

# Sree Chitra Tirunal Institute for Medical Sciences and Technology



**Annual report**  
**2000 - 2001**



# Annual Report 2000 - 2001

SREE CHITRA TIRUNAL INSTITUTE FOR  
MEDICAL SCIENCES AND TECHNOLOGY

THIRUVANANTHAPURAM - 695 011  
KERALA, INDIA

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Cover & Lay out: Medical Illustration Unit

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## ORIGINS

The origins of the Institute reach back to 1973 when the Royal Family of Travancore gifted a multi-storeyed building for the people and the Government of Kerala resolved to develop the gift as the Sree Chitra Tirunal Medical Centre for medical specialities. Sri. P. N. Haksar inaugurated the Medical Centre in 1976 and the growth of a Biomedical Engineering & Technology Wing followed quickly at the Satelmond Palace, Thiruvananthapuram.



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



## **Institute Body**

**Dr. N.H.Wadia**

Jaslok Hospital and Research Center, 15 Dr.G.Deshmukh Road, Mumbai 400 026.

*President*

**Prof. N.Appaji Rao**

Department of Biochemistry, Indian Institute of Science, Bangalore- 560 012.

**Dr. S.P. Agarwal (Ex-Officio)**

Director General of Health Services, Government of India, New Delhi - 110 011.

**Dr. B.Ekbal (Ex-officio)**

Vice Chancellor, University of Kerala, Thiruvananthapuram.

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Director, International Advanced Research Centre for Powder Metallurgy and New Materials,  
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**Sri. BK. Parthasarathi**

Member of Parliament (Lok Sabha) with effect from 1.8.2000.

**Sri. Pon Radhakrishnan**

Member of Parliament (Lok Sabha) with effect from 1.8.2000.

**Sri. J.A.Chowdhury**

Secretary to the Government of India

Ministry of Health and Family Welfare Nirman Bhawan, New Delhi-110 011.

**Dr. M.R.Das**

Chairman, State Committee on Environment, Science and Technology,  
Government of Kerala, Thiruvananthapuram.

**Secretary to the Government of India**

Ministry of Human Resources Development, Shastri Bhavan, New Delhi - 110 001.

**Dr. S.K.Mahajan**

Head, Molecular Biology & Agriculture Division, BARC, Trombay, Mumbai - 400 085.

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Secretary to the Government of India, Ministry of Science and Technology,  
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**Head, Biomedical Technology Wing**

Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram.

**Dr. K.K.Talwar**

Professor of Cardiology, All India Institute of Medical Sciences, New Delhi - 110 029.

**Sri. Vayalar Ravi**

Member of Parliament (Rajya Sabha),  
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**Dr. Vijay Kak**

Director, Principal Secretary, Medical Education and Research, Chandigarh.

**Sri. V. Vijayachandran**

Secretary to the Government of Kerala, Health & Family Welfare, 695011.

## **Governing Body**

**Dr. N.H.Wadia**

Jaslok Hospital and Research Center, 15 Dr.G.Deshmukh Road, Mumbai 400 026.

*Chairman*

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**Dr. K.Mohandas**

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**Prof. V.S.Ramamurthy**

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**Head, Biomedical Technology Wing**

Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram.

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Professor of Cardiology, All India Institute of Medical Sciences, New Delhi - 110 029.



## Overview

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Two Decades ago, the Institute came into being with a mandate to develop appropriate technologies to meet the health care needs of the country and initiate training and research programmes integrating biomedical technology and health sciences, while demonstrating high standards of patient care in medical specialities. The activities of the Institute during the year not only reflect its faithful adherence to the original objectives, but also its constant striving to change with the changing economical, scientific and societal realities.

The Institute transferred seven technologies for commercial production while two others entered final stages of clinical evaluation. Following the policy of actively seeking industrial sponsorship for R&D, two more programmes were identified, even as the first major industry sponsored project – the membrane oxygenator – was poised to enter the multicentric trial phase. Four patents were sealed this year and five new applications were filed. Biomaterial and medical devices development activities were further streamlined with the setting up of laboratories for dental products, instrumentation, modeling and prototyping. Implementation of the quality system to conform to ISO/IEC 17025 standard was progressing on schedule. The decision to seek accreditation by international agencies was taken to enable the Institute to successfully meet the global challenges posed by economic liberalization and the eventual disappearance of trade barriers. When accredited early next year, the Institute will also be able to provide testing services of international quality to the growing health care industry in India.

With the formal inauguration of the comprehensive movement disorder services by the Hon. Chief Minister of Kerala, yet another advanced therapeutic technique became available in the hospital. Conscious of the changing health care demands of the society, the Institute established a state-of-the-art comprehensive acute coronary care service that is directly accessible to patients 24 hours of the day. And in the continuing effort to meet the rising demand for diagnostic and therapeutic services, the Institute was able to further increase the quantum of investigative, surgical and other treatment facilities, despite severe infrastructural and almost crippling financial constraints.

Biomedical research on the molecular mechanisms in cardiac fibrosis, the role of free radicals in cardiac myocyte hypertrophy, relationship between Vitamin D levels

and the incidence of coronary artery disease in the tropics and the continuing work on mucoid vasculopathy and galectine-1 and its role in immune complex formation appeared to holdout potentially interesting answers. The Institute was also able to develop a PCR based diagnostic technique for spinocerebellar ataxia and a rat model to study molecular dynamics during epileptic seizures.

A new off-campus course – Master of Applied Epidemiology – at the National Institute of Epidemiology (ICMR) marked the Institute's new initiative in academic collaboration with other public health institutions in the country. The Achutha Menon Centre for Health Science Studies was identified as the nodal Centre for the network of public health training institutions in the developing countries, even as the Ministry of Health, Government of India, recognized it as a centre of excellence.

The Institute played host to several national and international conferences. The international workshop on ethical issues in health research with participants from 15 countries was the most notable among them. The Institute also started the TN Krishnan Memorial Lecture series with the first lecture having been delivered by Prof. Lincoln Chen, the Executive Vice President of the Rockefeller Foundation.

The Institute, as always, scrupulously followed the reservation policy of the Government of India in recruitment of staff and admission of students.

Conscious of its national and societal obligations, and confident in its ability to adapt to the changing times, the Institute continued its momentum of progress and development during the year.



## HIGHLIGHTS OF THE YEAR



Sri. E. K. Nayanar, Chief Minister of Kerala inaugurates Movement Disorders service. Facilities for intra-operative microelectrode recording during surgery for movement disorders created.



Sri. Bachi Singh Rawat, Minister of State for Science and Technology commissions a comprehensive acute Coronary Care unit and a dedicated cardiac electrophysiology laboratory.



Sri. O. Rajagopal, Minister of State for Parliamentary Affairs & Railways inaugurates an Official Language workshop.

A quality cell, customer service unit and calibration unit set up and test facilities restructured in Biomedical Technology Wing to conform to ISO/IEC 17025.



Laboratories for Dental Products and Medical Instrumentation started to focus development in these areas.



Memorandum of understanding signed for transfer of technologies of four dental products, fibrin glue and porous hydroxyapatite. Multi-centric clinical evaluation of these products also initiated.

Evaluation of membrane oxygenator in animals started.



Four patents were sealed and five patent applications filed.

A PCR based diagnostic technique for spinocerebellar ataxia 2 developed.



Achutha Menon Centre is recognized as an Institute of excellence for research and training in Public Health by the Ministry of Health and Family Welfare.



Institute hosts an international workshop on "Ethical issues in Health Research in south Asia".

Achutha Menon Centre is selected to be the secretariate for the 'Public Health Schools Without Walls' network.



An off-campus course, Master of Applied Epidemiology begins at National Institute of Epidemiology, Chennai.

A lecture series in memory of Professor T.N. Krishnan initiated.

## TECHNOLOGY DEVELOPMENT

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The market in India for medical devices is currently estimated to be a whopping Rs.5000 crores and it is growing at 15 to 20 percent annually. Eighty percent of this is met by imports, as the medical devices industry in the country is still relatively small. Being the premier institute in the country engaged in the research and development of biomaterials and medical devices, it has become essential for the Institute to provide international quality testing services to support the growing industry.

In consideration of this, a major programme for the implementation of a quality system for the testing services was initiated last year. The objective is to obtain accreditation of selected laboratories for the evaluation of biomaterials and medical devices. The quality system will conform to the latest standard ISO/IEC 17025 and accreditation by the French agency COFRAC is targeted. The implementation started in December 1999, gathered considerable momentum during the year under review. A number of training programmes and audits were conducted, including a pre-audit by the National Accreditation Board for Testing and Calibration of Laboratories (NABL), New Delhi. The final audit and accreditation are expected to take place during the second half of 2001.

Infrastructural improvements and restructuring of test facilities were carried out to meet international guidelines for testing environment and safety. The notable ones are the Animal house, Laboratories of Toxicology, Implant Biology, Tissue culture, Thrombosis research and Polymer analysis. A QUALITY CELL for monitoring the quality system, CUSTOMER SERVICES CELL for providing a single window service to customers and a CALIBRATION CELL for calibration of various equipments were set up to meet the needs of accredited testing.

To streamline device developmental activities, a laboratory for **Dental Products** was formed, thus stressing the importance of Dental Biomaterials in the current scenario. The division of Artificial Organs was reorganized with **Modeling & Prototyping and Devices Testing Laboratories**. The devices testing laboratory will focus on the development and standardization of test methodologies for evaluating various medical devices conforming to suitable national and international standards. An **Instrumentation Lab** was created to focus development work in selected areas of medical instrumentation.



Sustained efforts to convert R&D work on biomaterials and medical devices into commercial technologies were continued. Testing services brought in Rs.5.5 lakhs during this first year of service. Industry sponsored projects contracted during the year amounted to Rs.7.5 lakhs, mainly for scale up prior to technology transfer. Externally funded sanctioned projects have totalled Rs.92.79 lakhs and royalties amounting to Rs.33.43 lakhs were received.

## Technology development and transfer

### Dental Composites

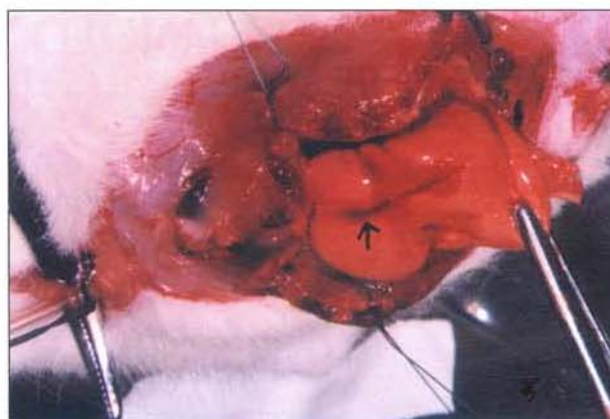
A Memorandum of Understanding was signed between SCTIMST and Dynamic Orthopedics Pvt. Ltd, Aluva in May 2000 for transfer of technology for 4 dental products: - Chemical cure, Light Cure, Radiopaque dental composite and Dentine bonding agent. Technology transfer and scale up activity has started with the joining of 2 trainees from the industry. The Ethics committee of the Institute approved multi-centric evaluation of these products in selected dental hospitals in the country.

### Fibrin Glue

The developmental efforts by the Thrombosis unit for fibrin glue and haemostatic fibrin sheet crossed a major milestone with the signing of agreements with Advanced Transfusion Medicine Research Foundation Ltd., Ahmedabad for scale up and transfer of technology. The multi-centric evaluation of the fibrin glue was also started.

### Hydroxyapatite and Bioglass

The pilot plant production of porous hydroxyapatite and transfer of technology to Dynamic Orthopedics Pvt. Ltd., Aluva were successfully completed. The Director at a formal function handed over the



Lung stab injury sealed with fibrin glue and inflated fully 2 minutes later

technology transfer documents to the company's Managing Director on 27<sup>th</sup> January 2001 at the BMT Wing. The multi-centric clinical evaluation of these granules for orthopedic application is currently going on at five centres.

Bioactive glass composite developed by the Bioceramics laboratory is undergoing clinical evaluation for various periodontal and related applications.

### Membrane Oxygenator

The development of a hollow fibre membrane oxygenator in collaboration with SPIC, Chennai made considerable progress. Batch production of the units was started and from this clinical quality batch the final series of animal experiments is progressing. The clinical evaluation is expected to start during the third quarter of 2001. Training of industry personnel in the assembly procedures and other technology transfer activities has been initiated.

### Wound Dressings

Chitosan based wound dressing material developed by the Bio-surface Technology Division underwent



Experimental set up for *in vitro* evaluation of membrane oxygenator

clinical evaluation at a hospital in Trivandrum. It has been observed that the application of the dressing (chitosan film) made chronic ulcers heal faster. The ulcers also became sterile, earlier than usual. Technology transfer of this wound dressing material is being initiated with Dynamic Orthopedics Pvt. Ltd., Aluva as the industrial partner.



Signing of MOU with Dynamic Orthopaedics Pvt., Ltd., Aluva for scale up and transfer of Chitosan-based wound dressings

### Intellectual Property Rights (Patents)

Five patent applications were filed during the year and 4 previous applications were successfully sealed. The Technical Co-Ordination Cell handled a few ambiguous situations in consultation with patent attorneys. The applications related to health care products that were deemed to come within the ambit of restricted inventions in the drug category were

successfully processed under the regular category.

The current status of the Institute's patents and designs is as follows: -

Patents held (sealed)	=	38 Nos.
Patents filed and pending	=	43 Nos.
Designs held (sealed)	=	13 Nos.

### Technology Transfer

Technology Transfer Cell strived to identify suitable entrepreneurs for the viable technologies that were developed. The concept of sponsored technology development was given a boost by the initiation of discussions on wound dressing materials and development of machining methodology for artificial orthopedic components.

The industrial partner for the technology related to the Large Diameter Vascular Graft was identified and approved by the Technology Transfer Committee. The Technology Transfer process would be initiated in consultation with our collaborators, M/s. South India Textiles Research Association, Coimbatore.

### Engineering Services

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

- Machining of 10 sets of artificial limb components and the required fixtures for M/s Dynamic Orthopedics Ltd, Aluva.
- Design and fabrication of Oximeter Sensor tip for MDS student Project work.
- Fabrication of 10 sets of Milking Forceps for the Hospital Wing.



- Fabrication of mouse restrainer- 3 numbers for the Toxicology division.
- Machining of S.S. mould and punching die for thin sheet moulding.

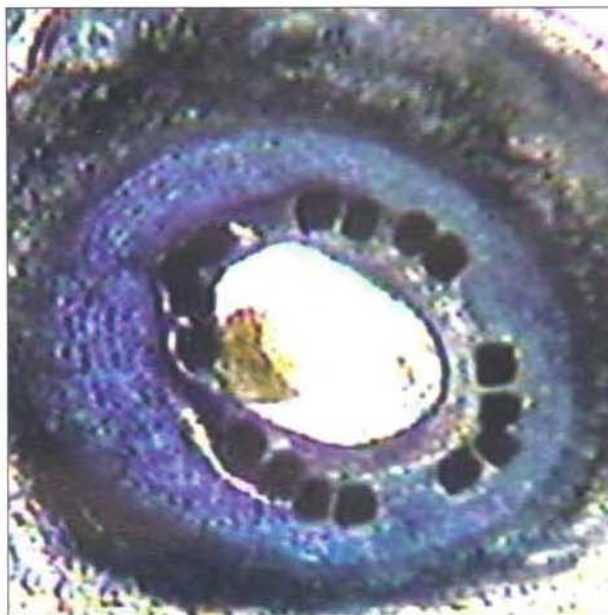
Implementation of an ISO 9002 quality system was initiated. Work procedures and system procedures for the different activities were prepared and implemented. A Metrology lab in Tool Room was set up for dimensional quality assurance of the works carried out.

A new water treatment system was commissioned including underground sump and plant room to meet the new quality requirements. Routine operation and maintenance of electrical, refrigeration, air conditioning, plumbing, sanitation and other support services were also carried out.

## Testing services and quality system

### Coronary stent evaluation

An umbrella MOU was signed with the Sahajanand Vascular Technoventions Pvt. Ltd., Surat for providing various testing services. The first product taken up under this agreement was the BIOFUNCTIONAL EVALUATION OF AN ENDOVASCULAR STENT (Stainless steel coronary stent) at a total cost of Rs.5.8 lakhs. The testing services include toxicology evaluation, in-vitro blood compatibility testing and in-vivo animal evaluation. This multi-disciplinary testing programme reached an advanced stage with the involvement of Departments of Cardiology, Thoracic Surgery, Vivarium, Toxicology, Tissue culture, Thrombosis research and Devices Testing.



Photomicrograph of cross section of carotid artery with stent

### Cholesterol lowering drug testing

An herbal preparation for lowering serum cholesterol, supplied by Cybele laboratories, Cochin was evaluated for its effects in rabbits and the final report was prepared.

### Quality system implementation

The quality system implementation gained momentum during the year with training programmes and infrastructure improvements. The document describing the system structure and management was developed and programme was implemented. Other changes and activities are given in the following sections. The range of tests being offered under the accreditation programme cover materials testing and evaluation of biocompatibility of materials.

### Infrastructure improvements

The animal house was substantially improved to meet the INSA guidelines for animal housing. The building has been rodent-proofed and selected areas air-conditioned as per requirements. The Toxicology

laboratory was reorganised to ensure correct movement of men and materials. The tissue culture laboratory was relocated and its layout designed to conform to international standards.

The testing facilities in the Thrombosis Research Unit were regrouped to enable blood compatibility testing of biomaterials to be carried out as per the requirements of international standards. The standardization included validation of the test procedures, inter-laboratory comparison and proficiency testing. For hematological and coagulation parameters, the lab has registered with the Quality Assurance Program of Royal College of Pathologists of Australia.

### **Customer Service Cell**

A single window service was set up in accordance with the quality policy to enable customers to avail the test services easily and quickly. Test requests from clients are handled and coordinated with the concerned laboratories for evaluation and issue of test reports. The guidelines and policies for this activity are in tune with the ISO 17025 standard for testing laboratories.

The Cell has handled about 100 test requests since its inception in November 2000. The activities include routine reply to general test enquiry, formulating new test protocols as desired by the customer in

consultation with the testing labs, coordinating the standard test requests and issuing the reports supplied from the test lab. The cell also coordinates internal test requests from the various laboratories.

### **Quality Cell**

The Quality Cell co-ordinates the implementation of Quality System as per the international standard ISO/IEC 17025. The Quality Manual and Quality Policy were revised to suit the specific requirements of this new standard. The revised Quality Policy is:

*We are committed to good professional practice and high quality service in testing of medical devices and materials, aiming at full customer satisfaction and zero defect performance by conforming to the policies and procedures of international standards.*

### **Calibration Cell**

The Cell was set up during the year to address the quality system needs for calibration of equipment, maintaining traceability in measurements and reference material requirements. The Cell started functioning during mid 2000 and has been able to set up the basic infrastructure. During the first six months the cell has carried out over 100 calibration operations in various instruments. The cell also provides training assistance on uncertainty estimation and validation of test methods.



## PATENTS GRANTED

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**A Method for surface processing of polystyrene plastic wares**

Inventors: M.Jayabalan, C. P. Sharma and M.Raveendranath, Polymer Division.

Indian Patent No: 182889 dt.11.02.1994

**A process for the preparation of a two-component paste/liquid system for dental applications**

Inventors: S.N.Pal, K.Usha, V.Kalliyanakrishnan and S.Manu, Division for Dental Products.

Indian Patent No: 184062, dt. 15.03.1995.

**A process for grafting poly(ethylene glycol) on to the surface of plasticized poly(vinyl chloride)**

Inventors: A.Jayakrishnan and A.Lakshmi, Division of Polymer Chemistry.

Indian Patent No: 183743, dt. 6.03.1997.

**A process for the development for the preparation of a drug formulation based on narrow spectrum drugs with enhanced activity**

Inventors: K. Rathinam, Asokan Kuttiyil, K.Sreenivasan and R.Sivakumar, Division of Toxicology.

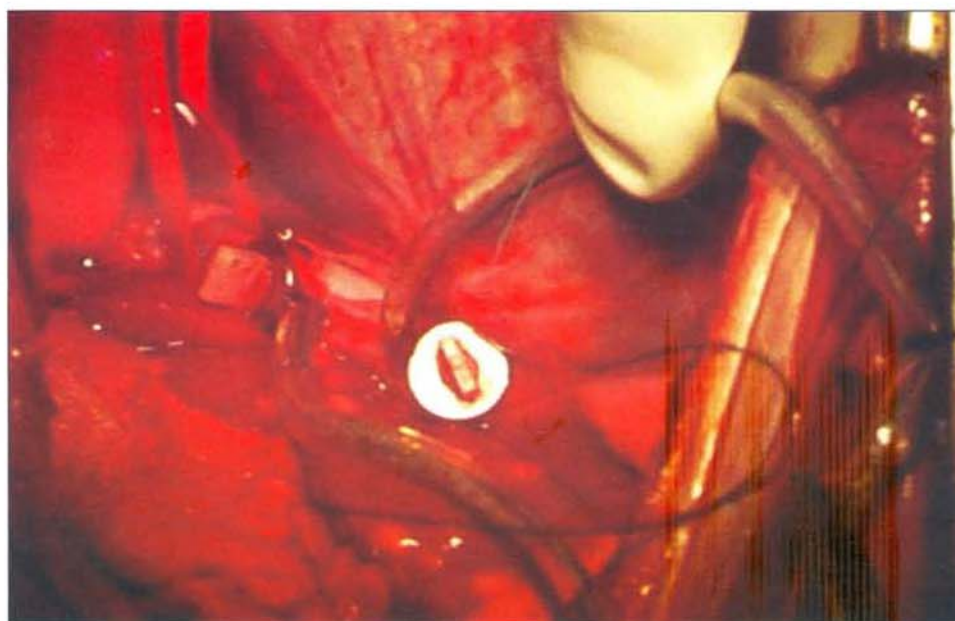
Indian Patent No: 184326, dt. 29.06.1998.

## RESEARCH ACTIVITIES

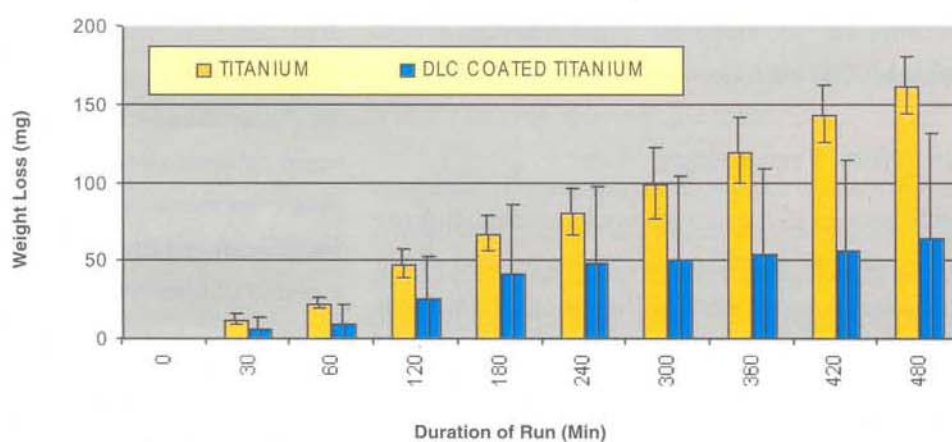
### Biomaterials Research and Development

#### Collaborative Programmes

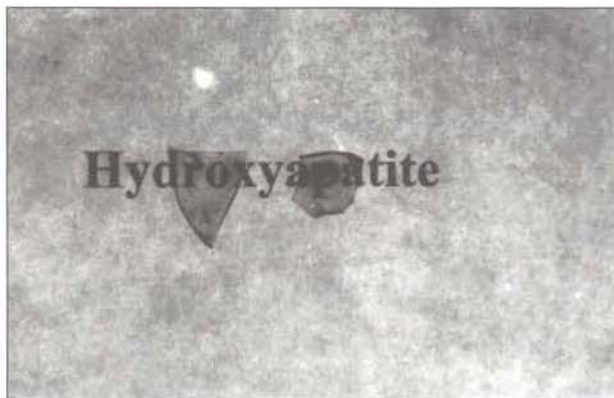
The Indo-French collaborative project, "Development of Diamond like coatings for medical and other applications" progressed as per schedule. The project aims at qualifying a special Diamond Like Coating (DLC) developed in France by the French



DLC coated titanium sample *in situ* in sheep for blood compatibility testing



Wear characteristics of DLC coated titanium samples



Transparent Sintered Hydroxyapatite and the SEM Micrograph showing the microstructure of the ceramic having nano-scale sintered grains

industrial collaborator for blood contacting applications. This coating can be applied on both metallic and polymer materials for various biomedical applications. The toxicological evaluation of the coating including the one-year implantation, *in vitro* and *in vivo* blood compatibility evaluation were completed during the year. The results indicate the coating to be a very good blood compatible material.

### **Bioceramics**

The division developed a coating of calcium phosphate compounds over polymeric substrates by biomimetic processing. In collaboration with the Dental Products Lab, a novel radiopaque glass filler to be used as a substitute for the imported glass filler in dental composites has been developed.

### **Biosurface Technology**

Modification of PVA microspheres by covalent linkage of poly ethylene glycol in addition to heparin and a specific amino acid to inhibit adhesion of WBC without affecting the adsorption of IgG type of immunoglobulins (under haemoperfusion column program) was carried out. Development of hydroxyapatite nanoparticles as oral peptide delivery

system with an emphasis to insulin was undertaken. Preliminary *in vitro* studies have been performed. Development of a membrane for artificial kidney, artificial skin and transdermal delivery system based on polyvinyl alcohol (PVA), chitosan and polyethylene glycol (PEG) made good progress.

### **Dental Products**

A novel dual cure dental formulation based on BIS-GMA resin was developed. It combines the advantages of both light and chemical curing composites and eliminates their disadvantages. Measurement of their properties, such as working and setting times, compressive, diametral tensile and flexural strengths, depth of cure, water sorption and solubility were made. Shelf life studies up to 90 days were conducted for the pastes and change with time in properties of cured composites was measured. Shelf life studies of two novel resins Urethane di- and tetra-methacrylate resins synthesized in the lab were also carried out for a period of 6 months.

In collaboration with the Bioceramics Lab, a novel radiopaque glass filler to be used as a substitute for the imported glass filler in dental composites was developed. This filler was tested in dental composite



formulations and was found to be radiopaque as well as to impart excellent mechanical properties. This material is expected to considerably bring down the production cost of radiopaque composite.

### Polymer Analysis

The various research activities of the laboratory during the year were:

- Preparation of synthetic polymers containing affinity sites towards biomacromolecules in order to develop molecular imprinting
- Use of chemically modified hydroxyapatite as a selective separation medium
- Development of new polymeric formulations and evaluation using different cell lines to assess their suitability as immunoisolation matrices. A novel polyurethane-ethyl hexyl acrylate graft copolymer was identified as having superior properties for such applications.
- The porous polyurethane-IPN material that was seen to perform well for the immunoisolation of islets cells were further tested *in vivo*, using diabetic mice models in collaboration with NCCS, Pune. The encapsulated islets could reverse the diabetic state of the mice within 24 hours and continue to maintain the non-diabetic status for a period of 3 months. These encouraging results indicate the possibility of developing a bioartificial pancreas.

### Polymer Division

In continuation of the development of biodegradable polymeric implant materials, syntheses of oligomeric

resins were carried out for the development of vascular stent material. Biodegradable and non-thrombogenic polymeric implants have been proposed as an alternative to metallic stents. One advantage of the biodegradable polymeric stent could be that, it can self expand gradually and re-open the narrowed blood vessels. The setting time and temperature of the injectable mixture based on low molecular weight copolymers are low and satisfy the ISO specification. The cured materials possess appreciable mechanical properties, swelling characteristics and biodegradability.

### Polymer Chemistry

Preparation of some azide-containing polymers from *p*-azido benzoic acid and epichlorohydrin azide has been carried out. This was based on the fact that azide-substituted poly(vinyl chloride) was found to resist bacterial adhesion in earlier studies. Vinyl monomers prepared from these compounds have been used to synthesize homopolymers and copolymers. These are currently being evaluated.

A new iodine-containing vinyl monomer was synthesized and polymerised in an attempt to prepare polymers with radio-opaque properties. Work on a rapidly gelling polymer system for use as a possible wound dressing material, based on gelatin and alginic acid dialdehyde is being continued.

Work on surfactant-modified polymer surfaces to resist protein and platelet adhesion was continued using cyanuric chloride chemistry. Although considerable time and effort were directed to synthesize a Tween-20 containing surface on various substrates using different approaches, this work did not lead to fruition for a number of reasons.

### **Polymer Processing Laboratory / Bioceramics**

The DST research project on hydroxyapatite (HAP) – ethylene vinyl acetate co-polymer (EVA) composites for bone substitute applications made steady progress during the year. A novel class of microstructured microspheres of bioceramic could be prepared using a special processing route.

### **Biological Research And Evaluation**

#### **Animal House**

The main activity of the animal facility is the care and management of small animals like guinea pig, rabbit, rat and mice required for the toxicological experiments. This facility was registered under the CPCSEA (Committee for the Purpose of Control and Supervision of Experiments in Animals), Government of India. The Institutional Animal Ethic Committee (IAEC) meets once every three months to evaluate and clear proposals for animal experiments.

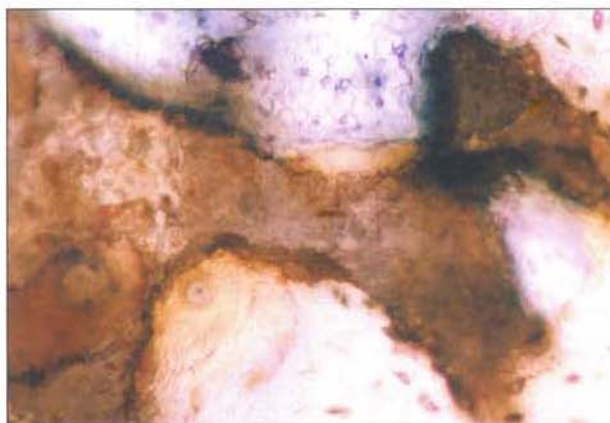
#### **Implant Biology**

*Histopathology laboratory:* The studies carried out during the year are listed below.

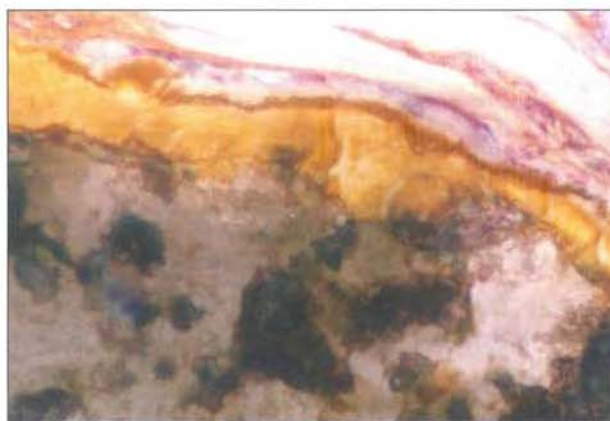
- Bone response to HA-BG composite granules, in the mandible and long bones was studied in end use application experiments in rabbits and sheep.
- Gross and histological evaluation of tissue response around EVA-HAP composites in a cranioplasty rabbit model and in carotid artery in pre-clinical evaluation of stainless steel vascular stents in pigs began in early 2001.
- Light microscopic and scanning electron microscopic evaluation of the tissue and

implant materials from retrieved human implants was started.

- Preliminary studies on the isolation of liver stem cells for incorporation into an artificial device were initiated.



Photomicrograph showing new bone formation in and around degrading Hydroxyapatite-Bioglass composite in sheep bone

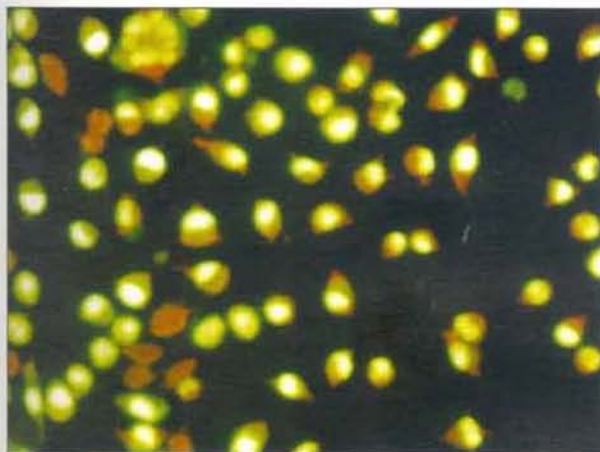


Early induction of bone formation in fibrin glue coated hydroxyapatite bioactive glass composite implanted in skeletal muscle

#### **Tissue culture laboratory :**

Cytotoxicity and cytocompatibility studies of titanium with diamond like carbon coating using fibroblasts, endothelial cells and osteoblasts were completed. Specific cytotoxicity screening of ophthalmic sponge





Fluorescent micrograph showing the intact nature of L929 cell membrane seeded on Diamond Like Carbon coated titanium, indicating non-cytotoxic nature of the material

material was also carried out using SIRC corneal cell lines.

Osteogenic potential of ceramics was evaluated by studying the effect of interactions of osteoblasts with different types of ceramics. The biomineralization process was investigated using primary rat calvarial cells and cell lines.



Spreading of osteoblast cells (MG-63) seeded onto Diamond Like Carbon coated titanium in tissue culture, showing good cell adhesion properties

Work was started in the field of tissue engineering employing a co-culture of hepatocytes and endothelial cells.

## Microbiology

The division provided services for the microbiological monitoring of controlled environments, sterility testing, testing of anti-microbial property of materials and bacterial adhesion studies. Support to Vivarium in the health care monitoring of laboratory animals is being given.

## Thrombosis Research

Radioscintigraphic technique for measurement of platelet adhesion on to biomaterials during *in vitro* material-platelet rich plasma exposure and during implantation was standardized. Project on monoclonal antibody production of b-TG for detection of clinical platelet activation was completed and the final report was submitted.

The project "Development of an electrolyte medium for platelet storage for transfusion" supported by STEC, Govt. of Kerala made good progress. Different compositions of electrolytes were evaluated using a battery of tests to assess the ability of platelets to remain viable and functional in the suspension. The results indicate that the optimum test medium can replace the plasma for storage and transfusion of platelets for up to 96 hours of storage.

## Toxicology

As a requirement of the quality system, the division has set up the physio-chemical and bacteriological analysis of potable water supplied in the BMT Wing campus. The facilities for the analysis of animal feed for proximate principles and contamination are under way. Routine toxicological studies on a variety of materials submitted for evaluation were carried out.



### **Vivarium**

The division has developed a pig model for the biofunctional evaluation of an endovascular stent developed and supplied by the Sahajanand Vascular Technoventions Ltd., Surat. Initial problems in the implantation of the stent have been overcome and studies are underway now.

*In-vivo* blood compatibility testing of DLC coated samples was undertaken in a sheep model and was successfully completed during the year.

An antibiotic sensitivity kit for testing for mastitis in milch cows was developed in collaboration with the Microbiology division. The results of the Phase 1 field trials have been very encouraging. Standardization of the test kit to yield consistent results and shelf life studies are being carried out.

## Clinical Research

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### Division of Biochemistry

#### *Coconut oil and incidence of coronary artery disease in Kerala*

Since coconut oil belongs to the saturated fat class, it is maligned as hypercholesterolemic. Association between hypercholesterolemia and coronary artery diseases (CAD) is well established, but that between hypercholesterolemia and intake of coconut oil remains to be investigated. The objective of the project is (1) to screen CAD patients based on the type of fat intake to correlate hypercholesterolemia with dietary fat, (2) to analyse the level of lipids and lipoproteins and (3) to look for lipid and lipoprotein abnormalities. We have collected data from a large number of patients with CAD along with that from matched healthy controls and analysis of data is in progress.

#### *Galectin-1*

Although the 14kDa galactose-binding lectin (galectin1) is ubiquitous in human body and implicated in development, tumorigenesis, microbial adhesion and apoptosis, its natural ligands in the body remain unknown. Our recent demonstration that human IgA1 is sugar- specifically recognised by human heart galectin 1 suggests a role for this lectin in immune complex formation as well as in IgA1 deposition in blood vessel walls. Bacterial neuraminidase treatment of IgA1 enhanced its recognition by galectin, indicating that infection can augment this phenomenon. In another study human galectin 1 was found to bind and agglutinate trypsin-treated human RBC suggesting a possible role for galectin -1 in scavenging senescent or transformed cells.

### Blood Transfusion Services

#### *A psycho- social perspective study of Blood transfusion Services in Kerala*

The objectives of the study are: (1) to study the factors that motivate and influence blood donors to become regular voluntary blood donors (2) to study the psycho-social problems of patients / relatives related to Blood Transfusion Services. (BTS) (3) to examine the role of NGOs in the field of Blood donation and (4) to make a SWOT analysis of the present BTS and propose a model of BTS, in the psycho-social perspective.

The study aims to bring out factors that affect and are involved in providing optimal service to patients requiring transfusion. It proposes to come up with a 'Patient Oriented Model' of Blood Transfusion Service.

### ***Collaborative research programs***

- i. Assessment of platelet function and swirling phenomenon in stored platelets
- ii. Supply of source material for preparation of aliquots of fibrin glue for multicentric trial evaluation.
- iii. Platelet for monoclonal antibody production to study clinical platelet activation, through an ELISA based assay.
- iv. Study on storage lesion of returned blood units from OTS / ICUs,
- v. Study of platelet concentrates stored in synthetic media for biochemical parameters as part of project 'Evaluation of synthetic medium for platelet storage'.

### **Division of Cellular & Molecular Cardiology**

#### ***Molecular basis of endomyocardial fibrosis***

An attractive view for pathogenesis of endomyocardial fibrosis (EMF) is that injury to endocardial endothelium, activation of endothelial cells and endothelial-fibroblast interaction in the subendocardium are responsible for increased matrix synthesis and extensive fibrosis in the disease. The division initiated a study to obtain clues to pathogenesis of EMF and to test specifically the hypothesis that cerium activates endocardial endothelial cells and secretes factors responsible for

stimulating cardiac fibroblasts causing enhanced collagen synthesis. The study includes treatment of cultured cardiac endothelial cells with cerium, quantification of cell adhesion molecules and cytokine expression by ELISA, measurement of growth of cultured cardiac fibroblasts and investigation of the influences of signal transduction inhibitors on inductive effects by cerium. The DST funded project is with collaboration of Dr.Hema Balaram of Molecular and Genetics Unit of Jawaharlal Nehru Center for Advanced Scientific Research, Bangalore.

#### ***Molecular mechanisms in cardiac fibrosis***

Factors that modulate cardiac fibroblast function have attracted increasing attention in the past decade. Substance P is a neuropeptide that is released from nerve endings in the heart under conditions such as hypoxia and ischemia but no attempt has been made to understand its action on cardiac cells. Investigations carried out in the Division suggest that substance P might have important regulatory roles over cardiac fibroblasts. It was found that the neuropeptide acts via neurokinin -1 (NK -1) receptors to elicit a hyperplastic but not hypertrophic response in cardiac fibroblasts. Further, concerted increases in superoxide production and calcium influx contributed to its mitogenic action. The involvement of substance P in the pathogenesis of myocardial fibrosis associated with magnesium deficiency was investigated. Consistent with the hypothesis that it may activate cardiac fibroblasts in magnesium deficiency, serum from magnesium-deficient rats was found to have a more marked effect on fibroblast proliferation, net collagen production, and superoxide generation in these cells, compared to control. Oxidant signaling seemed to contribute to the increased proliferative response to serum from magnesium-deficient rats.



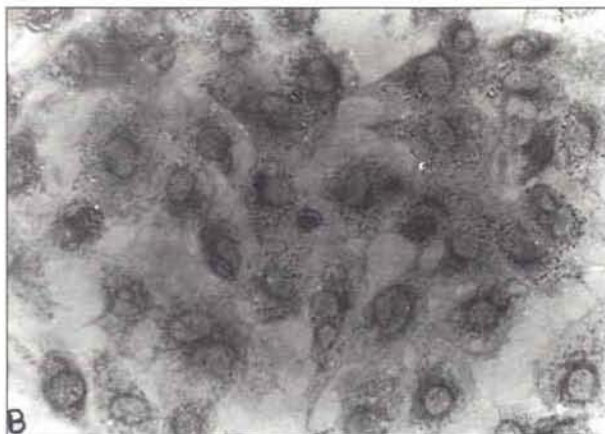
NK-1 receptor block partially abolished the effects, suggesting that NK-1 receptor-mediated pathway may contribute, to a limited extent, to cardiac fibrosis associated with magnesium deficiency. Taken together, the findings point to a neural pathway of activation of cardiac fibroblasts.

A significant achievement of the Division during the year was the development of a model of cardiovascular injury in magnesium deficiency. The model offers a mechanistic explanation for cardiovascular injury in magnesium deficiency and provides vital leads for future investigations.

A serendipitous finding of considerable significance was that, exposure of cardiac fibroblasts to a calcium-free medium or calcium channel blockers increases oxidative stress in these cells. The observation is of considerable importance in the context of hypocalcemic cardioplegia, employed in cardiac surgery, and the use of calcium channel blockers as anti-hypertensives.



Superoxide anion dependent reduction of nitroblue tetrazolium in cardiac fibroblasts  
A. Untreated control



B. Cells exposed to cerium (0.5µM)

### ***Free radicals in cardiac myocyte hypertrophy***

Free radical stress has been implicated in the causation of cardiac hypertrophy and failure. To identify the role of reactive oxygen species in the etiology and progression of these cardiac ailments, oxidative stress in individuals with these disorders was being assessed and compared with suitable control. Excessive free radical generation in patients can be the consequence or cause of the disease. The role of reactive oxygen species in cardiac hypertrophy was studied using isolated rat cardiac myocytes as the experimental model.

### ***Vitamin D and its relationship to coronary artery disease (CAD) in a tropical population***

A number of experimental, clinical and epidemiological studies indicate possible relationship of Vitamin D with CAD. In an earlier study in our laboratory, 25 (OH) Vitamin D<sub>3</sub> levels in serum were significantly elevated in male patients with angiographic evidence of CAD when compared to controls. In the present study, apart from validating



those results serum levels of  $1,25(\text{OH})_2$  Vitamin  $\text{D}_3$ , parathyroid hormone, ionic calcium and magnesium are to be measured in male patients with angiographic evidence of CAD and controls. The hormone levels are measured by radioimmunoassay. The present study done in collaboration with Dr.MGR Rajan, Radiation Medicine Center, BARC would provide data not only on the Vitamin D status of tropical population but also explore the relationship between vitamin D status and CAD, a problem of high magnitude in the study population.

### **Abdominal aortic aneurysm**

Environmental factors have been identified in the expression of abdominal aortic aneurysm. Familial clustering of the disease suggests the contribution of genetic components in the multifactorial etiology of the disease. Analysis of pedigrees of propoiti is being carried out to ascertain the heritability of the condition. This study is done in collaboration with the Department of Cardiovascular and Thoracic surgery.

### **Division of Molecular Medicine (BMT Wing)**

A rat epileptic model for identifying molecular variations during seizure development in neuronal cells was developed by the injection of pilocarpine. This induces in rats, seizures that are similar to human temporal lobe epilepsy. The gene expression variations in the hippocampal neurons of these rats were studied.

The division successfully developed a PCR based diagnostic technique for Spinocerebellar Ataxia2 and standardized a nested PCR technique for the diagnosis of *Mycobacterium tuberculosis* for meningitis cases.

## **Department of Neurology**

### **Epilepsy Research**

#### **Epidemiological Research**

The data accumulated through the most elaborate and comprehensive epidemiological survey ever undertaken in India were analyzed. The results of the prevalence and KAP results got published in *Epilepsia*, the official journal of the International League Against Epilepsy. The data have attracted widespread international attention. In summary, the prevalence rate of epilepsy in Kerala is comparable to that of developed countries. Although the people of Kerala have a good awareness of epilepsy, their attitudes towards persons with epilepsy are much more negative.

#### **Electrophysiological Research**

The cost effective utilization of the available electrophysiological facilities to select candidates for epilepsy surgery is the thrust area of research. Meticulous analyses of ictal rhythms and seizure semiology as ascertained by video monitoring have brought out important informations. An indigenously modified sphenoidal electrode is undergoing testing.

#### **Kerala Registry of Epilepsy and Pregnancy**

There were 435 registration in the program till April, 2001, and less than 5% dropouts. This is the first large-scale registry of epilepsy and pregnancy in India. The major observation from the study is being compiled. Preliminary results are under publication. This registry has led to the formation of an Indian Registry of Epilepsy and Pregnancy. It is a matter of delight that our center has been nominated to co-ordinate the activities of the registry on a national level.

### **Molecular and Genetic Research**

The premature accumulation of corpora amylacea in the hippocampus of patients with medically refractory temporal lobe epilepsy is being investigated in the intraperitoneal pilacarpine mouse model of partial epilepsy. The initial results indicate that down regulation of the glycogen branching enzyme plays an important role in the pathogenesis of polyglycosan bodies in the mesial temporal lobe. In a collaborative research undertaken with the help of the Jawaharlal Nehru Center for Advanced Scientific Research, Bangalore, the phenotypic and genotypic characterization of primary generalized epilepsies are being delineated.

### **Neuromuscular Research**

The ongoing studies are (i) genetic studies in Spinal Muscular Atrophy in collaboration with Centre for DNA Finger printing at Hyderabad (ii) role of anti-striatal muscle antibodies and anti-titin antibodies in severity and natural history of myasthenia gravis and (iii) role of serum and CSF cytokines in the prognosis of Guillaine-Barre Syndrome in collaboration with the Division of Pathology.

### **Stroke Research**

A pilot study on the role of large vessel diseases as a risk factor for ischemic stroke has been initiated in collaboration with the Departments of Cardiology and Radiology.

### **Cognitive and Behaviour Neurology**

The two investigations undertaken during the year were (i) indigenising the standard neuropsychological tests for the local population and validating them and (ii) epidemiological survey in an urban elderly population (Trivandrum) in Kerala for prevalence of cognitive problems.

### **Department of Neurosurgery**

The various research programs in the department are

- (i) immunocytochemical studies of pituitary tumors
- (ii) role of mucoid vasculopathy in the etiopathogenesis of cerebral aneurysms (in collaboration with department of Pathology)
- (iii) comparison of spiral CT angiography and conventional angiography in the diagnosis of intracranial vascular lesions
- (iv) role of magnesium sulfate in the treatment of vasospasm in experimental animal models and
- (v) p53 gene mutations in gliomas.

### **STICH Trial**

The department is one of the three Indian centres selected for the multicentric international STICH trial (surgical trial in intracerebral hemorrhage) jointly conducted by the Stroke Association and the Medical Research Council with Prof. Mendelow from Newcastle General hospital, England as the principal investigator.

### **Clinical Trial of Fibrin glue**

Clinical trials in patients on the use of indigenously prepared fibrin glue in preventing CSF leak were initiated in collaboration with Thrombosis Research group and Vivarium of BMT Wing. Animal trials were also started on an indigenously prepared hydroxy apatite for cranioplasty.

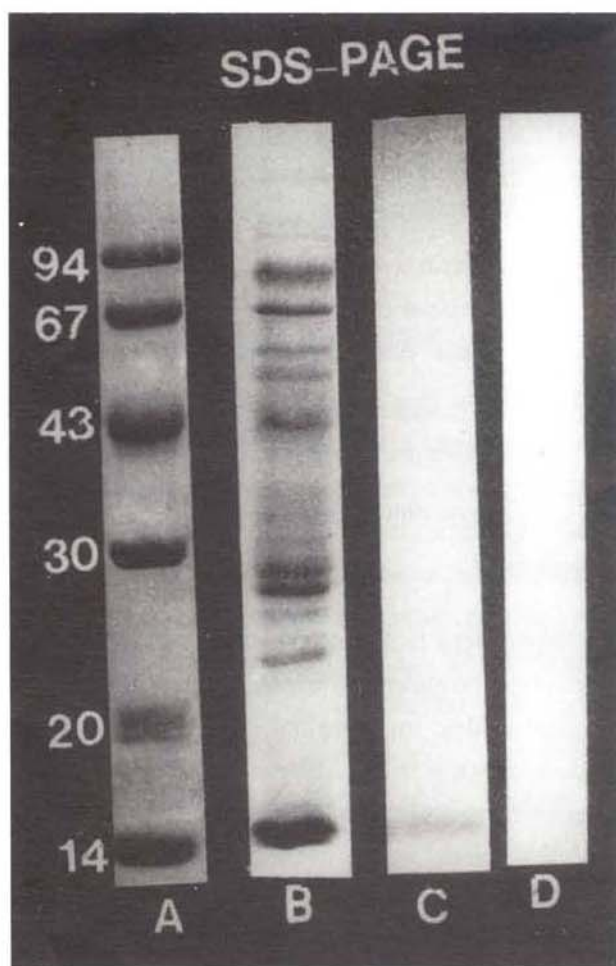
### **Artificial Dura**

The department is collaborating with the Polymer Division of BMT wing in the production of artificial dura.



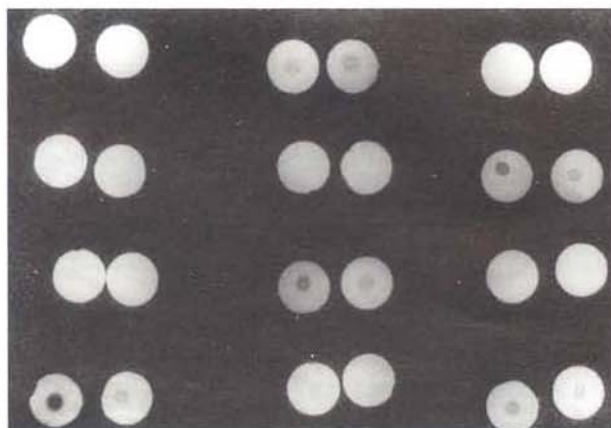
## Division of Pathology

### *Immunodiagnosis of tuberculosis of central nervous system*



SDS-polyacrylamide gel showing molecular weight standard (Lane A), culture filtrate antigens (lane B), 14k Da antigen isolated from culture filtrate antigen by specific IgG to *M. tuberculosis* (lane C) and control CSF IgG with no binding to 14kDa antigen (lane D)

The Division of Pathology has been conducting research in the field of Tuberculosis of CNS. During the year 1999-2000 the division developed a Dot-immunobinding assay (Dot-Iba) for the laboratory



Dot immunobinding assay showing positive and negative reactions

diagnosis of tuberculous meningitis. The Dot-Iba is a simple, rapid and sensitive method and more importantly the assay can be performed in any laboratory and therefore suited to the need of developing countries. The technical aspects of the assay have been submitted to DST, New Delhi for multicentric trials. This product has definite humanitarian value.

### *Role of cytokine in the pathogenesis of Guillaine- Barre syndrome*

The role of cytokine (TNF-alpha) in the pathogenesis of GBS is being evaluated in patients with GBS. The sera of patients with GBS contain elevated TNF level (normal: 4.8 pg/ml, GBS: 20-128 pg/ml). The decrease in TNF level correlates with neurological recovery in 60% of patients with GBS following plasma exchange or immunoglobulin therapy. Currently the interrelationship between TNF and its receptors is being studied.

### *Mucoid vasculopathy*

Short term studies carried out on bonnet monkeys under a DST project showed induction of mucoid degenerative changes in blood vessels and the heart



by nutritional imbalance due to low-protein high carbohydrate tapioca starch based diets. The lesions could be partially reversed by control diet. The animals developed a mild dyslipidemia with significant reduction in HDL-Cholesterol and mild rise in triglycerides and LDL- Cholesterol. The serum lipid levels could be reversed to normal with control diet. The histopathological and biochemical features resemble the 'metabolic syndrome' common in Indians with early onset of heart attacks and stroke. A diagnostic test for serum glycosaminoglycans being standardized as part of a STEC funded project may be an important test to identify mucoid vasculopathy in patients with aneurysmal and stenotic vascular disease.

## Department of Radiology

A Department of Atomic Energy funded project on effect of laser on regression of solid tumors and induced chemical carcinoma in mice was completed.

The department was selected for an open, multicenter non-comparative prospective study to evaluate the Detach-11/18 coil system for occlusion of intracranial saccular aneurysms. Under this project 10 cases of aneurysms were treated using a new Detach coil system this year under the guidance of Prof., James Edward Dervin, Dept. of Neuroradiology, Middlesbrough General Hospital, United Kingdom.

## HEALTH SCIENCE STUDIES

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**Achutha Menon Centre (AMC)** continued its trailblazing activities in this academic year also. The third batch of MPH graduates completed the course and they were absorbed in responsible positions either in their parent organizations or elsewhere. Several international agencies have approached the centre to lend its expertise to various projects in India. Currently there are 12 externally funded projects being carried out by various members of the faculty.

Ministry of Health and Family Welfare, Govt. of India recognized the Institute as an Institute of Excellence for Public Health Training. AMC is also the secretariat for Public Health Schools without Walls Network, which is a network of Public Health Schools in Asia and Africa.

The Centre organized several important training workshops and seminars. Among them the International Workshop on Ethical Issues in Health Research in South Asia, the Asian regional workshop for the PHS WOW and the short-term program for Gujarat medical officers from Gujarat deserve special mention. The students and faculty of AMCHSS (14 students and 2 faculty) participated in the XVIIth INCLEN Global Meeting at Bangkok, Thailand and presented papers prepared from the MPH dissertations or on-going research.

### *New initiatives during the year*

- Off-campus course: An off-campus course, Master of Applied Epidemiology was commenced at the National Institute of Epidemiology (ICMR), Chennai; from January 2001.
- Short term training: A training programme for the District and State Level Health Officers from Gujarat was organized during 18-24 December, 2000.
- Leadership: The AMCHSS became the secretariat for the Public Health Schools without Walls Networking Initiative, Asia Region. This is a prestigious initiative that includes all public health schools in Asia and is funded by the Rockefeller Foundation.
- TN Krishnan Memorial Seminar and Working Paper Series: The AMCHSS started the TN Krishnan Memorial Seminar and Working Paper Series with the inaugural lecture delivered by Prof. Lincoln Chen on 28<sup>th</sup> January, 2001.

### Special programs

A workshop to discuss the draft code for 'Ethics in Social Sciences and Health Research' was conducted at the Centre on 15 July, 2000. The workshop resulted in a fruitful discussion on the draft code. Suggestions made during the workshop were forwarded to CEHAT, Mumbai.

AMC was selected as the centre to coordinate the process of defining the future form of the PHSWOW Network. The "PHSWOW Network Development. Asia Meeting" was organized during 2-3 February 2001 to identify possible ways of improving Public Health Training and Practice. Over thirty members from far and wide particularly from India, Nepal, China, South Africa, Vietnam, Kenya, Thailand, Zimbabwe, Switzerland, Lebanon, USA attended the meeting.

### Creditable achievements

- All the 16 (sixteen) papers submitted from the centre were accepted by the Scientific Committee

of the XVII INCLEN Global Meeting held at Bangkok, Thailand during 15-18 October 2000. All the papers were presented in the Global Meeting.

- Two proposals, one from a faculty member and another from an MPH student from AMCHSS, to the Alliance for Health Policy and Systems Research, WHO were selected from a global competition involving about 450 similar proposals.

### Status of ongoing/routine activities

Nine students (including two international students) of the 1999-2000 batch successfully completed the MPH programme. A list of dissertations is given below. Currently a batch of 8 students (2000-2001 batch) is working towards completion of their dissertations. From January 2001 another batch of 8 students is undergoing the course at the AMCHSS.

### Dissertations submitted in June 2000

S. No.	Name of the student	Topic
1.	Abraham P George	Solid Waste Management in Thiruvananthapuram City - a case study
2.	Anjan Kumar Nag	Prevalence and Correlates of Hypertension in the Elderly - A community based survey in rural Bangladesh
3.	Anuradha R	Menstrual Hygiene Practices and Reproductive Morbidity: A community based survey in rural Thiruvananthapuram
4.	Jaya Krishnan R	Prevalence of Periodontal Disease and its Association with Tobacco Use
5.	Manu G. Zachariah	Prevalence and Correlates of Hypertension Among the Middle-aged Population in Urban Thiruvananthapuram, Kerala



6. Md. Iftekhar Quasim      Prevalence and Correlates of Hypertension in the Elderly: A community based survey in urban Bangladesh
7. Mrunal Shetye Subash      Prevalence and Correlates of Hypertension in the Elderly: A community based survey in Pune, Maharashtra
8. Shiney C. Alex      Prevalence and Correlates of Hypertension in the Elderly: A rural-urban comparison in Thiruvananthapuram District, Kerala
9. Varkey Abraham K      Evaluation of the Level of Community Integration Among Post-Stroke Patients in Thiruvananthapuram District, Kerala

## PATIENT CARE

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During the year patient care services maintained the highest standard in every field of specialized care. Every department made positive efforts in updating the quality of service to keep it on par with the world standard. There have been many patients from other states and neighboring countries who got treatment in various disciplines during the year.

### **Additions to the Patient Care Services**

#### ***Comprehensive Acute Coronary Care Unit and New Cardiac Catheterization Lab***

The bed strength in the Coronary Care Unit was increased to 17, by addition of 8 more beds. With the acquisition of the most modern digital cardiac interventional lab from Philips the Cardiology Department is currently able to admit patients suffering from acute chest pain directly after a telephonic communication. The CACCU is intended to provide without delay the entire spectrum of recent advances in the management of patients with acute coronary events.

#### ***Cardiac Surgery ICU***

Structural modifications were done in the C.S.I.C.U. and three more beds were added. This has helped to avoid postponement of surgery for want of beds in the ICU.

#### ***New Clinics***

Two new specialty clinics namely Dementia and Behavioural Disorder clinic and a Lipid Clinic were added to the out patient service during the year by the departments of Neurology and Cardiology respectively.

### **Medical Records**

During the year 2000 – 2001, the Medical Records Department added 17,000 new charts to the old collection of 3 lakhs. Out of these charts, 90,325 charts were retrieved for the purpose of patients' treatment, scientific studies of doctors, nurses and paramedical staff and for audit. 30% of charts from filing areas were taken out and issued to the OPDs and collected back, checked the deficiency, rectified and filed in the proper areas. MRD provided statistical information to all users. The bed strength of the hospital was enhanced to 232 with an addition of 10 beds in medical ICU. 24,114 charts of patients, who were not coming for the past 10 years, were separated as inactive.

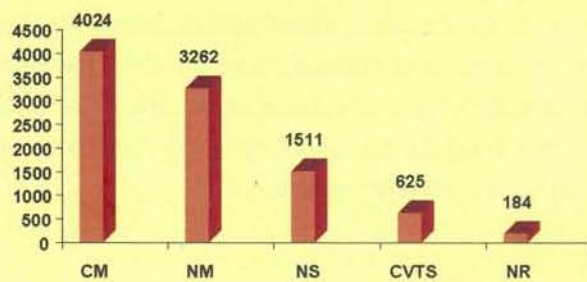
### Hospital Statistics



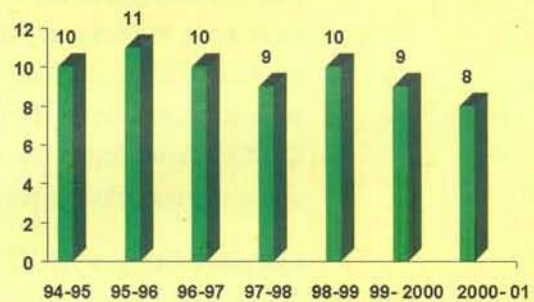
### Paying & non paying of Op & Ip in 2000-2001



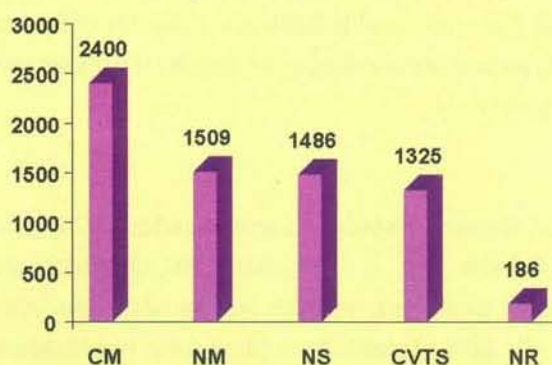
### New Registrations in 2000-01



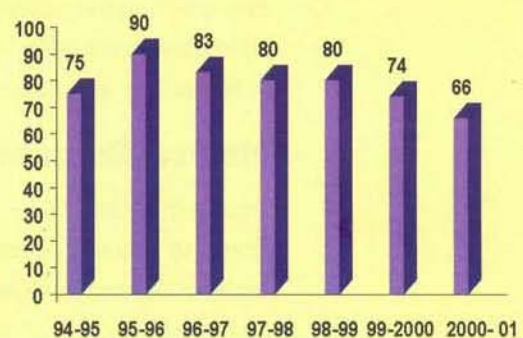
### Average length of stay of Patients



### In-patients in 2000-01



### Percentage of bed occupancy





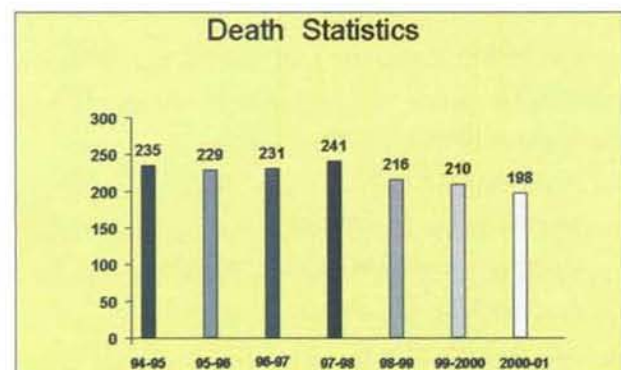
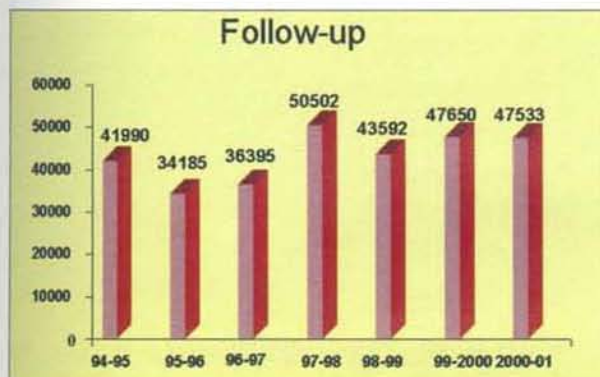
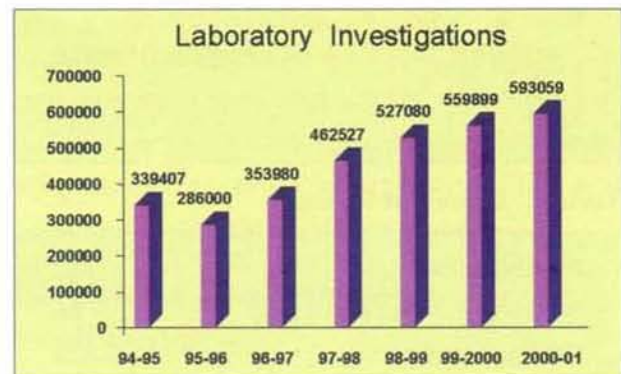
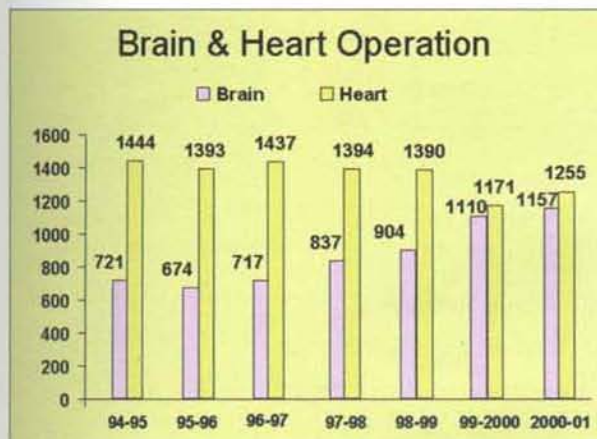


Table 1. Number of Charts Retrieved

Follow up in Special Clinic	47, 633
Correspondence of patients	11, 276
Analytical Studies	7,202
Inactive	24, 114
Internal Audit	100
Total	90, 325

Table 2. Important Statistics

Number of beds	232
Percentage of bed occupancy	66
Cardiac Surgery	1,255
Perfusion	745
Neurosurgery	1,157
New Registration	9,606
Repeat Cases	47,533
Admissions	6,805
Discharges	6,906
Death	198
Average length of stay	8
Bed Turn over rate	30
Mortality rate percentage	3
Operation Mortality rate percentage	4
Autopsy Rate percentage	3
Lab. Investigations	5,93,059
Physiotherapy	26,878
Electrocardiogram	18,657
Echocardiogram	19,000
Transesophageal echocardiogram	262
Pacemaker Implantation	100
Treadmill test	1, 918
Holter	321
Fluoroscopy	2
4 Vessel angio	596
Aortogram and Coronary angiography	45

Aortogram	165
4 Vessel Angio and CAG	1
Bronchial Angio	1
Spinal Angio	23
Pulmonary Artery Angio	1
Barium swallow	14
Barium meal	1
Cysternogram	1
Cystogram	1
Venogram	3
Sinogram	1
Orbital Venogram	1
Intravenous Digital	
Subtraction Angiography	8
Arteriogram	8
Arm arteriogram	1
Bronchial Arteriogram	2
Hepatic Angio	4
CO2 Aortogram	1
Petrosal Sinus Sampling	4
CO2 angiogram	2
Electrode Implant	2
Renal Angio	9
Facial Angio	1
Laser ablation	2
WADA (Intra carotid Amobarbital/ Brevital Test)	33
Angioplasty	19
Peripheral Angioplasty	22
Aortic Angioplasty	3
Vertebral Angioplasty	2
Thrombolysis	24
Embolisation	17
Uterine Artery Embolization	4
Balloon Occlusion Embolisation	8
Caroticoavernous Fistula embolisation	5

Oesophageal Stent	6
Aortic Stent	1
Cerebral Coil Embolisation	24
Dural Arteriovenous Malformation Embolisation	1
Cerebral Histoacryl Embolisation	48
Cerebral Particle Embolisation	9
Shoulder Embolisation Histo A	2
Bronchial Embolisation Histo A	7
Bronchial Embolisation Particle	1
Alcohol Embolisation	10
Spinal Angio Embolisation	6
Nasal Embolisation	1
PTA plus Stenting	7
Oesophageal Dilatation	5
Renal Stent	2
Tumour AVM Embolisation	1
Lip AVM Embolisation	1
Renal Embolisation	1
Hepatic Embolisation	1
Hydrosel Embolisation	2
Carotid Stenting	3
Tracheal Stenting	1
Percutaneous Laser Disc Decompression	4

## Department of Anaesthesiology

Anaesthetic support given during the year

PROCEDURE	NUMBER OF CASES
Cardiovascular & Thoracic Surgery	1225
Neurosurgery	1004
Investigational & Interventional Neurological & Cardiac Procedures	460

Anesthesiologists from Orissa had short periods of training in the department.

## Division of Biochemistry

The central clinical laboratory functioned round the clock providing investigative support in clinical chemistry, hematology and clinical pathology. The total number of procedures crossed 4.6 lakhs which included not only routine tests, but also therapeutic drug monitoring and assay of enzymes like aryl sulfatase A and hexosaminidases A and B.

## Division of Biomedical Engineering

As in previous years, the activities of the Biomedical Engineering Division included the installation of new equipments and maintenance of equipments and utilities, keeping maximum uptime. One of the most important activity for this year was the provision of infrastructure facilities for a number of new extensions and expansions incorporated in some of the other departments, like re-structuring of rooms for installation of a new Cardiology cath lab, re-installation of the electrophysiological lab, new intensive coronary care unit, fourth operation theatre for Neurosurgery department etc. Extension of chilled water lines and medical gas lines, installation of air handling units etc. were completed in record time with minimum expenditure.

Major new installations done in the current year include

- One fully digital cardiac catheterisation lab system for Department of Cardiology.
- Micro-electrode recording system (MER) for Neurology/Neurosurgery combined project.



- Twelve multi parameters monitoring and recording system for use in various ICUs and operation theatres.
- Four portable X-ray units.
- Two automatic film processors.
- One portable EEG machine for neuro-medical ICU.
- One Plasma separator.
- Medical gas line extensions and outlet points in the new Cath Lab, electrophysiology lab, new neurosurgery theater, ICUs etc.
- Three steam sterilizers were installed, one each in cardiac, thoracic and neuro surgery theatres.

Major airconditioning installation and modification work in cardiac catheterization and electrophysiology laboratories, neuro and cardiac surgery operation theaters as well as the central sterilization room were also done. The department continued its training programs for graduate, Diploma and Certificate holders in the concerned branches, observer trainees deputed from other Government institutions and guiding project work of students from other academic institutions.

## Division of Blood Transfusion Services

Our blood bank, a completely voluntary blood bank working round the clock, supports surgical and invasive procedures of this tertiary care hospital, with blood and blood components supported by state-of-the art technology in blood component separation and immuno haematological testing.

On the academic side the one year certificate course in Blood Banking Technology is going on smoothly in



Blood component separation by cell separation-plateletpheresis

addition to regular training program for Blood Bank Medical Officers of the State.

We have collaborating research activities with the Thrombosis Research Unit of the BMT Wing. Hospital Transfusion Committee serves as a forum for better patient care.

### *The new initiatives during the year were:*

Participatory approach to blood donation program in the community with the following aims

1. To spread the knowledge on Blood donation in the panchayats to improve their attitude and practice.
2. To extend the voluntary Blood donor base to the sub urban areas of the city.
3. To promote self-help and self-sufficiency towards voluntary blood donation in the community.

Panchayat model of recruitment of blood donors needs a grass root level approach, which ensures participation of the community. It also means involving the administrative machinery to make the programme a success.

Vilappil Panchayat, of Trivandrum was adopted for the purpose and the monitoring phase of the project has been initiated.

As part of the World Health Day 2000 theme on blood safety, several programs were initiated.

- a. Regular voluntary blood donors were felicitated on April 12<sup>th</sup> 2000
- b. Honorable speaker Sri.M.Vijayakumar inaugurated Vilappil Panchayat – Blood Donor Forum (adopted by SCTIMST).
- c. Release of booklet 'Blood: The Essence of Life' by the Honourable Minister for Health Shri VC Kabir.
- d. A seminar was organized to mark the conclusion of the Panchayat Programm. Dr. K. Narayanan Nair of KRPLLD spoke on "Responsibilities for community Leaders" and released information booklet for panchayat on voluntary blood donation.
- e. Monitoring phase of Vilappil panchayath program was launched in March 2001.

A Megafuge with tetramax for Microplate technique and an automated ELISA washer and reader from NACO were acquired during the year.

## Department of Cardiology

During the year, 4024 new patients were registered in the department and 2400 patients were treated as in-patients. The non-invasive cardiac laboratory performed 18, 657 ECG, 19, 000 Echo cardiograms, 262 transesophageal echo studies, and 1918 tread mill exercise stress tests.

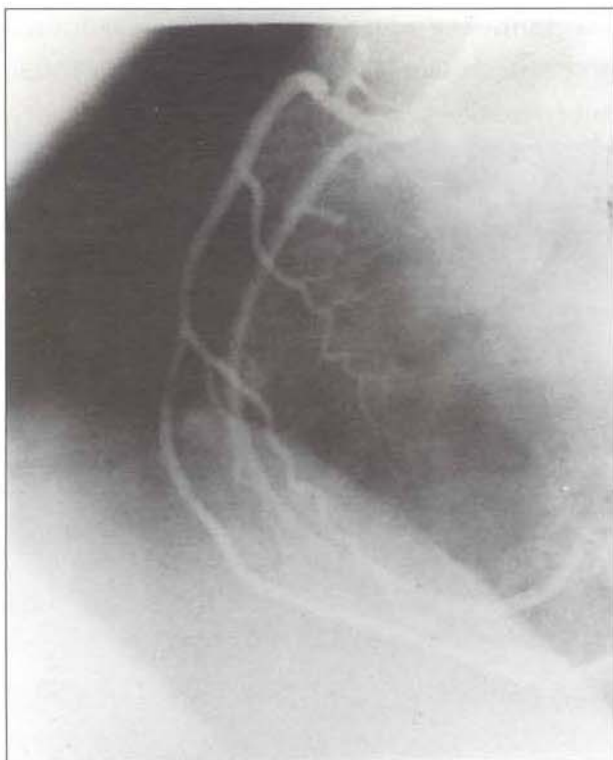
The following invasive and/or interventional procedures were performed in the cardiac catheterization laboratory.

Coronary angiography	953
Cardiac catheterization and studies	381
PTCA and stenting	130
PTMC including Balloon Mitral valvotomy	187
Balloon pulmonary valvotomy	30
Balloon aortic valvotomy	9
Other interventions	5
Pacemaker implantation	100
Electrophysiology studies	14
Radio frequency ablation for arrhythmias	38
Coil/device closure of Patent ductus arteriosus	30
Device closure of atrial septal defect	4

The department achieved significant advances in patient care management, with the commissioning of the comprehensive Acute Coronary Care Unit comprising the new philips Integris 5000 digital cardiac cath lab and a 12 bed Acute Coronary Care Unit by Sri Bachi Singh Rawat, Hon. Minister of State for Science and Technology, Government of India. With the opening of this facility, state of the art acute coronary care including primary angioplasty is available at all times, to patients suffering from myocardial infarction, and various acute coronary syndromes.

Simultaneously, a dedicated Cardiac Electro physiology Lab facility was also commissioned to cater to patients with cardiac arrhythmia. A workshop was





Coronary artery angiogram showing-double right coronary artery



Honorable Minister of State for Science & Technology speaks while commissioning the new acute coronary care unit

conducted on "Cardiac arrhythmia and radiofrequency ablation" on 17th and 18th January 2001 with Dr. Mohanan Nair, Professor, GB Pant Hospital, Delhi as the principal operator.

A collaborative study with Madurai Kamaraj University, on patients with hypertrophic cardiomyopathy, including family survey and genetic mutation studies is ongoing.

### Department of Cardiovascular and Thoracic Surgery

Seven hundred and seventy (770) open heart procedures were carried out during this period. The details are given below:

Congenital cases	240
Coronary bypass surgery	180
Valve surgery	150
Closure of atrial septal defects	180
Aneurysms on CPB	20
Closed Cases	
Pulmonary and general thoracic	130
Vascular	120
Closed mitral valvotomy	30
Patent ductus arteriosus interruption	50
Miscellaneous	155

Over all there was an increase in open and closed cases as compared to last year.

After successfully completing limited clinical trial of the large diameter Chitra graft prosthesis, Ethics Committee has sanctioned multicentric trial in 6 centers including our institute. One hundred cases are expected to be done in one year beginning in July 2001. Simultaneously measures are being taken to transfer the technology.

### Computer Division

Major activities involved software and hardware maintenance for all the user departments,



development of new application softwares and system planning for the future.

### **New Initiatives are given below**

Cabling for gigabit network with 10/100 switches at Surgical Block and Middle Block was completed and users at Middle Block and users of ground floor, third and fourth floors of Surgical Block got connected to the new network through terminal server /switches/hubs. Network layout for Medical Block got finalised. Tender for Medical Block gigabit cables, gigabit switches, routers for connecting Hospital Block to BMT Wing was finalised.

#### **Hardwares added were**

SUN Server E 3500	1
Thin Clients of VXL instruments	20
PC Pentium III , 10 GB HD, 128 MB RAM	10
Printer Epson LX 300	4
Acer Altos 12000 Dual Pentium III	
Xeon Server	1
Switches 3 COM 3500	4
Terminal Server 16 port	3
Hub 8 port	3
Rack 22U	3
Rack 9U	9
Printer TVSE MSP 240	10

On line report generation for MRI/CT was started in the Department of Radiology with facility for correction by doctors anywhere in the Imaging Complex.

### **Division of Microbiology**

Routine Microbiological investigations were carried out in Bacteriology, Virology, and Immunology sections and an increasing trend in the number of investigations was observed.

Studies are in progress under a project titled “ Anti Viral and Anti fungal studies on some indigenous medicinal plants of Western Ghats”. The study is sponsored by the Science, Technology and Environment Committee, Government of Kerala”.

A project titled “Identification and characterization of protective Antigens of *Mycobacterium tuberculosis* with the potential benefits of identifying antigens as vaccine candidate and as reagents for immunodiagnostic tests”, sponsored by STEC is also in progress.

The department is also taking part in a multicentric study involving 21 centres across India- EGAST 2000 sponsored by Pfizer Ltd. Mumbai on antibiotic susceptibility testing and Beta lactamase production among clinical isolates obtained from hospital in patients.

### **Department of Neurology**

The emphasis in the Department of Neurology, in addition to running general outpatient and inpatient care, was the development of subspecialties such as Cognitive and Behavioural Neurology, Epilepsy, Movement Disorders, Neuromuscular, diseases and Stroke. The activities of the department in general and in the subspecialty areas are detailed below:

#### **Epilepsy Section**

The R. Madhavan Nayar Center for Comprehensive Epilepsy Care is the only center in the country dedicated to comprehensive management of persons with epilepsy. During the last academic year, the center accomplished its objectives in all the three areas: Epilepsy care, Epilepsy Education and Epilepsy Research.



Fluoroscopy guided placement of left sphenoidal electrode

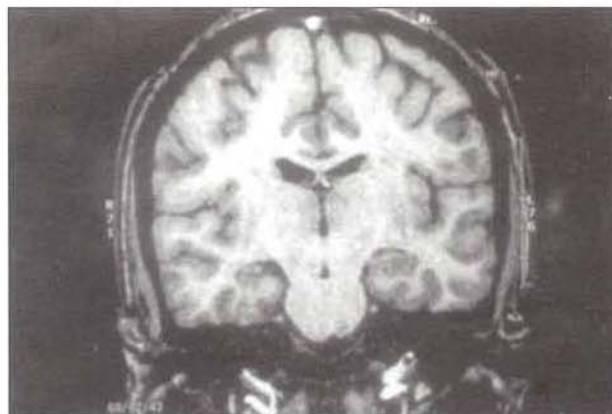


Figure C. Right hippocampal atrophy,

Figure. A, B, C, D: Concordant electro-clinical-radiological correlation in a patient with refractory temporal lobe epilepsy

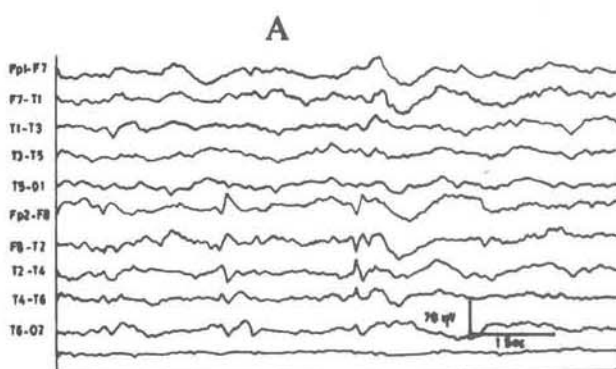


Figure A. Interictal spikes over right temporal region,

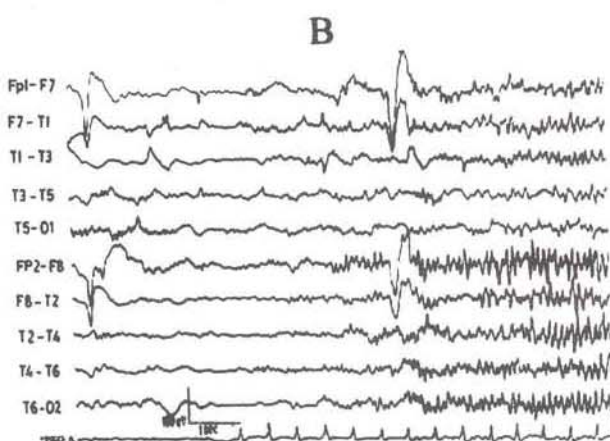


Figure B. ictal discharges over right temporal region



Figure D. Complex partial seizure with deviation of head to right and dystonic posturing of left upper extremity

## Epilepsy Care

In addition to the twice-weekly Epilepsy Clinics in SCTIMST, twice monthly (first and third Sundays) Epilepsy Clinics were regularly conducted in the PHC, Changarankulam, Malappuram District and Ansar Hospital, Perumpilavu in Thrissur District. Through these outreach clinics, modern epilepsy care to the doorsteps of people in the villages. Fifty to 70 patients were examined in each clinic.

Over 300 patients were hospitalized for comprehensive evaluation for epilepsy surgery including EEG, video-EEG, MRI and neuropsychological assessment. Two highlights of the



program were the introduction of prolonged video-sphenoidal EEG recording and refinement of functional hemispherectomy as the treatment of catastrophic childhood epilepsy syndromes. The use of an indigenously modified sphenoidal electrode resulted in cutting down the cost by two-thirds for this procedure. Sixty-one patients underwent surgery for medically refractory partial epilepsy. Yogic relaxation as an adjunct treatment for medically refractory seizures was introduced with the help of Yoga Center for Health Research, Attingal, Trivandrum.

**Patients seen and procedures undertaken from 1, April 2000 to 31, March 2001**

<b>Patients</b>	<b>Number</b>
Epilepsy Clinic attendance	4830
Outreach Epilepsy Clinic attendance	1140
Epilepsy Ward admissions	334
<b>Procedures</b>	
Electoencephalogram	2485
Video EEG	241
Sphenoidal EEG recording	22
Neuropsychological evaluation	529
Number of Epilepsy Surgery	61

### **Epilepsy Education**

Before each epilepsy clinic, patients and their families were provided with information about various aspects of epilepsy for one hour. A medical social worker and a psychologist moderated this session. Educating the patient and the caregivers about positive aspects of life in epilepsy is an important aspect of comprehensive epilepsy care. Similar sessions were carried out for the public and general practitioners through the outreach program.

On the National Epilepsy Day, 17<sup>th</sup> November 2000, a patient awareness and education program was organized. Marriage and epilepsy was the theme of this session. In addition to medical aspects, societal and legal aspects of epilepsy in women were highlighted. An epilepsy camp was conducted in Tirunelveli on 25, March 2001 with the help of Rotary Club, where a talk about recent advances in epilepsy care was delivered.

### **Neuromuscular Section**

Number of clinic attendance	984
Number of nerve conduction studies	678
Number of electromyography studies	380
Visual evoked potential	118
Number of small/large volume plasma exchange	54
Number of thymectomies	24

All children admitted with Acute Flaccid Paralysis (AFP) were investigated according to the protocol laid down by WHO which includes Polio viral studies by Pasteur Institute at Coonoor.

### **Movement Disorder Section**

Honourable Chief Minister of Kerala Sri. EK.Nayanar inaugurated the Comprehensive Care Center for Movement Disorders on June 25<sup>th</sup>, 2000.

Number of clinic attendance	989
Number of Botox injections administered	54
Deep brain stimulation – (MER guided)	12
Various other surgeries	22

The program acquired an intraoperative microelectrode-recording (MER) machine for intraoperative neurophysiological targeting during functional surgery for movement disorders. Our functional program for movement disorders is the first



and until now, the only program in India which utilizes intraoperative electro physiology for movement disorder surgery. The funding for the purchase of this equipment was provided by a donation from the Kerala State Beverages Corporation for the development of the Comprehensive Care center.

### Stroke Section

Number of Clinic attendance	1015
Number of speech therapy sessions	564

A 45 minutes session is conducted before the stroke clinic educating the patients on various rehabilitative and preventive aspects of stroke, moderated by an occupational therapist.

### Cognitive and Neurobehavioral Section

Streamlining of the Cognition section (CBNC) was done and the activities of the Memory and Neurobehavioural Clinic (MNC) was changed to focus on adult acquired cognitive problems.

Number of clinic attendance	182
Number of speech therapy sessions	883
Number of patients underwent neuropsychological evaluation	87
Number of audiometry cases	182
Number of speech evaluation	136

### Department of Neurosurgery

With the commissioning of the fourth operation theatre during the last year the volume of operative work increased substantially. Vascular and skull base surgery constituted majority of our operative workload. However neuroendoscopy, epilepsy surgery, surgery for movement disorders and spinal instrumentation were our thrust areas during the year.

Vascular	158
Cerebello pontine angle	48
Sellar/sup rasellar	93
Skull base	23
Epilepsy	58
Surgery for movement disorders	28
Stereotactic procedures	42
Endoscopy	38
Posterior fossa tumours	52
Spine	153
Craniovertebral junction	54
Supratentorial tumours	182
Others	228

### Division of Pathology

The three routine activities in the department include diagnostic services to the hospital, teaching the post-graduate students and research on neuro and cardiac diseases. During the year more than 1200 surgical specimen from neuro and cardiothoracic operations were analysed. Intraoperative rapid tissue diagnosis (frozen section) was offered in 380 cases and muscle biopsies were performed in 45 cases. Immunopathological investigations were performed in 2100 cases.

### Department of Radiology

Investigations and Procedures done during the year are given below.

Procedures	Number
Plain X-rays	23,411
CT Scan	3,665
MRI Scan	2,921
Ultra Sound Scan	3,009

Interventional procedures done during the year are listed in the report of Department of Medical Records.

#### *Other activities*

1. Bronchial tumor ablation, resection of haemangioma and the resection of lung were done in the division of CVTS under the assistance of laser division of our department.
2. Laser ablation of osteoid osteoma was done in 5 cases.
3. Tracheal stenting, started towards the end of 1999 was continued and six cases in total have been done so far, with good results. Our series is one of the largest in the country with good results.

## Major equipments costing Rs. 50,000/- and above purchased during the year

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(a) Direct import  
Hypothermia machine  
Heart Lung machine  
Elisa Readers  
Blood Gas Analyser  
LCD Projector  
Performix Tube for CT Scanner  
Peristaltic pump system  
Rotary Evaporator  
Height measuring system  
Analytical balances  
Gaussemeter  
Microbiological safety cabinet  
Electrophoresis system & Densitometer  
Switches for networking  
Ultra low temp freezer  
Monitoring system  
IC Ventilators  
Diathermy unit  
Operation Theater Table  
Anaesthetic Machine  
Brain Stimulator  
Digital Camera  
Endoscope system  
Refrigerated Centrifuge  
Operating Microscope (up gradation)  
Medical freezer  
b. Import Indigenous  
MRI tube  
Portable X-ray machine (3 units)  
Chromatography Integrator  
Film Processor ( 2units)  
Pulse Oximeter  
Infusion Pump ( 7 units)  
MRI Compatible pulse Oximeter  
Video Projector  
Visual presenter  
Pulse Oximeter  
c. Indigenous: Distiller, Gamma Counter



## ACADEMIC ACTIVITIES

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### *Student Enrolment*

The student strength for DM/MCh degrees and Post Doctoral Certificate Courses during the year was 56.

The Master of Public Health degree programme has 16 scholars including a candidate from Bangladesh.

The Institute has, as of now, 20 scholars for the Ph.D programme, 19 scholars enrolled for the Post Basic Nursing Certificate programme and 25 scholars for the various Diploma programmes.

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

#### **DM (Cardiology)**

Kannan B.R.J., MD  
Rakesh P. Gopal, MD  
Santhosh Kumar Dora, MD  
Rajeev K.G., MD  
Krishnakumar, MD  
Anand Srinivasan K., MD  
Sonny P. Jacob, MD  
Krishnakumar Nair., MD  
Rajeev E., MD  
Siva Subramaniam P., MD  
Balu Vaidyanathan, MD  
Hemant Madan, MD  
Nirmal Kumar P., MD

#### **DM (Neurology)**

Mahalekshmi P., MD  
Boby Varkey M., MD  
Rajesh R., MD  
Anu Jacob, MD  
Ashalatha R., MD

Sanjeev V.K., MD  
 Vinayan K.P., MD  
 Sreekumar J., MD  
 Rajesh B., MD  
 Parameswaran K., MD  
 Somarajan A., MD

### **DM (Neuro Radiology)**

Krishnamoorthy, MD  
 Dandu Ravi Varma, MD  
 Sukalyan Purkayastha, MD

### **MCh (Cardiovascular and Thoracic Surgery)**

Sameer S Divale, MS  
 Bishnu Kr. Deka, MS  
 Girish Warriar, MS  
 Amit Mishra, MS  
 Anbarasu M., MS  
 Paresh.P Shah, MS  
 Baiju.S.Dharan, MS  
 Anand K.T., MS  
 Milan Kundu, MS  
 Murugu Sundara Pandiyan R., MS  
 Manoranjan Misra, MS

### **MCh (Neurosurgery)**

Anudath. K.B., MS  
 Rajesh B.J., MS  
 Easwer H.V., MS  
 Mathew Abraham, MS  
 Sanjeev Kumar, MS  
 Muthu Retnam, MS  
 Sudish Karunakaran, MBBS  
 Purushothama Rao T., MS  
 Rajeshkumar J., MS  
 Somesh Desai, MS

### **PDCC Anaesthesiology**

Hari R., MD  
 Shikha Gupta, MD  
 Manoj Subramanian, MD  
 Biju Sekhar, MD  
 Nilesh Manohar Juvekar, MD  
 Abdul Vahab T.T., MD

### **PDCC Radiology**

Sheik Akbar Hussain, MD

### **PDCC Vascular Surgery**

Sreekumar R.C., MS

### **Ph.D Candidates**

Balu K. Chacko  
 Sangeetha S.R.  
 Indira Adiga  
 Kumaran.C.  
 Resmi K.R.  
 Manju L.  
 Sumi Mary George  
 Sheela George  
 Suneesh Kumar  
 Abiraman  
 Vijai J.  
 Vinoy Thomas  
 Shiney Velayudhan  
 Santhosh Kumar T.R.  
 Preeta. R  
 Anilkumar P. R.  
 Krishnaprasad. C  
 Leena Kuruvila  
 Biji Balakrishnan  
 Elizabeth George

**Master of Public Health**

Hemachandran  
 Saiju Hameed  
 Betty Susan Nainan  
 Deepa Mathew  
 Joe Varghese  
 Roy. N  
 Biju Gopinath  
 Md. Shafiul Islam  
 Rohina Joshi  
 Sandeep. K  
 Ajay V.S.  
 Pradeepkumar. K.P.  
 Jeemon. P.  
 Rani K.R.  
 Manju Nair, R.  
 Paul Kumaran P.

**Candidates awarded Ph.D Degree**

Scholar's Name	Thesis title	Guide
Sindhu.C.P	Species Prevalence, strain Charac-terization, antibiotic/non-antibiotic susceptibility and epidemiology of nosocomial pathogens in cardiac surgery patients.	Dr. Shanmugam
Santhosh Kumar T.R	Tissue engineered biomaterial surfaces using endothelial cells and bio adhesives to reduce thrombogenicity.	Dr. Lissy K. Krishnan

**List of successful candidates for DM MCh**

Name of candidates	Degree	Speciality
Jayakumar T.G	DM	Cardiology
Padmakumar. R	DM	Cardiology
Ravichandra. M	DM	Cardiology
Ahsan Moosa N.V	DM	Neurology
Hariprasad K.V	DM	Neurology
Joy M.A	DM	Neurology
Robert Mathew	DM	Neurology
Kalpesh Malik	MCh	CVTS
Praveen Varma	MCh	CVTS
Raja Joshi	MCh	CVTS
Rakesh Kumar Goyal	MCh	Neurosurgery
Mohd. Irfan Siddiqui	MCh	Neurosurgery

**List of successful candidates –  
Post Doctoral Certificate Programme**

Ramakrishnan S	Anaesthesiology
Kalla Amit Dharanidhar	„
Jairam Paniker	„
Asha. R	„
Hema Chandrasekharan Nair	„
Shivakumar. H	„
Bimal Kumar. P	Radiology
Hemanth Kumar	
Pandhar Purkar	Vascular Surgery

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

Shetye Mrunal Subash  
 Varkey Abraham  
 Shiney C. Alex  
 Abraham Pavooreth George  
 Anuradha R  
 Jayakrishnan R  
 Anjan Kumar Nag  
 Md. Iftekhar Quasem  
 Manu G. Zachariah



### List of successful candidates for Post Basic Certificate Programme

	Cardiac Nursing
Bindu. K. Joseph	„
Grace Jeslic Eliazar	„
Joby Paul	„
Lalymol Thomas	„
Renimol Philip	„
Sreekala K.S	„
Suma. B	„
Sumi Anto	„
Susan Abraham	„

	Neuro Nursing
Babitha Nelson	„
Bindu Joseph	„
Cimi S. John	„
Manju Joseph	„
Mini Mathew	„
Nimmi Jose	„
Porkodi N	„
Shiji John	„

### List of successful candidates for – Diploma and Certificate Programme

Anil Kumar S	Cardiac Lab Technology
Sabeena H	„
Sneha S.S	„
Preetha Govind G	Neuro Technology
Vishnu M.S	„
Maya T.V	Operation Theatre Technology
Safeer A	„
Sindhu D. R	Clinical Perfusion Technology
Gayatri V. S	Medical Record Science
Manju S	„
Ajithkumar D.R	Advanced Medical Imaging Technology
Rajeev C.P	„

Roy Jacob	
Resmi K Raju	Blood Banking Technology
Jyothi M	„

### Nursing Education

A Nursing Education Cell was formed in order to promote Continuing Nursing Education for nurses and class IV employees.

Two training programmes were conducted at the Institute for Nurses from Government Hospitals of Kerala. The programmes were aided by DAHS, Govt. of India. The theme was “Update In Critical Care Nursing”. There were about 35 participants, each time.

In response to an invitation from PSG College of Nursing, Coimbatore, a team of 4 Nursing Experts (Mrs. V. Harikrishnan, Nursing Supdt, Mrs. P.P. Saramma, Instructor in Nursing, Mrs.S. Sudhamaniamma, Ward sister (CSICU) and Mrs. Hepsebah Sella Rani, Senior Grade Staff Nurse (CSICU) conducted a workshop on ‘Critical Care Nursing’ at PSG College of Nursing.

The thirteenth batch of Cardiovascular and Thoracic nursing and the ninth batch of Neuronursing students successfully completed their programme in December 2000. There were 18 graduates this year adding up the total number to 176, over the past 13 years. Currently 19 students are undergoing training in these two programmes.

Nursing students from Institutions all over the country were provided clinical experience for periods varying from two weeks to one month. Twenty-two post-graduate students from 4 institutions and 143 graduate students from three Institutions utilized the clinical field of this Institute for their study purpose.

Nursing students from Karolinska Institute, Sweden also visited the Institute on two occasions during the current year. The details are given below

Institution	Progr- amme	Dura- tion	No. students
1. Fr. Muller's College of Nursing Managalore	MSc(N)	4 wks	6
2. Omayal Achi College of Nursing Tamil Nadu	M.Sc(N)	1 day	8
3. College of Nursing Thiruvananthapuram	M.Sc(N)	2 wks	4
4. College of Nursing Kozhikode	M.Sc(N)	1 wk	4
5. College of Nursing, Thiruvananthapuram	B.Sc (N)	2 wks	72
6. College of Nursing Kottayam	B.Sc (N)	2 wks	34
7. College of Nursing Kozhikode	B.Sc (N)	2 wks	37
8. School of Nursing, Catherine Booth Hospital	GNM	One day	21
9. Karolinska Institute, Sweden	GNM	One day	11
10. Karolinska Institute, Sweden	GNM	One month	2

Quiz programme for nursing staff & students continued on a monthly basis, with the help of computer network.

## Student Projects in Biomedical Technology Wing

*Name of the Student (s):* Rakhesh V., and Viji V.R.  
*Degree* : M.Sc.

*Institution:* Department of Physics, Kerala University, Trivandrum

*Worked under* : H.K.Varma, Bioceramics Lab

*Title of the project* : Sintering characteristics of precipitated hydroxyapatite bioceramic powders prepared at two different temperature

*Name of the Student:* Dr. Shamsheer K.M.

*Degree* : MDS

*Institution:* Department of Physics, Kerala University, Trivandrum

*Worked under* : H.K.Varma, Bioceramics Lab

*Title of the project* : Comparative evaluation of chitra (HAP) granule and ossopan -chitosan sol in the management of periodontal infrabony defects - a clinical study

*Name of the Student:* Dr. Suja Thomas.

*Degree* : MDS

*Institution:* Department of Conservative Dentistry and Endodontics, Dental College, Trivandrum

*Worked under* : H.K.Varma, Bioceramics Lab

*Title of the project* : Comparison of the bone regeneration potential of chitra hydroxyapatite-bioglass composite with biogran for bone defects in animal models

*Name of the Student* : Alice P.J.

*Degree* : M.Pharm.

*Institution:* College of Pharmaceutical

Sciences, Medical College, Trivandrum

*Worked under* : C.P.Sharma, Biosurface Technology

*Title of the project :* Formulation and evaluation of alginate encapsulated chitosan microspheres for oral insulin delivery

*Name of the Student :* Manjusha K.K.

*Degree :* M.Sc.

*Institution:* Department of Chemistry, University of Calicut, Calicut

*Worked under :* A. Jayakrishnan, Polymer Chemistry

*Title of the project :* Studies on surface grafting of cyanuric chloride-activated Tween-20 onto poly(ethylene terephthalate) and polyurethane

*Name of the Student :* Radhika T.

*Degree :* M.Sc.

*Institution :* Department of Applied Chemistry, Cochin University of Science and Technology.

*Worked under :* A. Jayakrishnan, Polymer Chemistry

*Title of the project :* Preparation and characterization of some azide containing polymers

*Name of the Student :* Nisha, V.S.

*Degree :* M.Sc.

*Institution :* Department of Chemistry, Catholicate College, Pathanamthitta

*Worked under :* A. Jayakrishnan, Polymer Chemistry

*Title of the project :* Synthesis, characterization and copolymerization of a new iodine-containing vinyl monomer

*Name of the Student :* Pradeesh T.S.

*Degree :* M.Tech.

*Institution:* Dept. of Poplymer Science & Rubber Technology, Cochin University of Science and Technology.

*Worked under :* P.Ramesh, Polymer Processing Lab

*Title of the project :* A class of microspheres for emerging biomedical needs

*Name of the Student :* Meenu V.

*Degree :* M.Tech.

*Institution:* Dept. of Poplymer Science & Rubber Technology, Cochin University of Science and Technology.

*Worked under :* P. Ramesh, Polymer Processing Lab

*Title of the project :* Studies on preparation of microstructural microspheres with special reference to DNA separation

*Name of the Student :* Rejani G.V.

*Degree :* M.Sc.

*Institution:* Dept. of Applied Chemistry, Cochin University of Science and Technology.

*Worked under :* V. Kalliyankrishnan Dental Products

*Title of the project :* Development and evaluation of properties of novel dual cure dental restorative systems

*Name of the Student :* Jancy Mathew.

*Degree :* M.Sc.

*Institution:* Department of Chemistry, Catholicate College, Pathanamthitta

*Worked under :* V. Kalliyankrishnan, Dental Products

*Title of the project :* Shelf life studies of dual cure dental composite pastes

*Name of the Student :* Johnsy George.

*Degree :* B. Tech

*Institution:* School Technology and Applied Sciences, Mahatma Gandhi University, Kottayam

*Worked under :* Prabha. D.Nair, Polymer Analysis Lab

*Title of the project :* Intelligent semi-IPN of polyurethane for medical applications



*Name of the Student* : Seema A.M.

*Degree* : M.Sc.

*Institution:* Dept. of Applied Chemistry, Cochin  
University of Science & Technology

*Worked under* : K.Sreenivasan, Polymer Analysis Lab

*Title of the project* : Synthesis and evaluation of  
hydrophilic copolymers based on  
hydrophobic vinyl acetate and methyl  
methacrylate

*Name of the Student* : Anitha Nair V

*Degree* : M.Sc.

*Institution:* Department of Chemistry, University of  
Calicut, Calicut

*Worked under* : M.Jayabalan, Polymer Division

*Title of the project* : Studies on the copolymers of poly  
(propylene fumarate) as biodegradable  
Materials

*Name of the Student* : Tressia Alias Princy Paulose

*Degree* : M.Sc.

*Institution:* Department of Applied Chemistry, Cochin  
University of Sci. and Technology.

*Worked under* : M.Jayabalan, Polymer Division

*Title of the project* : Studies in biodegradable  
polyester composites for orthopaedic  
applications

*Name of the Student* : Geetha V.

*Degree* : M.Sc.

*Institution:* Department of Biotechnology, Cochin  
University of Science and Technology

*Worked under* : Lissy K. Krishnan

*Title of the project* : Standardisation of an electrolyte  
medium for platelet storage

## TRAINING PROGRAMS IN OTHER DIVISIONS

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### *Division of Cellular & Molecular Cardiology*

Dr. K G.Raghu (Scientist, CDRI, Lucknow) underwent short-term training in the technique of isolation and culture of cardiac myocytes from adult rats. After the training he has been successful in establishing the procedure at his department.

Myna T Achar, a final year medical student from Bangalore Medical College spent two months in the division as a summer research fellow of Indian Academy of Sciences.

### *Computer Division*

A 10 days course on usage of 'Windows & MS Word' was arranged by the Computer Division for all the staff of Administration, Purchase, Accounts and Medical Records with the help of Sramik Vidya Peeth and certificates were issued.

### *Hospital Management*

Observer trainees were admitted to Physiotherapy and Dietary Departments. Apprentice training in Medico-social work was given to candidates with social science background. Hospital Management trainees from M.G. University, Kottayam were given orientation and guidance in fulfilling their project requirements.

### *Department of Medical Records*

23 Medical Documentation students of MG University Kottayam have attended one- month training programme from our Computerized MRD.

Four Medical Documentation students did their project work under the guidance of SMRO for 2 months in different topics of medical record management.

The first batch of PGDMRSc students successfully completed their 2 years training programme. The second and third batch of students are continuing their training.

### *Division of Microbiology*

Seven postgraduate students underwent training of 3 months duration in the division of Microbiology during the last one year.

MSc Biotech students of Kerala University spent 3 days in Virology lab.

### *Department of Neurosurgery*

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

## Functions, Workshops and Conferences

### National Science Day

The Institute celebrated Science Day on 3<sup>rd</sup> March 2001 by organizing a lecture and slide demonstration on Information Technology and Science Education as well as a symposium on Biomaterials. The special program was for postgraduate students from diverse science disciplines and with aptitude for research.

Prof. K. Mohandas, Director gave the Science Day address. Sri. Raju Narayanaswamy IAS, State Coordinator SCERT delivered the Sir CV Raman Memorial Lecture. Professor CC Kartha, Dean paid tribute to Sir CV. Raman and recited the events, which led to the discovery of the Raman effect. Mrs.G.Geetha conducted the slide seminar. The symposium on Biomaterials discussed topics such as Materials in a biological environment, Polymers in medicine, Composite materials in Dentistry and Bioceramics. Dr. Mira Mohanty, Dr. A.Jayakrishnan, Dr.V.Kalliyanakrishnan and Dr.HK Varma spoke. Dr.AV. George, Registrar welcomed the gathering.



Mr. Raju Narayanaswamy on National Science Day delivering Sir. C.V. Raman memorial lecture

### Workshop on Ethical Issues

An international workshop on "Ethical Issues in Health Research in South Asia" was organized at Achutha Menon Center from 29 January to 1 February, 2001. Over seventy-five eminent scholars from fifteen countries such as India, Switzerland, South Africa, Zimbabwe, Lebanon, USA, Pakistan, Sri Lanka, Bangladesh, Nepal,





Former Chief Justice of India Sri. Venkateshiah inaugurates workshop on Ethical Issues in Health Research in South Asia

Myanmar, Thailand, China, Kenya and Vietnam participated in the workshop. The objective of the workshop was to bring together participants in South Asia to share experiences and initiated a dialogue on formulating broad ethical guidelines for international health research that take into consideration the differences in cultures, politics, wealth, standards of care, individual and group rights etc. Former Chief Justice of India Sri. Justice Venkateshiah inaugurated the workshop, which was co-sponsored by the ICMR, NIH and Harvard School of Public Health.

### **Workshop on Interventional Neuroradiology**

The department of Radiology conducted a two-day workshop on Interventional Neuroradiology on 24 & 25 of February 2001. The workshop focussed on unique neuroradiology problems, endovascular treatment such as embolisation of arteriovenous malformations in the brain and the relatively new procedure, vertebroplasty. Dr. Kiren Murphy from

Johns Hopkins Hospital, USA demonstrated vertebroplasty. In this procedure, vertebra affected by conditions such as osteoporosis is strengthened by injecting bone cement using a wide bore needle under fluoroscopic guidance. Professor J. Moret and Professor Luc Picard from Nancy, France, pioneers of many neurointerventional procedures demonstrated various methods of tackling complex AVMs in the brain. The use of newer occlusal materials like onyx was discussed. Specialists from University institutions and other leading academic institutions attended the workshop.

### **Workshop on Neuroendoscopy**

A national workshop on Neuroendoscopy and minimally invasive neurosurgery was organised by the department of Neurosurgery in February 2001. Dr. Axel Pernesky, Professor of Neurosurgery, Johannes-Gutenberg University, Mainz, Germany conducted the workshop.



Training Workshop Conducted at Our Blood Bank by National Institute of Biologicals New Delhi for Blood Banks in the State.



Minister of State for Railways and Parliamentary Affairs Inaugurates the Official Language Workshop



### **Workshops in Blood Bank Techniques**

Our Blood Bank was identified as a Regional Training Center for HCV screening in the State by the National Institute of Biologicals, New Delhi. As a prelude to introduction of mandatory testing of HCV in blood banks, four workshops were conducted in May & June 2000 for participants from 35 Blood Banks in the State. They were given hands on training in ELISA techniques.

In accordance with the decision of Hospital Transfusion Committee, an outreach service programme was initiated for the supply of blood and components to outside hospitals in and around Trivandrum City.

Employees from Hindustan Latex Limited were given training in blood administration activities as part of their training and development programme in July 2000.

A CME on 'Clinical Transfusion Practice' was organized for clinicians and nurses from hospitals in Trivandrum district.

### **Official Language Workshop**

Hindi fortnight celebrations were jointly organized by the TOLIC & the Institute. An official language workshop was conducted by the Institute, which marked the beginning of the celebrations. Sri.O.Rajagopal, Minister of State for Parliamentary affairs and Railways inaugurated the workshop on 11.01.2001. Sri. V.S. Sivakumar MP presided.

### **Library and Information Center**

During the year the library added 1284 books and 444 bound volumes to its collection. Hospital wing library have now its stock with 11176 books and

12759 bound volumes and in BMT wing library have 8765 and 4902 respectively. The Hospital wing library subscribed to 125 journals and received 23 journals as gratis while BMT wing received 85 and 15 journals respectively.

The number of permanent members increased to 545 and temporary users to nearly 100. Approximately 350 members from other institutions have used our library during the last year.

### **Information services**

The accesses to important databases and E- journals sites through INTERNET were provided to the members. This helped them to read or download the journal articles and other information resources from the websites. EMBASE on Neurological sciences and Cardiac sciences in CD-ROM, Current Contents on Diskettes on three subject, Engineering and Technology, Life sciences and Physical, Chemical and Earth Sciences were the major secondary sources of Information searched by the library members during the year.

In co-operation with DELNET (Developing Library Network, Delhi), the library provided Document Delivery Services to the Members, which facilitate the users to collect photocopies of the documents/ articles that were not available in our library or in local libraries. During the year, more than 300 documents were delivered to the members on their requests.

**New Developments:** Library designed a website which was linked to the Institute's site. One part of it deals with the details of library services, facilities, timings, and library rules. Other part provides websites of various medical resources that help you to find out relevant information in the fields of Cardiac Sciences, Neurosciences, Anesthesiology, Radiology, Nursing,



Pharmacology, Library Science and Computer Science. Web pages of Electronic Journals and E- Journal publishers of different areas will help to download the abstract/ full text of the original articles. Facilities for obtaining instructions to authors, title conversation of medical journals and free content page registration have also been included.

Library implemented BARCODE system to issue/ return books/ journals and this facilitated quick and error- free service.

### **Public Relations**

Public Relations section continued to be responsible for media coverage of the Conferences, Seminars and

other functions organized by the Institute. It was also responsible for the publication of the in house journal- 'The newsletter' and health education services.

An official language team from DST headed by Smt. Vimala Yadav, Director Official Language visited the Institute. The inspection team spent 4 days from 19.03.2001 to 22.05.2001 to familiarize with the activities.

The section organized the INDO FRENCH council meeting from 30.10.2000 to 3.11.2000. The team consisted of 11 French and 11 Indian Scientists. The section received a grant of Rs. 1, 50000/- from State Bank of Travancore for health educational publications.

## Externally Funded Research Projects

### Achutha Menon Center

Sl No	Principal Investigator/ Responsibility	Project Title	Funded By	Duration	Status
1	Dr. K R Thankappan	PHSWOW Network Development	The Rockefeller Foundation	1 year	On- going
2	Dr. K R Thankappan	Detection and Monitoring of Hypertension in Kumarakom	KRPLLD, CDS Trivandrum	1 year	On- going
3	Dr. K R Thankappan	Surveillance of CVD risk factors	WHO/ Government of India	1.5 year	On- going
4	Dr. K R Thankappan	Current Status of Service delivery in RCH program	Government of Kerala (European commission)	7 months	On – going
5	Prof.CAK Yesudian TISS, Mumbai/ Dr. K R Thankappan.	Developing research capacity of NGOs in India	The Rockefeller Foundation	3 years	On – going
6	Dr. Mala Ramanathan	Abortion. Situational analysis MTP services in India	The Rockefeller Foundation, Ford Foundation	1.5 years	On – going
7	Dr.Sundari Ravindran Dr. Mala Ramanathan	TB/STI/ HIV	WHO, SEARO	1.5 years	On – going
8	Dr.Sundari Ravindran Dr. Mala Ramanathan	Reproductive and gender program	Ford Foundation	3 years	On – going
9	Dr. D Varatharajan	Idle capacity in govt. hospitals in Kerala	WHO, Geneva	I year	On - going
10	Dr. D Varatharajan	Strengthening PHCs through panchayath raj	Helponet	11 months	On - going

11	Dr. Mohanan Nair	Health manpower study in Kerala	Kerala Government (European Commission)	1 year	On – going
12	Dr. Joe Varghese	Resource allocation decisions by the Panchayaths.	WHO Geneva	6 months	On going

### Biomedical Technology Wing

1	Dr. Annie John	Biodegradation of calcium phosphate based ceramics in bone	DST, Gov. of India	3 years	Completed
2	Dr. T. Anoopkumar	Identification of molecular basis of temporal lobe epilepsy	STEC, Kerala	3 years	Completed
3	Dr. T. Anoopkumar	Quality assurance for health care in India: physical standards	World Bank/ Ministry of Health & Family welfare	8 months	Completed
4	Dr. T. Anoopkumar	Identification of the promoter region of human synaptotagmin 1 by 5'RACE	STEC, Kerala	3 years	Ongoing
5	Dr.GS Bhuvaneshwar	Development of diamond like coatings for medical and other applications	IFCPAR, New Delhi	3 years	Ongoing
6	Dr.Lissy Kalliyanakrishnan	Experimental evaluation of endothelialized biomaterial for vascular implants	DST, Gov. of India	3 years	Ongoing
7	Dr.PP Lizymol	Development and biocompatibility studies of organically modified ceramic for medical applications	DST-SERC Fast track young scientist scheme	3 years	Ongoing



8	Dr. Manoj Komath	Apatite calcium phosphate bone cements	STEC, Kerala	2 years	Ongoing
9	Dr. TV Kumari (supervisor of DBT fellow Bindu Menon)	Evaluation of biological response of hepatocytes to certain polymeric biomaterials using <i>in vitro</i> culture systems	DBT, Gov. of India	2 years	Ongoing
10	Dr. TV Kumari	Osteogenic potential of biomaterials	SCTIMST Technology Development Committee	2 years	Ongoing
11	DS Nagesh	Blood pump control & monitoring unit with disposable centrifugal pump head for extracorporeal cardiopulmonary bypass	DST, Gov. of India	3 years	Ongoing
12	Dr. Prabha D Nair	Biopolymers for medical applications	STEC, Kerala	3 years	Ongoing
13	Dr. P Ramesh	Hydroxyapatite-ethylene vinyl acetate copolymer composites for bone substitute applications	DST, Gov. of India	3 years	Ongoing
14	Dr. P Ramesh	Development of non-toxic latex formulation for biomedical applications	DST, Gov. of India	3 years	Ongoing
15	Dr. CP Sharma	Stimuli sensitive polymeric nanoparticle based advanced drug delivery systems for cancer, diabetes and antibacterials	New millennium Indian technology leadership initiative of CSIR	2 years	Ongoing

### Industry sponsored projects

	Project Title	Investigator	Funding agency	Duration of the Project
1	Biofunctional evaluation of an endovascular stent-preclinical evaluation in porcine model	Dr.Arthur Vijayan Lal	Sahajan and Technovention, Gujarat	2 years
2	Development of a hollow fiber based membrane oxygenator	Dr.GS.Bhuvaneshwar	SPIC Pharma Ltd., Madras	2.5 years
3	Dental Composite: Scale up and multi-centric evaluation	Dr.V. Kalliyana krishnan	Dynamic Orthopaedic Pvt.Ltd., Aluva	1 year
4	Silverisation of wound dressing	Dr.K. Sreenivasan	Dynamic Orthopaedic Pvt.Ltd., Aluva	6 months
5	Fibrin glue and sheet – scale up and multi-centric evaluation	Dr.Lizzy Kalliyanakrishnan	ATMRE Ahmedabad	8 months

### Hospital Complex

Sl. No.	Investigator	Project Title	Funding Agency	Duration	Status
1	Dr. KS Iyer	Coconut oil and incidence of coronary artery disease in Kerala	Coconut Development Board, Ministry of Agriculture, New Delhi	3 years	Ongoing
2	D. Jayachandran	Group intervention and psychosocial care of Epilepsy	Indian epilepsy Association/ International epilepsy Trust	2 years	Ongoing
3	Dr. CC Kartha	Molecular basis of endomyocardial fibrosis	DST, Gov. of India	3 years	Ongoing

4	Dr. CC Kartha	Vitamin D and its relationship to coronary artery disease in a tropical population	BRNS, Dept. of Atomic Energy	2 years	Ongoing
5	U Kandaswamy	Participatory approach to voluntary blood donor programme in the community	KRPLLD, CDS	2 years	Completed
6	Dr. MK Katti	Identification and characterization of protective antigens of <i>Mycobacterium tuberculosis</i>	STEC, Kerala	3 years	Ongoing
7	Dr. A Kishore	Movement Disorders	Kerala State Beverages Corporation	5 years	Ongoing
8	Dr. A Kishore	Drug trial in Parkinson's disease	Schwarz Pharma, Germany	3 months	Completed
9	Dr. K Radhakrishnan	Phenotypic and genotypic characterization of primary generalized epilepsies	JNCASR, Bangalore	2 years	Ongoing
10	Dr. VV Radhakrishnan	The role of cytokines in the pathogenesis of Guillaine Barre syndrome	DBT, Gov. of India	3 years	Ongoing
11	Dr. R Renuka Nair	Modulation of myocardial contraction by sub-optimal levels of extracellular magnesium in free radical stress	DST, Gov. of India	3 years	Ongoing
12	Dr. S Sandhyamani	Studies on mucoid vasculopathy in Kerala	DST, Gov. of India	6.5 years	Completed
13	Dr. S Sandhyamani	Investigation of serum and urinary mucopolysaccharides in patients with coronary artery and cerebrovascular diseases	STEC, Kerala	3 years	Ongoing



14	Dr. K Shivakumar	Mechanisms of cardiac fibrogenesis in experimental magnesium deficiency	DST, Gov. of India	4.5 years	Completed
15	Dr. PN Sylaja	Multicenter, open, non-randomized study of phenobarbitone in epileptic patients to study the cognitive effect	Rhone Poulenc	1.5 years	Ongoing

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## HONOURS AND AWARDS

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Dr Annamma Mathai was selected by National Academy of Medical Sciences for Sir Sriram memorial award for the year 2000-01.

Dr. M. Jayabalan has been selected as Chairman for the Biomaterials Subject Group of Materials Science Research Society for 2001-2004.

Dr. M. Jayabalan received the Materials Research Society Medal for contributions to the field of materials science and engineering.

Dr. A. Jayakrishnan was elected as a Fellow of the Indian Academy of Sciences, Bangalore.

Professor KS. Neelakandhan was elected as a Fellow of The National Academy of Medical Sciences.

Professor K. Radhakrishnan was selected to deliver the prestigious Mayo Neurology Grand Round Lecture "Epilepsy Surgery in a developing Country" at the Mayo Clinic, Rochester MN.

Mrs. Ramany John, Senior Grade S/N working in Thoracic Operation Theater passed M.Sc Nsg with distinction during the year 2000.

Dr.S.Sandhyamani was awarded "Distinguished Career Award:2000" of the South Asian Society on Atherosclerosis and Thrombosis, for her contribution to Cardiovascular Research.

Mrs. T. Sathykumary, Staff Nurse working in Neurosurgery ICU bagged the First Rank at all India level in B.Sc Nursing under IGNOU. She was awarded gold medal for the same.

Dr. Usha Kandaswamy received the 2<sup>nd</sup> best paper award for her presentation in the Motivational Session at National Conferences of ISBTI, Tirupathi.

Dr.D.Varatharajan received the Nick Prescott prize given by Asia Pacific Health Economics Network under the World Health Organisation for the year 2000.

## Students

Ms.V. Geetha won the best paper award in the National Symposium on Medical, Plant and Industrial Biotechnology for the paper 'Suitability of a plasma-free synthetic medium for platelet storage and transfusion' authored by Geetha V., Jaisy Mathai and Lissy K. Krishnan.

Ms. Nissey Varghese won the best paper award in the National Symposium on Nuclear and Radiochemistry (NUCAR) for the paper 'Use of I-125 labeled platelets for quantification of platelet adhesion to biomaterials *in vitro* using phosphor

imager' authored by Nissey Varghese, G.S. Bhuvaneshwar and Lissy K. Krishnan.

Ms. Sheela George won the Young Scientist award for the best paper in the Health Sciences section of the XII th Kerala Science Congress, 2000. She also won the Bajpai-Saha award for the best presentation second prize of the XIth National Conference of the SBAOI.

Ms. Shiny Velayudhan, won the Bajpai-Saha best paper award at the Ixth National Conference of the SBAOI for the paper entitled 'Hydroxyapatite filled ethylene vinyl acetate copolymer composites for bone substitute applications' authored by Shiny Velayudhan, P. Ramesh and HK. Varma.

## IMPORTANT VISITORS

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### *Achutha Menon Center Visiting Faculty*

1. Dr. Arnab K. Acharya from the University of Sussex, United Kingdom, conducted the course on 'Health Policy Analysis-II' during April 2000.
2. Dr. Reginald B. Matchaba from the Department of Community Medicine, University of Zimbabwe, Harare, conducted the course on 'Environmental and Occupational Health' during April, 2000.
3. Prof. CAK. Yesudian from the Tata Institute of Social Sciences conducted a course on 'Management in Public Health' during April/May, 2000.
4. Prof. Arthur L. Reingold, Head, Division of Epidemiology, School of Public Health, University of California at Berkeley, USA, conducted a course on 'Advanced Epidemiology' during May, 2000.
5. Dr. Jayaprakash Muliyl, Professor, Department of Community Health, Christian Medical College, Vellore, conducted a course on 'Introduction to Epidemiology' during June, 2000.
6. Prof. William A. Reinke from Johns Hopkins University, USA, conducted a course on 'Management in Public Health' during August 2000.
7. Prof. Richard Cash from the Harvard School of Public Health conducted a course on 'Epidemiology of Infectious Diseases' during Jan-Mar. 2001.
8. Prof. Robert Beaglehole from the University of Auckland, New Zealand conducted a course on 'Introduction to Epidemiology' during February 2001.
9. Prof. Ruth Bonita, Director Surveillance, Non-Communicable Diseases and Mental Health, WHO, Geneva conducted two lectures 'Surveillance of Non-Communicable Diseases' during Feb. 2001.

### *Other Visitors to Achutha Menon Center*

1. Dr. Rachel Snow from Heidelberg University, Germany visited the centre and presented a paper on "Contraceptives and Health Policy" on 15 April 2000.



2. Dr. Madhavram, Surveillance Officer, National Polio Surveillance Project – India (Govt. of India-WHO Collaboration) visited the centre and presented a paper on “National Polio Eradication” on 26 April 2000.
3. Dr. Sunita Krishnan, Division of Epidemiology, University of California, Berkeley, USA, visited the Centre on 29 June 2000 and presented a paper on “Gender, Caste and Women’s Vulnerability to Sexually Transmitted Diseases in Rural Karnataka State”.
4. Prof. Dileep Mavalankar from IIM, Ahmedabad led a team from Gujarat Health Services in December 2000.

### **Visitors to Biomedical Technology wing Division of Artificial Organs**

In connection with the Indo-French collaborative project, “Development of diamond like coatings for

biomedical and other applications” the Scientific Council of Indo French Council for the Promotion of Advanced Research (IFCPAR) visited during October 2000 for monitoring the progress of the project.

Dr. R. Suryanarayanan of Laboratoire de Chimie des Solides, University of Paris-sud, France visited the laboratories in April 2000 and January 2001 for discussions on various aspects of the project implementation.

Mr. Yvon Sampeur, (Director ICMC and Industrial partner in the project) visited the laboratory during January 2001 for discussion on the progress of the project and future course of action.

### **Bioceramics Lab**

In connection with the discussions on the INDO-JAPAN Scientific Collaborative Program (funded by DST, Govt of India and STA, Govt of Japan) on “Biomimetic Processing of Bioceramic Composites”, Dr. Yoshiyuki



Visit of Lord Swaraj Paul

Yokogawa, Leader of Biofunctional Ceramic Research Group, Ceramic Research Division, National Institute of Advanced Science and Technology (formerly known as National Industrial Research Institute of Nagoya (NIRIN)), Nagoya, Japan, visited the division in February 2001.

### **Vivarium**

Dr. Christopher Lawrence, Veterinary Scientist, Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow visited the division.

### **Important Visitors to the Hospital**

1. Mr. Michel Morgan Asst. Prof. Of Nursing and Research consultant in Wayne State University, USA visited the Institute on 3<sup>rd</sup> Jan 2001 and took a class on 'Developing Research in Nursing'.
2. Mrs. Brita Perers and Van V. Vilues, Mary Lebone Visiting Professors and two students from Sweden were visitors under a collaborative program of Con- TVM with WHO.
3. Lord Swaraj Paul visited the Institute on 4 January 2001.
4. Lt.General Jaiswal, Director General of Armed Forces Medical Services visited the Institute on 1 August 2000.

### **Important Visitors to Blood Bank**

1. Professor Thomas R Odhiambo, Honorary President African Academy of sciences Kenya
2. Dr.C. Sokhey, Scientist Grade I, NIB
3. Dr. Veena Doda, Medical Officer, RML hospital, New Delhi

4. Dr. Joy Mammen, Dept of Clinical Pathology and Blood Bank, CMC, Vellore
5. Dr. Ranjeet S. Ajmani, INTAS Pharmaceuticals, Ahmedabad.
6. Dr.Ramani Pulimoodu/ Cochin
7. Dr. Anjali Kale-AIMS Cochin
8. Mr. Soora Ramanathan & Mr. Rajkumar of Asociation of Voluntary Blood Donor Forum Chennai
- (9) Dr.KG Badami, Haematologist Jeevan Blood Bank Chennai

### **Division of Microbiology**

Prof: K.B. Sharma, Centre for Infectious Disease, Education and Research visited the division.

### **Department of Neurology**

Dr.Herbert Silfvenius MD. PhD, Former Head of Department of Neurosurgery, University Hospital, Umeå, Sweden, visited the epilepsy center in November, 2000. In addition to taking part in academic activities, he helped the neurosurgical colleagues in the epilepsy program with functional hemispherectomies.

### **Department Neurosurgery**

Dr. Axel Pernescky, Professor of Neurosurgery, Johannes-Gutenberg University, Mainz, Germany visited the department and conducted a Neuroendoscopy and minimally invasive Neurosurgery workshop in February 2001.

### *Exchange Students in Achutha Menon Center*

1. Ms. Laura Michael Talarsky, a Fullbright scholar from the University of Arizona, USA joined the Centre for her research project titled 'Health Seeking Decisions of Elders in Kerala'. Her research is of 10 months duration.
2. Mr. Hacho Bohossian, Harvard Medical Student joined the centre to conduct a study on "The Prevalence of Persistent Cough". His study was for 6 months.



## VISITS ABROAD OF FACULTY

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Dr.Abraham Kuruvilla proceeded on one-year sabbatical leave to the Uppsala University Hospital, Sweden to get further training in advanced Clinical Neurophysiological techniques under Prof.E.Stahlberg.

Dr. M Bhaskara Rao is presently at Kings Hospital, London under the Commonwealth fellowship program.

Dr.GS. Bhuvaneshwar visited France in October 2000 for 2 weeks for discussions with the French collaborators and for planning the execution of the project as a part of the Indo-French project,

Dr. Jaisy Mathai participated in the Planning meet on HIV/ AIDS Project of Association of Commonwealth Universities at Geneva from 11<sup>th</sup> to 13<sup>th</sup> March 2001.

CV. Muraleedharan visited Republic of Ukraine for 10 days during November 2000 as a member of the Dept. of Science and Technology Team, Government of India for exploring possible area of co-operation in science and technology, under the Indo-Ukrainian scientific exchange program.

Dr.K Radhakrishnan was on study leave till October 30, 2000. He went to Mayo Clinic, Rochester, MN, USA. During this period, he got acquainted with the recent advances in presurgical evaluation of patients with medically refractory epilepsy such as intracranial recordings, SPECT, MRS, and in vagus nerve stimulator as a treatment. In May 2000, he visited the Epilepsy Program of UCLA, Los Angeles, CA. In August 2000, he was invited to visit the Epilepsy Program of the Medical School, University of Indiana, Indianapolis, Indiana, USA. He gave a talk titled "Epilepsy care in Developing countries". In October 2000, he visited the Montreal Neurological Institute, Montreal, Canada, during the American Neurophysiological Society Meeting. He delivered the lecture at the grand round "Epilepsy Care: A Developing Country Perspective".

## Conferences/Meetings attended by Faculty Members

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### *International Conferences*

Dr.Asha Kishore, attended the 6<sup>th</sup> International congress of Movement disorders and Parkinson's disease, Barcelona, Spain and presented a paper on "Bilateral simultaneous subthalamotomy for Parkinson's Disease", which is the first report from India. She also attended the Principal investigator's meeting for international drug trial at Prague, Czech Republic.

Dr. R Girish Menon delivered a lecture titled 'Symptomatic chiari malformation: Surgical outcome' at the Kobe University School of Medicine, Kobe, Nov 2000.

Dr. Jaisy Mathai attended the International Conference on 'Safe Blood Transfusion Practices 2000' at Colombo, Sri Lanka and presented a paper titled Processing and preservation of blood and components (from April 7<sup>th</sup> – 9<sup>th</sup> 2000)

Dr. Mala Ramanathan participated in the International Workshop on 'Taking Post Abortion Care Services to Scale' conducted by AVSC International and IPAS, Mombassa, Kenya, during May 15-18, 2000. She also presented a paper titled 'Providers' Perspective of Quality of Services in the Family Welfare Programme: A case study of Orissa State' at the Gender, Reproductive Health and Population Policies International Networking Meeting, Cha-am, Thailand, during June 12-16, 2000.

Dr. Suresh Nair attended the third ACNS meeting at Nagoya Japan as an invited faculty. He chaired three sessions apart from presenting one paper in the luncheon seminar. Dr.Dilip Panikar attended the fourth congress of the Asian soceity for Stereotactic, Functional and Computer assisted Neurosurgery at Beijing , Peoples republic of China from October 29<sup>th</sup> to November 4<sup>th</sup> 2000. He presented a paper on the long term result of unilateral pallidotomy for parkinsons disease. Dr. Dilip Panikar was an invited faculty at the international seminar on Current Spine – Advances in technique and technology at Lanjkaw, Malaysia. Dr. Rajneesh Kachhara and Dr. Girish Menon attended the third ACNS meeting at Nagoya, Japan where Dr. Rajneesh Kachhara presented a paper on anterior clinoid meningiomas at the luncheon seminar. Dr. Suresh Nair, Dr. Rajneesh Kachhara and Dr. Girish Menon



attended the first Japan China symposium at Kobe, Japan in November 2000. They also visited the department of Neurosurgery, university of Kobe and delivered guest lectures.

Dr. D Panikar delivered a lecture titled "Long term results of unilateral pallidotomy for Parkinsons disease" at the Asian society of stereotactic and functional surgery Beijing, China- October 2000.

Dr. Rajneesh Kachhara delivered a lecture titled "Clinoidal meningiomas: Surgical experience" at the 3<sup>rd</sup> ACNS meeting at Nagoya, Japan in Nov 2000 and another titled "Transbasal approach for anterior skull base tumour" at Kobe university School of medicine, Kobe, Japan. He made a video assisted presentation on "Extended frontobasal approach for anterior skull base and sphenoclivar lesions and Total excision of craniopharyngiomas through translamina terminalis approach" Heio university school of medicine, Tokyo Japan in November 2000.

Dr. Suresh Nair spoke on 'Ophthalmic segment aneurysms: Luncheon seminar on current topics of CVD' at the 3<sup>rd</sup> Asian Conference of Neurological Surgeons at Nagoya in November 2000, and on "Management strategy and operative outcome of spinal intramedullary tumours: Experience of 141 cases" at the Kobe University School of Medicine, Kobe in November 2000. He chaired the sessions on "Hands on Workshop" on Aneurysm Clip, Head frame and Stereotactic system, the session on "Anterior communicating artery aneurysms" and the session on "Internal carotid artery aneurysms" during the symposium.

Dr. Sabeena Jayapalan presented a paper titled- "Determinants Of Delay In The Health Seeking Behaviour Of Patients With Sexually Transmitted

Diseases In Kerala, India" at the INCLEN GLOBAL Meeting at Bangkok, Thailand during October 15-18, 2000

Dr. K R Thankappan, Associate Professor, AMCHSS participated in the workshop on Health and Transition, organized by the University College London at London, on 25-26 January 2001 and presented a paper titled "Reasons for Kerala's low mortality rate."

Dr. K R Thankappan, Associate Professor, AMCHSS participated in the International Conference on "Knowledge of Resourcing public Health: Clarification of Concepts and Enabling National Processes" held during 19-22 March 2001 at Bangkok Thailand.

Dr. K R Thankappan, Associate Professor, AMCHSS participated in the International conference on Health Research for Development at Bangkok during 10-13 October, 2000 and the INCLEN Global meeting during 16-18 October 2000. He presented a paper on "Incidence And Correlates Of Diarrhoea Among Under Five Children: A Comparative Study in Kerala And Tamil Nadu States, India".

Dr. D. Varatharajan presented a paper titled 'Idle capacity in public health care sector: Its size, distribution and determining factors in Kerala, India' at a workshop on 'Research protocol development' at Hotel Montain, Bangkok, Thailand, November, 2000.

Dr. D. Varatharajan participated at the International Conference on Health sector reform: Equity, efficiency, sustainability? Institute of Health Economics and Health Economics Unit, Ministry of Health & Family Welfare, Government of Bangladesh, Dhaka, Bangladesh, July 2000.



## National Conferences

*88th Session of Indian Science Congress, January 3-7, 2001 held at Indian Agricultural Research Institute, Pusa, New Delhi*

Dr. Jayakrishnan presented the invited lecture, "Polymers for Drug Delivery" in the congress.

Dr. Mira Mohanty gave an invited lecture "Tissue-Material interactions" for the 'Symposium on biomaterials and their applications' at the congress.

Dr. C.P. Sharma delivered an invited lecture on "Surface Modification of Materials for Biocompatibility" and was invited to be Member of the Young Scientist Award Committee of Materials Science of the congress.

*3<sup>rd</sup> Asian Oceanian Epilepsy Congress Meeting held at New Delhi*

Dr.K.Radhakrishnan, Dr.Sanjeev.V.Thomas, Dr.Joseph Cherian and Dr.Sylaja PN participated and presented papers in the meeting.

Dr.P.Joseph Cherian presented a paper on "Value of Ictal semiology in lateralizing the seizure focus in temporal lobe Epilepsy".

Dr.K.Radhakrishnan delivered an invited talk titled "Epilepsy Surgery in a developing country".

Dr.Sanjeev.V.Thomas chaired the session "Epilepsy in Women" and delivered a talk on "Epilepsy and Pregnancy". He also presented a paper on "Impact of tertiary care in intractable childhood epilepsies"

Dr. PN Sylaja presented a paper on "Ictal EEG patterns in temporal lobe epilepsy".

Dr.M.Jayabalan delivered a talk on the topic "Surface investigation of Novel high performance polyurethane

urea for cardiac assist devices" at the International Conference on Advances in Surface Science and Engineering held at Chennai in February 2001.

Dr. S.Sandhyamani spoke on "Tapioca and vascular disease" at the 4<sup>th</sup> International Conference of South Asian Society on Atherosclerosis and Thrombosis in December 2000 at Mumbai.

*Annual General Meeting of the Materials Research Society of India held at Saha Institute of Nuclear Physics, Kolkatta on Feb.2, 2001*

Dr..Jayabalan delivered the Materials Research Society Medal Lecture -2001 on "Development of novel high performance polyurethanes for biomedical applications" at the meeting.

*XI National Conference of the Society for Biomaterials and Artificial Organs, India at IIT Kharagpur in December, 2000*

S. Abhiraman presented a paper titled "Fibrin glue as an osteoinductive protein and its possible clinical impact" in the conference.

PR. Anilkumar presented a paper titled "Cytocompatibility studies of Diamond like Carbon coated titanium for end use application in medical devices" at the conference.

Dr.M. Jayabalan delivered an invited talk on "Novel polyurethane urea for polyurethane heart valve" at the conference.

Dr. Mira Mohanty presented a paper titled "Inflammatory cells and bone matrix formation around ceramics in a soft tissue environment" at the conference.

Dr. CP. Sharma delivered an invited lecture on "Biomaterials & Artificial Organs - A Perspective", and chaired a session at the conference.

Dr. Anilkumar T.V. presented a paper entitled "Application of immunocytochemistry and in situ hybridization in pathology" at the National Symposium on 'Current concepts in animal and poultry diseases' at Akola in Dec, 2000.

Dr.P.S.Appukuttan presented the paper, "Human galectin 1 recognizes serum IgA1 sugar specifically," at the 27 th Annual Meeting of the Immunological Society of India, at Agra, December 2000.

S.Jayaprabha attended a Seminar on "E- Journals, Internet databases and Library automation" organized by Informatics India Ltd, Bangalore, on 25<sup>th</sup> Aug 2000.

Joy Vithayathil participated in the Training programme on "Information Technology applications in libraries" Organized by the DELNET, held at Central Library, University of Roorkee; UP; from October 3-5, 2000.

*Second Annual Conference of the Skull Base Society of India at Lucknow October 2000*

The following papers were presented

Top of the basilar aneurysm: Still a surgical challenge. RN Bhattacharya, S Parameswaran, BK Misra, D Rout, S Nair.

Foramen magnum meningioma: Surgical experience. R Kachhara, S Nair, R N Bhattacharya.

Clinoidal meningiomas: Surgical experience. R Kachhara, RN Bhattacharya, S Nair, D Panikar, BRM Rao, G Menon, S Parameswaran.

Surgery for vestibular schwannomas: Still a surgical challenge. G Menon, S Nair, BK Misra, R Kachhara, S Parameswaran, K Anudath, BRM Rao, D Panikar, RN Bhattacharya.

Rare cerebellopontine angle lesions – An operative series of 35 cases. G Menon, S Nair, RN Bhattacharya, D Panikar, S Parameswaran, R Kachhara, BRM Rao..

Posterior petrous meningiomas; A comparative study of pre and post meatal tumours. S Nair, G Menon, R Kachhara, S Parameswaran, BK Misra, RN Bhattacharya.

*Annual conference of Indian Society of Anaesthesiologists, December 26-30, 2000 at Nagpur.*

Dr. P.K. Neema, presented paper on "Intrinsic airway abnormality in association with multiple congenital defects viz cardiac defect, low anorectal abnormality, undescended testis, Inguinal hernia and bony deformities- a chance association or an unrecognized syndrome.

Dr. P.K. Dash, presented a paper on "Anaesthetic management of patient for deep brain stimulation" at the Annual conference of Indian society of Neuro-anaesthesiologist, January 12-14, 2001 at Vellore.

Annual conference of Indian society of Cardiovascular & Thoracic Anaesthesiology, November 13-15, 2000 at Hyderabad.

Dr. P.K. Neema presented paper on "Anaesthetic management of rare combination of total anomalous Pulmonary venous connection (TAPVC) with Tetralogy of Fallot".

Dr. Rupa Srinivas presented papers on "Flash Pulmonary edema" and "A technique for insertion of left atrial and pulmonary artery catheter".

*Annual Conference of International Society for Heart Research (Indian Section) - New Delhi, Jan. 27-29 (2001)*



Prof. C.C . Kartha: Vitamin D and atherosclerosis – a noteworthy link.

Dr. R.Renuka Nair: Influence of extracellular magnesium on cardiomyocyte mechanics and inotropic response to ion channel modulators

Dr. K.Shivakumar: Mechanism of activation of cardiac fibroblasts in magnesium deficiency

C. Kumaran: Mitogenic effect of substance P on cardiac fibroblasts: A neural pathway of activation of cardiac connective tissue growth.

*Annual Conference of the Neurological Society of India, Chennai, India December 2000.*

Dr. Asha Kishore gave a talk on “MER guided DBS for Parkinson’s disease”.

Dr. MD Nair presented a scientific paper in the section of history of Neurosciences.

Dr. V V Radhakrishnan Chaired a scientific session on ‘Infectious diseases of CNS’.

The following papers were presented by the neurosurgery department members at the NSI meeting at Chennai.

Surgical management of hypothalamic hamartomas. RN Bhattacharya, S Nair, S Parameswaran.

Rare cerebellopontine angle lesions. Muthuretnam, S Nair, G Menon, RN Bhattacharya.

Giant middle cerebral artery aneurysms. HV Easwar, RN Bhattacharya, S Nair, D Rout, R Kachhara, G Menon, S Parameswaran.

Surgery for vestibular schwannomas: still a surgical challenge. BB Anudath, S Nair, BK Misra, R. Kachhara,

S Parameswaran, G Menon, BRM Rao, D Panikar, RN Bhattacharya.

Posterior petrous meningiomas: A comparative study of pre and post meatal tumours. BJ Rajesh, S Nair, G Menon, R Kachhara, S Parameswaran, BRM Rao, D Panikar, BK Misra, RN Bhattacharya

Holo cord intramedullary astrocytoma: Radical surgical extirpation. S Nair, S Parameswaran, G Menon, K Sudeesh, RN Bhattacharya.

Foramen magnum meningioma: surgical experience. S Nair, G Menon, S Parameswaran, BK Misra, RN Bhattacharya.

Internal carotid artery injury during transphenoidal surgery: Management strategy. RN Bhattacharya, R Kachhara, G Menon, S Nair.

Top of basilar aneurysms: still a surgical challenge. S. Parameswaran, RN Bhattacharya, S Nair, G Menon.

Extended frontobasal approach for anterior skull base and sphenoclivar lesions: surgical experience. R Kachhara. S Nair, RN Bhattacharya.

Clinoidal meningiomas: surgical experience. D Panikar, R Kachhara, RN Bhattacharya, S Nair, BRM Rao, G Menon, S Parameswaran

*Annual Conference on Indian Association of Pathologists and Microbiologists, New Delhi-November 2000*

Dr VV. Radhakrishnan presented a paper ‘Tumours of temporal lobe’.

Dr.S. Sandhyamani gave the lecture “A monkey model for diabetes mellitus, during “Dr Gayaprasad Pathology Symposium on Diabetes Mellitus an update”.



Dr. Jaisy Mathai & Dr. P.V. Sulochana attended the Review Meeting on HCV screening at Institute of Public Health, Hyderabad

Dr. Jaisy Mathai, Dr. Sathyabhama and Ms. Usha Kandaswamy presented papers at the 25<sup>th</sup> National Conference of ISBTI at Tirupathi November 10<sup>th</sup> -12<sup>th</sup> 2000. (a) Swirling as a marker of platelet function, (b) Analysis of leuko depletion in random and apheresed platelet concentrates (c) Knowledge, perception and problems of replacement Blood donors.

Dr. Jaisy Mathai participated as member in the Technical Resource Group Meeting of NACO to formulate guidelines on Best Practices in Blood Transfusion Services at Mumbai in January 2001.

Dr. P.V. Sulochana & Mr. Raveendran Nair PK participated in the Workshop on HCV screening for Trainers organized by IIH at Mumbai from April 17<sup>th</sup> – 19<sup>th</sup> 2000.

In the Neurology Update organized by Dr. B.S.Singhal of the Bombay Hospital and Research Center, Dr.K.Radhakrishnan, delivered the lecture "Epilepsy surgery: SCTIMST experience".

Dr.Asha Kishore attended the 8<sup>th</sup> National Movement Disorders and Parkinson's surgery workshop, Mumbai, and presented a paper on "Controversies in Pallidotomy".

Dr. Mala Ramanathan participated at the National meeting to discuss the proposed 'Draft code of ethics for Research in Social Sciences and Health' organised by CEHAT, Mumbai, during May 29-30, 2000. She also participated in the Population Colloquium to discuss the Population Policy of the Govt. of India, at the Singamma Sreenivasan Foundation, Bangalore, during October 18-19, 2000 and in the International

Workshop on 'Lessons Learned From Abortion Research: International Perspectives' conducted by the Ipas during 14-16 March, 2001 at Manesar Heritage Village, Haryana.

### State level conferences

Dr. TV. Anilkumar presented a paper titled "Evaluation of biomedical implants, devices and artificial organs" at the National Symposium on 'Bioprosthesis-Current status in small animal surgery' at Thrissur in November 2000.

Dr.Arthur Vijayan Lal presented the theme paper "Current status of Bio-prosthesis in Small animal surgery" in the National symposium on Bioprosthesis – Current status in small animals surgery, held at College of Veterinary and Animal Sciences, Mannuthy, Thrissoor during November 10-12, 2000. He also presented two other papers titled "Biocompatibility evaluation of silicone scleral buckling device" and "Evaluation of fibrin glue for neuro-surgical application in rabbit model" in the symposium.

G.Geetha attended one-day seminar on Internet Server Side Technologies conducted by Computer Society of India at Trivandrum.

She also presented a paper 'Network Migration for High Bandwidth' at IEEE Annual Conference held in Technopark, Trivandrum.

V. Geetha (Project Trainee, TRU) presented a paper titled "Suitability of a plasma-free synthetic medium for platelet storage and transfusion" in the National Symposium on Medical, Plant and Industrial Biotechnology, held at Cochin during 1-2 Dec 2000.

Dr. Jaisy Mathai participated in the discussion on Strategy planning for Ensuring Blood Safety for 2001-2003 at State AIDS Cell, Trivandrum.

Dr.CC Kartha gave an invited talk "Genetics for Nephrologists" at the Annual meeting of the Indian Society of Nephrology- southern India chapter, held at Kochi in February.

P. Krishnamoorthia Pillai attended a workshop on 'Counting the dead and Clarification of causes of death (organized by R C E R T C)' and delivered an invited talk on "The Need of Medical Audit " on 03.07.2000 at Medical College, Trivandrum. He also delivered an invited talk on "Importance of Medical Records" in Nurses conference on 20.07.2000 at SCTIMST, Trivandrum.

Dr. P.P.Lizymol presented a paper on "Novel dual cure composite formulations for dental applications" at the National Conference on 'Materials for the new millennium', MATCON 2001, held in March, 2001 at Cochin University of Science & Technology.

Dr. Mala Ramanathan participated in the International Reproductive Health Research Group Meeting with experts at Thiruvananthapuram, during January 9-12, 2001.

Mr.Mohanlal gave a talk on Biomedical Instrumentation at N.I. College of Engineering, Thackalai, as chief guest, at the Annual Day of instrumentation students.

Mrs. K. Naseema attended a one-day seminar on AIDS and the inauguration of Science Programme on 1-11-2000 at Trivandrum.

Dr. P. Ramesh delivered an invited talk on "Biomedical Applications of Polymers with Special Reference to Composites for Bone Substitute Applications" at School of Chemical Sciences, Mahatma Gandhi University, Kottayam, on 29<sup>th</sup> April, 2000,

Dr.P.V. Sulochana as an invited guest lecturer gave lecture on 'Lab Diagnosis of Transfusion Transmitted Diseases'. Ms. Sindhu PN and Baby Saritha, BTAs presented papers of on "Immunoglobulin class of haemolysine using sulphydral compounds and Factors affecting Surgical Blood Usage respectively at ISBTI, Kerala chapter meeting at Kottayam.

Dr.Suresh Nair gave a lecture on "Neuro-ophthalmic manifestations of intracranial aneurysms and subarachnoid haemorrhage" at the Trivandrum chapter of Ophthalmological Socieity of Kerala Feb 2001

Dr.HK.Varma presented a paper on "Biomaterials in Tissue Engineering Clinical applications" at the Indian Society for Periodontology Post Graduate Workshop conducted at Trivandrum on in May 2000.

Dr.HK.Varma gave a talk on "Ceramics and Bioceramic materials" at the UGC sponsored National Level Refresher Course in Chemistry held at School of Chemical Sciences, MG University, Kottayam on 14<sup>th</sup> June 2000

*Paper presented at the mid-term meeting of Kerala Chapter of Neurological Socieity at Trichur, September 2000.*

Foramen magnum meningiomas. S Nair, G Menon, BK Misra, RN Bhattacharya

Outcome of acoustic neurinoma surgery. Anudath, S Nair, G.Menon, R Kachhara, BK Misra, RN Bhattacharya.

Hypothalamic hamartomas. S Parameswaran, G Menon, S Nair, RN Bhattacharya.

*Annual conference of Karnataka State branch of Indian Society of Anesthesiology, October 20-22, 2000 at Mangalore*

Dr. R.C. Rathod gave an invited talk on "Anaesthetic Management of Patients with Mitral Valve Disease".

Dr. Thomas Koshy gave an invited talk on "Anaesthetic Management of Patients with Ischaemic Heart disease."

Dr. P.K. Neema gave an invited talk on "Anaesthetic Management of patient with Congenital Heart diseases."

Dr. P.K. Dash gave an invited lecture on "Recent advances in Cardiopulmonary bypass" at the annual conference of Orissa state branch of Indian Society of Anaesthesiologists Berhampur (Orissa) 7-8-Sept. 2000.

Dr. D. Varatharajan taught the Health Economics Module at National Institute of Epidemiology (ICMR),

Chennai to Master of Applied Epidemiology (MAE) students during March 2001.

Dr. D. Varatharajan participated in the Second Phase Workshop on capacity strengthening in health policy analysis and research in the context of changing macro-economic environment. Indian Institute of Management (IIM), Ahmedabad, Gujarat, India, June 2000.

Dr. D. Varatharajan participated in the Dissemination Workshop on Macro-economic Adjustment Policies, Health Sector Reform and Access to Health Care in India held at Centre for Development Studies, Thiruvananthapuram, Kerala, India in April 2000.



## Conferences/Meetings attended by students

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*INCLEN GLOBAL Meeting at Bangkok, Thailand, October 15-18, 2000*

Abraham P George - "Solid Waste Management In Trivandrum City, India: A Case Study."

Anjan Kumar Nag - "Prevalence And Correlates Of Hypertension In The Elderly: A Community-Based Survey In Rural Bangladesh".

Anuradha R - "Menstrual Hygiene Practices And Self-Reported Reproductive Morbidity: A Community- Based Survey In Rural Kerala".

Md.Iftekhhar Quasem - "Prevalence And Correlates Of Hypertension In The Elderly: A Community-Based Survey In Urban Bangladesh".

R.Jayakrishnan - "Prevalence And Correlates Of Periodontal Disease: A Community Based Study In Kerala, India".

C. Ibrahim Kutty - Antimicrobial Usage In Animals: Treatment Practices Of Bovine Mastitis In Kerala, India.

Manu G. Zachariah - "Prevalence And Correlates Of Hypertension Among The Middle Aged Population In Urban Kerala, India."

Mrunal S.Shetye - "Prevalence And Correlates Of Hypertension In The Elderly: A Community Based Survey In Urban Pune, Maharashtra, India."

A.S.Pradeep Kumar - "Consumption Of Tobacco Products: A Community-Based Survey In Rural Kerala, India."

Shiney C.Alex - "Prevalence And Correlates Of Hyperension In The Elderly:A Community-Based Survey In Trivandrum District, Kerala, India".

C.V.Sowmini - "Reported Reproductive Morbidity In Contraceptive Users in Kerala, India."

R. Suresh - "Knowledge And Adherence Level Of Aids Control Measures Among Healthcare Delivery Staff in Kerala, India".

Varkey K Abraham - "Evaluation Of The Level Of Community Integration Among Post-Stroke Patients in Trivandrum District."

P.Vinod Kumar - "Animal Slaughter Practices in Rural Kerala: A Discriptive Study".

Dr. S. Ramakrishnan, student of PDCC (anaesthesia) presented a paper on "Anaesthetic management of Infrarenal abdominal Aortic Aneurysm with aorto-caval fistula in an 85 years old critically old patient" at the annual conference of Indian society of Cardiovascular & Thoracic anaesthesiology.

J. Jaichand presented a paper on "Antiviral activity of some indigenous Medicinal Plants" at the 21<sup>st</sup> Annual Conference of IABMS in October 2000 at Rajah Muthai Medical College, Annamalainagar, Tamil Nadu.

Two Neuronursing students attended the 21<sup>st</sup> Annual Conference of Society of Indian Neuroscience Nurses held at Chennai and presented a scientific paper entitled 'Rehabilitation of patients with communication Deficits- Aphasia'. Both the students got second prize for neuroquiz in this conference.

## STANDING COMMITTEES

### Academic Committee

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

### Building Committee

1. Dr.K.Mohandas, Director of SCTIMST, (Chairman)
2. Head, Biomedical Technology Wing, Sree Chitra Tirunal Institute for Medical Sciences & Technology.
3. Sri.V. Vijayachandran, Secretary to the Government of Kerala, Health & Family Welfare, Sports and Youth Affairs, Thiruvananthapuram.

4. The Civil / Construction Engineer, ISRO, Vikram Sarabhai Space Centre, Thiruvananthapuram.
5. Sri. P. Vijayakrishnan, Financial Advisor & Chief Accounts Officer, Sree Chitra Tirunal Institute for Medical Sciences & Technology (Convenor).
6. A member to be co-opted by the Director as and when necessary.

### Finance Committee

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

### Senior Staff Selection Committee

1. Dr. K. Mohandas, (Chairman Ex-officio), Director, SCTIMST
2. Dr. V.R. Muthukkaruppan, Former Vice Chancellor, Bharatidasan University, Vadapalani, Chennai-600 026.
3. Head, Biomedical Technology Wing, SCTIMST.
4. A nominee of the Secretary, Department of Science & Technology, Government of India, New Delhi.



5. A Senior Professor of SCTIMST
6. A nominee of the President (External Expert).

### Junior Staff Selection Committee

1. Dr.P.Velayudhan Pillai, (Ex-officio), Medical Superintendent, Sree Chitra Tirunal Institute, Thiruvananthapuram.
2. Head, Biomedical Technology Wing,
3. Sri.P.B.Sorabhan, Dy. Director (Admn), Sree Chitra Tirunal Institute for Medical Sciences & Technology, Thiruvananthapuram.
4. Mrs.Vijayamma Harikrishnan, Nursing Superintendent, Sree Chitra Tirunal Institute for Medical Sciences & Technology, Thiruvananthapuram.
5. Representative of Academic Staff of the Institute nominated by the Director.
2. Dr.N.Appaji Rao, Department of Biochemistry, Indian Institute of Science, Bangalore-560 012
3. Dr.Aurthur Vijayan Lal, Scientist-F, Sree Chitra Tirunal Institute, Thiruvananthapuram.
4. Dr.A.P. Chaukar, Prof. & Head of CVTS, Dept. of CVTS, LTM Medical College, Sion, Mumbai-400 022.
5. Dr.M.R.Das, Chairman State Committee of Environment, Science & Technology, Government of Kerala, Thiruvananthapuram.
6. Dr. Mira Mohanty, Scientist-F, Sree Chitra Tirunal Institute, Thiruvananthapuram
7. Dr.Placid Rodriguez, Director, Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam 603 102, Tamil nadu.
8. Dr.S.Ramachandran (Ex. Secretary, DBT, DST, Govt. of India), 1, Playground View Street, Nandanam Extension, Chennai - 400 036.
9. Head, Biomedical Technology Wing,

### Ethics Committee

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

### Technology Development Committee

1. Dr.K.Mohandas, Director (Ex-officio Chairman)

### Technology Transfer Committee

1. Dr.S.Varadarajan (Chairman), President, Indian National Science Academy, New Delhi 110 002
2. Sri.S.Sivaram, Dy. Director, National Chemical Laboratory, Pune 411 008.
3. Sri. S.B.Krishnan, Secretary, Technology Development Board, Dept.of Science & Technology, New Delhi, 10 016.
4. Sri. C. Venugopal, Head, Technology Transfer Division, V.S.S.C., I.S.R.O, Thiruvananthapuram.
5. Head, BMT Wing (Ex-officio member),
6. FA & CAO of the Institute (Ex-officio)
7. Scientist-in-charge, Technology Transfer Cell (Ex-officio)

## DEPARTMENTS AND PERSONNEL

Professor K.Mohandas, MD

### **Director**

### **Academic Division**

Professor VV. Radhakrishnan, MD

*Dean (till 30 November 2000)*

Professor CC. Kartha, MD, FNASc, FASc

*Dean*

Dr.AV. George, MA, BEd, PhD

*Registrar*

Sundar Jayasingh, MA, MBA, DLL

*Assistant Registrar*

### **Library**

S.Jayaprabha, BA, MLISc

*Librarian-cum-Documentation Officer*

*(Librarian-in-charge)*

Jayachandra Das, BSc, MLISc

*Librarian-cum-Documentation Officer*

### **Nursing Education**

PP. Saramma, BSc, M N

*Instructor in Nursing*

### **Public Relations**

TV. Hemalatha, MA, MPhil, LLB, PGDJ

*Public Relations Officer*

### **Achutha Menon Centre for Health Science Studies**

Dr.T.K.Sundari Ravindran, PhD

*Honorary Professor*

Dr Thankappan, MD, M PH

*Associate Professor*

Dr.P.Sankara Sarma, PhD

*Associate Professor*

Dr. Mala Ramanathan, PhD, MA

*Associate Professor*

Dr.D.Varatharajan, PhD

*Assistant Professor*

### **Administration**

Dr. K. Mohandas, MD

*Director*

V. Ambujakshan, BCom LLB

*Secretary to the Director*

PB. Sourabhan, MA, LLB, PGDMM, DCA

*Deputy Director (Administration)*

P. Vijayakrishnan, BSc, CA

*Financial Advisor & Chief Accounts Officer*

S.Sasikumar BA, LLB, BGL, PGDIR, PGDPM

*Administrative Officer Gr I*

IT.Edwin, BA

*Administrative Officer Gr II*

C.Gopinathan, B Sc., LLB, SAS

*Accounts Office Gr I*

A.Santhakumari, MCom

*Accounts Officer Gr I*

CR.Mohandas, BCom

*Accounts Officer Gr II*

R.Sreekumar, B Sc, PGDMM

*Purchase Officer Gr I*

George Philip, BA

*Stores & Purchase Officer Gr II*

P. Gopalakrishnan Nair, BA

*Asst.Stores & Purchase Officer Gr II*

B.Joseph, BA

*Security Officer*

B.Radhakrishnan Nair, BA

*Security Officer*

Venkitachalam Iyer, BCom

*Pool Officer*

## Biomedical Technology Wing

Dr.G.S.Bhuvaneshwar, MS,PhD

### Head

### Artificial Organs

Dr.GS.Bhuvaneshwar, MS,Ph.D

Leader

CV.Muraleedharan, MTech

Engineer

### Bioceramics

Dr. PR.Harikrishna Varma, PhD

Scientist & Leader

Dr Manoj Kamath, Ph D

Scientist

S.Vijayan, BSc

Jr. Scientific Officer

R.Sreekumar, BSc.

Jr. Scientific Officer

### Biosurface Technology

Dr.Chandra P.Sharma, MTech,

Scientist & Leader

MS., DSc, MEBE,

### Calibration Cell

CV.Muraleedharan, MTech

Engineer

### Customer Service Cell

D.Ranjit, BE (Electrical)

Engineer

### Dental Products

Dr.V.Kalliyana Krishnan, PhD

Scientist-in-Charge

Dr. P P.Lizymol, PhD

Scientific Assistant

### Engineering Services

OS.Neelakantan Nair, BSc., (Engg.)

Engineer & Leader

V.Ramesh Babu, B.E. (Mech.)

Engineer

KPR. Bhas, Dip. Electl. Engg

Jr. Engineer

EB. Mohan Raj. Dip in Mech. Engg.,

Foreman

### Implant Biology

Dr.Mira Mohanty, MD (Pathology)

Scientist and Leader

Dr.TV.Kumary, PhD, Biochemistry

Scientist in charge of Tissue Culture laboratory

Dr.Annie John, PhD

Scientist in charge of TEM

Dr.TV.Anilkumar, MVSc, PhD

Scientist, Histopathology lab

### Instrumentation

Niranjan Khambete, M.Tech, PhD

Engineer

### Microbiology

Dr.Maya A.Nandakumar, PhD

In charge (on leave)

Dr.Arthur Vijayan Lal, BVSc

Scientist (acting in charge)

### Modelling & Prototyping Laboratory

DS.Nagesh, MTech

Engineer



### **Molecular Medicine**

Dr.T.Anoopkumar, PhD  
*Scientist and Leader*

### **Polymer Analysis**

Dr.K. Sreenivasan, PhD  
*Scientist*

Dr.Prabha D.Nair, PhD  
*Scientist (on leave)*

PR.Hari, BSc, AIE  
*Scientific Assistant*

C.Radhakumari, M.Sc  
*Scientific Assistant*

### **Polymer Chemistry**

Dr.A.Jayakrishnan, PhD  
*Scientist and Leader*

Dr.S.Lakshmi, PhD  
*Scientist (Temporary)*

### **Polymer Division**

Dr.M.Jayabalan, PhD  
*Scientist and Leader*

### **Polymer Processing Laboratory**

Roy Joseph MSc, MTech  
*Scientist (on leave)*

Dr.P.Ramesh MTech, PhD.  
*Scientist in-charge (acting)*

MC.Sunny, BSc., AIC  
*Scientific Assistant*

### **Quality Cell**

DS.Nagesh, MTech  
*Quality Manager*

S.Balram, MTech  
*Engineer*

### **Technical Co-ordination Cell**

D.Ranjit, BE. (Electrical)  
*Engineer*

### **Technology Proving Facility**

Dr.GS.Bhuvaneshwar, MS, PhD  
*In Charge*

DS.Nagesh, MTech  
*Engineer*

### **Technology Transfer Cell**

D.Ranjit. BE (Electrical)  
*Engineer*

### **Thrombosis Research**

Dr.Lissy K. Krishnan, MSc, PhD  
*Scientist & Leader*

K. R Resmi, MSc  
*Scientist*

### **Toxicology Division**

Dr.A.C.Fernandez, MSc, PhD  
*Scientist-E*

Jacob Varghese Biboy, MSc  
*Scientist (Temporary)*

Dr.PV.Mohanan, MSc, PhD  
*Scientist*

### **Vivarium**

Dr.Arthur Vijayan Lal, BVSc  
*Veterinary Scientist and Leader*

Dr.PR.Umashankar, BVSc&AH  
*Veterinary Scientist*

## Hospital Wing

Dr. P. Velayudhan Pillai MS, MCh

**Medical Superintendent**

Dr. S. K. Jawahar, MBBS

*Asst. Administrative Medical Officer*

Smt.Vijayamma Harikrishnan RN, RM, BSc (N)

*Nursing Superintendent*

Smt.Rosamma Edwards RN, RM, DNA

*Deputy Nursing Superintendent*

### Anaesthesiology

Dr.K. Mohan Das, MD

*Professor & Director of the Institute*

Dr.RC.Rathod, MD

*Professor & Head*

Dr.(Mrs) Rupa Srinivas, MD, Dip.NBE

*Additional Professor*

Dr.G.Suresh, MD

*Associate Professor upto 10.6.2000*

Dr.Thomas Koshy, MD

*Associate Professor*

Dr.Srinivas V.Gandhinhalikar, MD

*Assistant Professor*

Dr. Prasanth Kumar Dash, MD

*Assistant Professor*

Dr.Raghunath Sreedhar Nalgirkar, MD

*Assistant Professor*

Dr.P.K. Neema, MD

*Assistant Professor*

Dr.Ratan Gupta, MD, Dip.NBE

*Assistant Professor upto 4.10.2000*

Dr.P.Sujatha, MD

*Ad- hoc consultant upto 30.4.2000*

Dr.Kesavar V, MD

*Ad- hoc consultant from 26.6.2000*

Dr.S.Manikandan, MD

*Ad- hoc consultant from 18.9.2000*

Ganapathy Potti

*Scientific Assistant*

### Biochemistry

Dr.K.Subramonia Iyer PhD

*Professor and Head*

Dr.PS.Appukuttan PhD

*Additional Professor*

Dr.N.Jayakumari PhD

*Additional Professor*

Shanta A George MSc

*Scientist*

K.I.Annamma. BSc

*Junior Scientific Officer*

Sri.B.Sasikumar. M.Sc

*Scientific Assistant*

### Biomedical Engineering

K.Vijayakumar, BSc, BSc (Engg.)

*Engineer and Head*

Koruthu P Varughese, BSc (Engg.),

PGDEDT, PGDCA.

*Engineer*

G.Mohanlal, B.Sc. (Engg.)

*Engineer*

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

*Scientist/Engineer*

N.Sivanandan

*Junior Engineer (Electrical).*

### Blood Transfusion Services

Dr. Jaisy Mathai, MBBS DCP

*Chief Blood Transfusion Officer*

Dr. PV Sulochana, MBBS

*Blood Transfusion Officer*

Dr. S. Sathyabhama, MBBS

*Blood Transfusion Officer*

### **Cardiology**

Dr. Jaganmohan A Tharakan, MD, DM

*Professor & Head*

Dr. Thomas Titus, MD, FAMS, DM

*Professor*

Dr. V. Ajithkumar, MD, DM

*Associate professor*

Dr. Anil Bhat, MD, DM

*Associate professor (on leave)*

Dr. S. Sivasankaran, MD, DM, DIP NB (Cardiology)

*Associate professor*

Dr. Bimal Francis, MD, DM

*Associate professor*

Dr. KM.Krishnamoorthy, MD, DM

*Asst. Professor*

Dr.S.Harikrishnan, MD, DM

*Asst. Professor*

Dr.R. Padmakumar, MD, DM

*Asst. Professor (Joined on 27-3-2000)*

Dr. R. N. Vijaya senam

*Junior Scientific Officer*

### **Cardiovascular & Thoracic surgery**

Dr. M.P. Mohan Singh, FRCS (Eng), FRCS (Edin),

FIACS *Professor & Head*

Dr. K.S. Neelakandan, MS,MCh

*Professor*

Dr. R. Shankar Kumar, MS, MCh.

*Additional Professor*

Dr. K.G. Shyam Krishnan MS, MCh

*Additional Professor*

Dr. M. Unnikrishnan, MS, MCh

*Additional Professor*

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

*Associate Professor*

Dr. Apurba Kumar Sharma, MS, MCh

*Assistant Professor*

Dr. Thomas Maliakal

*Scientific Assistant*

### **Cellular and Molecular Cardiology**

Dr.CC. Kartha, MD, FNASc, FASc

*Professor & Head*

Dr.Renuka Nair, PhD, MNAMS

*Scientist*

Dr..K. Shivakumar, PhD

*Scientist*

Dr. John T. Eapen, PhD

*Scientist*

### **Computer Division**

G.Geetha, MTech

*Scientist*

### **Medical Records**

P. Krishnamoorthia Pillai, MA

*Senior Medical Records Officer & Head*

N.G. Thampi MA, BMRSC

*Medical Records Officer*

P. J. Varghese

*Assistant Medical Records Officer*

### **Microbiology**

Molly Antony, MSc, DMV

*Assistant Professor*

Dr. Muralidhar K. Katti, PhD

*Assistant Professor*

M. Ravindranath, BSc

*Junior Scientific Officer*

K. Naseema, MSc – MLT

*Scientific Assistant*



## Neurology

Dr. K. Radhakrishnan, MD, DM, FAMS

*Professor & Head*

Dr. C.Sarada, MD, DM

*Additional Professor*

Dr. MD.Nair, MD, DM

*Additional Professor*

Dr. Sanjeev V. Thomas, MD, DM

*Associate Professor*

Dr. Asha Kishore, MD, DM

*Associate Professor*

Dr. PA. Suresh, MD, DM

*Associate Professor*

Dr. Joseph Cheriyan, MD, DM

*Assistant Professor*

Dr. PN.Sylaja, MD, DM

*Assistant Professor*

## Neurosurgery

Dr. RN. Bhattacharya, MS, MCh

*Professor & Head*

Dr. S. Suresh Nair, MCh

*Professor*

Dr. Dilip Panikar, MS, MCh

*Associate Professor*

Dr. Malla Bhaskara Rao, Dip NB

*Associate Professor (on leave)*

Dr. Rajneesh Kachhara, MS, MCh

*Assistant Professor*

Dr. Ravi Mohan Rao, MS, MCh, Dip NB

*Assistant Professor*

Dr. R. Girish Menon, MCh, DipNB

*Assistant Professor*

Dr. S. Parameswaran, MCh

*Assistant Professor*

## Pathology

Dr. V. V. Radhakrishnan, MD

*Professor & Head*

Dr. S. Sandhyamani, MD

*Additional Professor*

Dr. Annamma Mathai, PhD

*Junior scientific Officer*

## Radiology

Dr. A. K.Gupta, MD

*Professor & Head*

Dr. R. Santhosh Joseph, DMRD, MD

*Additional Professor*

Dr. TR. Kapilamoorthy, DMRD, MD

*Associate Professor*

Dr. C. Kesavadas, DMRD, MD

*Assistant Professor*

Dr. Shama Rao, DMRD, DNB

*Assistant Professor*

Dr. PV.Santhosh, MD

*Assistant Professor*

Dr. Bejoy Thomas, MD, DNB

*Assistant Professor*

# Statement of Accounts

## 2000-2001

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## Balance Sheet As at 31st March 2001

Figures for the previous year		GENERAL FUND AND LIABILITIES	Amount	
Rs	Ps		Rs	Ps
		<b>GENERAL FUND :</b>		
991429666.24		Balance as per last Balance Sheet	1105104524.25	
		Additions out of		
		(a) Grant from Govt. of India for		
110000000.00		Plan Expenditure	120000000.00	
		(b) Donations for Specific purposes		
3674858.00		utilised during the year	4256845.00	
1105104524.24			1229361369.25	
986549.96		Less : Capital Assets written off	1040849.96	
		Less : Excess of Expenditure over Income		
288629770.62		adjusted out of General Fund upto 31.03.2000	352839916.82	
64210146.20		Less : Excess of Expenditure over Income for the current year	71676202.45	
358525824.99		Less : Reserve for Depreciation for Fixed assets till 31-03-2001	412442096.11	
392752232.47			391362303.91	
54854546.00		Sinking Fund	69692491.00	
12447972.00		Technology Development Fund	16067614.80	
15936150.26		Unutilised Grants for Research Projects	25403312.39	
150511290.49		Employee's Benefit Funds	188939637.29	
		<b>Current Liabilities &amp; Provisions</b>		
9210570.72		Sundry Creditors for expenses	7723948.32	
13242791.89		Other Liabilities	17576550.49	
		Temporary over draft from Banks	17534983.41	
648955553.83		<b>Total</b>	734300841.61	

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

sd/  
Financial Adviser &  
Chief Accounts Officer



Figures for the previous year	ASSETS	Amount			
		Rs	Ps	Rs	Ps
726185994.45	<b>FIXED ASSETS</b>	795373439.35			
986549.96	Less : Assets written off	1040849.96			
358525824.99	Less : Depreciaion provided till 31-03-2001	412442096.11			
366673619.50					381890493.28
	<b>Current Assets</b>				
13706876.65	General Stores	16201125.79			
2579146.42	Tools	2270012.24			
8428201.13	Instruments	7138989.91			
833519.28	Glasswares	1113363.44			
0.00	Spares	7223103.57			
4790575.68	Medicines	5171533.23			
2000.00	Investment in shares of Employees co-operative Society	2000.00			
					39120128.18
1640995.28	<b>Deposits</b>				1657995.28
	<i>Deposit with Banks</i>				
149476858.45	For Staff Benefits				190316679.76
80162793.08	For Specific Purposes				94155351.88
	<b>Loans and Advances</b>				
	Advances Recoverable in Cash or in kind or for Value to be recovered				
	<b>Unsecured considered good</b>				
2730774.00	For purchases	2383669.00			
13579887.32	To staff	13881756.82			
2496447.00	Other Advances	5986499.75			
0.00	Grant receivable from Govt. of India	0.00			
1296854.42	Amount receivable from sponserers of Projects	1139901.01			
					23391826.58
	<b>Cash &amp; Bank Balances</b>				
363697.75	Cash and stamps in hand	497154.15			
193307.87	Balance with Banks	3271312.51			
					3768466.66
648955553.83	<b>Total</b>				734300841.61

sd/  
Director

## Income and Expenditure Statement Account for the year ended 31st March 2001

Figures for the previous year		EXPENDITURE	Amount	
Rs	Ps		Rs	Ps
		Excess of Expenditure over Income		
131100217.84		Hospital Wing	140848279.21	
24024075.76		Bio Medical Technology Wing	23043010.51	
443059.00		Expenses for Committee Meetings	443456.75	
57417.00		Legal Expenses	87400.00	
92844.60		Travelling Expenses	55186.00	
11205198.50		Expenses for Academic Programmes	11761708.65	
904763.00		Travelling expenses for Seminars and Conferences	687830.00	
260054.00		Expenses of Achutha Menon Centre	458189.00	
168087629.70		Total	177385060.12	

sd/  
Financial Adviser &  
Chief Accounts Officer

Figures for the previous year		INCOME	Amount	
Rs	Ps		Rs	Ps
100000000.00		Grant received from Govt. of India	100000000.00	
291826.00		Rent	329511.00	
882337.50		General Receipts	709668.00	
0.00		Notice Pay received	279985.00	
0.00		Interest received-staff	1080220.00	
1610777.00		Interest received-Bank	1561674.67	
0.00		Leave salary collected	158450.00	
0.00		Income from Sale of Assets	54300.00	
901945.00		Receipts from Academic activities	1064491.00	
190598.00		Income from Projects-AMC	470558.00	
64210146.20		Excess of expenditure over income transferred to General Fund Account	71676202.45	
168087629.70		Total	177385060.12	

sd/  
Director



## Income and Expenditure Account for the year ended 31st March 2001 Hospital Wing

Figures for the previous year		EXPENDITURE	Amount	
Rs	Ps		Rs	Ps
191999821.23		Medicines	22533969.95	
435720.35		Chemicals	90823.00	
3046094.50		Medical Gases	3528582.00	
2713615.55		Films & Chemicals for Radiology Dept.	4485532.00	
1341011.55		Uniforms & Hospital linen	558689.15	
51105342.14		Hospital Items	65991320.51	
978734.40		Hospital Expenses	942164.90	
2425638.10		Inpatient Diet expenses	2517080.70	
5427929.10		Laboratory Expenses	4622902.30	
127130560.85		Salaries & Allowances	117878269.50	
168219.00		Honorarium to Visiting Faculty	293096.00	
3018361.00		Medical benefit to staff	4707260.00	
885273.00		Contribution to Provident Fund	4104.00	
14960.00		Travelling Expenses	141932.00	
0.00		Expenses for visiting faculty	23193.00	
443403.00		Home travel & Leave travel concession	1265128.00	
823077.50		Postage, Telephone and Telegrams	1096873.00	
1217361.75		Printing & Stationery	1820413.50	
208198.00		Advertisements	371465.00	
47986.00		Recruitment Expenses	30523.50	
10715754.00		Electricity & Water Charges	14455302.00	
269831.72		Freight, Insurance & Handling charges	306009.00	
403908.30		Vehicle Maintenance Expenses	482461.35	
115486.20		Bank charges and commission	189331.00	
25650.00		Agricultural Expenses	0.00	
193125.00		Taxes & Licence	265080.00	
		<b>Repairs and Maintenance</b>		
12157561.30		Equipments	16798079.68	
2071495.55		Buildings	2454264.65	
480046.65		Others	1132784.85	
15616.00		Staff Training Expenses	1350.00	
25382.00		Research-In House Projects	3315.00	
193805.06		Other Expenses	163313.00	
0.00		Bonus & Festival Allowences		
1498033.60		Tools, Glassware & Instruments - consumed	1370383.67	
6924960.00		Contribution to Pension Fund	7955628.00	
6555758.00		Contribution to Sinking Fund	7203153.00	
0.00		Contribution to Gratuity Fund	400000.00	
<b>262277881.40</b>		<b>Total</b>	<b>285083777.21</b>	

sd/  
Financial Adviser &  
Chief Accounts Officer

Figures for the previous year		INCOME	Amount	
Rs	Ps		Rs	Ps
		<b>Hospital Collections</b>		
103257830.00		Inpatient Charges	111974797.00	
27856863.00		Investigation & Registration Charges	32091263.00	
62970.00		Income from Projects	110100.00	
0.00		Receipts from medicine	59338.00	
		Excess of expenditure over Income transferred to Income & Expenditure Account - General		
131100217.84			140848279.21	
262277881.40		<b>Total</b>	285083777.21	

sd/  
Director

## Income and Expenditure Account for the year ended 31st March 2001 - Biomedical Technology Wing

Figures for the previous year		EXPENDITURE	Amount	
Rs	Ps		Rs	Ps
314988.00		Chemicals	735724.00	
49602.85		Consumable Stores	81199.30	
485889.40		Laboratory Expenses	223444.05	
20225455.20		Salaries & Allowances	17256374.70	
181259.00		Medical benefits to staff	215770.00	
68523.50		Travelling Expenses	67468.00	
19912.85		Uniforms to Staff	41410.80	
17084.50		Expenses for Visiting Faculty	0.00	
213125.00		Postage, Telephone & Telegrams	250558.75	
84590.00		Printing & Stationery	123359.80	
103550.00		Advertisements	19650.00	
1522293.00		Electricity & Water Charges	1778623.00	
166212.00		Freight, Insurance & Handling Charges	50879.50	
31816.00		Bank Charges & Commission	3987.00	
79946.50		Garden & Estate Expenses	64486.50	
		<b>Repairs &amp; Maintenance Expenses</b>		
565930.00		Equipments	984209.00	
50330.00		Buildings	133588.00	
57994.00		Others	31583.00	
208976.90		Animal Research Lab Expenses	551911.85	
136029.55		Other Expense	104426.50	
216718.05		Workshop & Tool room expenses	407841.70	
13600.00		Honararium	19226.00	
156482.70		Seminar & Conference expenses	188436.00	
47600.00		Legal Charges	67815.00	
7026.00		Exhibition expenses	0.00	
53132.00		Home travel & Leave travel expenses	291727.00	
5881.90		Vehicle maintenance expenses	0.00	
157614.00		Taxes & Licences	80702.00	
1462183.11		Tools, Glassware and Instruments written off	1260207.71	
59983.60		Staff Training expenses	2000.00	
0.00		Contribution to Technology Development Fund	3619642.80	
586103.00		Research expenses - In house projects	0.00	
23604.00		Visiting faculty expenses	0.00	
245.00		Committee meeting expenses	840.00	
<b>27373581.51</b>		<b>Total</b>	<b>28657091.96</b>	

sd/  
Financial Adviser &  
Chief Accounts Officer



Figures for the previous year		INCOME	Amount	
Rs	Ps		Rs	Ps
586103.00		Premium & Royalty received	3619642.80	
174989.00		Facility charges received	248010.00	
19879.00		Overhead charges collected from projects	32103.00	
10137.00		Interest received	13260.00	
40390.00		Income from Garden & Estates	124620.20	
48129.75		Sundry receipts	47767.45	
2397113.00		Interest from technology fund	1352116.00	
68265.00		Rent collected from staff	170562.00	
0.00		Sale of tender forms	0.00	
4500.00		Examination fee received	6000.00	
24024075.76		Excess of expenditure over income transferred to general income and expenditure account	23043010.51	
27373581.51		Total	28657091.96	

sd/  
Director

## Receipts and Payments Account for the year ended 31st March 2001

Figures for the previous year		RECEIPTS	Amount
Rs	Ps		Rs Ps
		<b>Opening Balance</b>	
251435.65		Cash in hand	363697.75
2591995.12		Balance with banks for G.P.	193307.87
		<b>Hospital Collection</b>	
102369037.00		Inpatient deposit	115336390.00
25995713.00		Investigation and Registration charges	29185423.00
		<b>Research and Development Wing</b>	
586103.00		Royalty received	3619642.80
40390.00		Income from estate	124620.20
39983.50		Sundry receipts	29374.00
8148.00		Interest on bank deposits	10593.00
2397113.00		Interest on specific deposit	1352116.00
171989.00		Facility hire charges	232250.00
		<b>General Receipts</b>	
422394.50		Sundry receipts	634202.00
73857.00		Rent	161829.00
709258.95		Interest received	2067136.67
1084943.00		Application & Examination fee from PG students	1363545.00
425710.00		Notice pay received	221798.00
		Leave salary contribution	67108.00
		<b>Grant received from Govt. of India</b>	
100000000.00		For recurring expenses	100000000.00
110000000.00		For capital expenses	120000000.00
		Grant for specific research	
18352914.01		Projects	31092198.60
6252871.59		Receipts for specific purpose	11218317.73
903079.00		Deposits received	951220.40
0.00		Receipts from sale of Assets	54300.00
16907661.41		Receipt for PF & Pension Fund	33193457.00
0.00		Donation for specific purpose	0.00
0.00		Temporary over draft (Bank)	17534983.41
10000000.00		Deposit refunded	10000000.00
<b>399584596.73</b>		<b>Total</b>	<b>479007510.43</b>

sd/  
Financial Adviser &  
Chief Accounts Officer

Figures for the previous year		PAYMENTS	Amount	
Rs	Ps		Rs	Ps
		<b>Expenses for Hospital Wing</b>		
135073486.20		To staff	132407857.45	
117495142.85		To others	159797910.40	
		<b>Expenses for BMT Wing</b>		
20639735.25		To staff	18355325.40	
4706815.75		To others	4597768.88	
407870.50		Expenses for general purpose	645493.50	
11694632.00		Expenses for Academic purpose	10614857.40	
188090.00		Expenses for Achutha Menon Centre	118128.00	
46802748.28		Payment for fixed assets	67584188.90	
8464.90		Payments for tools	0.00	
1198222.25		Payment for glasswares	1312011.00	
2033491.00		Payment for Instruments	371787.00	
0.00		Refund of Bank overdraft	0.00	
13337313.13		Payment for Projects	24260269.31	
960666.00		Deposits Refunded	701627.00	
33658995.00		Deposit for specific expense	47897777.53	
10720178.00		Deposit for sinking fund	6555758.00	
101740.00		Deposit-Others	18284.00	
		<b>Closing balance</b>		
363697.75		Cash in hand	497154.15	
193307.87		Cash with banks	3271312.51	
399584596.73		<b>Total</b>	479007510.43	

sd/  
Director



## Schedule of Fixed Assets as on 31-03-2001

### GROSS BLOCK

Particulars of Assets	Values as on 1-4-2000		Additions during the year		Assets disposed off		Total	
Item	Rs.	Ps	Rs.	Ps	Rs.	Ps	Rs.	Ps
1. Land	1463299.63		0.00				1463299.63	
2. Land development	122543.88		0.00				122543.88	
3. Buildings	86772475.18		2001585.00				88774060.18	
4. Statemond Palace	2166170.00		0.00				2166170.00	
5. Compound Walls	3460656.68		0.00				3460656.68	
6. Equipments	462740567.59		57649766.00		559710.00		519830623.59	
7. Gas plant installations	1026560.09		27128.00				1053688.09	
8. Air conditioners & Refrigerators	15813015.91		1085944.00		25000.00		16873959.91	
9. Cold room installation	341700.00		0.00				341700.00	
10. Sub-station installations	1349552.25		0.00				1349552.25	
11. Electrical installation	11076340.42		588687.00				11665027.42	
12. Water Cooler	62866.50		0.00				62866.50	
13. Lift instillation	2577633.10		723800.00				3301433.10	
14. Canteen Equipments	93216.09		6575.50				99791.59	
15. Office Equipments	857064.54		0.00				857064.54	
16. Furniture & fixtures	17301623.61		1120204.00		54107.00		18367720.61	
17. Motor Vehicles	2715789.30		0.00		398614.89		2317174.41	
18. Telephone Installation	1735535.94		34335.00				1769870.94	
19. Library Books	56750669.64		4102610.00		3338.07		60849941.57	
20. Kitchen Utinsils	556697.82		2822.40				559520.22	
21. Mural Paintings	271757.63		90000.00				361757.63	
22. Cycles	6135.33		0.00		80.00		6055.33	
23. Roads	750822.04		0.00				750822.04	
24. Animal Houses & cages	433376.70		0.00				433376.70	
25. Oxygen Cylinders	203362.42		0.00				203362.42	
26. Livestock	31848.00		0.00				31848.00	
27. Bore well	174615.00		0.00				174615.00	
28. Buildings-ACM	55330099.16		1753988.00				57084087.16	
<b>Total</b>	<b>7261859994.45</b>		<b>69187444.90</b>		<b>1040849.96</b>		<b>794332589.39</b>	

## DEPERECIATION BLOCK

Deprciation till 31-03-00	Deprciation for the year	Deprciation till 31-03-2001	Net Block
Rs. Ps	Rs. Ps	Rs. Ps	Rs. Ps
0.00	0.00	0.00	1463299.63
0.00	0.00	0.00	122543.88
37590848.38	2559160.59	40150008.97	48624051.21
643577.73	76129.61	719707.34	1446462.66
861100.19	129977.82	991078.01	2469578.67
251560819.26	40240470.65	291801289.91	228029333.68
550714.82	75445.99	626160.81	427527.28
7722461.06	1372724.83	9095185.89	7778774.02
327980.17	2057.97	330038.14	11661.86
1167508.99	27306.49	1194815.48	154736.77
6302444.82	804387.39	7106832.21	4558195.21
61584.30	192.33	61776.63	1089.87
2049559.32	187781.07	2237340.39	1064092.71
65187.84	5190.56	70378.40	29413.19
634111.38	33442.97	667554.35	189510.19
10767249.30	1140070.70	11907320.00	6460400.61
1876279.06	88179.07	1964458.13	352716.28
1189815.52	87008.31	1276823.83	493047.11
33383105.19	4120025.46	37503130.65	23346810.92
367124.07	28859.42	395983.49	163536.73
176187.03	27835.59	204022.62	157735.01
5395.37	131.99	5527.36	527.97
620075.51	19611.98	639687.49	111134.55
332972.96	15060.56	348033.52	85343.18
175245.35	4217.56	179462.91	23899.51
11012.48	3125.33	14137.81	17710.19
83464.88	13672.52	97137.40	77477.60
0.00	2854204.36	2854204.36	54229882.80
358525824.98	53916271.13	412442096.11	381890493.28

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

System of Accounting followed by Institute :

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

### Notes on Accounts :

1. As per the requirement of Audit, depreciation on Fixed Assets is provided and shown in Balance sheet, calculated on reducing balance method, at the rates fixed by Income tax Act (from the date of installation of equipments).
2. Payment for Fixed assets in Receipts & Payment do not include any advance payments for fixed assets.
3. Since there is no surplus income for the Institute, Income tax is not payable by Institute.
4. Physical verification of Assets and other stock items are done for 2000-2001 during April to June 2001. Physical verification certificates will be shown to audit at the time of next audit.

Sd/  
FA & CAO

Sd/  
Director



## **Audit Report**

### **Audit Report on the Accounts of the Sree Chitra Tirunal Institute for Medical Sciences & Technology, Thiruvananthapuram for the year 2000-2001**

#### **Introduction**

The Sree Chita Tirunal Institute for Medical Sciences and Technology (Institute), Thiruvananthapuram is governed by the provisions of The Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum Act, 1980 (52 of 1980). The Institute is financed mainly by grants from the central Government. During the year 2000-2001, Institute received a sum Rs. 2200.00 lakh as grants from Central Government.

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

#### **Comments on Accounts**

##### **Balance Sheet**

##### **1. Uncovered Deficit**

The liabilities to be discharged by the Institute including the provisions accounted for in current year was to the extent of Rs 2807.96 lakh. As against this, the investments and deposits made were to the extent of

#### **Replies to Audit Comments**

Investments for the provisions created on 31/03/2001 (for Sinking fund) can be made only during succeeding financial year. Hence the deficit reported.

Rs. 2760.77 lakh only. Hence there was an uncovered deficit of Rs. 47.19lakh in the investments and deposits.

## 2. Mixing up of the Plan Non-Plan Grants.

Grants received from Govt. of India to meet capital expenditure was to the extent of Rs. 1200.00 lakh. Out of this, expenditure to the extent of Rs. 649.30 lakh was only incurred for capital and an amount of Rs. 337.41 lakh was used for meeting the expenditure for Research and Academic programme. Hence plan grant of Rs 213.29 lakh was mixed with Non-plan grant for meeting recurring expenditure.

Institute had already taken up with Department of Sciences & Technology, Govt. of India for revising Non-Plan funds to meet the additional expenditure due to revision of pay implemented based on Vth Pay commission orders of Govt. of India. The additional expenditure due to pay revision is now met from plan fund grant released to the Institute.

## 3. Liabilities Against Unutilised Grants of Sponsored Projects

The liabilities to be discharged by the Institute against unutilised grants received for sponsored research projects was to the extent of Rs. 254.03 lakh. As against this there is a deposit to the extent of Rs. 83.95 lakh only. Thus grants received for specific purpose was diverted for meeting recurring expenditure of the Institute and deposit on this account was understated to the extent of Rs. 170.08 lakh on the asset side.

The funds borrowed from the unspent balance in the Project Grant Funds were refunded during next financial year (2001-02).

## 4. Investment of Sinking Fund Deposit

As per Schedules to Balance Sheet the amount included in State Bank of Travancore Fixed Deposits towards sinking fund was Rs. 696.92 lakh. However, deposits amounting to Rs. 441.01 lakh are pleaded to SBT as Security for the overdraft of Rs. 175.35 lakh drawn by the Institute.

Institute had arrangement with State Bank of Travancore, for a temporary over draft facility, to meet urgent requirements of funds occurred during delay in receipt of Grants from Govt of India (for meeting urgent expenses of hospital). For reducing interest incidence on such overdraft the fixed deposits of Institute with State Bank of Travancore were provided as security for the short periods.

## 5. Accounting of Assets

- (i) The value of assets shown in the Balance Sheet after charging depreciation was Rs. 3818.90 lakh. It was reported by the Institute in the previous years, that a committee was formed for identifying and valuing fixed assets, which were of obsolete, unusable and for the disposal. However, no assets, were written off or removed from the assets block on the recommendations of the said committee. As such, it could not be certified in Audit that all such assets shown in Balance Sheet are of usable or put into use.

The Committee appointed for reporting obsolete equipments had identified such equipments. The valuation based on original cost of such equipments are being done now. Adjustment of assets will be made on receipts of valuation.

Since depreciation is provided for all assets the obsolete assets are shown approximately at its realisable value in Balance Sheet. The net value of fixed assets shown in Balance sheet may hence be taken as value of assets held by institute.

- (ii) An amount of Rs. 54300 was realised during current year towards disposal of a few items of Assets. However Assets to the extent of only the sale proceeds of Rs. 54300 was written off from the Asset account instead of book value of the assets.

The sale proceeds for assets are reduced from value of Fixed assets, as per general procedure followed by Institute in previous years.

## 6. Amount Receivable From Employees State Insurance (ESI)

Amount receivable as on 31-03-2001 from ESI for the treatment of employees covered in the scheme is Rs. 49.13 lakh as per the Balance Sheet. However the schedule of outstanding bills of ESI patient indicates outstanding Rs. 62.10 lakh. Thus the amount receivable from ESI has been understated in the Balance Sheet to the extent of Rs. 12.97 lakh. Also the ledger balance has not been reconciled with the actual amount receivable from ESI.

The difference in amount reported Rs. 12.97 lakh receivable from ESI is included in the account under the head "In patient Deposit account". Reconciliation as required by audit will be provided during next audit.

## Receipts & Payments Accounts

### Royalty Receivable

During the year Royalty received and accounted for was Rs. 36.20 lakh. However, there is no mechanism

Details of royalty receivable for technology transferred directly by Institute to industry are available and is being



in the Institute to arrive at how much amount is actually receivable in respect of each Technology so far transferred by the Institute. Royalty in respect of Heart Valve and Blood Bag of the year 1999-2000 onwards and for Hydrocephalus Shunt for the year 1998-99 onwards are yet to be received.

followed up. In the case of Heart valve and Blood bag the technology was transferred through NRDC (Under Dept of Science & Technology, Govt. of India) and hence royalty receipts directly managed by them. Royalty for the period upto 98-99 were transferred to Institute after their finalisation of accounts of NRDC.

## General

### Revision of Accounts at the Instance of Audit

#### (i) Assets Account

Assets to the extent of Rs. 36.49 lakh procured out of the funds received for the sponsored Research Projects was included in the Assets of Institute. This was reduced from the Assets and capital fund of the Institute at the instance of Audit. This has resulted in reduction in fixed Assets and corresponding reduction in the depreciation.

Equipments received by Institute through external projects were included in the Fixed assets of Institute. At the instruction of audit these assets were removed from fixed assets of Institute and the statements of accounts stands revised accordingly.

#### (ii) PF and PF investments

The Provident Fund and PF investments at the close of the year was understated in the Balance Sheet to the extent of Rs. 243.73 lakh. This was rectified. This had resulted in increase in assets and liabilities of the Balance Sheet.

Details of Interest accrued on PF investments were received in accounts division after preparation of accounts. However necessary correction was made in the statements before accounts were finalised by audit.

#### (iii) Gratuity Fund

Liability against gratuity fund was reduced by Rs 4 lakh consequent to rectification carried out in the balance outstanding in the provision for Gratuity Fund.

The error in adjustment of provision was traced by accounts after statement of accounts were prepared. Necessary corrections were provided to audit before completion of auditing.

#### (iv) Liability Against Deposits

Liability against Security Deposit and Earnest Money Deposit included in Other Liabilities in the Balance Sheet has been reduced to the extent of Rs. 1.05 lakh consequent to write back of lapsed deposit to the Institute's Account.

Liability against Security Deposits and Earnest money Deposit up to 31-03-1998 were written off at the instruction of Audit even though liability against the deposits are still outstanding.

## (v) Revision of Closing Stock of Spares

Error in closing stock of spares was corrected and it was revised to Rs. 72.23 lakh.

Due to an error in computer programme, the closing stock were valued wrongly. This was traced by Institute and rectified in statement.

## (vi) Increase in Excess Expenditure Over Income

Due to revision of accounts mentioned, there is an increase in excess of expenditure over income to extent of Rs.147.55 lakh.

The above correction in closing stock valuation necessitated the changes in Income & Expenditure statement prepared.

EFFECT OF AUDIT COMMENTS ON  
BALANCE SHEET, INCOME AND  
EXPENDITURE AND RECEIPTS AND  
PAYMENT ACCOUNT.

The net impact of the comments given in preceeding paras is that assets as on 31-03-2001 were understated by Rs. 183.05 lakh.

Sd/-

Pr. Director of Audit (SD)

19/12/2001

Sd/-

Financial Adviser &

Chief Accounts Officer

Sd/-

Director

## Audit Certificate

I have examined the Receipts and Payment Account, Income and Expenditure Account for the year ended 31 March, and the Balance Sheet as on 31 March, 2001 of the Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram. I have obtained all the information and explanations that I have required and subject to the observations in the appended Audit Report. I certify, as a result of my audit, that in my opinion these Accounts and Balance Sheet are properly drawn up so as to exhibit a true and fair view of the state of affairs of the Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram according to the best of information and explanations given to me and as shown by the books of the organisation.

Place: New Delhi  
Dated : 19-12-2001

Sd/  
Principal Director of Audit(SD)





Sree Chitra Tirunal Medical Centre

Bio Medical Technology Wing



Maharani Setu Parvati Bai Surgical Centre

Achutha Menon Centre for Health Science Studies

