. 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 Procedure Done

A. DIAGNOSTIC PROCEDURES

No.	Procedures	No. of Cases
1	Plain X-rays	40406
2	MRI Scans	3842
3	CT Scans	3695
4	US Scans	2739

B. INVASIVE DIAGNOSTIC PROCEDURES

No.	Procedures	No. of Cases
1	Peripheral Angio & Aortogram	35
2	4 Vessel Angiogram	380
3	Spinal Angiogram	20
4	Renal Angiogram	17
5	Bronchial Angiogram	4
7	Fluoroscopy	3
8	Barium swallow	20
9	Peripheral DSA	2
10	Barium meal	1
11	IVC gum	2
12	Arteriogram lower limb	2
13	WADA test	2
14	IVC gum & filter	1
15	Check angiogram	3
	Total	492

C. INTERVENTIONAL PROCEDURES

No	Interventional Procedures	Total (No.of cases/ Procedures done)
1	AVM	31
2	ICA coiling	12
3	CCF coiling	13
4	Thrombolysis/ stenting	13
5	Embolisation	25
6	Glomus Jugular Tumor (PVA)	5
7	Uterine Artery Embolisation	27
8	CIA stenosis	6
9	Vertebroplasty	13
10	Tracheal stenting	2
11	Angioplasty / stenting	43
12	SFA stenosis	9
13	Carotid Stenting	8
14	JNA PVA	1
15	SMA Stenting	2
16	Spinal Embolisation	8
17	Heamangioma Embolization	4
18	EVLT (Laser)	1
19	Aneurysm Coiling	15
20	Popliteal	1
21	Bronchial artery Embolisation/stent	8
22	DAVF	10
23	Bilateral renal angioplasty	10
24	Chemo embolisation	5
25	Peripheral embolisation	8
26	Renal Embolisation	8
27	Liver heamangioma	1
	Total	287

D.INTERVENTIONAL RADIOLOGY SERVICES:

i. OP Registrations	- 250
ii. IP Admissions	- 310
iii. Interventional Radiology Procedures	- 287

A total of 287 Interventional Radiological procedures were done. Three hundred and ten patients were admitted under interventional radiology.

New initiative during the year

Radio frequency ablation of osteoid osteoma. - Technique for viability and evaluation of endo-myocardial fibrosis using MR has been started.

CLINICAL RESEARCH

Biochemistry

Molecular mechanisms of Lp(a) mediated vascular pathology

Lipoprotein (a) [Lp(a)] is an independent risk factor for atherosclerosis stroke, peripheral neurological disorders and aneurisms, though the molecular mechanisms of etiology are unknown. Lp(a) molecule is unique in possessing sialylated O-linked oligosaccharide. Work in this department during the year has shown that desialylation of sugar chains of Lp(a) by neuraminidase enzyme secreted by infectious pathogens can render Lp(a) recognizable by serum and tissue sugar binding proteins to trigger immune inflammations We reported that Lp(a) isolated from human serum by ultra centrifugation and electro elution techniques was found to be the best among serum lipids as ligand for the human lectin galectin-1 present on vascular endothelial cells, more so after its desialylation. This suggested possible attachment of Lp(a) to vascular bed through binding to galectin-1. In support, immunohistochemical and immunofluorescent studies using arterial tissue segment and endothelial cells revealed co-localization of Lp(a) with galectin-1 and its inhibition with galectin-1 specific sugars. This study revealed that Lp(a) attachment through its desialylated T- antigen sugar to galectin-1 present in arterial tissues and endothelial cells could be a viable mechanism for Lp(a) mediated pathology in atherosclerosis

In another study human serum anti-T was found to form immune complex with desialylated, but not native Lp(a), pointing to another mechanism of Lp(a) toxicity through formation of infection –driven immune complexes

Serum IgA 1- derived immune complexes following infections:

Neuraminidase secreted by most viral and bacterial pathogens was found to desialylate human serum IgA1, the sole T-antigen containing immunoglobulin. We reported that the exposed free T-antigen is recognized by serum anti-T antibody to form immune complexes (IC). These IC may be of pathological significance since a) infection precede most atherosclerosis and nephropathies and b) IgA deposited in glomeruli during IgA nephropathy is exclusively IgA1 and that too desialylated.

Enzyme –linked lectin assay (ELLA) for serum Lp(a).

A novel and simple assay using micro plate coated lectin jacalin was developed for Lp(a) in serum and other samples. The assay was equally specific and more sensitive than existing kits for the purpose.

Diabetes –related shift in serum antibody repertoire against fungal antigens.

Though increasing glucose concentration in normoglycemic sera prevents formation of immune complexes (IC) with added fugal antigens, hyperglycemic sera forms far more IC with fungal antigens. This paradox was found to be due to high affinity antibodies against certain epitopes in fungal antigens in diabetic patients.

Immobilization of human tissue galectin-1 in active form.

Our laboratory has, for the first time, developed protein conjugation protocol for immobilizing the physiologically important galectin-1 in active form. This will enable study of glycoconjugate-lectin interactions in more physiological environment.

Fetal malformation and oxidative stress in women with epilepsy

Pregnant women with epilepsy and using anti-epileptic drugs were compared with controls for serum concentrations of malondialdehydes, total anti-oxidant capacity, glutathion content and anti oxidant enzyme activities. The significantly increased oxidative stress seen in the former group in preliminary results may have bearing on fetal malformation in offsprings of epileptic mothers.

Cancer biology

Project work is in progress on mechanism of action of natural products in controlling tumorigenesis and of metalloproteinase in metastasis.

Cellular and Molecular Cardiology

Isolation and cloning of human resident adult cardiac stem cells

Given the increasing interest in developing cell-based therapies to regenerate functional muscle and blood vessels in infarcted dysfunctional myocardium using resident stem cells in the adult heart, the project is aimed at developing a strategy for the isolation and expansion of adult cardiac stem cells (CSCs) for potential use as cell-based therapy for myocardial infarction and/or end stage heart disease in humans.

Recent animal studies and clinical trials have reported the scope of using heart resident ckit$^+$ stem cells in regenerating infarcted myocardium. In our previous studies, we have shown the cardiac resident stem cells can be successfully isolated from right atrial biopsies of patients with CAD. The determinants of successful isolation of such cells are however unknown. ckit positive stem cells from heart biopsies were obtained from patients with chronic stable coronary artery disease who underwent elective coronary artery bypass grafting. Quantitative characterization of the isolated stem cells was done by flow cytometry assay. Patients were grouped depending on the presence or absence of individual risk factors, total vascular risk score (TVRS) and the severity of CAD (number of stenosing coronary arteries and NYHA class). The number of ckit positive stem cells obtained from different patient groups was compared by one-way ANOVA test, bivariate correlation and single linear regression analysis. ckit$^+$ stem cell migration was observed from adherent tissue explants grown from right atrial samples collected from all the patients in the study. Characteristic clusters of cells termed 'cardiospheres' were formed when grown in a growth factor supplemented medium and the cardiosphere cells

revealed expression of stem cell specific markers (ckit, MDR1, CD34) and cardiac differentiation markers (cTNI and MHC). The cardiovascular risk factors and severity of CAD do not seem to affect the number of ckit positive cells migrated from explanted atrial tissue samples. The number of migrating cells was also not affected by any of the drugs taken by the patients. A significant negative correlation between age of the patients and the number of migrated ckit positive stem cells was observed. The study suggests that the yield of stem cells from cardiac biopsies is not influenced by either disease severity or risk factors for coronary artery disease.

We have also been able to optimize a technique for the isolation and expansion of cardiac stem cells from the pig. We have opted 'pig' as the animal model since its anatomy closely resembles that of human. The molecular characterization of the isolated pig stem cells are under way.

Isolation and cloning of human circulating endothelial progenitor cells (EPCs)

Stem cell research has the potential to provide solutions to many chronic diseases via the field of regeneration therapy. In vascular biology, endothelial progenitor cells (EPCs) from peripheral blood and resident cardiac stem cells have been recently identified to have therapeutic potential to revascularise ischaemic tissues.

Circulating endothelial progenitor cells (EPCs) constitute a powerful cellular substrate for neovascularization in ischemic tissues. However the therapeutic potential of ex-vivo expanded EPCs for angiogenesis is limited due to their quantitative and qualitative impairment in certain pathologies including coronary artery disease (CAD). In an earlier study, we have shown that cardiovascular risk factor score and the number of stenosing coronary arteries are important determinants of the formation of functional EPC-CFUs in culture (1). Henceforth, strategies to address this shortfall become requisite. Given an important role of endothelial nitric oxide synthase (eNOS) in the regulation of EPC migration, we have evaluated the effects of eNOS gene transfer on ex vivo expanded EPCs from patients with CAD. Peripheral blood mononuclear cells have been isolated, differentiated into EPCs and then transfected with mammalian expression vector pcDNA3.1-eNOS containing the full-length human eNOS gene using lipofectamine. Transfection efficiency of EPCs was observed to be about 20%. eNOS activity and mRNA expression was significantly increased after transfection. In vitro functional studies showed that in comparison to the untransfected EPCs, eNOS-modified EPCs showed a greater presence of endothelial-like spindle-shaped cells and increased length of tubes on the matrigel ($P = 0.002$). We feel that the modification of human EPCs by eNOS gene transfection strategy lead to a significant improvement in their function in vitro and possibly may have therapeutic potential to enhance the in vivo reparative and angiogenic properties of EPCs.

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

High glucose (HG) induces MCP-1 gene in a variety of mammalian cells; the mechanism however is not clearly understood. 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.

During the year under review, we examined whether the transcription factor, Nuclear Factor - êß (NF-êB) is involved in HG induced MCP-1 expression in aortic endothelial cells (AECs) and whether the bioflavonoid quercetin with anti inflammatory actions can attenuate HG induced MCP-1 expression in AECs. Rat aortic endothelial cells (RAECs) were stimulated with high glucose (25mM) in the presence or absence of quercetin and mRNA and protein levels were measured using reverse transcriptase- polymerase chain reaction (RT-PCR) and enzyme linked immunosorbent assay (ELISA) respectively. The nuclear translocation of NF-êB was studied using confocal microscopy and its DNA binding was analyzed by electrophoretic mobility shift assay (EMSA). The subunit composition of NF-êB was determined using supershift assay. It was found that MCP-1 mRNA and protein synthesis were significantly higher in RAECs exposed to HG. Increased DNA binding of NF-kB in HG stimulated RAECs was seen in EMSA. Super shift analysis and confocal microscopy confirmed that classical NF-kB pathway subunits (p50 and p65) were involved. Quercetin at a concentration of 100 μM significantly inhibited HG induced MCP-1 mRNA and protein synthesis by RAECs. Quercetin, was also found to inhibit NF-kB DNA binding. These results show that HG induces MCP-1 gene expression in RAECs through NF-êB and quercetin attenuates the effect significantly.

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. A study is in progress to examine the role of metabolic shift in the mediation of hypertrophy and identify gene polymorphisms that are associated with cardiac hypertrophy in hypertension. A positive association has been observed between PPARá gene and cardiac hypertrophy.

We are also examining the prevalence of cardiac complications in hypertensives by retrospective analysis of data and also aim to identify biomarkers associated with cardiac complications in hypertensives. The observation of this study is expected to facilitate pre-clinical identification of susceptible individuals and provide opportunity to tailor therapy to specific underlying abnormalities.

Cardoguard Tablet-delineation of molecular mechanism of action and its efficacy in the regression of ventricular hypertrophy

One of the factors affecting the acceptance of Ayurvedic medicines is the lack of scientific validation of the efficacy of the preparations. An anti hypertensive formulation of Nagarjuna Herbal Concentrates Ltd. is being examined in spontaneously hypertensive rats (SHR), to delineate the mechanism of action and efficacy of the formulation in the regression of ventricular hypertrophy.

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

Regulation of cardiac fibroblasts by hypoxia

Fibroblasts are importantly involved in the pathophysiology of cardiac remodeling induced by hypertension, myocardial infarction, and reperfusion injury after ischemia. Modulation of cardiac fibroblast activity by hypoxia, a major component of myocardial ischemia, has been a subject of intensive study in this laboratory over the past few years. Investigations during the current year focused on: 1) the molecular mechanisms underlying G_1-S regulation in hypoxic cardiac fibroblasts, and 2) the relative resistance of these cells to hypoxic injury.

Hypoxia was found to delay G_1-S transition in cardiac fibroblasts by a mechanism involving p27, the cyclin-dependent kinase inhibitor, which in turn was found to be regulated by p38 MAPK. It was also observed that changes in cyclins A, D1 and E follow a pattern consistent with delayed G_1-S transition in response to hypoxia.

Work over the past one year demonstrated the relative resistance of cardiac fibroblasts to hypoxia vis-à-vis cardiomyocytes and pulmonary fibroblasts. Other notable achievements during the year were the delineation of the subunit composition of NFkB in cardiac fibroblasts and its activation profile under hypoxia. A role for NFkB in cardiac fibroblast resistance to hypoxia was suggested by the observation that its abrogation by transfection of the cells with mutant IkB or with a chemical inhibitor rendered the cells susceptible to damage under hypoxic but not normoxic conditions. Constitutive expression of the anti-apoptotic Bcl-2 was detected at the transcript and protein levels by RT-PCR and western blot analysis, respectively, under both normoxic and hypoxic conditions. Further, western blot analysis showed that hypoxia markedly induces the expression of the anti-apoptotic IAP-2 in these cells. Experiments were designed to test whether IAP-2 expression in hypoxic fibroblasts is NFkB-dependent and if this link in turn determines survival, which would explain the greater susceptibility of NFkB-silenced cells to hypoxic damage.

Neurology

- Clinical and MRI correlations in subsets of Multiple Sclerosis parients.
- Inching technique and 2nd Lumbrical/interossei latency difference in the diagnosis of Carpal tunnel syndrome.
- Clinical profile of patients with MUSK positive Myasthenia Gravis
- Clinico electrophysiological correlation in Diabetic Neuropathies
- Temperature standardization in EMG lab studies
- Standardisation of F wave parameters in nerve conduction studies
- Family and genetic studies in Myotonic dystrophy patients

- Autonomic function studies in Diabetic neuropathy patients
- Mortality studies in the neuro medical ICU
- Standardization of Brain stem Auditory potential in infancy, with the aim to detect early deafness in infancy
- Registry of follow up patients attending the Neuromuscular clinic, for the utility of services
- Computer data base of the biopsy studies in patients with neuromuscular studies
- Molecular genetic study of benign childhood epilepsy in collaboration with Columbia University, USA, Funded by NIH

Movement Disorder Section

Analysis of neuroprogenitor cells in the peripheral blood mononuclear fraction of Parkinson's disease patients" collaboration with Lissy K.Krishnan, BMT Wing, SCTIMST

Collaboration with Jawaharlal Nehru center for Advanced Scientific Research, Bangalore on the "genetics of PD and other familial parkinsonian syndromes.

Neurosurgery

Ongoing research projects

1 Drug trial with AP 12009, an international multicentric study for treatment of recurrent cerebral high-grade gliomas". The principal investigator for the trial form our centre is Prof Suresh Nair

2 Open Label, Dose confirmation study of Interstitial 131I-ch TNT 1/B Mab(COTARA) for the treatment of Recurrent Glioblastoma Multiforme The principal investigator for the trial form our centre is Prof Suresh Nair

3 Surgical Trial in Intracerebral hematoma (STICH II), funded by MRC, UK and coordinated from Newcastle The principal investigator for the trial form our centre is Prof Suresh Nair

4 Neuropsychological assessment for intracranial neoplasms

Pathology

Immunological studies in Myasthenia Gravis

In this study an attempt have made to isolate the tumor specific antigen in patients with myasthenia gravis with thymoma and also to correlate the antigenic similarities between skeletal muscle antigens and tumor specific antigen in patients with myasthenia gravis. Immunoassay to estimate the circulating thymoma specific antigen in the sera of patients with myasthenia gravis is useful not only in the diagnosis but also in the prognosis of the disease. As an extension of this the department is initiating one more project to study the Immunological markers that play a role in patients with myaethsnic syndromes undergoing plasma exchange to the Department of Science and Technology State council, Kerala state.

Immunocytochemical method for the demonstration of mycobacterial antigens in cerebrospinal fluid specimens for the rapid laboratory diagnosis of tuberculous meningitis.

This was attempted in the cytospin smears of cerebrospinal fluid. This direct immunocytochemical method is simple, rapid reproducible and can be used

an adjunct in the early laboratory diagnosis of tuberculous meningitis particularly in patients in whom bacteriological methods did not yield positive results for M tuberculosis in cerebrospinal fluid specimens.

A research project was submitted and department of Science and Technology- New Delhi has approved (Jan 2004- Dec2008) a research project and this is entitled **"Demonstration of *Mycobacterium tuberculosis* by an in-situ hybridization and immunocytochemical method in the CSF-cytospin smears for the diagnosis of tuberculous meningitis".**

Besides these the department also conducted studies on the ***characterization of major lipid antigens of M tuberculosis as well as isolated four immunoractive genes of M tuberculosis.*** The results of these studies will immensely benefit making accurate diagnosis in patients with Pulmonary and neuro tuberculosis.

MAJOR EQUIPMENTS PURCHASED DURING THE YEAR

Intra Aortic Balloon pumps

Clinical Auto Analyser

Electro Hydraulic Operation Table

Portable Cardio Vascular Ultrasound system

Polysomnography system

Site-Rite-5 Vascular System

Intraoperative Monitoring System

Transcraniel Magnetic Stimulator System

Ultrasonic Surgical Aspirator

Transoesophageal Echo Cardiography System

DSA Biplane Flat Panel

Video EEG MRI Compatible

Variable angle Ellipsometer

Pulsed Laser Deposition System(Nd:YAG Laser head, sophisticated vacuum chamber for deposition)

High performance Liquid Chromatograph

Shimadzu UV 17000, Spectrophotometer

Mediaid multipara patient monitor

D. G. Set 500KVA

Transformer 750 KVA

Trinoccular motorised research microscope for phase contrast with DIC and digital imaging system

Automated staining system

Advanced macro digital imaging system

Power Wave XS multiplate reader (BioTek)

Electrophysiology Microscope

Phase contrast microscope

Micro injection moulding machine

Ultra Centrifuge

High speed continuous flow centrifuge

ACADEMIC ACTIVITIES

Division of Academic Affairs

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

Programmes on offer – 2008

Post-doctoral	*PhD./Master's*	*Diploma*
1. DM Cardiology 2. DM Neurology 3. DM Neuroimaging and Interventional Neuroradiology 4. DM Cardiac Anaesthesia 5. DM NeuroAnaesthesia 6. MCh Cardiovascular & Thoracic Surgery 7. MCh Vascular Surgery 8. MCh Neuro Surgery (after M.S) 9. MCh Neuro Surgery (after MBBS and 1 year Residency in General Surgery) 10. Certificate course in Anaesthesia 11. Certificate course in Radiology 12. Certificate Course in Vascular Surgery 13. Post DM/MCh Fellowship 14. Fellowship in Biomedical Technology	15. PhD 16. Master of Public Health (MPH)/ Diploma in public Health 17. Master of Applied Epidemiology (MAE)	18. Cardiac Nursing 19. Neuro Nursing 20. Blood Banking Technology 21. Cardiac Laboratory Technology 22. Neuro Technology 23. Operation Theatre Technology 24. Advanced Medical Imaging Technology 25. Clinical Perfusion 26. Medical Records

Students Enrolment

The student strength for DM/MCh degree and Post-docroral Certificate courses and Post DM/MCh Fellowships during the year was 86. The Master of Public Health degree programme has 30 scholars and the Master of Applied Epidemiology programme 20 scholars. The Institute has, as of now, 53 students for the PhD programme, 54 scholars for the various Nursing and Technology related Diploma programmes.

A. List of Post-doctoral students

DM (Cardiology)

Rajesh Muralidharan.P
Krishna Kumar. M
K.J. Prem Kumar
Saurabh Kumar Gupta
Ali Shafeeq (Sponsored)
Ragesh.P
Shanmuga Sundaram.R.
S.V.K.R.Krishna
Haridasan. V.
P. Shyam Sundar Reddy
Randeep Singla
Bhavesh Harivadan
S. Venkateshwaran

DM (Neurology)

Abhijit Das
Pranav D Shinde
Neeraj N Baheti
Malini Gopinath
Ajith Cherian
Atma Ram
Deepak Gupta
Chandra Mohan Singh
AtamPreet Singh
Shiva Kumar. R.
Gopal Krishna Dash
Mahesh Pundlik Kate
Wattamwar Pandurang
Doshi Suyog Ashok

DM (Cardiothoracic Anaesthesiology)

Aveek Jayant
Ganesh. S
Murali Krishna. T
DM (Neuro Anesthesiology)
Suparna. B
Sriganesh. K
Nilay Chatterjee

DM (In Neuroimaging and Interventional Neuroradiology)

Jitender Saini
Jolapara Milan Babulal
Arvinda.H.R.
Periakaruppan.M.
Amit Aslam Khan
Keerthiraj. B
Somenath Chatterjee

Mch (Cardiovascular & Thoracic Surgery)

Thomas Mathew
Saurabh Jaiswal
Kirun Gopal
Ajoy Menon (Sponsored)
Varghese.T.Panicker
Sanjay Gandhi
Vivek Babu.B.
Arul Dominic Furtado
Balasubramoniam. K. R
Brijesh. P. K
Mahesh Wadhwani

Sabarinath Menon
Kurkure Laxman Kiran

MCh (Neurosurgery)

Jinendra Kumar.R
Bimal.G
Rahul Jain
Nilesh Jain
Ganesh Divakar
Naren.N.Nayak
Vikas.V.
Vishal Jain
Shivananda. S
Sachin Sampat Baldawa
Mukesh Pandey
Amit Sadashiv Dhakoji
Mradul Kumar Sharma

MCh (Neurosurgery) (5 year)

Jayanand Sudhir. B

MCh (Neurosurgery)

Shivananda. S

PDCC (Anaesthesiology)

Sivakumar. R
Mallikarjun Rao.D. T. V. S
Ajay Aravind
John George

PDCC (Radiology)

Mahadevaswamy. S
Wangju Sumnyan
Uttam. B.George

PDCC (Vascular Surgery)

Rajesh Anto

Post DM / MCh Fellows

Rajesh Shankar Iyer
Chandrasekhar. R
Mini. S
Dilip. M
C. V. Gopalakrishnan
Benny Paul. M
Sumanta Shekhar Padhi
Sanjay. G
Sachin Nayyar

B. List of PhD / Master's Programme students

PhD Students

Lynda Velutheril
Manju. S
Ragaseema.V. M
Malini. S. Pillai
Devi. R.R
Rajesh. P
Suboj Babykutty
Priya. P. S.
Deepa. D
Sudhakar.M.
Anu.S.Nair
Anu Mol Jose
Dawlee. S
P.R.Uma Sankar
Anu Paul
Aghila Rani.K.G.
Manna Jose
Sangeetha Mohan
Sreeja Purushothaman
Vandana Shankar
Arun.B
Sumith.R.Panicker
Manitha.B.Nair

Sailesh Mohan
Anie.Y
Sumi.S.
Josna Joseph
A.Edwin Sam
A.S.PradeepKumar
Sajeesh.S
Viji Mary Varghese
Manickam. P
Godwin. S.K.
Neethu Mohan
Kaladhar.K
C. V. Muraleedharan
D. S. Nagesh
Divya.P.
Sailaja.G.S
Nishi.K.K.
Anuradha
Sunitha.S.S.
Sapna. S.
Siddharth Banerjee
Priya. A. Nair
Kiran. S
Sreerekha. P.R
Anwar Azad. P
Vrinda. S. Kumar
Shelma. R
Shabeesh Balan
Geetha. M
Fayaz. R. K

Master of Public Health Students

Deepti Joy
Meena Daivadanam
Shyam Swaroop Sharma
Rajeev Arun Ekka
Elizebeth Mathews
Deepak. K.G
Bhanderi Mitesh Kumar Narsinbhai
Khalipe Mahesh Mahaling
Jayant Kumar Panda
S. S. Rani
Soumya Sarkar
Supriya Bonnie Minz
Mini P Mani
Venkatesh Vinayak Narayan
Kovid Sharma
Sanjay. S. Das
Madhu. U
Amritha Geevarghese
Indrani Sharma
Ujjwala Gupta
Gayatri Giri
Chiranjeev Bhattacharya
Subhasis Bhandari
Tumge Loyi
Jagan Kumar. B
J. Radha
Bency Joseph
Mohammed Asheel
Pinaki Sen Sharma
Anitha

Diploma in Public Health Students

Appu Chitwadgi
Pahadia Ramesh Devalal
Bharti A. Dholakia
Vidhu Shekar Tripathi
Gautam V. Nayak
Pradeep G. Bhatt
Banesang G.Gohil
Rajesh Babubhai Patel
Rajesh Kumar Patel
Haresh Ramanlal Nayak
Rajnikanth Bhaljibhai Kapadia

Dinesh N. Barot
Fulmani Ravindrakumar Ramdas
Bharat B. Goswami
P. N Bharuah
Ravisankar Rajendra Jha
H. B. Parmer
Bharat Kumar Babubhai Solanki

Master of Applied Epidemiology Students

Tana Takum
Omesh Kumar
Rajesh Kumar Sood
Satish Pundir
Udit Kumar
Vikram Katoch
M. Dinesh Singh
Gopal Singh
Lolee Mao
Somasundaram
Stanley Michael
Parveen Kumar Anand
Jagannath Sarkar
Kisalay Datta
B. P. Mukhopadhyay
Rita Ray
Subhranshu Chakraborti
Susmita Roy
Tapas Kumar Ray
Tapan Kumar Saha

C. List of Diploma students- Cardiac Nursing

Joby John
Mariamma Philip
Sunitha. S. S
Hevin. D. Das
Shirin Victor
Sindhu Susan Isac
Lekshmi. R. P
Salini. S
Sreelekha.K
Jayasree.K.P
Akhila Raveendran
Sunanda.P.K
Suja.V.M
Tessymol Antony

Neuro Nursing

Aswathy Abraham
Asha Gopi. G. S
Soumya. V. M
Manjusha Nair.M.L
Don.T.K
Jisha.M
Anu Johnson
Jansi Selva Mary. R
Sreeja.T.P
Prinu. P. Koshi
Surya

Technology related Programme

Jishnu K. Namboothiri
Princy. V
Lakshmi. C
Rejith. R. S
Amith Krishnan
Vishnu Kumary. T
Aruna. S. S
Renjini. N
Varghese. P. Mathew
Santhosh. S
Sujesh. S
Priya Rani. R
Sameer
Sooryajith

Abilash. T. R
Neethu. G. P
Nisha Gopi. G. S
Shammy. S
Meera Sundaram. C. S
Fatima Mehmood Ahmed
Gigin Nath.G
Sajith.V.S
Praveen Kumar.A
Shijil Joseph
Ranjith.C
Shanu. P. S
Don Sebastian
Suma. B
Remya.L.T

Graduands of Postdoctoral degree courses

Name of Candidates	Degree	Speciality
C.V. Gopalakrishnan	MCh	Neurosurgery
Dilip. M	MCh	Neurosurgery
Manmeet Singh S. Chhabra	MCh	Neurosurgery
Vivek V. Pillai	MCh	Cardiac surgery
Suraj Kumar Pradhan	MCh	Cardiac surgery
Prashanth. Y. M	MCh	Cardiac surgery
Neerav Bansal	MCh	Cardiac surgery
Gagandeep Singh Nagi	MCh	Cardiac surgery
Mini. S	DM	Neurology
Sapna Erat Sreedharan	DM	Neurology
Sumanta Shekhar Padhi	DM	Cardiology
Anees. T	DM	Cardiology
Sanjay. G	DM	Cardiology
Sachin Nayyar	DM	Cardiology
Hima. S.Pendharkar	DM	Neuroradiology
Bhupesh Kumar	DM	Cardiacanaesthesia
V.Smitha	DM	Neuroanaesthesia

Graduands of Post Doctoral Certificates courses

Name of Candidates	Specialty
Dipanjan Chatterjee	Anaesthesiology
David Jacob	Anaesthesiology
Amit Kumar Ahuja	Anaesthesiology
Santhosh Kumar. K	Radiology
Ashley Solomon. C	Vascular Surgery
Shah Prashant Naresh Kumar	Vascular Surgery

Diploma Awarded

Name of Candidates	Specialty
Mansoor. K	Cardiac Laboratory Technology
Indu. S. Asokan	Cardiac Laboratory Technology
Midhun. S. V	Cardiac Laboratory Technology
Anees. C. A	Neuro Technology
Sreevidya. M	Neuro Technology
Ampily. R	Medical Imaging Technology
Rupesh. V. K	Medical Imaging Technology
Munavar. T. K	Medical Imaging Technology
Krishnaprasad. R	Medical Records Science
Gopikrishnan. P. S	Medical Records Science
Manju. R. S	Operation Theatre Technology
Vipindas. P. H	Operation Theatre Technology
Divyamol. V. S	Blood Banking Technology
Rijesh. S. R	Blood Banking Technology
Arun Kumar. S	Blood Banking Technology
Priya. L	Cardiac Nursing
Timy Santhipalan	Cardiac Nursing
Resmi. M. I	Cardiac Nursing
Bindhu. V. T	Cardiac Nursing
Asha. A	Cardiac Nursing
Aswathy. L. B	Cardiac Nursing
Rani. R. Nath	Cardiac Nursing
Darsana Rani Vasanthan	Neuro Nursing
Anjana. P	Neuro Nursing
Shima. P. A	Neuro Nursing
Soumya. S. S	Neuro Nursing
Sini. S. S	Neuro Nursing
Ambily. V. V	Neuro Nursing

Short-term training/observership upto period of six months

Candidates sponsored by the Government / Autonomous institutions/ Health sector organizations, approved Medical /Dental / Nursing colleges, paramedical Institutions and Government / Defence services are provided short term training. This training / observership is arranged in consultation with the respective department / discipline and the time and period of training is decided by the Academic Division in consultation with the head of the department/ division. Around 500 observers from 81 institutions all over the country spent varying periods from two weeks to six months in different department of the Institute.

Library

Books – Total:	23116
Books – Added during 2007-08:	710
Back Volumes – Total:	19719
Back Volumes – Added during 2007-08:	421
Periodicals Subscribed:	167

Nursing Education

The 2006 batch students of the 2-year Diploma Programes in Speciality Nursing have graduated in December 2007. There were seven graduates in the Diploma Programme in Cardiovascular and Thoracic Nursing and six graduates in the Diploma Programe in Neuro Nursing. Three students admitted to the CVT Nursing programme discontinued the same due to various reasons. Currently fourteen students of 2007 batch and eleven students of 2008 batch are undergoing these two speciality nursing programmes. So far 157 cardiac nurses and 106 neuro nurses have undergone speciality training from this Institute (1988 – 2007).

The Lecturer in Nursing and a team of sixteen Neuro nurses attended the 28th annual conference of the Society of Indian Neuroscience Nurses (SINN) held at Agra, during December 2007. They presented papers, posters and participated in Neuro written quiz, Essay writing, and Elocution competition and secured twelve prizes including Dr.Lalitha's Rolling shield for the best scientific paper. Regular interactive sessions on cardiopulmonary resuscitation based on AHA guidelines 2005, using Heartsim 4000 ACLS mannequin were given to 150 Nursing staff and students from different institutions. The Lecturer in Nursing also conducted a State level Quiz for the student nurses and continued as the Treasurer of the SINN.

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 for varying periods ranging from one week to three months.

EXTERNALLY FUNDED RESEARCH PROJECTS

ACHUTHAMENON CENTRE FOR HEALTH SCIENCE STUDIES

ONGOING PROJECTS

S. No	Principal Investigator/ Responsibility	Project Title	Funded By	Total cost	Duration
1	Dr K R Thankappan, Dr A S Pradeep Kumar, Dr C U Thresia	Tobacco Cessation Research and Training in India and Indonesia	Fogarty International Centre of the National Institutes of Health	US $ 400,000	Five years
2	Dr. MalaRamanathan	Stakeholders' perceptions of IRBs in India	Harvard School of Public Health? /NIH	US $ 10,000	18 months
3	Dr. Biju Soman Dr K R Thankappan Dr. P S Sarma	A longitudinal study in the tsunami affected areas of Kerala	University of Southern California, USA	Rs. 40 lakhs	Three years
4	Dr K R Thankappan Dr V Raman Kutty Dr S Sivasankaran Dr P Sankara Sarma Dr Biju Soman Dr Manju Nair	Community Intervention for Health	Oxford Health Alliance	US $ 6,90,000	Four years
5	Dr P S Sarma Dr K R Thankappan	Non-Communicable Diseases Risk factor Surveys under the Integrared Disease Surveillance Project	Indian Council of Medical Research New Delhi	Rs 25 Lakhs	Three years

S. No	Principal Investigator/ Responsibility	Project Title	Funded By	Total cost	Duration
COMPLETD					
1.	Dr K Mohandas, Dr Amar Jesani, Dr Mala Ramanathan	Research, training and advocacy for gender sensitization of medical education and capacity building of health professionals for reduction of Maternal Mortality and Morbidity	MacArthur Foundation	US $ 300,000	Four Years
2	Dr. K R Thankappan Manju R Nair	Development of a reference manual for primary health care workers	European Commission (through Government of Kerala)	Rs 18 lakhs	One year
3	Dr. D. Varatharajan Dr. M. MuraliKannan Dr P S Sarma	Banking for better health: Medisave for rural women in Karnataka, India	Ford Foundation	$ 45,000	Two years

BIOMEDICAL TECHNOLOGY WING

EXTERNAL FUNDED PROJECTS

NEWLY INITIATED

Sl No.	Title	Principal Investigator	Funding Agency	Cost (in lakhs)	Duration
1.	Biomimetic Processing of inorganic –organic composites for biomedical applications	Dr. H. K. Varma	DST (INDO – Japanese S&T Cooperation Joint Project)	2.60	2 years
2.	Development of Radiopaque Nanocomposites	Dr. V. Kalliyana Krishnan	DST	43.00	3 years
3.	Development of a Portable Medical Electrical Safety Analyser*	Dr. Niranjan D. Khambete	Department of Information Technology	19.696	1.5 years
4.	Development of Medical Investigation Camera for Endoscopy*	Dr. Niranjan D. Khambete	Department of Information Technology	12.00	1.5 years
5.	Implanted neural interface and control schemes for artificial hand control **	Dr. Niranjan D. Khambete	Department of Biotechnology	41.296	3 years
6.	Differentiation of foetal progenitor cells and fabrication of a prototype of bioartificial liver.	Dr. TV Kumary	Department of Biotechnology	36.99	3 years
7.	Bioconjugation of nanomaterials and their applications in cancer therapy'	Co – Investigator – Dr. Annie John (in collaboration with the University of Kerala)	DBT, (Nanoscience & Nanotechnology Task Force)	10.00	3 years

** In collaboration with CDAC, Trivandrum*

*** In collaboration with CMC, Vellore*

Sl No.	Title	Principal Investigator	Funding Agency	Cost (in lakhs)	Duration
8.	Cell-Based Tissue-Engineered Fabrication of Osteochondral Constructs	Dr. Annie John	DBT	30.14	5 years
9.	Bone Tissue Engineering using adipose stromal cells on 3D porous bioactive ceramic scaffolds	Dr. Annie John	DBT	25.06	3 years
10.	Novel microporous polymeric membranes for medical applications	Dr.P.Ramesh	DBT, Govt. of India, New Delhi.	7.756	2.5 years
11.	Combination Products of Polymer-Ceramic Nanocomposites with Cells and Growth Factors for Bone Tissue Engineering Applications	Dr. P. Ramesh Co – investigator – Dr. Annie John	DBT, Govt. of India	34.64	3 years
12.	Tissue Engineered Small Diameter Vascular Graft (TEVG): Fabrication & Evaluation	Dr. Lissy K. Krishnan	DBT, Govt. of India	10.00	1 year
13.	Development of Technologies for isolating tissue-engineering scaffolds from mammalian organs and tissues	Dr. T. V. Anilkumar	Department of Biotechnology, Government of India	24.58	3 years
14.	Programme support on Tissue Engineering" under the Centres for Excellence and Innovation program of DBT	Prabha D. Nair	DBT Govt. of India	357.59	5 years
15.	Development and evaluation of surface modified, hydrogel coated medium and large diameter vascular graft	Dr. Roy Joseph	DBT	18.05	1 year

ONGOING EXTERNALLY FUNDED PROJECTS

Sl No.	Title	Principal Investigator	Funding Agency	Cost (in lakhs)	Duration
1.	Evaluation of the pro and anti inflammatory profile of cells onto bio- material surface	Dr. C.P. Sharma in collaboration with Prof. Dr. Herald Renz, Department of Clinical Chemistry and Molecular Diagnostics -Central Laboratory, Philipps-University, Marburg, Germany.	Indo-German (DST- DAAD) Project based Personnel exchange Programme.	3.00	2 years
2.	Oral Insulin Delivery	Dr. C.P. Sharma	CSIR under NMITLI, New Delhi	150.00	7 years
3.	Langmuir Blodgett Film Deposition: Blood Compatibility	Dr. C.P. Sharma	DST, New Delhi	6.78	4 years
4.	Development of coronary stent system	Mr. C.V. Muraleedharan	NMITLI, CSIR, GOI	180.13	5 years
5.	Technology development and commercialisation of Hemoconcentrators for open heart surgical application (Technology Partner)	Mr. D. S. Nagesh	TIFAC	7.05	2 years
6.	Development of Left Ventricular Assist Devices (LVAD) VSSC-SCTIMST joint project	Mr. D. S. Nagesh	VSSC, Trivandrum	15.00	3 years
7.	Commercialisation of Centrifugal blood pump for extracorporeal applications	Mr. D. S. Nagesh	TDB	8.00	2 years

Sl No.	Title	Principal Investigator	Funding Agency	Cost (in lakhs)	Duration
8.	Assessment of Electrical Impedance Spectroscopy as a Technique for Early Detection of Cervical Cancer in Developing Countries: A pilot Study*	Dr. Niranjan D. Khambete	Women's Cancer Initiative, Mumbai	6.1425	2 years
9.	Cardogaurd tablets delineation of molecular mechanism of action and its efficacy in the regression of ventricular hypertrophy	Dr. A. C. Fernandez & Dr. Renuka Nair	DST	36.68	4 years
10.	Bioengineered cell sheet for corneal tissue engineering	Dr. TV Kumary	Department of Biotechnology	7.91	3 years
11.	Delineating mechanisms of biofilm formation in urinary catheters: characterization of the role of *E. coli* secretory proteins and influence of environmental signals	Dr. A. Maya Nandkumar	KSCSTE Govt. of Kerala.	6.60	3 years
12.	Tissue engineered hybrid artificial lung Model for Testing pollutants and drugs	Dr. A. Maya Nandkumar	DBT India	37.954	3 years
13.	Differential expression of rat brain RNA during seizure development.	Dr. Anoopkumar Thekkuveettil	Department of Science and Technology	22.77	3 years
14.	Development of thermo responsive copolymers as sensing elements for C-reactive proteins.	Dr. K. Sreenivasan	LSRB (DRDO)	16.7614	3 years

* *In collaboration with Tata Memorial Hospital, Mumbai, and The University of Sheffield, UK*

Sl No.	Title	Principal Investigator	Funding Agency	Cost (in lakhs)	Duration
15.	Designing molecularly imprinted polymers as substrates for glucose	Dr. K. Sreenivasan	DBT	9.20	2 years
16.	Process optimisation and development of dispensable and biodegradable polymeric bone cement for minimally invasive treatment of bone diseases"	Dr. M. Jayabalan	DST	15.786	3.5 years
17.	Development and studies on novel biodegradable polymeric materials as functionally active cardiac implant	Dr. M. Jayabalan	DBT	23.208	3 years
18.	Development of molecularly reinforced biodegradable nanocomposite materials as internal orthopedic fixation devices	Dr. M. Jayabalan	DST-BMBF	2.50	3 years
19.	Development of bioactive bone graft substitutes for spinal fusion surgery	Dr. Roy Joseph	DST, Govt. of India	22.59	3 years
20.	A Joint Indo-US Centre on Stem cells and Tissue engineering	Dr. Prabha D. Nair	IUSSTF, Indo-US forum	57.69	2 years
21.	Islet immunoisolation with xenotransplantation and stem cell regeneration to islets as strategies for treatment of diabetes	Dr Prabha D Nair	DBT	66.88	3 years
22.	Synthesis and characterization of radiopaque polyurethanes for medical applications	Dr. Roy Joseph	KSCSTE	5.83	3 years

EXTERNALLY FUNDED COMPLETED PROJECTS

Sl No.	Title	Principal Investigator	Funding Agency	Cost (in lakhs)	Duration
1.	Development of improved tilting disc heart valve	Mr. C.V. Muraleedharan	PATSER, DSIR, GOI	92	4 years
2.	Development and Clinical Evaluation of Artificial Intelligence Based Biomedical Instruments*	Dr. Niranjan D. Khambete	DST	5.44	2 years
	* *In collaboration with BARC Mumbai*				
3.	Bone regeneration in Large Segmental defects using tissue engineered new generation bioceramic scaffold	Dr. Annie John	DRDO	9.7037	3 years
4.	Bone regeneration in a diabetes-induced rat model	Dr. Annie John	DST	8.335	3 years
5.	Ultra structural study of the interface between bone and bioactive ceramics – a pre-clinical evaluation.	Dr. Annie John	KSTEC	3.35	3 years
6.	Resorption and Remodeling of Novel Bioceramics	Dr. Annie John (Indian side) & Dr. Michael Gelinsky (German side)	DST-DAAD Joint Research Project (Indo-German)	3.50	3 years
7.	Quantitative immuno-phenotyping of inflammatory cells in biocompatibility assessment of materials"	Dr. Mira Mohanty	DST	12.60	4 years
8.	Development of an In vitro pyrogen test kit: Evaluation of pyrogenicity using human whole blood	Dr. P.V. Mohanan	Dept. of Biotechnology, New Delhi	14.64	3 year
9.	Development of smart biomaterials for cardiovascular tissue engineering.	Dr. Prabha D. Nair	DBT	32.612	3 years

INSTITUTE FUNDED (TDF) PROJECTS

Newly Initiated Institute Technology Development Fund Projects

Sl No.	Title	Principal Investigator	Cost (in lakhs)	Duration
1.	Scale up production and process standardization of Chitra Polyurethane potting compound	Mr. D. S. Nagesh	1.962	1 year
2.	Calcium Sulphate Based Bone Filler Cements for Drug Delivery Applications	Dr. Manoj Komath (Co-PI: Dr. H. K. Varma)	1.2	1 year
3.	Feasibility study on the use of Commercially pure Titanium as reference as reference material for bone implantation tests.	Mrs. Leena Joseph	1.982	1 year
4.	Disposable latex covers for ultra sound probes	Dr. P. Ramesh	1.892	1 year
5.	Scale-up and Small-scale Production of Fibrinogen Concentrate, Thrombin and Factor VIII for Clinical Use	Dr. Lissy K. Krishnan	9.472	1 year

Ongoing Institute TDF Projects

1.	Development of Silverised Chitosan Wound Dressing	Dr. C. P. Sharma	0.862	2.5 years
2.	Development of a glass ionomer for restorative, luting and core build up applications	Dr. V. Kalliyana Krishnan	1.98	2.5 years
3.	Estimation of the in vitro release kinetics of drug eluting stents.	Dr. K. Sreenivasan	1.08	2 years
4.	Development of in vitro alternative methods for pyrogen testing using human whole blood	Dr. P.V. Mohanan	0.80	1 year

Completed Institute TDF Projects

Sl No.	Title	Principal Investigator	Cost (in lakhs)	Duration
1.	Coating and Characterisation of Vascular grafts with hydrogel derived from oxidised alginate and gelatin	Dr. Roy Joseph, PPG	1.992	1 year
2.	Development of Single Solution bonding agent	Dr. V. Kalliyana Krishnan	0.963	2 years
3.	Development of an alternative *in vitro* cell culture model for the in vivo ocular test of chemicals/materials - A feasibility study.	Dr. T. V. Kumary	2.0	1 year
4.	Standardization of culture of human bone marrow-derived mesenchymal cells on bioactive ceramics – a pilot study to Bone Tissue Engineering in Orthopaedic Clinical Trials	Dr. Annie John	1.956	6 months
5.	Technology development for polyurethane potting compound based on indigenous raw materials.	Dr. M. Jayabalan	1.35	1 year
6.	*In vivo* evaluation of the efficacy of anti viper venom antibodies to Neutralize the effects of venom	Dr. Lissy K. Krishnan	1.386	2 years
7.	Standardization and evaluation of genotoxicity studies Investigator	Dr. P.V. Mohanan	1.042	1 year

INDUSTRY SPONSORED PROJECTS

Newly Initiated Industry Sponsored Projects

Sl No.	Title	Principal Investigator	Funding Agency	Cost (in lakhs)	Duration
1.	Microparticles based Hemostatic chitosan material	Dr. Chandra P. Sharma	India Sea Food Ltd. Cochin	2.51	1 year
2.	Pilot level production of Bioactive Composite Granules for Dental Application	Dr. H. K. Varma	DORTIIOM Medi Dents Pvt Ltd., Coimbatore	2.0	6 months
3.	Development and evaluation of a drug releasing intrauterine system	Dr. V. Kalliyana Krishnan	Hindustan Latex Ltd. Trivandrum	32.0	3 years
4.	Animal evaluation of Supralimus- Sirolimus eluting coronary stents in porcine coronary artery model.	Dr. P.R. Umashankar	Sahajanand Medical Technologies Pvt. Ltd, Surat	19.80	1 year
5.	Preliminary biofunctional evaluation of NTU drug eluting coronary stents in porcine coronary artery model: Part A- Animal study	Dr. P.R. Umashankar	Nanyang Technology University, Singapore	18.59	1 year

Ongoing Industry Sponsored Projects

1.	Development and evaluation of a two component caries dissolving agent	Dr. V. Kalliyana Krishnan	Dr.Toms Health Concepts, Calicut	2.5	1.5 years

STUDENT PROJECTS

Sl No.	Title	Name of student/ Institution/ course	Supervisor
1.	M. Tech Project. :Structural and dynamic analysis of coronary stents using finite element modelling technique	Mr. Naveenkumar KU, Cochin University of Science and Technology Cochin	Mr. Muraleedharan C. V.
2.	M. Tech project :Modelling of flow past TTK Chitra valve using CFX	Mr. Sajith T. K. Anna University, Chennai	Mr. Muraleedharan C. V.
3.	Strontium-Substituted Hydroxyapatite Bioceramics	Mr. Sudheesh Kumar P.T. M.Sc. Materials Science, Kannur University	Dr. H. K. Varma
4.	Development of Movement Artefact free Breathing monitor	Mr. Sameer P. Kelkar, Department of Instrumentation and Control, College of Engineering, Pune, M.Tech	Dr. Niranjan D. Khambte
5.	Differentiation of mesenchymal stem cells to hepatocytes	Ms. Sanju Sourabhan MTech project	Dr. T. V. Kumary
6.	Cellularization of micro beads and its characterization for tissue engineering	Ms. Abitha Thomas MSc project	Dr. TV Kumary (completed)
7.	Preliminary studies of the fish scale as a biomaterial	Rajeela Alakkat Kannur University	Dr. Annie John (completed))
8.	Osteogenic Activity of Goat Bone Marrow-Derived Stem Cells on Fish Scale – An *In Vitro* Study	Mir Mahmoud Mortazavi Roudmiane Kerala University	Dr.Annie John (completed)
9.	Comparative evaluation of antibacterial effect of three root canal irrigants on *Enterococcus faecalis* biofilms an in vitro study	Dr. Afzal A.	Dr. Maya Nandkumar A.

Sl No.	Title	Name of student/ Institution/ course	Supervisor
10.	Understanding the Jerky gene and its involvement in the molecular pathways associated with seizure	Mr. Siddharth Banerjee PhD	Dr. Anoopkumar Thekkuveettil
11.	Functional and molecular analysis of C2 domains of synaptotagmin	Ms. Sunitha S. S. PhD	Dr. Anoopkumar Thekkuveettil
12.	Design of nano structured materials by Layer-by-Layer assembly for drug delivery applications.	Ms. S. Manju (Ph.D programme)	Dr. K. Sreenivasan
13.	Evaluation of curcumin telease from polymer matrices	Mr. Anumon V. D., Dept. of Polymer Science and Rubber Technology, Cochin University of Science and Technology, Kochi. MTech (Polymer Technology) May 2007	Dr. Roy Joseph
14.	Mechanisms and Modulations of Restenosis after PTCA: Role of Circulating Smooth Muscle Progenitor Cells	Ms. Sreerekha P.R.SRF (funded by ICMR for three years)	Dr. Lissy K. Krishnan
15.	In vitro genotoxic effect of Polyethylene terephthalate and Titanium nitride coated Ti6Al4V alloy on human peripheral lymphocytes	Ms. Reeshma P., Sir Syed Institute for Technical Studies, Kannur Univeristy, Kannur (MSc Biotechnology)	Dr. P.V. Mohanan.

HOSPITAL WING

Externally Funded Research Projects

Sl. No	Title	Principal Investigator	Funding Agency
1	Glycobiological characterization of glycans-anti-glycans immune complexes in human serum including enzymatic modulation of their tissue uptake	Anu Paul- SRF Dr.P.S Appukuttan	ICMR, New Delhi
2	Oxidative stress in women with Epilepsy and its relation to fetal malformation	Dr. Sanjeev V Thomas Dr. N Jayakumari	
3	Studies on matrix metalloproteinase (MMP) gene transcription by nitric oxide: mechanism of MMP gene induction in human colon cancer cells	Dr. G Srinivas	Dept. of Biotechnology
4	Mechanism of anti-cancer activity of emodine/aloe emodine: effects on cell growth, angiogenesis and metastasis in human colon cancer cells	Dr. G Srinivas	Department of Atomic energy
5	Blood Component Separation Unit	Dr Jaisy Mathai	Kerala State AIDS Control Society for SCTIMST Blood Component Separation Unit
6	Modulation of high glucose induced monocyte chemoattractant protein-1 (MCP-1) gene expression in aortic endothelial cells	Dr. CC.Kartha Dr. PV. Mohanan	Kerala State Council for Science, Technology & Environment
7	Adult human resident cardiac stem cells and endothelial progenitor cells: detection of optimum conditions for their therapeutic use	Dr.CC.Kartha Dr.G.Srinivas Dr.R.Renuka Nair Dr.K.Jayakumar	Department of Biotechnology, Government of India

Sl. No	Title	Principal Investigator	Funding Agency
8	*Cardoguard* Tablet-delineation of molecular mechanism of action and its efficacy in the regression of ventricular hypertrophy	Dr.R.Renuka Nair & Dr.A.C.Fernandez in collaboration with Nagarjuna Herbal Concentrates Ltd	Department of Science & Technology- Drugs and Pharmaceutical Research Programme
9	Determination of genetic component in hypertension and cardiac hypertrophy	Dr.R.Renuka Nair & Dr.V.K. Ajit Kumar	KSCSTE
10	Pro-inflammatory cytokine expression in cardiac fibroblasts in response to hypoxia: Modulation by substance P	Dr.K.Shivakumar	Department of Biotechnology, Government of India
11	Survival mechanisms in cardiac fibroblasts	Dr.K.Shivakumar	Life Science Research Board
12	Tele Health & Medical Education	Dr. S.K. Jawahar	ISRO and Govt. of Kerala
13	Pilot Study for Homograft Harvesting (for 100 Valves)	Dr. Krishna Manohar Dr.S.K. Jawahar Dr. Sreekumari	Kerala State Council for Science, Technology and Environment, Govt. of Kerala
14	Evaluation of patients with medically refractory temporal lobe epilepsy based on MDR 1 polymorphism	Dr.K.Radhakrishnan Dr M. Banerjee	Kerala State Council for Science, Technology and Environment
15	A multicenter, double-blind, parallel-group, placebo-controlled, randomized study: evaluation of the efficacy and safety of brivaracetam in subjects (=16 to 70 years old) Partial Onset Seizures (N01252)	Dr.K. Radhakrishnan	UCB, Belgium
16	Evaluation of the sub-types of dementia in the cognitively impaired elderly subjects in Urban Kerala	Dr. Mathuranath	State Council for Science Technology and Environment
17	Kerala-Einstein Study: Risk factors for cognitive decline		RO1 grant

Sl. No	Title	Principal Investigator	Funding Agency
18	Setting up a brain-mapping unit & a neurogenetic laboratory Expansion	Dr. Mathuranath Dr. C.Kesavadas, Dr. MR.Kaimal, Dr. G.Sreenivas	State Council for Science Technology and Environment
19	The Indian Brain Template for MRI-A pilot project (Intramural funding)	Dr. Mathuranath	IBT group- a multicentric team with members from Sree Chitra Tiruanl Institute for Medical Sciences & Technology, Trivandrum, Department of Computer Sciences, Osmania University, Hyderabad; Nizam's Institute of Medical Sciences, Hyderabad; Krishna Institute of Medical Sciences, Hyderabad; Indian Statistical Institute, Kolkatta).
20	Registry of epilepsy and pregnancy	Dr. Sanjeev V. Thomas	ICMR funded
21	Oxidative stress in women with epilepsy	Dr. Sanjeev V. Thomas	KCSTE
22	Pharmacogenetic evaluation of teratogenic effects of anti epileptic drugs	Dr. Sanjeev V. Thomas	DBT
23	Prevention of cerebrovascular and cardiovascular events of ischaemic origin with terutroban in patients with a history of ischaemic stroke or transient ischaemic attack. The PERFORM Study.	Dr. S. Dinesh Nayak	

Sl. No	Title	Principal Investigator	Funding Agency
24	Mycobacterium tuberculosis by an in-situ hybridization and immunocytochemical method in the CSF-cytospin smears for the diagnosis of tuberculous meningitis	Dr.V.V.Radhakrishnan	DST
26	Development of spectroscopic protocol for magnetic resonance spectroscopy and chemical shift imaging of temporal lobe epilepsy in rabbits	Dr. R. S. Jayasree	DST
27	Multimodality neuroimaging in presurgical work up of patients with temporal lobe epilepsy (TLE)	Dr. C. Kesavadas	Kerala State Council for Science, Technology and Environment

SCIENTIFIC PUBLICATIONS

ACHUTHA MENON CENTRE FOR HEALTH SCIENCE STUDIES

1. Jacob N, Thomas SV, Sarma PS. Anti epileptic drug usage and withdrawal in elderly persons with epilepsy. *Ann Indian Acad Neurol* 2007:10(1): 34-38.

2. Kelkar-Khambete A, Kielmann K, Pawar S, Porter J, Inamdar V, Datye A, et al. India's Revised National Tuberculosis Control Programme: looking beyond detection and cure. *Int J Tuberc Lung Dis* 2008;12(1):87-92.

3. Laxmaiah A, Nagalla B, Vijayaraghavan K, Nair M. Factors affecting prevalence of overweight among 12- to 17-year-old urban adolescents in Hyderabad, India. *Obesity* 2007;15(6):1384-90.

4. Mathuranath PS, Cherian JP, Mathew R, George A, Alexander A, Sarma SP. Mini Mental State Examination and the Addenbrooke's Cognitive Examination: Effect of education and norms for a multicultural population. *Neurol India* 2007; 55(2):106-10.

5. Pandian JD, Venkateswaralu K, Thomas SV, Sarma PS. Maternal and fetal outcome in women with epilepsy associated with neurocysticercosis. *Epileptic Disord* 2007; 9(3): 285-91.

6. Pokhrel BR, Thankappan KR, Mini GK, Sarma PS. Tobacco use among health professionals and their role in tobacco cessation in Nepal. *Prevention and Control* 2006; 2(3): 117-25.

7. Rathore C, Abraham M, Rao RM, George A, Sankara Sarma P, Radhakrishnan K. Outcome after corpus callosotomy in children with injurious drop attacks and severe mental retardation. *Brain Dev* 2007; 29(9): 577-85.

8. Ravindran TKS, Balasubramanian P. Rural women take reproductive health matters into their own hands. *Arrows For Change* 2007; 13: 4-5.

9. Ravindran TKS. The World Bank and India's Health Sector. *Medico Friends Circle Bulletin* 2007; 323/24: 1-7.

10. Reddy KS, Prabhakaran D, Jeemon P, Thankappan KR, Joshi P, Chaturvedi V, et al. Educational status and cardiovascular risk profile in Indians. *Proc Natl Acad Sci* 2007; 104(41): 16263-68.

11. Thankappan KR, Thresia CU. Tobacco use & social status in Kerala. *Indian J Med Res* 2007;126(4):300-8.

12. Thankappan KR. Public Health Education: Lessons, challenges and future plans from Kerala, India. Bulletin of the World Health Organization 2007; 85 (12): 969-70.

13. Thomas SV, Sukumaran S, Lukose N, George A, Sarma PS. Intellectual and language functions in children of mothers with epilepsy. *Epilepsia* 2007;48(12):2234-40.

CHAPTERS IN BOOKS

1. Nair M. Health Status of Women in Kerala: Beyond Indicators. In Kerala: Fifty years and beyond: Festschrift for CR Soman on his 70th birthday. Kartha CC ed. Gautha Books, Trivandrum: 2007: 505-22.

2. Soman B. How healthy is Kerala population? In Kerala: Fifty years and beyond: Festschrift for CR Soman on his 70th birthday. Kartha CC ed. Gautha Books, Trivandrum: 2007: 369-74.

3. Thankappan KR, Patrick WK. War as a disease: An epidemiological perspective. In Health as a bridge for peace. Indika Karunathilake & Paula Palmer ed. Supplementary volume of the 39th APACPH conference in Japan: 2007: 30-33.

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1. Anil Kumar PR, Sreenivasan K, Kumari TV. Alternate method for Grafting thermoresponsive polymer for transferring *in vitro* cell sheet structures. *J. Appl. Polym. Sci* 2007;105(4):2245-51.

2. Anil Kumar PR, Varma HK, Kumary TV. Cell patch seeding and functional analysis of cellularized scaffolds for tissue engineering. *Biomed Mater* 2007;2(1):48-54.

3. Anilkumar TV, Shelma R, Joseph R, Mohanan PV, Muraleedharan CV. Implant pathology of polyvinylidene fluoride coated polyethylene terephthalate fabric in rabbits. *Indian J. Vet. Pathol* 2007;31(1):11-16.

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5. Divya P, Krishnan VK, Krishnan LK. Vascular Tissue Generation in Response to Signalling Molecules Integrated with a novel poly(e-caprolactone)- fibrin hybrid scaffold. *J Tissue Eng Regen Med* 2007; 1(5): 389-97.

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9. Kaladhar K, Sharma CP. Surface passivation and controlled ligand supplementation of cellular activation processes- Strategies for bottom up synthesis of bioactive surfaces. *Trends Biomater Artif Organs* 2007; 21(1):29-62.

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14. Nishi KK, Antony M, Mohanan PV, Anilkumar TV, Loiseau PM, Jayakrishnan A. Amphotericin B-gum arabic conjugates: synthesis, toxicity, bioavailability, and activities against Leishmania and fungi. *Pharm Res* 2007; 24(5): 971-80.

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16. Paul W, Sharma CP. Tricalcium phosphate delayed release formulation for oral delivery of insulin: a proof-of-concept study. *J Pharm Sci* 2008;97(2):875-82.

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2. Aghila Rani KG, Jayakumar K, Srinivas G, Nair RR, Kartha CC. Isolation of ckit^{+ve} cardiosphere forming cells from human atrial biopsy. *Asian Cardio Vasc Thorac Ann* 2008;16(1):50-56.

3. Anie Y, Sumi S, Varghese P, Madhavi LG, Sathish M, Radhakrishnan VV. Diagnostic approaches in patients with tuberculous pleural effusion. *Diagn Microbiol Infect Dis* 2007; 59(4): 389-94.

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CHAPTERS IN BOOKS

1. Kishore A. Etiopathogenesis of Parkinson's disease. Reviews in Neurology. Kalyan Bhatachrya ed. 2007: 200.

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HONOURS, AWARDS AND RECOGNITIONS

KG. Aghila Rani received the Young Scientist Award at the '20th Kerala Science Congress' meeting held during 28th-31st January 2008 at Trivandrum.

Annamma George, Speech Therapist won the Second Best Poster Award at the 8th Joint Annual Conference of Indian Epilepsy Association and Indian Epilepsy Society, Mumbai, 4th October2007.

Easwer H V won the best paper award for the paper titled "Cosmetic and radiological outcome following the use of hydroxy apatite porous dense bilayer burr hole buttons at the annual conference of the Kerala chapter of the neurological society of India at Allepey in 31st March 2007.

CC. Kartha was nominated as a Member of the Nano Applications and Technology Advisory Group of the Nano Science and Technology Mission of Department of Science and Technology

CC. Kartha was nominated as a Member of the Research Council for Science and Engineering of Kerala State Council for Science, Technology and Environment.

CC. Kartha has been nominated as a Member of the Project Advisory Committee of the "Prathibha Council" of Kerala Government.

CC. Kartha was a special invitee to the Scientific Advisory Committee of the National Institute of Virology, Pune.

CC.Kartha was inducted as a member of the Editorial Advisory Board of *The Open Nitric Oxide Journal* published by Bentham Science Publishers Ltd.

C. Kesavadas has been awarded Certificate of Merit at the Radiological Society of North America, November 2007, Chicago, USA for the scientific exhibit Susceptibility weighted imaging – A new tool in imaging stroke patients

K. Mohandas was nominated as the Member of the National Advisory Committee of the International Conference on Advanced Materials (ICAM-2007) (May 2007).

K. Mohandas was nominated by the Govt. of Kerala as a Member of the Governing Council of the Karalla State Higher Education Council (June 2007).

K. Mohandas was nominated as a Member of the Research Advisory Board of the World Nonie Research Foundation, Cheney (June 2007).

K. Mohandas was appointed as a Member of the Cadre Review Committee of the Christian Medical College, Vellore (July 2007).

K. Mohandas was appointed as the Chairman of the Committee to discuss the technical and financial aspects with the Indian applicant Companies for India-Israel initiative for industrial R&D (i4RD) (September 2007) by the Secretary, Department of Science and Technology, Government of India

K. Mohandas was appointed as a member of the State Council of the Karalla State Council for Science, Technology and Environment, Thiruvananthapuram (January 2008)

K. Mohandas was appointed as a Member of the Committee to review the existing Private Practice Scheme (SHI) for Medical Officers and discuss the new proposal for Share in intellectual Fee for Research and Education (SIFRE) for Medical, Scientific and Technical Officers in Tata Memorial Centre, Mumbai (March 2008).

Naredra Bodhey has been awarded BOYSCAST research fellowship for a period of 1 year to the Division of Cardiac MRI in the German Heart Institute, Berlin, Germany from March 2007 to March 2008 .

Ravi Mohan Rao was an invited guest faculty at the AO spine conference held at Bangalore in August 2007

Savneet Kaur received the second best poster award at the '7th Indo-US' workshop on 'Cardiovascular Prosthetic Devices: In vitro Studies to Clinical Implantation' organized by DST at Trivandrum, Kerala, India from 1st-4th February 2007

Suresh Nair was invited as a resource person for the Neurosurgery Update 2007 conducted by Park Clinic Calcutta in March 2007. and gave 6 lectures

Suresh Nair was appointed as a Guest Professor, Department of Neurosurgery, Fujita Health University, Toyokae, Japan (2006-2007).

Suresh Nair was invited as a Visiting Professor to Mohammed V University Souissi, the Department of Neurosurgery at Hospital Des Specialties, Rabat, May 2007.

Suresh Nair was invited as one of the two guest faculties in the annual microneurosurgery workshop conducted by the All India Institute of Medical Sciences, New Delhi Feb- March 2008 and conducted operative workshop.

VISITORS

AMCHSS

Abhay Bang, Director of Society for Education, Action and Research in Community Health (SEARCH) visited the Centre during January 2008 and offered the TN Krishnan Memorial oration. The title of the oration was " Research with the People".

Amarjith Singh, Principal Secretary (Family Welfare) and Commissioner, Government of Gujarat visited the Centre to meet the director and request him to take more candidates for the DPH course. He also made a presentation on the Chiranjeevi Scheme in Gujarat in the national conference on emerging public health issues January 10-13, 2008 at Trivandrum.

Gita Sen, Professor at the Indian Institute of Management Bangalore visited our Centre in connection with the national conference on emerging issues in public health and offered a special lecture on Gender as a social determinant of Health on January 12, 2008.

Harry A Lando, Professor of Epidemiology at the University of Minnesota USA Visited the Centre in April 2007 and January 2008. The first visit was to discuss the progress of the project Quit Tobacco International and the second one was to present a paper for the national conference on emerging public health issues.

Mark Nichter, Professor of medical anthropology at the university of Arizona, USA Visited the Centre during the month of January 2008. He is the principal Investigator of the project titled " Building Capacity for Tobacco cessation in India and Indonesia" which is supported by the Fogarty International Centre of the National Institutes of Health USA. He had detailed discussion with the faculty and the institute director regarding the importance of this project and how best this can be implemented in India.

Richard A Cash, from the Harvard School of Public Health visited the Centre during the months of January – March 2008. He taught the MPH students a part of the health and development module.

HOSPITAL

Dr. Arun Kumar Gupta, Technical Supervisor from Dayanand Medical College and Hospital, Ludhiana visited the Epilepsy Program from 02.07.07 to 16.07.07

Dr. Deepak Shrivastava, Professor, Medical Director, San Joaquin General Sleep Center, USA visited the Epilepsy Program on 17.12.2007

Dr. Harry. T. Chugani, Professor and Head, Department of Pediatric Neurology, Children's Hospital of Michigan and Wayne State University, Detroit, Michigan visited the Epilepsy Program from 08.08.07 to 11.08.07.

Y Kato, Fujita University, Nagoya, Japan

Dr. Kottil Rammohan, MD, Professor of Neurology, Director, Clinical and Experimental Neuro immunology and Multiple sclerosis, Ohio State University, Columbus, OH, USA visited the epilepsy program from 22.01.08 to 29.01.08.

Laligam Sekhar, George Washington University, USA

Martin Bettag, Hospital of Barmherzige Bruder Trier, Germany.

Dr. K. Mishra, Professor, University of Southern California School of Medicine, California visited the Epilepsy Program on 17.11.2007

Nabjyoti Choudhary, Medical Director, Prathama Blood Center.

R Nelson, Bristol, UK

Radhakrishnan KM Special Officer on duty, Dept.of Transfusion Medicine, Tamilnadu MGR Medical University, Chennai visited Blood Bank and appreciated the various research activities carried out at the center.

Sunil Rajadhyaksha, Professor & HOD, Transfusion Medicine, Tata Memorial Hospital

Tetsuo Kanno, Fujita University, Nagoya, Japan

Representatives of Commonwealth Study Group visited Blood Bank

H Sano, Fujita University, Nagoya, Japan

Suzuki Y, Daini red Cross hospital, Nagoya, Japan

Dr. G. V Subbaiah Choudhary and Dr Venkataswamy, Consultant Neurologists from Sigma Hospital, Hyderabad visiting the Epilepsy Program from 16.09.2007 to 30.09.2007.

VISITS ABROAD

Mr S. Balram visited the office of Technology Transfer at NIH, Bethesda during May-June 2007 as part of Indo-US exchanges programme

Dr. Biju Soman, got trained in health informatics at Department of Informatics in University of Oslo, Norway as part of the International HIS-project, Integrated Health Information Systems (IHIS) in developing countries-NFR-GLOBAC from September 1, 2007 to December 15, 2007.

Dr. Bejoy Thomas Visited San Raffaele Hospital, Milan, Italy during the month of December 2007(one month) under the Indo- Italian Project (BS 3) 2005- 2007 on "Characterization of brain tumors using advanced MR imaging techniques.

Dr. A. K. Gupta Visited San Raffaele Hospital, Milan, Italy during the month of December 2007 under the Indo- Italian Project (BS 3) 2005- 2007 on "Characterization of brain tumors using advanced MR imaging techniques

Dr. M. Jayabalan visited University of Duisburg, Essen, Germany during 11.08.2007 to 09.09.2007under DST-BMBF Programme

Dr. V. Kalliyana Krishnan, visited M/s. Scanco Ltd. Switzerland as part of training on Micro CT during June 24-29th 2007

Dr. C.Kesavadas.C attended meetings of Radiological Society of North America, in Nov 2007, Chicago, USA and International Society of Magnetic Resonance in Medicine , Berlin Germany in May 2007.

Dr. Mala Ramanathan, participated as a faculty on the three day training program on 'Ethical Issues in Health Service Delivery Research', ICDDR, B, Dhaka, Feb 12-14, 2008

Dr. K. Mohandas attended the Executive Committee meeting of Association of Commonwealth Universities at London from 24th April to 27th April 2007.

Dr. K. Mohandas attended the Council Meeting of Association of Commonwealth Universities at Penang, Singapore on 3rd June 2007.

Dr. K. Mohandas visited Moscow 10th to 13th of October 2007 as a member of Indian Science and Technology Delegation to Moscow in connection with Integrated Long Term Programme (ILTP) meeting.

Dr. K. Mohandas attended the meeting of the Executive Committee of Association of Commonwealth Universities at London from 3rd November 2007.

Dr. K. Mohandas attended the Annual Meeting of the Association of Commonwealth Universities (ACU) on 29th February 2008 at London.

Dr. P.V. Mohanan presented a paper entitled Cytogenetic effect of an indigenously developed dental material at the XI International Congress of Toxicology held at Monteal, Canada, during 15-19 July 2007.

Dr. Naredra Bodhey Visited Division of Cardiac MRI in the German Heart Institute, Berlin, Germany as a BOYSCAST research fellow from March 2007 to March 2008

Dr. Naredra Bodhey visited the Department of Cardiology and Molecular Genetics, Charite' University of Medicine, Berlin Campus Buch in December 2007 and delivered a talk on ""Initial experience in the Diffusion Tensor spectroscopy in Cardiac imaging"

Dr. Naredra Bodhey visited the the Department of Cardiology, Charite' University of Medicine, Campus Benjamin Franklin, Berlin in December 2007 and delivered a talk on "Application of DTI in the structure delineation of the myocardium".

Dr. Niranjan D. Khambete visited Department of Electrical Engineering and Computing, University of Zagreb, Zagreb, Croatia.

Dr. Niranjan D. Khambete visited Department of Medical Physics and Clinical Engineering, The University of Sheffield, UK and Department of Medical Physics and Clinical Engineering The University of Leeds, UK

Dr. Prabha D. Nair visited Australia visited Australia as a member of the DBT delegation to the Indo-Australian workshop on Stem cells and tissue engineering during 10-14 June 2007 organised by the Australian Stem cell Network and Monash University. She also visited Fremantle Hospital from 15th to 21st June 2007 and delivered invited lectures at their surgical grand rounds.

Dr. Prabha D. Nair visited the Georgia Tech, U.S.A, and University of Washington Seattle, U.S.A as part of the research collaborative activity of the Joint Indo-US Centre on Stem Cells and tissue engineering. From March 10 to April 10 2008.

Dr. Prabha D. Nair attended the Annual Hilton Head Workshop at Savannnah, U.S.A from March 12 16, 2008

Dr. C. P. Sharma attended the Annual General Meeting of the International Union of Societies for Biomaterials Science and Engineering (IUS-BSE) on April 21, 2007 at Chicago.

Dr. T K Sundari Ravindran, Regional Planning Meeting on SRHR monitoring and advocacy, Asia-Pacific Research and Resource Centre for Women (ARROW), Kuala Lumpur, 13-15 November 2007.

Dr. K. R. Thankappan, participated as a public health expert to finalize the curriculum for the Master of public health program of the new university of public health in Myanmar during April 4-6, 2007. The WHO Country office Myanmar supported this activity.

Dr. K. R. Thankappan, participated in the research and training meeting and a university symposium on global health issues at the University of Southern California, USA during April 15-20, 2007.

Dr. K. R. Thankappan, participated as a World Health Organization Temporary Advisor to provide technical support to the workshop to develop non-communicable disease (NCD) strategic action plan for Maldives during July 15-19, 2007 organized by the Government of Maldives.

Dr. K. R. Thankappan, participated in the preparatory workshop of the EU-Asia Link Program on Partnership for Better Health at Dhaka Bangladesh during January 21-23, 2008.

Dr. K. R. Thankappan , participated in the Oxford Health Alliance Annual Summit 2008 at Sydney, Australia Feb 25-27, 2008.

Dr. K. R. Thankappan, participated in the Macroeconomic Study Investigators meeting at London March 12-14, 2008

Dr. H.K. Varma and Dr. Manoj Komath visited Osaka, Japan from September 25 to 28, 2007, in connection with the 7th Asian BioCeramics Symposium 2007 (ABC 2007).

Two of the MPH Students (**Dr Sheethal Joy and Dr Pratap Kumar Jena)** had their field placement at the University of Southern California, USA during the months of November and December 2007. All local hospitality was provided by the USC.

FUNCTIONS, WORKSHOPS AND CONFERENCES

ACHUTHAMENON CENTRE FOR HEALTH SCIENCE STUDIES

Conferences

The Centre organized a National Conference on Emerging Issues in Public Health during Jan 10-13, 2008. The conference was inaugurated by the honorable minister for health and family welfare, government of Kerala Smt. P K Sreemathy. Prof K Mohandas director of SCTIMST chaired the inaugural function. Dr M Krishnan Nair former director of the Regional Cancer Centre, Trivandrum, Dr Richard A Cash, faculty at the Harvard School of Public Health Boston, USA and visiting faculty of the AMCHSS, Ms Poonam Muttreja, country director Macarthur Foundation India country office offered felicitations for the conference. More than 250 public health experts from all over India and a few from foreign countries such as the USA, UK, Australia, New Zealand, Thailand, Nepal, Sri Lanka and Bangladesh participated in the conference.

The conference was organized around the following key themes: the patterns of communicable and non-communicable diseases in the country, the role of health systems in helping communities to deal with these challenges and lastly the policies and programs for public health training and practice that are needed to meet the challenge posed by these health problems.

Four communicable diseases, malaria, tuberculosis (TB), HIV-AIDS, and emerging infectious diseases were discussed in detail. Researchers noted that some of the re-emerging communicable diseases were caused by the changes in settlement patterns and unregulated urban development that brought up new precedents in human-animal interactions. They called for better systems of surveillance for the diseases as well as the disease causing vectors. Evidence based policies and programs and specifically targeted programs to reach out to marginalized groups using an integrated approach were needed, particularly for conditions like TB and HIV that rendered individuals and communities vulnerable both immunologically and socio-economically.

The third day (January 12, 2008) focused on emerging epidemics of non-communicable diseases. Dr Jerzy Leowski Regional advisor for non-communicable diseases WHO south East Asia Region made presented the NCD situation in the WHO south East Asia Region and the challenges ahead. This was followed by a presentation by Dr K Srinath Reddy, Professor of Cardiology at the All India Institute of Medical Sciences New Delhi and currently the president of the public health foundation of India on primary prevention strategies and working with communities to identify appropriate interventions for addressing the emerging epidemics of non-communicable diseases. A third presentation at this session was on gender and mental health issues in India, which was made by Dr Vikram Patel Professor at the London School of Hygiene and Tropical Medicine.

Another plenary session on the same day focused one of the major risk factors of NCD i.e. tobacco use. In this session Prof Harry A Lando Professor of Epidemiology at the University of Minnesota, Dr Prakash C Gupta a well-known tobacco researcher from Bombay, Dr K R Thankappan, Professor and Head of the AMCHSS and Professor Mark Nichter, Professor of the department of Anthropology, University of Arizona, USA made presentations on important issues related to tobacco control.

The last day of the conference was on health systems to address the above public health problems. The first presentation was on "financing health care in India: current situation and future options" by Prof Peter Berman, Chief of health, nutrition and population at the World Bank office at New Delhi. This was followed by a presentation on "Equity in an Age of Developing Health Care Markets" by Prof VR Muraleedharan of the Indian institute of Technology Madras. The third presentation was on "Regulation of Health Care - Options for the State" by Prof Rama V Baru of the Jawaharlal Nehru University, New Delhi. The last presentation in this session was on "Kerala Health System: Crisis and Response" by Prof V Raman Kutty of the AMCHSS.

The second plenary session on the last day was on Public Health Education. Dr Ravi Narayan of the Community health Cell Bangalore and a member of the board of directors of the public health foundation of India made a presentation on "Professional Training in Public Health- Undergraduate and Post-Graduate Level". He also talked on human resources in general for addressing the challenges of public health in India.

The conference devoted several sessions to sexual and reproductive health (SRH) and identified the diminishing international investment in SRH and un-kept promises at the ICPD as one of the reasons for the poor status of SRH in the country. The Chiranjeevi scheme of public-private partnership in Gujarat state was presented by Dr Amarjit Singh principal secretary and commissioner for heath and family welfare government of Gujarat and the Tamil Nadu Initiative for Safe Motherhood by Dr Padmanabhan, director department of public health and preventive medicine, Government of Tamil Nadu.

Regardless of the problems, either communicable, non-communicable, SRH or health systems related, the strategies suggested were similar in terms of using a public health perspective to problem solving, networking amongst professionals working in health and advocating for building this public health orientation amongst health and health care professionals.

National Conference on Emerging Issues in Public Health Inagurated by Smt. P.K. Sreemathy, Minister for Health and family welfare, Govt. of Kerala From January 10-13. 2008

Seminars

Geographic Information System in Community Health" by Prof. K. R. Srivathsan, Director, Indian Institute of Information Technology and Management, Kerala at Conference Hall, AMCHSS on 4th February 2008

'Neoliberalism and its impact on health' by Prof. Gavin Mooney, Curtin University of Technology, Perth, Australia on 28th February 2008

Epidemiology workshop on February 11th and 12th, 2008 by Professor Oliver Epidemiology workshop on February 11th and 12th, 2008 by Professor Oliver Razum, University of Bielefeld, Germany and Professor Seval Akgun, Baskent University, Ankara, Turkey

Guest lecture by Prof Frank Shann Feb 20, 2008, "Warfare and The State of the World's Children" former director of Intensive Care Unit at Royal children's hospital, Melbourne and associated with Lancet journal.

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Workshops

A workshop of the Pacific Rim Global Health Forum (PRGHF) was held at AMCHSS, SCTIMST on January 14-15, 2008. The workshop was attended by participants from University of Colombo-Sri Lanka, Eastern University, Batticaloa-Sri Lanka, National Institute of Preventive and Social Medicine (NIPSOM)-Bangladesh, Mahidol University-Thailand and University of Southern California-USA. The workshop came up with activities for the next year.

A review meeting with 16 participants, including the alumni of the GME courses held in 2003-2004 was conducted in AMCHSS on Jan. 14-15, 2008 to discuss the possible focus of future activities. Several activities were planned including the development of a training manual for these courses, both for the two weeks course and for the three day course

Short Courses

Harvard Students Program

A batch of seven public health students from the Harvard School of Public Health visited AMCHSS for a period of three weeks from January 04 to January 21, 2008. After an initial introduction to the health status of Kerala the students were taken to various field cites within Kerala and outside. Following are the names of the students who attended this program.

Names of students from Harvard University

1) Diya Basu-Sen-USA
2) Lana Dinic-Croatia
3) Sumona Chaudhury-United Kingdom
4) Sabrina Khan-USA
5) Thandeka Myeni-USA
6) Naomi Odell-USA
7) Zubin Shroff-India

Dr. K. Mohandas, Director, SCTIMST is addressing the students from Harvard School of Public health

Training program on "Community Based Interventions For Cardiovascular Diseases.

Under the World Health Organization country fellowship program, two fellows were selected for training in community based interventions in cardiovascular diseases for a period of four months from November 15, 2007 to March 14, 2008 at AMCHSS. Ms Sonam Lhamu Bhutia, from Gangtok, Sikkim and Ms Jessy Tomy, from New Delhi participated in this training program. The training focused on major risk factors such as tobacco use, unhealthy diet and physical inactivity and how to control them at the community level. They were posted in the Institute's community based program on prevention and control of chronic non-communicable diseases focusing on hypertension control in Kumarakom Panchayat of Kottayam district. They also participated in many of the lecture sessions in the institute closely related to chronic diseases and public health. They also attended the national conference on emerging public health issues organized by the institute during January 10-13, 2008. In addition they were also provided training in cardiovascular nursing at our hospital wing.

Making Pregnancies Safer

Two courses were run, from 26-30 January and from 21-27 February 2008, respectively. Thirty-five participants from all over India participated, including PHC medical officers, senior professionals from state health departments, medical educators, and health program managers from NGOs. A training manual based on these courses is under preparation.

Basic Training on "Ethical Issues in Health Research in India" held from 6-8-07 to 10-8-07

BIOMEDICAL TECHNOLOGY WING

Inauguration of Indo-Russian Centre for Biomedical Technology by
Dr. T. Ramasami, Secretary to Government of India, Department of Science & Technology on 10-1-2008

Indo - US Symposium on Good Laboratory Practice (Emphasis on Medical Devices) Jointly organized by Indo-US Science and Technology forum, National GLP Compliance Monitoring Authority and Sree Chitra Tirunal Institute for Medical Sciences & Technology on March 5,7-2008

Inauguration of the 19th AGM of MRSI and theme symposium on "Materials for Hostile Environment" by Dr. S. Banerjee, Director, BARC, on 13th Feb 2008. On the dias are Dr.G.S. Bhuvaneshwar, Prof. S B Krupanidhi, Gen. Secretary, MRSI, Dr. A D Damodaran, Shri. M. R. Ajith.

Dr. K. Mohandas, Director,SCTIMST is handing over the Technology Transfer Agreement for Dental Composites with M/s Anabond Stedman Pvt Ltd on 10-7-07

Dr. K. Mohandas, Director, SCTIMST is inaugurating the National Technology day celebrations on 11-5-2007

HOSPITAL WING

The Division of Cellular and Molecular Cardiology organized a workshop for evolving projects in cardiovascular biology during 16 - 18 November 2007. It was sponsored by Department of Biotechnology. The aim of the workshop was to sensitize cardiologists and cardiovascular researchers abour the new avenues for research with respect to studies on disease mechanisms, identifying diagnostic and prognostic biomarkers and discovering novel therapeutic targets.

There were 54 participants, which included cardiologists, cardiovascular surgeons, pharmacologists, biochemists, pathologists and molecular biologists. Twenty-one of them were plenary speakers. Dr. KG. Nair, eminent cardiologist and a pioneer in molecular cardiology gave the key-note address. He spoke on "Exciting avenues for research in cardiovascular diseases in India".

The recommendations made during the final session of the workshop were forwarded to the Department of Biotechnology for follow-up action.

Release of the short film on SCTIM1ST 13-11-07 by H.H Uthradam Thirunal Marthanda Varma (The Maharaja of Travancore)

Agreement with DC books

Dr. Vishwas Mehta. IAS, Principal Secretary, Health & Family Welfare, Govt. of Kerala inagurating 'Students Day' - Resonance 07 on 6-10-07

Dr. K. Mohandas, Director, SCTIMST is inaugurating the Dr. Mahadevan Pillai memorial Workshop on Clinical and Biomedical MRI (Aug 1-5, 2007)

Dr. K. Mohandas, Director, SCTIMST is inaugurating the CME programme on Imaging Technologies FLAIR 2007 on 23-9-07

Nursing Training course (DGHS, Govt. of India) was inaugurated by Dr. K. Mohandas, Director, SCTIMST from 16-04-2007 to 26-04-2007

Neurovascon 2007 was Inagurated by H E The Governor Kerala. Sri R L Bhatia (14,15 &16 September, 2007). Prof. Dr. K. Mohandas, Director of SCTIMST and Dr. G. Madhavan Nair, Chairman, ISRO were also Present

Dr. K. Mohandas, Director,SCTIMST is inaugurating the CME programme on Respiratory Care Update -2007 organised by Department of Anaesthesiology on 8-7-2007

Dr. K. Mohandas, Director, SCTIMST is inaugurating the "Workshop on Women & epilepsy" (26 & 27 Jan 2008)

Silver Jubilee Valedictory Function of TOLIC, Trivandrum
Release of Souvenir by Sri PJ Thomas IAS, Chief Secretary to Govt. of Kerala and Dr K. Mohandas, Director, SCTIMST

IMPCC Meeting

Visit of Prof. V.L. Chopra, Member, Planning Commission

INTERNATIONAL CONFERENCES AND MEETINGS ATTENDED BY FACULTY

Name of the Participant/Speaker	Name of the Conference	Date & Venue	Title of the Paper/ Participants Status
Dr. Asha Kishore	11th International Congress of Parkinson's disease and Movement Disorders	Istanbul Turkey	"Effect of early use of amantadine on the development of motor fluctuations and dyskinesias during levodopa treatment in Parkinson's disease"
Dr.Asha Kishore	1st Asian Oceanian parkinson's and movement disorder congress	Singapore	Invited lecture as guest faculty & spoke on "Management of complicated dystonia"
Dr. Asha Kishore	Annual Conference of the Association of Srilankan Neurologists	Colombo, SriLanka	Diganosis and treatment of "advanced Dystonia" and "Treatment of early and late Parkinson's disease"
Dr. Asha Kishore	Investigators meeting	Portugal	
Dr. Bejoy Thomas	Annual joint conference of ISMRM - FSMRMB - 2007 Berlin, Germany	19-25, May 2007	1. MR Perfusion Imaging and Intensity – time Curve Analysis in Cerebral Tumors. 2. Clinical Applications of Susceptibility Weighted Imaging
Dr.Biju Soman	'USC-IPR/NIH Conference on Interdisciplinary Science, Health, Promotion and Disease Prevention'	May 2-3, 2007 - Pasadena, California, USA	'Participant'
Dr.Biju Soman	'Symposium on Health Promotion in South Asia and the Pacific Rim in the Era of Globalisation'	April 17, 2007 – University of Southern California, Los Angeles, USA	'GIS training among rural village women'

Name of the Participant/Speaker	Name of the Conference	Date & Venue	Title of the Paper/ Participants Status
Prof. Jayakumar. K.	Hands-on workshop on Radio frequency ablation of Atrial fibrillation	Florence Nightingale Hastanesi Hospital, Instanbul, Turkey.	Organiser
Prof. Jayakumar. K.	87th Annual Meeting of American Association of Thoracic Surgeons	Washington	Participant
Prof. Jayakumar. K.	Annual Meeting of European Association of Cardiac Thoracic Surgeons	Geneva, Switzerland	Participant
Dr.Kesavadas	Radiological Society of North America, Chicago, USA Nov 2007.	Chicago, USA, Nov 2007.	1. Advanced MR imaging in Presurgical workup of patients with Epilepsy 2.Functional MR Imaging (fMRI) Study of cortical reorganisation in focal cortical dysplasia (FCD) 3. Susceptibility Weighted Imaging (SWI): A new tool in magnetic resonance imaging of stroke patients
Dr. Sathyabhama. S.	135th Annual Conference of American Public Health Association Washington. D.C. 2007	Washington DC	November 2007 'Health benefits of reducing body iron as a motivational tool for increasing voluntary blood donation'
Dr. Sanjeev V. Thomas	American Academy of Neurology Annual meeting	Boston, USA	Motor and mental development of infants of mothers with epilepsy.
Dr. Sanjeev V. Thomas	American Epilepsy Society Annual meeting	Philadelphia, USA	Intellectual and language development of children exposed to anti-epileptic drugs in utero

Name of the Participant/Speaker	Name of the Conference	Date & Venue	Title of the Paper/ Participants Status
Dr. Suresh Nair	World Federation of Neurosurgical Societies 13th interim meeting/ 12th Asian-Australasian Congress of Neurological Surgeons	Nagoya	Guest speaker
Dr. Suresh Nair	5th International Conference on Vestibular Schwannomas and other CPA lesions	Barcelona	Guest speaker
Dr. Suresh Nair	Department of Neurosurgery at Hopital Des Specialites, Mohammed V University Souissi	May 2007 – Rabat	Guest speaker
Dr. K.R. Thankappan	39th Asia Pacific Academic Consortium for public health conference	22-26, November 2007 University of Nagasaki, Japan	Health Status of Kerala
B. Thomas	International Society of Magnetic Resonance in Medicine	Berlin, Germany, May 2007	1. Clinical applications of Susceptibility weighted imaging 2. MR perfusion imaging and intensity time curve analysis in cerebral tumors

National Conference on Showcasing Cutting Edge Science & Technology by Women- National Task Force for Women in Science and Technology

Four women scientists, Dr. N. Jayakumari, Dr. T.V. Kumari, Dr. Maya Nandkumar and Dr. S. Sandhyamani, were nominated to attend the National Conference on Showcasing Cutting Edge Science & Technology by Women, organized in March 2008, by a National Task Force for Women in Science and Technology, set up by the DST, New Delhi. The two-day conference, inaugurated by Smt. Prathibha Devisingh Patil, Honourable President of India along with Shri Kapil Sibal, Minister for Science & Technology and Earth science, was aimed at encouraging women to take up careers in science and technology. During the Conference, National Awards were presented to women who had carried out exemplary work and leading women scientists from various fields spoke on their research achievements. Discussions were held on policy issues to recommend measures and programmes for facilitating larger numbers of women to pursue active research, especially in the form of grants and infrastructural support during various stages of a scientific career. The Conference provided an opportunity for our women scientists to interact with others from several national institutes and participate in the discussions.

INTERNATIONAL CONFERENCES ATTENDED BY STUDENTS

Name of the Participant/ Speaker	Name of the Conference	Date & Venue	Title of the Paper/ Participants Status
Dr. Deepak Gupta DM, Neurology-Student	1st Asian Oceanian Parkinson's and movement disorder congress	Singapore	

STANDING COMMITTEES

Academic Committee

1. Prof. K. Mohandas (Chairman)
   Director
   SCTIMST, Thiruvananthapuram
2. Dr. G. S. Bhuvaneswar
   Head, BMT Wing, SCTIMST
   Poojappura, Thiruvananthapuram
3. Prof. M. K. Ramachandran Nair
   Vice Chancellor
   University of Kerala, Thiruvananthapuram
4. Prof. K. Radhakrishnan
   Dean & Head of the Dept. of Neurology
   SCTIMST, Thiruvananthapuram
5. Dr. S. K. Mahajan
   Ex-Head, Agriculture& Molecular Biology
   Division, BARC, Mumbai
6. Prof. J. M. Tharakan
   Head of the Dept. of Cardiology, SCTIMST,
   Thiruvananthapuram
7. Dr. A. Jayakrishnan
   Scientist 'G' BMT Wing, SCTIMST,
   Thiruvananthapuram
8. Prof. Jayaprakash Muliyil
   Principal, Christian Medical College, Vellore

Building Committee

1. Prof. K. Mohandas (Chairman)
   Director, SCTIMST, Thiruvananthapuram
2. Dr. G. S. Bhuvaneshwar,
   Head, BMT Wing
   SCTIMST, Poojappura, Thiruvananthapuram
3. Shri. Viswas Mehta I A S
   Secretary to the Government of Kerala
   Health & Family Welfare, Thiruvananthapuram.
4. Shri. K.N. S Nair
   Retd.Head, Engineering Maintenance Division,
   VSSC
   "Deepti", Kazhakuttan, Thiruvananthapuram.
5. Sri.S.Chandrasekharan Nair (Ex-Officio Convenor)
   Financial Advisor & Chief Accounts Officer,
   SCTIMST, Thiruvananthapuram.
6. A member to be co-opted by the Director as and when necessary

Finance Committee

1. Prof. K. Mohandas (Chairman)
   Director, SCTIMST,
   Thiruvananthapuram
2. Prof. V. S. Ramasami,
   Secretary to the Govt. of India
   Ministry of Science and Technology, Technology
   Bhavan, New Delhi.
3. Shri. K.P. Pandian
   Joint Secretary to Govt. of India &
   Financial Advisor, Department of Science &
   Technology, New Delhi.
4. Vice Chancellor
   University of Kerala,
   Thiruvananthapuram.
5. Sri. S. Chandrasekharan Nair (Ex-Officio Convenor)
   Financial Advisor & Chief Accounts Officer,
   SCTIMST, Thiruvananthapuram.

Senior Staff Selection Committee

1. Prof. K. Mohandas (Chairman)
   Director, SCTIMST, Thiruvananthapuram.
2. Dr. G. S. Bhuvaneshwar
   Head, BMT Wing, SCTIMST,
   Thiruvananthapuram.
3. Dr. K. A. Dinshaw
   Director, Tata Memorial Hospital,
   Parel, Mumbai.
4. A nominee of the Secretary,
   Department of Science & Technology,
   Govt.of India, New Delhi.
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 Thorasic Surgery
   SCTIMST, Thiruvananthapuram.
6. Representative of Academic Wing of the Institute nominated by the Director of the Institute.

Ethics Committee

1. Shri. Justice M.R. Hariharan Nair (Chairman)
   Judge, (Retd) High Court of Kerala, Kochi.
2. Prof. G. Santhakumari
   Former Prof. of Pharmacology & Director of Medical Education, Govt. of Kerala,
   Thriveni, Ulloor
   Thiruvananthapuram.
3. Smt. J.A. Lalithambika IAS,
   "Abhilash" Golf Links Road, Kowdiar,
   Thiruvananthapuram.
4. Prof. K.A Kumar, Professor of Psychiatry
   "Koikal", T.C 13/598, Pattom,
   Thiruvananthapuram.
5. Dr. P.G. Premila
   Professor of Pediatrics (Rtd.)
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   Thiruvananthapuram.
6. Dr. B. Ekbal
   (Former Vice Chancellor, University of Kerala)
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7. Dr. Amar Jesani
   Co ordinator, CSER
   (Centre for Studies in Ethics and Rights)
   Candelar, 4th Floor, 26 St. John Baptist Road,
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8. Dr. S.N. Pal
   Director (Engineering)
   HSCC (India) limited, E-6 (A),
   Sector -1, NOIDA (U.P)
9. Dr. K. Mohandas
   Director
   SCTIMST, Thiruvananthapuram.

10. Dr. G.S. Bhuvaneswar
Head, BMT Wing, SCTIMST,
Poojappura, Thiruvananthapuram

11. Dr.Anoop Kumar T. (Member Secretary IEC)
Scientist 'E', Molecular Medicine,
SCITMST, 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 Development Committee

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

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

3. Dr. A. P. Chauker
Cardiovascular & Thoracic Surgeon
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Low Parel (South), Mumbai.

4. Dr. S.N. Pal
Director (Engineering)
HSCC (India) limited, E-6 (A), Sector –1
NOIDA (U.P)

5. The Executive Director
TIFAC, Dept. of Science & Technology
Govt. of India, Technology Bhavan,
New Delhi.

6. Prof. Chitra Sarkar
Dept. of Pathology
All India Institute of Medical Sciences,
New Delhi.

7. Prof. Ramachandra Rao
(Former Vice Chancellor, Banaras Hindu University)
Director, Institute of Armament Technology,
Pune.

8. Dr. C. P. Sharma
Scientist 'F'
BMT Wing, SCTIMST, Poojappura,
Thiruvananthapuram.

9. Shri. O. S. Neelakantan Nair
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SCTIMST, Poojappura, Thiruvananthapuram.

Technology Transfer Committee

1. Dr. Placid Rodriguez
(Former Chairman – IGACR)
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2. Mr. V. P. Balagangadharan
Deputy Head
Technology Transfer & Industry Co-ordination Division,
V.S.S.C., Thiruvananthapuram.

3. Dr. Gopala Pillai G.C.
(Former Managing Director, KINFRA)
Chairman, FACT, Udyogamandal, Kochi.

4. Dr. P. Parameswar Iyer
Principal Research Scientist
Centre for Scientific & Industrial Consultancy
Indian Institute of Science,
Bangalore.

5. Dr. G. S. Bhuvaneswar,
Head, BMT Wing (Ex-officio member)
SCTIMST, Thiruvananthapuram.

6. Sri. S. Chandrasekharan Nair (Ex-Officio)
Financial Advisor & Chief Accounts Officer,
SCTIMST,
Thiruvananthapuram

7. Er. D. Ranjit
Secretary, Technology Transfer Committee)
Engineer 'F', Technology Transfer Cell
BMT Wing, SCTIMST, Thiruvananthapuram

DEPARTMENTS AND PERSONNEL

Prof. K. Mohandas, MD, FRCA
Director

Academic Division

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Dean

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

Sundar Jayasingh, MA, MBA, DLL
Assistant Registrar

Library

S. Jayachandra Das, BSc, MLISc
Librarian-cum-Documentation Officer - B
(Librarian-in-Charge)

T. Sudha, M.A, MLISc.
Librarian-cum-Documentation Officer - A

Nursing Education

P. P. Saramma, BSc, MN
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
Professor and Head

Dr. T K Sundari Ravindran, PhD
Honorary Professor

Dr. V Raman Kutty, MD, MPH
Professor

Dr. P Sankara Sarma, PhD
Additional Professor

Dr. Mala Ramanathan, PhD, MA
Additional Professor

Dr. K Srinivasan
Associate Professor (On Deputation)

Dr. Biju Soman, MD, DPH
Assistant Professor

Dr. Manju R Nair MBBS MPH
Scientist C

Administration

Dr. K. Mohandas, MD, FRCA
Director

V. Ambujakshan Nair, BCom, LLB
Senior Principal Private Secretary to Director

C.S. Sreepriya. MA, LL.B, PGDHM, PGDT, DJ, DCA.
Executive Secretary to the Director-Cum-Ethics Committee Coordinator

S. Pramod.BA
Secretary to the Director

P. B. Sourabhan, MA, LLB, PGDMM, DCA
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P.V. Chandrasekharan BSc, SAS
Internal Audit Officer

I.T. Edwin, BA
Administartive Officer Gr II

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A. Santhakumari, MCom
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Dr. A. Sabareeswaran, MVSc
Scientist C

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

Instrumentation Laboratory

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

Division of Microbiology

Dr. A. Maya Nandkumar, PhD
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Laboratory for Confocal Microscopy and Experimental Pathology

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

Molecular Medicine Laboratory

Dr. Anoopkumar Thekkuveettil, PhD
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Polymer Analysis

Dr. K. Sreenivasan, PhD
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Dr. Prabha D. Nair, PhD
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Scientist F & Scientist In Charge

Polymer Processing Laboratory

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

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

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

Precision Fabrication Facility

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

Quality Cell

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

Dr. P. Ramesh, PhD
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Technology Business Division

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Scientist E & Scientist In Charge

Technology Co-ordination Cell

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Scientist F & Scientist In Charge

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Scientist In Charge

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Scientist F & Scientist In Charge

Dr. Anugya Bhatt, MSc, PhD
Scientist C

Toxicology

Dr. P. V. Mohanan, MSc, PhD
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Mrs. Geetha. C. S, MSc, MPhil
Scientific Assistant

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

Anaesthesiology

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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 Shrinivas, MD, Dip.NB
Professor

Dr. Thomas Koshy, MD
Additional Professor

Dr. Shrinivas V. Gandhinhaljkar, MD
Additional Professor

Dr. Prasant kumar Dash, MD
Additional Professor

Dr. P.K.Neema, MD
Additional Professor

Dr. S.Manikandan, MD
Associate Professor

Dr. P.K.Sinha, MD
Associate Professor

Dr. P.Gayatri, MD, FRCA
Associate Professor

Dr. P.R.Suneel, MD
Associate Professor

Dr. K.P.Unnikrishnan, MD
Assistant Professor

Dr.Subrata kumar Singha, M.D
Assistant Professor

Dr.Satyajeet Misra, M.D
Ad-hoc consultant

Mrs. K.V.Bhuvaneswary
Scientific Assistant

Biochemistry

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

Dr.N.Jayakumary Ph.D
Professor

Dr.G.Srinivas Ph.D
Scientific C

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 G

Dr. S. Sathyabhama, MBBS
Scientist F

Cardiology

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

Dr. Thomas Titus, MD, DM
Professor

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

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

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

Dr. S. Harikrishnan, MD, DM
Associate Professor

Dr. Santhoshkumar Dora, MD, DM
Assistant Professor

Dr. Krishnakumar Nair
Assistant Professor

Dr. Narayanan Namboodri
Assistant Professor

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

Dr. Biju Lal
Adhoc Consultant

Cardiovascular & Thoracic surgery

Dr. K. Jayakumar, MS, MCh
Professor and Head

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
Professor

Dr. Manoranjan Misra, MS, MCh
Assistant Professor

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

Dr. Chandrabhanu Parija MS, MCh
Adhoc Consultant

Dr. Adil Sadiq
Adhoc Consultant

Cellular and Molecular Cardiology

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

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

Dr. K. Shivakumar, PhD
Scientist-F

Computer Division

G. Geetha, MTech (Computer Science)
Scientist 'F'

Mr. Suresh Kumar
Scientist 'B'

Medical Records

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

N.G. Thampi MA, BMRSC
Medical Records Officer

P.J. Varghese
Assistant Medical Records Officer

Microbiology

Smt. Molly Antony, MSc, DMV
Scientist F
Dr. Muralidhar K. Katti, M.Sc, PhD, FISCD
Associate Professor
Smt. K. Naseema, MSc, MLT
Scientific Assistant

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

Neurology

Dr. K. Radhakrishnan, MD, DM, FAMS, FAAN
Professor Senior Grade& 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 (Cl/N Ph)
Associate Professor

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

Dr. P.S. Mathuranath, DM
Associate 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
Head of the Department

Dr. S. Suresh Nair, MCh Neurosurgery
Professor& Head in Charge

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

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

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

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

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

Dr. K. Krishna Kumar MS, MCh
Assistant Professor

Pathology

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

Dr. S. Sandhyamani, MD, FAMS
Professor

Dr. Annamma Mathai, PhD
Scientist C

Imaging Science and Interventional 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
Associatet Professor

Dr. Krishnamoorthy, MD, DNB, DM
Assistant Professor

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

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

Dr. R. S. Jayasree
Scientist 'C'

Statement of Accounts
2007-2008

Contents

Balance Sheet As At 31-03-2008

	Schedules	Current Year Rs. Ps.	Previous Year Rs. Ps.
CORPUS/CAPITAL FUND AND LIABILITIES			
CAPITAL FUND	1	2189133852.41	1629668576.01
RESERVES & SURPLUS	2	242356298.90	216048087.90
EARMARKED ENDOWMENT FUNDS	3	203416603.99	167123246.47
SECURED LOANS & BORROWINGS	4	0.00	0.00
CURRENT LIABILITIES & PROVISIONS	7	51190540.29	72354880.79
TOTAL		**2686097295.59**	**2085194791.17**
ASSETS			
FIXED ASSETS	8	884933862.64	754273578.25
INVESTMENTS FROM EARMARKED ENDOWMENT FUNDS	9	348211737.90	321387198.90
CURRENT ASSETS , LOANS, ADVANCES ETC	11	1452951695.05	1009534014.02
MISCELLANEOUS EXPENDITURE (TO THE EXTEND NOT WRITTEN OFF)		0.00	0.00
TOTAL		**2686097295.59**	**2085194791.17**

Sd/-
Financial Adviser &
Chief Accounts Officer

Sd/-
DIRECTOR
Sree Chitra Tirunal Institute for
Medical Sciences and Technology
Thiruvananthapuram

Income and Expenditure Account for the year ended 31-03-2008

	Schedules	Current Year Rs. Ps.	Previous Year Rs. Ps.
INCOME			
Income from Sales / Services	12	267685289.50	244692177.96
Grants Received from Govt of India(Non Plan)	13	226500000.00	215900000.00
Fees/Subscription	14	3751850.00	2701600.00
Income from Investments (Income on Investment from earmarked/endow. Funds transferred to Funds)	15	12576432.00	13420153.80
Income from Royalty, Publication etc	16	3054865.00	662980.00
Interest Earned	17	85376264.56	39442400.85
Other Income	18	7900321.40	4268871.00
TOTAL		**606845022.46**	**521088183.61**
EXPENDITURE			
Establishment Expenses	20	279096444.05	248739609.60
Other Administrative Expenses	21	316775484.00	316564928.31
Interest	23	80763.40	85687.00
Depreciation (Net Total at the year-end-corresponding to Schedule 8)		72963231.61	69805053.06
TOTAL		**668915923.06**	**635195277.97**
Balance being Excess Expenditure over Income		62070900.60	114107094.36
Add: Transfer to Special Reserve Account		27036968.00	25115936.00
BALANCE BEING DEFICIT CARRIED TO CAPITAL FUND		89107868.60	139223030.36
SIGNIFICANT ACCOUNTING POLICIES	24		
CONTINGENT LIABILITIES AND NOTES ON ACCOUNTS	25		

Sd/-
Financial Adviser &
Chief Accounts Officer

Sd/-
DIRECTOR
Sree Chitra Tirunal Institute for
Medical Sciences and Technology
Thiruvananthapuram

SCHEDULES TO CAPITAL FUND AND LIABILITIES

Schedules Forming Part of Balance Sheet as at 31-03-2008

		Current Year Rs. Ps.	Previous Year Rs. Ps.
SCHEDULE 1 - CORPUS/CAPITAL FUND:			
Balance as at the beginning of the year	2400033869.20		
Less Depreciation up to the end of the previous year	770365293.19		
Net balance at the beginning of the year		1629668576.01	1162591606.37
Add: Plan Grants received from Government of India Rs 720100000.00			
Less Expr on poor patient's treatment - Rs 92600000.00			
(Total 15.68cr less Rs 6.42 cr from WCP =Rs 9.26 cr)	627500000.00		
Add: Grants received from Others for Capital Assets(WCP)	22000000.00		
Add:Women Component Plan(WCP)-Grant received- Rs 95000000.00			
Less Expr on poor women patient's treatment- Rs 64200000.00			
Less Other Revenue Expr on WCP Rs 8800000.00			
Less Utilised on Capital assets Rs 22000000.00	0.00		
	649500000.00		
Add:Contribution towards Corpus/Capital Fund		649500000.00	606300000.00
Deduct: Balance of net expenditure transferred from the Income and Expenditure Account		89107868.60	139223030.36
		2190060707.41	1629668576.01
Less:Value of Assets Written off during the year		926855.00	0.00
DeductTransfer to BMT/Add Transfer from CHO			
BALANCE AS AT THE YEAR-END		**2189133852.41**	**1629668576.01**
SCHEDULE 2-RESERVES AND SURPLUS:			
1. Capital Reserve:			
As per last Account			
Addition during the year			
Less:Deduction during the year			
2. Revaluation Reserve:			
As per last Account			
Addition during the year			
Less: Deductions during the year			
3. Special Reserves:			
As per last Account		216048087.90	188082873.90
Addition during the year (Current year transfer+Decrease in provision)		26308211.00	27965214.00
Less: Deductions during the year		0.00	0.00
		242356298.90	216048087.90
4. General Reserve:			
As per last Account			
Addition during the year			
Less: Deductions during the year			
TOTAL		**242356298.90**	**216048087.90**

Schedules Forming Part of Balance Sheet as at 31-03-2008

Code	Name of Grantee	Fund-wise Break Up			Total
		Opening Balance	Additions To Fund		
			Grants	Other Receipts	
SCHEDULE 3 - EARMARKED/ENDOWMENT FUNDS (CHO)					
1014	NEW PENSION SCHEME	3829990.00		4517718.00	8347708.00
1075	PATIENT WELFARE FUND	903654.00		157921.00	1061575.00
1076	PWF EXPENSES	86828.35		22199.00	109027.35
1077	INSTITUTIONAL ETHICS COMMITTEE FUND	0.00		30000.00	30000.00
1080	STAFF BENEVOLENT FUND	2104835.75		5920198.00	8025033.75
1301	EMPLOYEES PENSION FUND	99859964.65		31271691.00	131131655.65
5000	PROJ-MISCELLANEOUS	917749.00	1151105.00	0.00	2068854.00
5008	DR.C.KARTHA	0.00	310000.00	0.00	310000.00
5018	CSIR PROJECT-DR. P.S. APPUKUTTAN	13450.79	0.00	0.00	13450.79
5027	DST GOVT. OF KERALA-DR. P.S. APPUKUTTAN	26335.53	0.00	0.00	26335.53
5028	DST GOVT. OF KERALA-DR.K RADHAKRISHNAN	11438.00	0.00	0.00	11438.00
5029	DST GOVT. OF KERALA- DR.J.SHANMUGHAM	7113.00	0.00	0.00	7113.00
5031	PHYSIO-ANTHROPOMATIC STUDY-DR.GUPTA	3871.77	0.00	0.00	3871.77
5033	MPH PROGRAMME	1480.00	100000.00	0.00	101480.00
5034	INDIAN EPILEPSY ASSN.DR.K. RADHAKRISHNAN	3558.00	0.00	0.00	3558.00
5036	PROJ/DST KERALA/DR.MURALEEDHARAN	4495.00	0.00	0.00	4495.00
5040	PROJ. DR.ASHA VIJAYARAGHAVAN	3502201.70	0.00	0.00	3502201.70
5047	IMPROVEMENT OF VOLUNTARY BLOOD DONAR	16094.90	0.00	0.00	16094.90
5054	ANTIVIRAL AND ANTIFUNGAL STUDIES ON	1418.30	0.00	0.00	1418.30
5055	GRANT/ROCKFELLER FOUNDATION,USA	725785.00	0.00	0.00	725785.00
5059	DST/KERALA/DR.S. SANDHYAMANI	-53729.00	53729.00	0.00	0.00
5065	M.D.PHARMA(DR,ASHA)	398586.50	0.00	0.00	398586.50
5070	PROJ.INDIAN EPILEPSY ASSTN.JAYACHANDRAN	485.30	0.00	0.00	485.30
5077	INDIAN EPILEPSY ASSOCIATION	18111.90	0.00	0.00	18111.90
5078	PROJECT GRANT/DR MALA RAMANATHAN	5810.00	0.00	0.00	5810.00
5080	GRANT/WHO/DR VARATHARAJAN/AMC/PROJECT	11471.30	0.00	0.00	11471.30
5082	T V HEMALATHA/HEALTHAWARENESS PROGRAM	90909.00	50000.00	0.00	140909.00
5083	PROJECT/DEPT OF NEUROLOGY	28511.00	0.00	0.00	28511.00
5088	DOUBLE BLIND PLACEBO CONT. PARALLEL	63683.00	0.00	0.00	63683.00
5091	EURO REG. OF EPILEPSY & PREGNANCY	86779.00	25000.00	29512.00	141291.00
5092	TIDES FOUNDATION,DR.MALA	142449.00	0.00	0.00	142449.00
5094	*KERALA STATE AIDS CONTROL SOCIETY*	*431560.00*	*1400000.00*	*0.00*	*1831560.00*
5098	RISK FACTORS FOR EPILEPSY-DR.RADHAKRISHNAN	7193.00	0.00	0.00	7193.00
5099	EFFECT OF BLOOD DONATION	1711.00	0.00	0.00	1711.00
5100	AMC/MAC ARTHUR FOUNDATION/02-70546	1340207.55	0.00	0.00	1340207.55
5103	CLINICAL TRIAL/QUINTAILSPEC/DR.RADHAKRISHNAN	254006.00	0.00	0.00	254006.00
5104	ANTIVIRAL PRINCIPLES/MOLLY ANTONY	68751.00	0.00	0.00	68751.00
5108	EVAL.SUB-TYPES DEMENTIA/DR.MATHURA	85859.50	0.00	10950.00	96809.50
5110	TOBACCO CESSATION & RESEARCH / DR.THANKAPPAN	995242.40	2776066.00	56.00	3771364.40
5111	DIFFUSION WEIGHTED IMAGING/DR.GUPT	-21226.00	0.00	0.00	-21226.00
5112	WHO FELLOWSHIP	281642.00		0.00	281642.00

(Amount Rs)

Capital Expenditure			Utilisation Revenue Expenditure					
Fixed Assets	Others	Total	Salaries Wages	Rent / Consumables	Other Adm Exp	Total	Total expenditures	Net Balance
		0			2887.00	2887.00	2887.00	8344821.00
		0			0.00	0.00	0.00	1061575.00
		0			42252.00	42252.00	42252.00	66775.35
		0			44402.00	44402.00	44402.00	-14402.00
		0			6017025.50	6017025.50	6017025.50	2008008.25
		0			31701339.00	31701339.00	31701339.00	99430316.65
0.00	0.00	0	993955.00	213689.00	187432.00	1395076.00	1395076.00	673778.00
0.00	0.00	0	0.00	347685.00	55964.00	403649.00	403649.00	-93649.00
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	13450.79
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	26335.53
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	11438.00
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	7113.00
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	3871.77
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	101480.00
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	3558.00
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	4495.00
0.00	0.00	0	0.00	0.00	6517.00	6517.00	6517.00	3495684.70
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	16094.90
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	1418.30
0.00	0.00	0	0.00	0.00	39665.00	39665.00	39665.00	686120.00
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	398586.50
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	485.30
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	18111.90
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	5810.00
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	11471.30
0.00	0.00	0	0.00	0.00	3200.00	3200.00	3200.00	137709.00
0.00	0.00	0	20000.00	0	6828.00	26828.00	26828.00	1683.00
0.00	0.00	0	0.00	0.00	660.00	660.00	660.00	63023.00
0.00	38204.00	38204	0.00	0.00	0.00	0.00	38204.00	103087.00
0.00	27167.00	27167	0.00	0.00	0.00	0.00	27167.00	115282.00
0.00	0.00	0	60945.00	1435907.00	4698.00	1501550.00	1501550.00	330010.00
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	7193.00
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	1711.00
0.00	0.00	0	164459.00	0.00	219595.50	384054.50	384054.50	956153.05
0.00	0.00	0	27419.00	0.00		27419.00	27419.00	226587.00
0.00	0.00	0	42549.00	5440.00	7163.00	55152.00	55152.00	13599.00
0.00	0.00	0	35000.00	28000.00	18009.00	81009.00	81009.00	15800.50
0.00	0.00	0	1437561.00	926.00	1735639.00	3174126.00	3174126.00	597238.40
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	-21226.00
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	281642.00

Schedules Forming Part of Balance Sheet as at 31-03-2008

Code	Name of Grantee	Fund-wise Break Up			Total
		Opening Balance	Additions To Fund		
			Grants	Other Receipts	
5113	STUDIES ON ANTI-VIRAL/MOLLY ANTONY	17010.00	0.00	0.00	17010.00
5114	IND.PARTICP. IN PUBLIC HEALTH/WORLD	51.00	0.00	0.00	51.00
5119	STAKE HOLDER-PERCEPT/INST.REV BO	232864.73	0.00	0.00	232864.73
5121	REG.OF.PREG IN WOMEN -EPILEPSY	109800.00	292683.00	0.00	402483.00
5124	PRO-INFLAMMATORY CYTOKINE/DR. K. SHIVAKUMAR	322163.50	0.00	0.00	322163.50
5125	PIOLOT STUDY/HEMOGRAFT HARVEST	6254.00	10000.00	35040.00	51294.00
5126	A MULTI NATIONAL, MULTI-CENTER/SIRO	98417.00	22522.00	1472.00	122411.00
5127	CARDOGUARD TABLET/DST/DR.RENUKA NAIR	834696.00	270000.00	0.00	1104696.00
5128	INDENT. OF MACOBACTERIAL/DST/V.V.RADHAKRISHN	410019.00	0.00	0.00	410019.00
5129	STRENGHTENING OF PANCHAYAT RAJ	-13724.75	0.00	0.00	-13724.75
5130	TELE-HEALTH & MEDICAL EDUCATION/JAWAHAR	747250.00	0.00	0.00	747250.00
5131	OXIDATIVE STRESS IN WOMEN/DR. SANJEEV THOMAS	102092.00	251900.00	797.00	354789.00
5132	STUDIES ON MATRIX METALLOPROTEINASE	183308.00	0.00	0.00	183308.00
5133	COMMUNITY BASED INTERVENTION/WHO	415242.00	0.00	0.00	415242.00
5134	PILOT STUDY/DR.K. RADHAKRISHNAN	107124.00	0.00	0.00	107124.00
5135	A 16-WEEK,DOUBLE BLIND/ASHA KISHORE	2006407.00	0.00	0.00	2006407.00
5136	A16 WEEKDOUBLE BLIND STUDY	713.00	0.00	0.00	713.00
5137	MECHANISM OF ANTICANCER/DAE, BRS	-116024.00	300575.00	0.00	184551.00
5138	PREVENTION ON NCD'S: TUNING/WHO	98.00	0.00	0.00	98.00
5139	A 24 WEEK, MULTICENTER/DR. MATHURANATH	783101.00	40637.28	0.00	823738.28
5140	HARVARD SCHOOL OF PUBLIC HEALTH	99233.00	0.00	60347.00	159580.00
5141	THE TRIVANDRUM STROKE REGISTRY/WHO SEARO	5591.00	0.00	0.00	5591.00
5142	BANKING FOR BETTER HEALTH-MEDISAVE	1074666.36	0.00	50000.00	1124666.36
5143	MODULATION OF HIGH GLUCOSE/STE/KARTHA	184568.00	0.00	0.00	184568.00
5144	WHO-SEARO/DEV&FIELD TEST/GME	137317.50	0.00	0.00	137317.50
5145	ADULT HUMAN RESIDENT/	447164.00	779000.00	108209.00	1334373.00
5146	DEVELOPMENT OF SPECT	339793.00	0.00	0.00	339793.00
5147	FATHERHOOD INITIATIVES	39137.00	0.00	0.00	39137.00
5148	HIV/AIDS/DR.D.VARATHARAJAN	83721.00	0.00	0.00	83721.00
5149	REDUCING DEATH RATE	1539.00	0.00	0.00	1539.00
5150	PROTOCOL 6002-INT 001	1198057.60	147040.00	0.00	1345097.60
5151	DOSE RANGING STUDY:CGHR	186326.00	22676.00	0.00	209002.00
5153	DEV REF. MANUAL FOR	1341324.00	0.00	315.00	1341639.00
5154	VISITING FACULTY	0.00	97048.00	0.00	97048.00
5155	COMM BASED DETECTION	432783.00	0.00	0.00	432783.00
5156	TSUNAMI PROJECT	2905165.50	0.00	238235.00	3143400.50
5158	DETERMINATION OF GENETIC CO(DR.RENUKA NAIR)	211161.00	0.00	12000.00	223161.00
5159	NCD RISK FACTOR	200000.00	0.00	0.00	200000.00
5160	BRAIN MAPING & BASIC NEUROGENETIC/DR.P.S MATHURANATH	1106.00	1042700.00	0.00	1043806.00
5161	DOSE RANGING STUDY:CGHR	32986.00	2723400.00	17500.00	2773886.00
5162	MAINTAINING EVENT REGISTRY	7638.00	0.00	0.00	7638.00
5164	FCTC PROVISION/DRKRTHANKAPPAN	184295.75	0.00	2610.00	186905.75

(Amount Rs)

Utilisation								
Capital Expenditure			Revenue Expenditure					
Fixed Assets	Others	Total	Salaries Wages	Rent / Consumables	Other Adm Exp	Total	Total expenditures	Net Balance
0.00	0.00	0	6510.00	0.00	10052.00	16562.00	16562.00	448.00
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	51.00
0.00	0.00	0	0.00	0.00	20965.00	20965.00	20965.00	211899.73
0.00	0.00	0	143791.00	0.00	167534.00	311325.00	311325.00	91158.00
0.00	0.00	0	27747.00	218484.00	1314.00	247545.00	247545.00	74618.50
0.00	0.00	0	21002.00	0.00	1824.00	22826.00	22826.00	28468.00
0.00	0.00	0	0.00	5336.00	2860.00	8196.00	8196.00	114215.00
0.00	0.00	0	48000.00	741752.00	70640.00	860392.00	860392.00	244304.00
0.00	0.00	0	9000.00	120208.00	55997.00	185205.00	185205.00	224814.00
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	-13724.75
0.00	0.00	0	60220.00	0.00	41710.00	101930.00	101930.00	645320.00
0.00	0.00	0	60000.00	52624.00	115603.00	228227.00	228227.00	126562.00
20198.00	0.00	20198	110400.00	150940.00	13661.00	275001.00	295199.00	-111891.00
0.00	0.00	0	0.00	0.00	183.00	183.00	183.00	415059.00
23901.00	0.00	23901	60000.00	0.00	18223.00	78223.00	102124.00	5000.00
0.00	0.00	0	0.00	28928.00		28928.00	28928.00	1977479.00
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	713.00
0.00	0.00	0	84920.00	59889.00	5565.00	150374.00	150374.00	34177.00
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	98.00
0.00	0.00	0	106929.00	0.00	17826.00	124755.00	124755.00	698983.28
0.00	0.00	0	4500.00	0.00	45989.00	50489.00	50489.00	109091.00
0.00	0.00	0	0.00	0.00	110.00	110.00	110.00	5481.00
0.00	0.00	0	1816.00	220619.00	661848.00	884283.00	884283.00	240383.36
0.00	0.00	0	30036.00	124927.00	3175.00	158138.00	158138.00	26430.00
0.00	0.00	0	0.00	0.00	6522.00	6522.00	6522.00	130795.50
0.00	0.00	0	202540.00	909190.00	185221.00	1296951.00	1296951.00	37422.00
0.00	0.00	0	36452.00	140255.00	17480.00	194187.00	194187.00	145606.00
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	39137.00
0.00	0.00	0	0.00	0.00	70094.00	70094.00	70094.00	13627.00
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	1539.00
0.00	0.00	0	0.00	0.00	275783.00	275783.00	275783.00	1069314.80
68536.00	2626.00	71162	0.00	0.00	0.00	0.00	71162.00	137840.00
0.00	133216.00	133216	4500.00	0.00	440259.00	444759.00	577975.00	763664.00
0.00	0.00	0	70598.00	0.00	26450.00	97048.00	97048.00	0.00
0.00	0.00	0	24000.00	0.00	41319.00	65319.00	65319.00	367464.00
51100.00	0.00	51100	204848.00	0.00	950638.00	1155486.00	1206586.00	1936814.50
7774.00	0.00	7774	0.00	123679.00	166206.00	289885.00	297659.00	-74498.00
0.00	0.00	0	10750.00	0.00	65.00	10815.00	10815.00	189185.00
0.00	0.00	0	0.00	66637.00	6950.00	73587.00	73587.00	970219.00
0.00	0.00	0	189083.00	0.00	287894.00	476977.00	476977.00	2296909.00
0.00	0.00	0		0.00	0.00	0.00	0.00	7638.00
0.00	34617.00	34617	54968.00	0.00	103297.00	158265.00	192882.00	-5976.25

Schedules Forming Part of Balance Sheet as at 31-03-2008

Code	Name of Grantee	Fund-wise Break Up			Total
		Opening Balance	Additions To Fund		
			Grants	Other Receipts	
5165	HEALTH SECTOR REFORM	228525.00	0.00	0.00	228525.00
5166	PHARMACOGENETIC STUDY/DR.SANJEEV	124961.00	0.00	0.00	124961.00
5167	PROJ/SURVIVAL MECHANISM	869013.00	0.00	0.00	869013.00
5168	PROJ/VERMEER STUDY	332519.00	1064764.00	0.00	1397283.00
5169	SAFETY OF MELPERONE	42543.00	292779.00	0.00	335322.00
5170	DR.ASHA KISHORE	0.00	1372913.00	0.00	1372913.00
5171	DOSE CONFIRMATION GLIOBLASTOMA...	0.00	0.00	0.00	0.00
5172	C.KESAVADAS	0.00	255750.00	0.00	255750.00
5173	DR.DINESH NAYAK	0.00	99298.00	1046.00	100344.00
5174	CHANGES IN SLEEP WAKEFULNESS-Dr.Mohanku.	0.00	276833.00	0.00	276833.00
5175	SURGICAL TRAIL IN LOBAR INTRACEREBRAL	0.00	23367.24	0.00	23367.24
5176	WOMEN COMPONANT PLAN	0.00	4900000.00	1716592.00	6616592.00
5177	DR.KRISHNAMANOHAR	0.00	53202.00	0.00	53202.00
5179	ASSOCIATION OF SUSCEPTIBILITY	0.00	0.00	0.00	0.00
5180	DR.KANNAN SRINIVASAN	0.00	290410.00	0.00	290410.00
5181	DR.ASHA KISHORE	0.00	0.00	93250.00	93250.00
5182	DR.SANJEEV.V.THOMAS	0.00	3900000.00	0.00	3900000.00
5183	DR.K.R.THANKAPPAN	0.00	5504550.00	0.00	5504550.00
5184	DR.JAWAHAR	0.00	1000000.00	0.00	1000000.00
6054	PROJ/DR RADHAKRISHNAN NEUROLOGY	172441.50	0.00	0.00	172441.50
6055	MOVEMENT/DR. ASHA KISHORE	0.00	167398.00	0.00	167398.00
6057	PUBLISHING JOURNAL ARTICLE/DR. THANKAPPAN	864592.00	0.00	0.00	864592.00
6058	ATHIYANOOR SCT ACTION/DR.K.R.T	25902.00	0.00	0.00	25902.00
6060	SILVERLINE PUBLICATION/DR.RADHAKRISHNAN	-71914.00	0.00	6800.00	-65114.00
6061	PROPOSAL FOR DEVELOP/DR.RADHAKRISHNAN	0.00	47875.00	0.00	47875.00
6062	AUDITING WORKLOAD/DR.RADHAKRISHNAN	0.00	15097.00	0.00	15097.00
6064	SPEECH THERAPY	0.00	153173.00	0.00	153173.00
7101	ADVANCES TO PI	-597586.00	0.00	4723323.00	4125737.00
7102	AMT.PAYABLE TO PROJECT STAFF	3959.00	0.00	33530.00	37489.00
2721	ADVANCE FOR SUPPLIES PROJECT	0.00			0.00
	Sub Total	**133613666.88**	**31283490.52**	**49061311.00**	**213958468.40**

(Amount Rs)

Utilisation								
Capital Expenditure			Revenue Expenditure					
Fixed Assets	Others	Total	Salaries Wages	Rent / Consumables	Other Adm Exp	Total	Total expenditures	Net Balance
0.00	0.00	0	225000.00	0.00	0.00	225000.00	225000.00	3525.00
0.00	0.00	0	108043.00	0.00	32788.00	140831.00	140831.00	-15870.00
0.00	0.00	0	184098.00	412097.00	135661.00	731856.00	731856.00	137157.00
0.00	0.00	0	17500.00	195934.00	3452.00	216886.00	216886.00	1180397.00
0.00	0.00	0	0.00	13374.00	99.00	13473.00	13473.00	321849.00
0.00	0.00	0	141000.00	150469.00	28436.00	319905.00	319905.00	1053008.00
0.00	0.00	0	0.00	0.00	35.00	35.00	35.00	-35.00
0.00	0.00	0	0.00	140700.00	1046.00	141746.00	141746.00	114004.00
0.00	0.00	0	7580.00	0.00	7518.00	15098.00	15098.00	85246.00
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	276833.00
0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	23367.24
0.00	0.00	0	0.00	0.00	3443063.00	3443063.00	3443063.00	3173529.00
0.00	0.00	0	19371.00	0.00	816.00	20187.00	20187.00	33015.00
	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0	244546.00	0.00	53370.00	297916.00	297916.00	-7506.00
0.00	0.00	0	0.00	93250.00	0.00	93250.00	93250.00	0.00
0	0	0	0.00	0	527299	527299.00	527299.00	3372701.00
0	0	0	11521	0.00	127887	139408.00	139408.00	5365142.00
0	0	0	0	0	0	0.00	0.00	1000000.00
0	0	0	26774	0	0	26774.00	26774.00	145667.50
0	0	0	160425	0	6973	167398.00	167398.00	0.00
0	0	0	132605	0	16185	148790.00	148790.00	715802.00
0	0	0	0	0	4896	4896.00	4896.00	21006.00
0	0	0	0	0	0	0.00	0.00	-65114.00
0	0	0	47875	0	0	47875.00	47875.00	0.00
0	0	0	12129	0	2968	15097.00	15097.00	0.00
0	0	0	149409	0	3764	153173.00	153173.00	0.00
0	0	0	0	0	4184960	4184960.00	4184960.00	-59223.00
0	0	0	0	0	28772	28772.00	28772.00	8717.00
		0			64387	64387.00	64387.00	-64387.00
171509.00	**235830.00**	**407339.00**	**5842374.00**	**6000939.00**	**52600908.00**	**64444221.00**	**64851560.00**	**149106908.40**

Schedules Forming Part of Balance Sheet as at 31-03-2008

EARMARKED/ENDOWMENT FUNDS (BMT WING) — Fund-Wise Break up

Code	Name of Grantee	Opening Balance	Additions To Fund: Grants	Additions To Fund: Other Receipts	Total
5000	PROJECT MISCELLANEOUS	0.00	2407527.00	0.00	2407527.00
5057	DYNAMIC ORTHOPAEDIC PVT LTD, HYDROXY	167179.55	45000.00	10000.00	222179.55
5089	DETEC & TREAT OF CANCER BY LASER	34929.00	0.00		34929.00
7000	MISCELLENEOUS PROJECT	40944.09	0.00	0.00	40944.09
7001	PRO;SAHAJANAND VASCU;DR.AURTHUR	2436504.75	1192212.00		3628716.75
7002	Dr.TOMS LABORATORY, Dr. K.KRISHNAN	36623.00	25000.00		61623.00
7003	PROJ:D.S.T. DR.P.V. MOHANAN	2537.40	0.00		2537.40
7004	PROJ:ATMRF:DR LISSY KRISHNAN	777.25			777.25
7005	PROJECT:DYNAMIC ORTHOPAEDICS	13656.00			13656.00
7006	PROJ: D.S.T. D.S.NAGESH	400000.00	0.00	0.00	400000.00
7008	NMITLI, PROJECT C.S.I.R	1750454.90	505000.00		2255454.90
7009	CHITOSAN BASED WAINED DRESSING	26259.75			26259.75
7011	DST-FAB: CLINICALLY/SIG:SHAPE OF HEVA	73039.00	199762.00		272801.00
7014	AUROLAB,ARAVIND EYE HOSPITAL	13674.00			13674.00
7015	TTK.HEALTHCARE.DEVELOPMENT OF VALV	48328.00			48328.00
7016	INDO-GERMAN COMMITTEE MEETING-DST	156484.00	500000.00		656484.00
7017	HINDUSTAN LATEX.EVALU:BLOOD BAG	641862.50	0.00		641862.50
7018	ALL INDIA COUNCIL FOR TECHNI:EDU:SH	66115.00		13650.00	79765.00
7019	DST.NIRANJAN	149063.00			149063.00
7020	IFCPAR-DR.JAYAKRISHNAN	188.00	0.00	0.00	188.00
7021	STED-KERALA,MANOJKPMATH,APATITE-CE	90889.00	0.00		90889.00
7022	DST-LBFDPSBC-DR.SHARMA				0.00
7023	DEV: HYDRO-CEPHALUS-HINDUSTAN LATEX	45510.00			45510.00
7024	LIFE SCIENCE RESEARCH BOARD DR.MIRA	41064.00	0.00	13967.00	55031.00
7026	DEV.HEART VALVE-DST.MURALEE	263645.00	0.00	9559.00	273204.00
7027	STED-DR T V KUMARY-INVITRO	41876.00	0.00		41876.00
7028	STEC-DR ANNIE	-43953.00	92366.00		48413.00
7029	DONERG/LIFE SCIENCE BOARD	-52957.00	123960.00	24377.00	95380.00
7030	DST/DR MEERA/QUANTITATIVE	-36377.00	300000.00	0.00	263623.00
7031	DBT/DR P V MOHAN/DEV INVITROPYRO	83303.00	0.00		83303.00
7032	DST. DR. ANNINE/BONE REGENERATION	-63460.00	0.00	128666.00	65206.00
7033	BIOFUNCTIONAL EVALUATION DR. UMASANKER	302200.00	0.00		302200.00
7034	DST. DR. NIRMALA RACHEL	112888.00	0.00		112888.00
7035	DST-H.K.VARMA	95433.00			95433.00
7036	INVITRO HEMO CAMPABILITY/ DR. LISSY	751860.00	0.00		751860.00
7037	INVIVO EVALUATION/ STED/DR. LISSY	6205.00			6205.00
7038	DST DR. NIRANJAN/	51990.00			51990.00
7039	JNC/ASR/DR. MOHANAN/STUDY OF ACCUTE.....	44684.00	0.00		44684.00
7040	BIOMED/ C.V. MURALEEDHARAN	44000.00	0.00		44000.00
7041	CSIR-GRANT-ASHA S MATHEW,PHD STUDENT	0.00	122500.00		122500.00
7042	CSIR-GRANT-BERNADETTE K. MADATHIL,PHD	119020.00	0.00		119020.00
7043	CSIR-GRANT-SAILAJA.G.S.SRF	21217.00	0.00		21217.00
7044	LISI NO TRIAL TRIAL MERIND	30550.65	237350.00		267900.65
7045	NIRMALA RACHEL, CSIR	9875.00	201700.00		211575.00
7046	C.S.I.R. GRANT, MS. SUNITHA	9494.00	239416.00		248910.00
7047	U.G.C. GRANT- RESEARCH FELLOW	369.00	461587.00		461956.00
7048	CSIR GRANT- JOSENA JOSEPH	1338.00	263209.00		264547.00
7049	CSIR GRANT - MARY VARGHESE	37126.00	153211.00		190337.00
7051	CSIR GRANT - MANITHA B NAIR	4483.00	373500.00		377983.00
7052	DBT/DR.PRABHA/DEV. OF TEMP - RES - CO-OPLY	669422.75	0.00		669422.75
7053	DR.SREENIVASAN/DEVEL.OF TEMP.RES.CO-OPLY	148398.00	226460.00		374858.00
7054	DST-DR.ANOOP-DIFF:EXPR:RAT BRAIN.....	73475.00	800000.00		873475.00
7055	CSIR-NMITLI SCHEME-C.V.MURALEEDHARAN	9719075.00	0.00		9719075.00
7056	D.S.T.ROYJOSEPH, BONE GRAFT SUB:SPINAL	237898.00	300000.00		537898.00
7057	DST - PROJECT.DR.JAYABALAN	205900.00	500000.00		705900.00
7058	DST - PROJECT.DR.L. ANILA	293961.00	0.00		293961.00

(Amount Rs)

Totals Capital Expenditure		Utilisation Revenue Expenditure					
Fixed Assets	Others	Total	Salaries/ Wages	Other Adm Exp	Total	Total Expenditure	Net Balance
		0.00	1613163.00		1613163.00	1613163.00	794364.00
		0.00		158767.00	158767.00	158767.00	63412.55
		0.00	25200.00	5770.00	30970.00	30970.00	3959.00
		0.00		10000.00	10000.00	10000.00	30944.09
		0.00	255013.00	458656.00	713669.00	713669.00	2915047.75
		0.00	13200.00	50526.00	63726.00	63726.00	-2103.00
		0.00			0.00	0.00	2537.40
		0.00		226.00	226.00	226.00	551.25
		0.00		0.00	0.00	0.00	13656.00
		0.00		8783.00	8783.00	8783.00	391217.00
		0.00	282593.00	1728557.00	2011150.00	2011150.00	244304.90
		0.00	0.00		0.00	0.00	26259.75
		0.00		162937.00	162937.00	162937.00	109864.00
		0.00			0.00	0.00	13674.00
		0.00		340.00	340.00	340.00	47988.00
		0.00		550000.00	550000.00	550000.00	106484.00
		0.00	56700.00	7416.00	64116.00	64116.00	577746.50
		0.00		31545.00	31545.00	31545.00	48220.00
		0.00		79216.00	79216.00	79216.00	69847.00
		0.00	0.00	0.00	0.00	0.00	188.00
		0.00	0.00		0.00	0.00	90889.00
		0.00	0.00	11436.00	11436.00	11436.00	-11436.00
		0.00		0.00	0.00	0.00	45510.00
		0.00		55031.00	55031.00	55031.00	0.00
		0.00	0.00	250228.00	250228.00	250228.00	22976.00
		0.00		36787.00	36787.00	36787.00	5089.00
		0.00	0.00	48413.00	48413.00	48413.00	0.00
		0.00	0.00	88504.00	88504.00	88504.00	6876.00
		0.00	41400.00	180420.00	221820.00	221820.00	41803.00
		0.00	0.00	2739.00	2739.00	2739.00	80564.00
		0.00	0.00	36040.00	36040.00	36040.00	29166.00
		0.00		225365.00	225365.00	225365.00	76835.00
		0.00	60253.00	37971.00	98224.00	98224.00	14664.00
		0.00			0.00	0.00	95433.00
		0.00	36000.00	341488.00	377488.00	377488.00	374372.00
		0.00			0.00	0.00	6205.00
		0.00	0.00	51990.00	51990.00	51990.00	0.00
		0.00	0.00	0.00	0.00	0.00	44684.00
		0.00			0.00	0.00	44000.00
		0.00	112500.00	0.00	112500.00	112500.00	10000.00
		0.00	93150.00	0.00	93150.00	93150.00	25870.00
		0.00	0.00	12150.00	12150.00	12150.00	9067.00
		0.00	222984.00	18074.00	241058.00	241058.00	26842.65
		0.00	181700.00	4062.00	185762.00	185762.00	25813.00
		0.00	212750.00	12344.00	225094.00	225094.00	23816.00
		0.00	301240.00	8262.00	309502.00	309502.00	152454.00
		0.00	238850.00	11723.00	250573.00	250573.00	13974.00
		0.00	123050.00	280.00	123330.00	123330.00	67007.00
		0.00	350700.00	7480.00	358180.00	358180.00	19803.00
		0.00	110400.00	294615.00	405015.00	405015.00	264407.75
		0.00	120416.00	7615.00	128031.00	128031.00	246827.00
		0.00	110400.00	79531.00	189931.00	189931.00	683544.00
103566.00		103566.00	214164.00	4439269.00	4653433.00	4756999.00	4962076.00
		0.00	102194.00	289233.00	391427.00	391427.00	146471.00
		0.00	130641.00	237009.00	367650.00	367650.00	338250.00
		0.00	0.00	293961.00	293961.00	293961.00	0.00

EARMARKED/ENDOWMENT FUNDS (BMT WING) Fund-Wise Break up

Code	Name of Grantee	Opening Balance	Additions To Fund Grants	Other Receipts	Total
7059	DBT-DR. PRABHA D NAIR, ISLET IMMUN.....	462861.00	1585000.00		2047861.00
7060	ICMR PROJECT/ SUDHAKAR MUTHALEE	5510.00	255096.00		260606.00
7061	DR. UMASANKAR/PRELIMI:EVALU:BIODEGRADABLE	774639.00	0.00		774639.00
7062	DR. LIZY-SAHAJA:EVA "STENT"INVITRO.....	356920.00	0.00		356920.00
7063	DR.P.V.MOHAN, SHAJANAD	282172.00	0.00		282172.00
7065	DR.T.V.KUMARI, DBT.BIOGENE	6284.00	600000.00		606284.00
7066	DR.B.S.GEETHA.PDF.STED	15321.00	0.00		15321.00
7067	DBT.DR.JAYABALAN,DEV:&STUDIES.....	978904.00	1061600.00		2040504.00
7068	STED.DR.JAYAKRISHNAN.SYNTHESIS.....	6890.00	198000.00		204890.00
7069	VSSC - PROJECT. D.S. NAGESH	366703.00	1071000.00		1437703.00
7070	CHO PROJECT - 5146 JAYASREE	46050.00	0.00		46050.00
7071	STEC-PROJECT: DR.MAYA NANDKUMAR	88779.00	140966.00		229745.00
7072	SAHAJANAND MED.TECH. C.V.MURALIDHARAN	80292.00	0.00		80292.00
7073	STUDY PROJECT:DR.P.V.MOHANAN	291180.00	0.00		291180.00
7074	STUDY PROJECT: CLRI- DR.MOHAN	289303.00	0.00		289303.00
7075	STUDY PROJECT - BIOSYNC SCI	37652.00	0.00		37652.00
7076	ARROW INTERNATIONAL : DR.UMASHANKAR	399773.00	0.00		399773.00
7077	UMHOU SENEMBYU:DR.UMASHANKAR	1137884.00	0.00		1137884.00
7078	DR.BOBBY.T.EDWIN-STEC PROJECT	10740.00	377760.00		388500.00
7079	DBT- DR.SREENIVASAN	701664.00	0.00		701664.00
7080	DBT-DR.MAYA- TISSUE ENGINEERING HYBRID	2467214.00	0.00		2467214.00
7081	USV LTD. MUMBAI - DR.MOHAN	88349.00	0.00		88349.00
7082	INDO-US JOINT PROJECT	1849800.00	0.00		1849800.00
7083	ARROW HAEMO DIALYSIS	45332.00	0.00		45332.00
7084	DR.R.V.THAMPAN - DBT	365370.00	0.00		365370.00
7085	DR.R.V.THAMPAN - CSIR	26381.00	0.00		26381.00
7086	HORMONE RELEASING INTRA DEVICES	1867196.00	378800.00		2245996.00
7087	CSIR - KALADHAR - BST	41395.00	20700.00		62095.00
7088	FEASIBILITY STUDY	1000000.00	0.00		1000000.00
7089	PROJ/7089/DEV.PORTABLE SAFETY		1296400.00		1296400.00
7090	PROJ/7090/TISSUE ENGINEERS VASCULAR		850000.00		850000.00
7091	PROJ/7091/NOVEL MICROPHORES		415400.00		415400.00
7092	PROJ/7092/SEA FOOD		100000.00		100000.00
7093	PROJ/7093/CSIR GRANT-LPA		171378.00		171378.00
7094	PROJ/7094/CSIR GRANT-GIJU		202696.00		202696.00
7095	PROJ/7095/CSIR GRANT-VIOLA.B.MORRIS		205229.00		205229.00
7096	PROJ/7096/CSIR GRANT-DEVI		187728.00		187728.00
7097	PROJ/7097/ACCELERATED AGEING		65731.00		65731.00
7098	PROJ/7098/EVALN OF NTU DRUG		1072050.00		1072050.00
7099	PROJ/7099/BCL		200000.00		200000.00
8001	PROJ/8001/PROGRAM SUPPORT &TISSUE		16552000.00		16552000.00
8002	PROJ/8002/PROGRAM SUPPORT & TISSUE		3167000.00		3167000.00
8003	PROJ/8003/PROGRAM SUPPORT & TISSUE		1355000.00		1355000.00
8004	PROJ/8004/PROGRAM SUPPORT & TISSUE		1511000.00		1511000.00
8005	PROJ/8005/PROGRAM SUPPORT & TISSUE		1567000.00		1567000.00
8006	PROJ/8006/BIOCONJUGATION NANO MAT.		336000.00		336000.00
8007	PROJ/8007/PRODUCTS OF POLYMER		2113000.00		2113000.00
8008	PROJ/8008/CSIR GRANT-PADMANA.P.NAMBI		105670.00		105670.00
8009	PROJ/8009/DEV.TECHNOLOGY-ISOLATING		1223400.00		1223400.00
8010	PROJ/8010/IMPLANT NEURAL INTERFACES		2953200.00		2953200.00
8011	PROJ/8011/INTRAMUSCULAR IMPLANTATION		139900.00		139900.00
	Sub Total	33509579.59	50748464.00	200219.00	84458262.59
	GRAND TOTAL	167123246.47	82031954.52	49261530.00	298416730.99

(Amount Rs)

Totals Capital Expenditure			Utilisation Revenue Expenditure					
Fixed Assets	Others	Total	Salaries/ Wages	Other Adm Exp	Total	Total Expenditure	Net Balance
		0.00	86603.00	1421034.00	1507637.00	1507637.00	540224.00
		0.00	210000.00	6548.00	216548.00	216548.00	44058.00
		0.00	0.00	66461.00	66461.00	66461.00	708178.00
		0.00	29265.00	371349.00	400614.00	400614.00	-43694.00
		0.00	128400.00	0.00	128400.00	128400.00	153772.00
		0.00	152025.00	269898.00	421923.00	421923.00	184361.00
		0.00	0.00	0.00	0.00	0.00	15321.00
59783.00		59783.00	116187.00	1545364.00	1661551.00	1721334.00	319170.00
		0.00	60000.00	33524.00	93524.00	93524.00	111366.00
		0.00	242161.00	217285.00	459446.00	459446.00	978257.00
		0.00	0.00	37922.00	37922.00	37922.00	8128.00
		0.00	45000.00	139934.00	184934.00	184934.00	44811.00
		0.00	0.00	4000.00	4000.00	4000.00	76292.00
		0.00	75600.00	114427.00	190027.00	190027.00	101153.00
		0.00	0.00	0.00	0.00	0.00	289303.00
		0.00	20800.00	4917.00	25717.00	25717.00	11935.00
		0.00	0.00	0.00	0.00	0.00	399773.00
		0.00	132116.00	380354.00	512470.00	512470.00	625414.00
		0.00	161618.00	127866.00	289484.00	289484.00	99016.00
131404.00		131404.00	102000.00	267573.00	369573.00	500977.00	200687.00
1605842.00		1605842.00	213106.00	642324.00	855430.00	2461272.00	5942.00
		0.00			0.00	0.00	88349.00
		0.00	60000.00	895534.00	955534.00	955534.00	894266.00
		0.00	0.00	14450.00	14450.00	14450.00	30882.00
		0.00	0.00	365370.00	365370.00	365370.00	0.00
		0.00	0.00	0.00	0.00	0.00	26381.00
1675336.00		1675336.00	236100.00	103893.00	339993.00	2015329.00	230667.00
		0.00	51750.00	6817.00	58567.00	58567.00	3528.00
		0.00			0.00	0.00	1000000.00
				4950.00	4950.00	4950.00	1291450.00
			185245.00	535676.00	720921.00	720921.00	129079.00
			82800.00	79515.00	162315.00	162315.00	253085.00
			54000.00	3900.00	57900.00	57900.00	42100.00
			93840.00		93840.00	93840.00	77538.00
			172754.00		172754.00	172754.00	29942.00
			189737.00		189737.00	189737.00	15492.00
			175154.00		175154.00	175154.00	12574.00
				8000.00	8000.00	8000.00	57731.00
			42252.00	157118.00	199370.00	199370.00	872680.00
			11574.00	3896.00	15470.00	15470.00	184530.00
				410.00	410.00	410.00	16551590.00
				6537.00	6537.00	6537.00	3160463.00
					0.00	0.00	1355000.00
				164633.00	164633.00	164633.00	1346367.00
					0.00	0.00	1567000.00
					0.00	0.00	336000.00
					0.00	0.00	2113000.00
			97650.00		97650.00	97650.00	8020.00
				0.00	0.00		1223400.00
				0.00	0.00		2953200.00
				0.00	0.00		139900.00
3575931.00	0.00	3575931.00	8236398.00	0.00 18336238.00	26572636.00	30148567.00	54309695.59
3747440.00	235830.00	3983270.00	14078772.00	6000939.00 70937146.00	91016857.00	95000127.00	203416603.99

Schedules Forming Part of Balance Sheet as at 31-03-2008

			Current Year Rs. Ps.	Previous Year Rs. Ps.
SCHEDULE 7- CURRENT LIABILITIES AND PROVISIONS				
A. CURRENT LIABILITIES				
1.	Acceptances			
2.	Sundry Creditors:			
	a) For Goods	11468890.00		
	b) Others	2499665.00	13968555.00	36090086.00
3.	Advances Received		16495819.00	20283158.90
4.	Interest accured but not due on: a) Secured Loans / borrowings b) Unsecured Loans / borrowings			
5.	Statutory Liabilities: a) Overdue b) Others		1937809.15	1119139.35
6.	Other current Liabilities		14939979.14	11742875.54
	TOTAL(A)		**47342162.29**	**69235259.79**
B. PROVISIONS				
1.	For Taxation			
2.	Gratuity			
3.	Superannuation/Pension(New Pension Scheme)			
4.	Accumulated Leave Encashment			
5.	Trade Warranties/Claims			
6.	Others(Specify) Audit fee	20000.00		
	Sinking fund contribution to investment	3828378.00	3848378.00	3119621.00
	TOTAL(B)		**3848378.00**	**3119621.00**
	TOTAL(A+B)		**51190540.29**	**72354880.79**

SCHEDULES TO ASSETS

Schedules Forming Part of Assets as at 31-03-2008

SCHEDULE 8 - FIXED ASSETS DESCRIPTION

	GROSS BLOCK Cost/Valuation as at the beginning of the year	Additions during the Year	Deductions during the Year
A. FIXED ASSETS:			
1. LAND:			
a) Freehold	1600169.51	0.00	
b) Leasehold			
2. BUILDINGS:			
a) On Freehold Land	37263857.26	173071.00	
b) On Leasehold Land			
c) Ownership Flats/Premises			
d) Superstructures on Land not belonging to the entity	123278085.50	1629087.00	
3. PLANT, MACHINERY & EQUIPMENT	893634100.64	71547297.00	926855.00
4. VEHICLES	2563985.74	975523.00	
5. FURNITURE, FIXTURES	27849177.61	2352012.00	
6. OFFICE EQUIPMENT	943937.54	8040.00	
7. COMPUTER/PERIPHERALS	0		
8. ELECTRIC INSTALLATIONS	14790863.67	119050.00	
9. LIBRARY BOOKS	96042013.57	8092652.00	
10. TUBEWELLS & W.SUPPLY	174615.00	0.00	
11. OTHER FIXED ASSETS			
a) OXYGEN CYLINDERS	234319.42	0.00	
b) AIR CONDITIONERS	20898225.91	940488.00	
c) TELEPHONE INSTALLATIONS	2026024.94	31280.00	
d) COLD ROOM INSTALLATION	341700.00	0.00	
e) WATER COOLERS	62866.50	0.00	
f) LIFT INSTALLATION	3301433.10	3796456.00	
g) KITCHEN EQUIPMENTS	559520.22	950.00	
h) CANTEEN EQUIPMENTS	132246.59	19236.00	
I) PAINTINGS	382715.63	0.00	
k) LIVESTOCK	31848.00	0.00	
l) GAS PLANT INSTALLATIONS	1159838.09	0.00	
TOTAL OF CURRENT YEAR	**1227271544.44**	**89685142.00**	**926855.00**
TOTAL OF PREVIOUS YEAR	1146522416.44	80749128.00	0.00
B. CAPITAL WORK-IN-PROGRESS	297367327.00	114865229.00	
TOTAL (A+B)	**1524638871.44**	**204550371.00**	**926855.00**

* Depreciation/value for Buildings on lease hold land included.

Cost/valuation at the year end	Depreciation as at the beginning of the year	Depreciation during the year	Total up to the year-end	NET BLOCK As at the Current year-end	As at the previous year-end
1600169.51	0	0	0	1600169.51	1600169.51
37436928.26					
124907172.50	75314889.12	4351460.58	79666349.70	82677751.06	85227053.64
964254542.64	572227603.46	58804040.88	631031644.34	333222898.30	321406497.18
3539508.74	2409559.42	225989.86	2635549.28	903959.46	154426.32
30201189.61	19552831.20	1597253.76	21150084.96	9051104.65	8296346.41
951977.54	830497.21	18222.05	848719.26	103258.28	113440.33
0.00					
14909913.67	12052307.21	428640.97	12480948.18	2428965.49	2738556.46
104134665.57	65185403.61	5842389.29	71027792.91	33106872.66	30856609.96
174615.00	145394.36	4383.10	149777.45	24837.55	29220.64
234319.42	206859.01	4119.06	210978.07	23341.35	27460.41
21838713.91	15556167.16	942382.01	16498549.18	5340164.73	5342058.75
2057304.94	1704448.21	52928.51	1757376.72	299928.22	321576.73
341700.00	337301.74	659.74	337961.48	3738.52	4398.26
62866.50	62455.46	61.66	62517.11	349.39	411.04
7097889.10	2900111.05	629666.71	3529777.76	3568111.34	401322.05
560470.22	497842.42	9394.17	507236.59	53233.63	61677.80
151482.59	96234.76	8287.17	104521.93	46960.66	55011.83
382715.63	312318.66	10559.55	322878.21	59837.42	70396.97
31848.00	25168.61	1001.91	26170.52	5677.48	6679.39
1159838.09	947900.50	31790.64	979691.14	180146.95	211937.59
1316029831.44	**770365293.19**	**72963231.61**	**843328524.80**	**472701306.64**	**456906251.25**
1227271544.44	700560240.13	69805053.06	770365293.19	456906251.25	445962176.31
412232556.00		**0**	**0**	**412232556.00**	**297367327.00**
1728262387.44	**770365293.19**	**72963231.61**	**843328524.80**	**884933862.64**	**754273578.25**

Schedules Forming Part of Balance Sheet as at 31-03-2008

			Current Year Rs. Ps.	Previous Year Rs. Ps.
SCHEDULE 9 - INVESTMENTS FROM EARMARKED/ENDOWMENT FUNDS				
1.	In Government Securities		51367034.00	50567034.00
2.	Other approved Securities		5685391.00	5685391.00
3.	Shares			
4.	Debentures and Bonds			
5.	Subsidiaries and Joint Ventures			
6.	Others (to be specified) (i) Sinking Fund Investments	206883158.00		184169028.00
	(ii) Technology Fund	35473140.90		31879059.90
	(iii) Pension & staff funds	48803014.00	291159312.90	49086686.00
	TOTAL		**348211737.90**	**321387198.90**

SCHEDULE 10 - INVESTMENTS-OTHERS

1.	In Government Securities	
2.	Other approved Securities	
3.	Shares	
4.	Debentures and Bonds	
5.	Subsidiaries and Joint Ventures	
6.	Others (to be specified)	
	TOTAL	

SCHEDULE 11 - CURRENT ASSETS, LOANS, ADVANCES ETC

A. CURRENT ASSETS					
1.	Inventories:				
	a) Stores and Spares		80150825.13	80150825.13	74661558.13
	b) Loose Tools		2497633.00	2497633.00	2214886.00
	c) Stock-in trade				
	Finished Goods				
	Work-in-progress				
	Medicine		8503376.00	8503376.00	7340132.00
2.	Sundry Debtors:				
	a) Debts Outstanding for a period exceeding six months	Rs.12408132.00			
	b) Others	Rs. 7215459.00	19623591.00	19623591.00	12473819.00
3.	Cash balances in hand(including cheques/drafts and imprest)		895160.13	895160.13	1143745.63

Schedules Forming Part of Balance Sheet as at 31-03-2008

			Current Year Rs. Ps.	Previous Year Rs. Ps.
4.	Bank Balances:			
	a) With Scheduled Banks:			
	- On Current Account	1.15		
	- On Deposit Accounts			
	(L.C. margin & Commitment deposit)	1030000000.00		
	-On Savings Accounts	137903638.11	1167903639.26	750478140.73
	b) With non-Scheduled Banks:			
	- On Current Account			
	- On Deposit Accounts			
	- On Savings Accounts			
5.	Post-Office-Savings Accounts			
	TOTAL(A)		**1279574224.52**	**848312281.49**
	B. LOANS, ADVANCES AND OTHER ASSETS			
1.	Loans:			
	a) Staff		11197189.00	12293728.00
	b) Other Entities engaged in activities/objectives similar to that of the Entity			
	c) Others (specify)			
2.	Advances and other amounts recoverable in cash or in kind or for value to be received:			
	a) On Capital Account		150223827.00	141854325.00
	b) Prepayments		11040430.53	5912332.53
	c) Others		916024.00	1161347.00
3.	Income Accured:			
	a) On Investments from Earmarked/endowment Funds			
	b) On Investments-Others			
	c) On Loans and Advances			
	d) Others			
	(includes income due unrealised Rs)			
4.	Claims Receivable			
	From Govt of India on Plan Funds			
	TOTAL(B)		173377470.53	161221732.53
	TOTAL(A+B)		1452951695.05	1009534014.02

Schedules Forming Part of Income & Expenditure for the Period/Year ended 31-03-2008

	Current Year Rs. Ps.	Previous Year Rs. Ps.
SCHEDULE 12 - INCOME FROM SALES/SERVICES		
1. Income from Sales		
a) Sale of Finished Goods		
b) Sale of Raw Material		
c) Sale of Scraps		
2. Income from Services		
a) Labour and processing charges		
b) Professional/Consultancy Services		
c) Agency Commission and Brokerage		
d) Maintenance Services		
e) Others (Specify)		
From Hospital Services-Gross Income Rs.421375147.00		
Less concession to poor Patients Rs.156800000.00	264575147.00	243014436.00
From Projects	898229.00	176775.50
Testing & Facility charges received	2211913.50	1500966.46
TOTAL	**267685289.50**	**244692177.96**
SCHEDULE 13 - GRANTS/SUBSIDIES (Irrevocable Grants & Subsidies Received)		
1. Central Government	226500000.00	215900000.00
2. State Government(s)		
3. Government Agencies		
4. Institution/Welfare Bodies		
5. International Organisations		
6. Others(Specify)		
TOTAL	**226500000.00**	**215900000.00**
SCHEDULE 14 - FEES/SUBSCRIPTIONS		
1. Entrance Fees	617350.00	539900.00
2. Annual Fees/ Subscriptions	2851000.00	1845500.00
3. Seminar/Program Fees	0.00	0.00
4. Consultancy Fees	0.00	0.00
5. Others(Specify) Examination Fees	283500.00	316200.00
TOTAL	**3751850.00**	**2701600.00**

Schedules Forming Part of Income & Expenditure for the Period/Year ended 31-03-2008

	Investment from Earmarked Fund				Investment-Others				Total for			
	Current Year		Previous Year		Current Year		Previous Year		Current Year		Previous Year	
	Rs.	Ps.	Rs.	Ps.	Rs.	Ps.	Rs.	Ps.	Rs.	Ps.	Rs.	Ps.
SCHEDULE 15												
INCOME FROM INVESTMENTS												
(Income on Invest.from Earmarked/Endowment Funds transferred to Funds)												
1) Interest												
a) On Govt. Securities												
b) Other Bonds/Debentures												
2) Dividends:												
a) On Shares												
b) On Mutual Fund Securities												
3) Rents					693989.00		576814.00		693989.00		576814.00	
4) Others(Specify)												
(i) On Sinking Fund	10214130.00		11320086.00		0.00		0.00		10214130.00		11320086.00	
(ii) On Technology Fund	1668313.00		1523253.80						1668313.00		1523253.80	
TOTAL	11882443.00		12843339.80		693989.00		576814.00		12576432.00		13420153.80	
TRANSFERRED TO EARMARKED/ ENDOWMENT FUNDS	11882443.00		12843339.80						11882443.00		12843339.80	

	Current Year		Previous Year	
	Rs.	Ps.	Rs.	Ps.
SCHEDULE 16 - INCOME FROM ROYALTY, PUBLICATION ETC				
1) Income from Royalty	3054865.00		662980.00	
2) Income from Publications				
3) Others(Specify)				
TOTAL	**3054865.00**		**662980.00**	

Schedules Forming Part of Income & Expenditure for the Period/Year ended 31-03-2008

		Current Year Rs. Ps.	Previous Year Rs. Ps.
SCHEDULE 17- INTEREST EARNED			
1)	On Term Deposit		
	a) With Scheduled Banks	83810357.05	37742643.00
	b) With non-scheduled banks		
	c) With Institutions		
	d) Others		
2)	On Savings Account		
	a) With Scheduled Banks	472298.51	582327.85
	b) With non-scheduled banks		
	c) Post Office Savings Account		
	d) Others		
3)	On Loans		
	a) Employees/Staff	1093609.00	1117430.00
	b) Others		
4)	Interest on Debtors and other Receivables		
	TOTAL	**85376264.56**	**39442400.85**
SCHEDULE 18 - OTHER INCOME			
1.	Profit on Sale/disposal of Assets:		
	a) Owned assets		
	b) Assets acquired out of grants, or received free of cost		
2.	Export Incentives realized		
3.	Fees for Miscellaneous Services		
4.	Miscellaneous Income (income from Projects)	5923556.00	2739696.00
	Other Income	1976765.40	1529175.00
	TOTAL	**7900321.40**	**4268871.00**
SCHEDULE 20 - ESTABLISHMENT EXPENSES			
a)	Salaries and Wages	205483261.80	200004717.60
b)	Allowances and Bonus	1321147.00	1211649.00
c)	Contribution to Provident Fund		
d)	Contribution to other fund(specify)		
e)	Staff Welfare Expenses	6967300.25	7515579.00
f)	Expenses on Employee's Retirement and Terminal Benefits	20469805.00	15209938.00
g)	Others(Specify) PG Training & Accademic payments	44854930.00	24797726.00
	TOTAL	**279096444.05**	**248739609.60**

Schedules Forming Part of Income & Expenditure for the Period/Year ended 31-03-2008

	Current Year Rs. Ps.	Previous Year Rs. Ps.

SCHEDULES 21 - OTHER ADMINISTRATIVE EXPENSES ETC

a)	Purchases	237025724.00	222126262.50
b)	Labour and processing expenses	0.00	0.00
c)	Cartage and Carriage Inwards	182884.00	323913.00
d)	Electricity and power	26904136.00	26305916.00
e)	Water charges	1093469.00	2017280.00
f)	Insurance	1124.00	2242.00
g)	Repairs and maintenance	22011852.00	40207767.80
h)	Excise duty	0.00	0.00
i)	Rent,Rates and Taxes	559163.00	343367.75
j)	Vehicles Running and Maintenance	335689.00	416509.00
k)	Postage,Telephone and Communication Charges	2105334.00	2078212.00
l)	Printing and Stationary	1350642.00	2143961.00
m)	Travelling and Conveyence Expenses	689640.00	1240207.71
n)	Expenses on Seminar/Workshop	2016196.00	2013319.00
o)	Subscription Expenses	62411.00	120552.00
p)	Expenses on Fees	0.00	0.00
q)	Auditors Renumeration	8427.00	6734.00
r)	Hospitality Expenses	0.00	0.00
s)	Professional Charges	0.00	0.00
t)	Provision for Bad and Doubtful Debts/Advances	0.00	0.00
u)	Irrecoverable Balances Written-off	0.00	0.00
v)	Packing Charges	0.00	0.00
w)	Freight and Forwarding Expenses	0.00	0.00
x)	Distribution Expenses	0.00	0.00
y)	Advertisement and Publicity	5256413.00	2314578.00
z)	Others(specify)	17172380.00	14904106.55
	TOTAL	**316775484.00**	**316564928.31**

SCHEDULE 23 - INTEREST

a)	On Fixed Loans		
b)	On Other Loans(including Bank Charges)	80763.40	85687.00
c)	Others(specify)		
	TOTAL	**80763.40**	**85687.00**

Receipts & Payments for the Period from 01-04-2007 to 31-03-2008

	RECEIPTS	Current Year	Previous Year
I	**Opening Balance**		
	a) Cash In Hand	1143745.63	1282474.38
	b) Bank Balances		
	i) In Current Account	1.15	1.15
	ii) In deposit Account		
	iii) Savings Account	74478139.58	77931058.91
II	**Grant Received**		
	From Government of India		
	Under Plan scheme	720100000.00	650000000.00
	Plan recurring	0.00	100000000.00
	Non-Plan scheme	69700000.00	72200000.00
	Women Comp. Plan	95000000.00	
III	**Receipts against Earmarked Funds**		
	a) Earmarked funds	31285551.00	23590488.00
	b) Own funds		
IV	**Interest Received**		
	a) On Bank deposits	85148053.56	40585535.90
	b) Loans Advances etc	65546.00	224492.00
V	**Receipts from services**		
	Receipts from Patient services	323125418.00	238017922.00
	Other receipts including Royalty	15151918.00	11081687.46
VI	**Other receipts**		
	Grant received for Projects	83457403.02	47754910.94
	Refund of Deposits(LC Margin)		
	Other Deposit received	99221353.00	81632353.29
	TOTAL	**1597877128.94**	**1344300924.03**

	PAYMENTS	Current Year	Previous Year
I	**Expenses**		
	a) Establishment expenses	373472602.95	267494607.31
	b) Administrative Expenses		
	For Purchases	315198993.00	324100573.50
	Other expenses	88916030.20	80238138.25
II	**Payments made against funds for various Projects**		
	As Per schedule	46283364.00	34109924.11
III	**Investments & Deposits made**		
	a) Out of Earmarked funds	16100000.00	5623379.00
	b) Out of own funds	333736301.00	203149180.00
IV	**Expenditure on Fixed Assets & Capital work -in- progress**		
	a) Purchase of Fixed Assets	83946767.00	52025660.00
	b) Capital work-in-progress		
V	**Refund of Loans**		
VI	**Finance Charges(Bank charges)**	51841.00	81571.00
VII	**Other Payments**		
	To Funds/Deposit- refunds	201372430.40	301856004.50
VIII	**Closing Balance**		
	a) Cash in hand	895160.13	1143745.63
	b) Bank Balances		
	i) In current Account	1.15	1.15
	ii) In Deposit Account		
	iii) Savings Account	137903638.11	74478139.58
	TOTAL	**1597877128.94**	**1344300924.03**

Schedules Forming Part of Accounts for the Period ended 31-03-2008

SCHEDULE 24 - SIGNIFICANT ACCOUNTING POLICIES

ACCOUNTING CONVENTION

Financial Statements are prepared on the basis of historical cost convention unless otherwise stated and on the accrual method of accounting

INVENTORY VALUATION

Stores and spares including machinery spares are valued at cost

INVESTMENTS

Investment including long term investments are carried at cost.

FIXED ASSETS

Fixed assets are stated at cost of acquisition inclusive of inward freight,duties and taxes incidental and direct expenses related to acquisition.

DEPRECIATION

6.1 Depreciation is provided on reducing balance method at the rates specified by the Incometax Act 1961.

6.2 In respect of additions to/deductions from fixed assets,during the year depreciation is provided for full year.

GOVT GRANTS/SUBSIDIES

9.1 Govt Grant from Plan fund are treated as additions to Capital fund of Institute.

9.2 Grants in respect of specific fixed assets acquired are shown as deduction from the cost of the related asset.

9.3 Govt Grants/subsidies are accounted on Grant release order basis.

FOREIGN CURRENCY TRANSACTIONS

Transactions denominated in foreign currency are accounted at exchange rate prevailing at the date of transactions.

RETIREMENT BENEFITS

12.1 An amount equal to one month salary every year is transferred to Pension Fund Account to meet liability on account of Pension payments.

12.2 An amount of Rs.4 lakh is transferred every year to above fund for meeting liabilities on account of Gratuity payments .

12.3 Leave encashment eligible at the time of retirement/reliving is accounted on actual payment basis.

PROVIDENT FUND

Liabilities and assets of Provident fund account were separated from Balance sheet of Institute and shown as separate statement.

SINKING FUND RESERVE

Five percent of receipts from patient are transferred to a Fund for meeting unexpected requirements for Fixed assets.

TECHONOLOGY DEVELOPMENT FUND

Receipts against technologies developed by Institute are transferred to the above fund for meeting additional expenses on Improvement of technologies already developed. During the year Rs.10.13 lakh was spent from this fund for the purpose.

SCHEDULE 25 - CONTINGENT LIABILITIES AND NOTES ON ACCOUNTS

CONTINGENT LIABILITIES

1.1	Claims against the Institute not acknowledged as debts	Rs. NIL (PY NIL)
1.2	In respect of:	
	Bank Gurentee given by Institute	Rs.13.01 lakh (PY Rs11.24 lakhs)
	Letters of credit opened on behalf of Institute	Rs.1049.44 lakh (PY Rs914.50 lakh)
1.3	Disputed demands on Income tax etc	Nil
1.4	In respect of claims from parties for non-execution of orders	Nil

CAPITAL COMMITMENTS

Estimated value of orders remaining to be executed on Capital Account	Rs.987.37 lakh (PY Rs.856.83 lakh)
Lease obligation for rentals for Plant&Machinery	Nil

CURRENT ASSETS, LOANS & ADVANCES

The aggregate amount shown in the Balance sheet for the Current assets, Loans and Advances, have the value which is realisable in the ordinary course of business.

TAXATION

Provision for Income tax not made since there is no taxable income for Institute under Income tax Act 1961, during the year

FOREIGN CURRENCY TRANSACTIONS:

6.1	Value of Imports	
	Capital Goods	Rs 676.57 lakh (PY Rs.1183.83 lakh)
	Stores Spare & Consumables	Rs 271.89 lakh (PY Rs. 394.49 lakh)
6.2	Expenditure in foreign currency	
	Travel Expenses	US $ 1150.00 (PY US$ 1500.00)
6.3	Earnings:	
	Value of Exports	Nil
6.4	Remuneration to Auditors	
	As auditors:	
	For Taxation	Rs 8427.00 (PY Rs 6734 .00)

Corresponding figures for previous years have been regrouped, where ever necessary.
Schedules 1 to 25 are annexed to and form integral part of the Balance Sheet as at 31-03-2008, and Income & Expenditure Acount for the year ended on that date.

Sd/-
Financial Adviser & Chief Accounts Officer

Sd/-
Director

Provident Fund Account for the year ended 31-03-2008

Amount Rs

	CURRENT YEAR	PREVIOUS YEAR
LIABILITIES		
MEMBERS BALANCE	173972283.00	166360773.00
MEMBERS CREDITS (FOR MARCH 2006)	2424610.00	0.00
BALANCE DUE TO MEMBERS NOT IN SERVICE		
Under EPF Scheme	6116671.00	5637485.00
,, GPF ,,	532055.00	532055.00
PENSION FUND DUES	37610132.00	39379166.00
RESERVES & SURPLUS-INTEREST	1756912.39	3684012.39
TOTAL	**222412663.39**	**215593491.39**
ASSETS		
INVESTMENT AT COST	204867803.00	199437803.00
DUES TO PF ACCOUNT		
FROM INSTITUTE	0.00	0.00
FROM PF COMMISSIONER	13857796.00	12772162.00
INTEREST ACCRUED NOT DUE	1000280.00	1044983.00
BALANCE WITH BANKS		
SBT -GPF A/C	2686784.39	2338543.39
SBT-CPF A/C	0.00	0.00
TOTAL	**222412663.39**	**215593491.39**

GPF Trial Balance 2007-08

GI Code		Debit	Credit
1001	SCTIMST	0.00	
1005	Dues from PF Commissioner	13857796.00	
1010	Members Balance		209398186.00
1011	Receipts(for March) not credited to Members		2424610.00
1012	Old Members EPF Account		6116671.00
1013	Old Members GPF Account		532055.00
1015	Dues to Pension Fund		37610132.00
1020	Reserves and surplus		3684012.39
1030	Loan Payment	27237672.00	
1040	Interest accrued	1927100.00	
1050	Investments	204867803.00	
1090	Final settlements	8188231.00	
1120	Interest accrued not due	1000280.00	
	Cash at Bank	2686784.39	
	TOTAL	**259765666.39**	**259765666.39**

Separate Audit Report of the Comptroller & Auditor General of India on the Accounts of Sree Chitra Tirunal Institute for Medical Sciences & Technology, Thiruvananthapuram for the year ended 31st March 2008

We have audited the attached Balance Sheet of Sree Chitra Tirunal Institute for Medical Sciences & Technology (SCTIMST), Thiruvananthapuram as at 31st March 2008 and the Income & Expenditure Account/Receipts & Payment Account for the year ended on that date under Section 19(2) of the Comptroller & Auditor General's (Duties, Powers & Conditions of Service) Act, 1971 read with Section 18(2) of SCTIMST Act 1980. These financial statements include the accounts of Bio Medical Technology, Poojappura unit/branch of the SCTIMST. These financial statements are the responsibility of SCTIMST management. Our responsibility is to express an opinion on these financial statements based on our audit.

2. This Separate Audit Report contains the comments of the Comptroller & Auditor General of India (CAG) on the accounting treatment only with regard to classification, conformity with the best accounting practices, accounting standards and disclosure norms, etc. Audit observations on financial transactions with regard to compliance with the Law, Rules & regulations (Propriety and Regularity) and efficiency cum performance aspects, etc., if any are reported through Inspection Reports/CAG's Audit Reports separately.

3. We have conducted our audit in accordance with auditing standards generally accepted in India. These standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatements. An audit includes examining, on a test basis, evidences supporting the amounts and disclosure in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of financial statements. We believe that our audit provides a reasonable basis for our opinion.

4. Based on our audit, we report that:

   i. We have obtained all the information and explanations, which to the best of our knowledge and belief were necessary for the purpose of our audit;

ii. The Balance Sheet and Income & Expenditure Account/Receipt & Payment Account dealt with by this report have drawnup in the format approved by the Central Government in consultation with CAG under Section 18(2)of SCTIMST Act 1980.

iii. In our opinion, proper books of accounts and other relevant records have been maintained by the Sree Chitra Tirunal Institute for Medical Sciences & Technology, Thiruvananthapuram as required under Section 19(2) of the Comptroller & Auditor General's (Duties, Powers & Conditions of Service)Act, 1971 read with Section 18(2) of SCTIMST Act 1980 in so far as it appears from our examination of such books.

iv. We further report that:

A. General

Bank Reconciliation

Scrutiny of Bank Reconciliation Statement as on 31 March 2008 revealed that the following amounts pertaining to the period from 2004-05 to 2007-08 (up to December 2007) are not reconciled so far.

a) Cheques issued but not presented for payment Rs. 3,68,508

b) Debited by Bank but not in the Bank book Rs. 23,49,559

c) Credited by Bank but not by Bank book Rs.26,06,689

d) Credited in Bank book but not in pass book Rs. 28,15,047

B. Grants in aid

Out of the grants in aid of Rs. 88.48 crore received during the year, the organization could utilize a sum of Rs. 88.48 crore leaving a balance of Rs. Nil as unutilised grant as on 31st March 2008.

C. Mangement letter:

Deficiencies which have not been included in the Audit Report have been brought to the notice of the SCTIMST through a Management letter issued separately for remedial/corrective action.

v. Subject to our observations in the preceding paragraphs, we report that the Balance Sheet and Income & Expenditure Accoungt/Receipts & Payment Account dealt with by this report are in agreement with the books of accounts.

vi. In our opinion and the best of our information and according to the explanations given to us, the said financial statements read together with the Accounting Policies and Notes on Accounts, and subject to the significant matters stated above and other matters mentioned in Annexure to this Audit Report give a true and fair view in conformity with accounting principles generally accepted in India:

a. In so far as it relates to the Balance Sheet, of the state of affairs of the Sree Chitra Tirunal Institute for Medical Sciences & Technology, Thiruvananthapuram as at 31 March 2008 and

b. In so far as it relates to Income & Expenditure Account of the deficit for the year ended on that date.

For and on behalf of the C & AG of India

New Delhi
Dated: 15-12-2008

Sd/
Pr. Director of Audit
Scientific Departments

ANNEXURE

1. Adequacy of Internal Audit System: The internal audit division is functioning under an Internal Audit Officer on deputation from IA & AD assisted by an Office Supdt. of this institute. Regular periodical audit is carried out according to programme approved by the Director, SCTIMST, Thiruvananthapuram every year. A transparent system of communication of observation of internal audit may however be evolved and put in place.

2. System of Physical verification of fixed assets: Physical verification of fixed assets was conducted upto 2005-06

3. System of physical verification of inventory: Physical verification of fixed assets was conducted upto 2005-06.

4. Regularity in payment of statutory dues: Regularly by paying the statutory dues.

Milestones...

Sree Chitra Tirunal Institute for Medical Sciences & Technology

Thiruvananthapuram - 695 011, Kerala, India