ANNUAL REPORT
2006-07

Vallabhbhai Patel Chest Institute
University of Delhi, Delhi, India

CREDIT LINE

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From the Director's Desk

I feel privileged to bring out the Annual Report of the V.P. Chest Institute (VPCI) for the year 2006-07. The Report presents as a comprehensive treatise highlighting the present achievements and notable activities of the Institute in the fields of 'education' 'research', 'patient care' and other developmental activities.

First of all, on behalf of the Institute, I sincerely thank Prof. P.N. Srivastava, the outgoing Chairman, Governing Body of VPCI for rendering his valuable time to the Institute. His keen efforts and valuable suggestions helped us in shaping the all round development of the Institute. At the same time, I welcome Prof. N.K. Ganguly (Direcor General, Indian Council of Medical Research), as our new Chairman, Governing Body of the Institute. I wish that his vision and guidance will further enhance the reputation of the Institute both in national and international levels.

The Institute continued its teaching, research and patient care activities. The Golden Jubilee Auditorium of the Institute was inaugurated with an International Symposium on "Herbal Drug Research and Therapy", on 8th December 2006. Later the Golden Jubilee Auditorium has been renamed as "Paintal Memorial Golden Jubilee Auditorium", in honour of the second Director of the Institute by a resolution of the Governing Body. The architectural beauty of this Auditorium is a unique one. It is also well equipped with new state-of-the-art facility. Moreover, the hospital wing of the Institute, Clinical Research Centre has been renamed as "Viswanathan Chest Hospital" in honour of the Founder Director of the Institute by a resolution of the Governing Body.

On the occasion of the 57th Foundation Day Celebrations, Prof. C.N. Deivanayagam, Former Medical Superintendent, Hospital for Thoracic Medicine, Chennai, delivered the 8th "Prof. Raman Viswanathan-VPCI Oration", on 6th April 2006. Prof. P.N. Tandon, President Brain Research Centre Society, Gurgaon, delivered the 2nd "Prof. Autar Singh Paintal Memorial Oration", on 24th September 2006.

Besides the routine Workshops and CMEs, the Institute has also organized an International Conference on "Cardiopulmonary Regulation in Health and Disease: Molecular and Systemic Integration" (dedicated to late Prof. A.S. Paintal), 22-24 February 2007, and a National Symposium on "Thoracic Imaging", on 5th April 2006.

During the year, the Institute organized an "Exhibition on harmful effects of tobacco" and a "Tobacco Awareness March", jointly with the World Lung Foundation-South Asia, on 12th December 2006. Hundreds of people, mostly, Delhi University students, participated in that March. The March was flagged off by Delhi Government Health Minister, Shri Yoganand Shastri, from the Patel Chest Institute. Eminent personalities delivered public lectures on the harmful effects of tobacco on our health. The objective of the March is to create a task force of young students who would promote a tobacco free society.

Dr V.K. Vijayan
Director

ANNUAL REPORT (2006-07)

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MILESTONES OF VPCI

April 6,	1949	Foundation stone of the Institute was laid down by Sardar Vallabhbhai Patel.
November	1951	Ad-hoc Governing Body was appointed by the Executive Council of University of Delhi for administrative affairs of the Institute.
December	1951	Main building of the Institute was completed.
January 12,	1953	The Institute was formally opened by Rajkumari Amrit Kaur, the Union Minister of Health, Government of India.
		Prof. R. Viswanathan was appointed as the first Director. The grant for 1953-54 was Rs. 2 lakh.
January 21,	1955	A regular Governing Body was constituted by the Executive Council of the University of Delhi for the management and administration of the Institute.
April 4,	1955	The first meeting of the regular Governing Body was held.
	1955	Prof. A.S. Paintal reported the discovery of lung deflation receptors, a historical landmark in understanding the functioning of lung and its diseases.
July 1,	1957	Prof. R. Viswanathan took over as full-time Director of the Institute. Previously, he was the Deputy Director General of Health Services, Govt. of India and Honorary Director of the Institute.
September 24,	1957	Pt. Jawaharlal Nehru said in a message : "It was a brave act of the University of Delhi to start the V.P. Chest Institute".
October 24,	1957	Clinical Research Centre was inaugurated by Dr Rajendra Prasad, President of the Republic of India.
January 24,	1959	Indian Association for Chest Diseases was formed and inaugurated by Sir A.L. Mudaliar. It was rechristened as National College of Chest Physicians (India) in January 1981.
July	1959	*The Indian Journal of Chest Diseases*, a Quarterly Journal, was started under the joint auspices of the V.P. Chest Institute and the Indian Association for Chest Diseases.
July	1959	A ward of 20 beds was opened to admit patients.
	1959	By a resolution of the Governing Body, V.P. Chest Institute was nominated as a "National Institute for Teaching and Research in Chest and Allied Diseases".
January	1960	A Diploma course in Tuberculosis Diseases, which was started in March 1947, was re-named as "Diploma in Tuberculosis and Chest Diseases" (DTCD) from XIV Course. The XV DTCD Course started from July 1960.
April 6,	1961	Celebration of Foundation Day of the Institute was started.
April 7,	1962	Foundation stone of Patel Niwas, a Post Graduate Hostel, was laid down by Dr C.D. Deshmukh, Vice-Chancellor, University of Delhi.
January 26,	1963	A contingent of V.P. Chest Institute staff participated in the Republic Day parade.
February 20-24,	1963	VII International Congress on Diseases of the Chest was held at Vigyan Bhawan under the auspices of V.P. Chest Institute, Indian Association for Chest Diseases and the University of Delhi.
August 1,	1964	Prof A.S. Paintal joined as the Director of the Institute.
April 6,	1965	Patel Niwas was inaugurated by Dr C.D. Deshmukh on the XVI Foundation Day of the Institute.
	1966	Prof. A.S. Paintal was elected Fellow of the Royal Society of Edinburgh.

	1969	Padma Shree was awarded to Prof. R. Viswanathan.
	1974	Padma Bhushan was awarded to Prof. R. Viswanathan.
	1981	Prof. A.S. Paintal was elected Fellow of the Royal Society of London.
	1984-85	Prof. A.S. Paintal was elected General President of the Indian Science Congress Association.
	1985-88	Prof. H.S. Randhawa was elected Vice-President of the International Society for Human and Animal Mycology.
	1986	Prof. A.S. Paintal was appointed as Director-General of the Indian Council of Medical Research.
	1986	Padma Vibhushan was awarded to Prof. A.S. Paintal.
	1986-88	Prof. A.S. Paintal was elected President of the Indian National Science Academy.
November 10,	1991	Prof. H.S. Randhawa joined as the Director of the Institute.
October 5,	1998	Dr V.K. Vijayan joined as the Director of the Institute.
April 6,	1999	Golden Jubilee Celebrations of the Foundation Day of the Institute.
		1st VPCI Oration by Prof. N.K. Ganguly, Director-General, Indian Council of Medical Research.
June 14,	1999	24-hour Respiratory Emergency Services started.
November 12,	1999	His Excellency, Shri K.R. Narayanan, President of India, received the copy of Compendium of Activities (VPCI) 1949-99.
April 6,	2000	2nd VPCI Oration by Prof. A.S. Paintal, former-Director-General, ICMR and former-Director, VPCI.
August 30,	2000	A New Ward (with an additional 40 beds) was inaugurated by Dr A.K. Walia, Honourable Minister for Health, Govt. of NCT of Delhi.
	2000-06	Dr V.K. Vijayan was elected International Regent, American College of Chest Physicians, U.S.A.
March	2001	A Respiratory Critical Care Unit was started.
March 15,	2001	CT Scan Centre was inaugurated by Honourable Padma Shree Dr C.P. Thakur, the Union Minister of Health & Family Welfare, Govt. of India.
April 6,	2001	3rd VPCI Oration by Dr S. Lakshminarayanan, University of Washington School of Medicine, Washington, Seattle, U.S.A.
April 21,	2001	1st Refresher (CME) Course in Respiratory Diseases started.
November 21,	2001	Inauguration of Tobacco Cessation Clinic.
April 6,	2002	4th VPCI Oration by Dr S. Padmavati, President, All India Heart Foundation and Director, National Heart Institute, New Delhi.
August 14,	2002	Inauguration of the State-of-the-art Oxygen Plant by Prof. P.N. Srivastava, Chairman, Governing Body, V.P. Chest Institute.
January 12-14,	2003	International Conference on Chest Diseases and Allied Sciences was held at India Habitat Centre, New Delhi, to commemorate the Golden Jubilee of the Inauguration of the Institute.
April 7,	2003	5th VPCI Oration by Prof. J.S. Bajaj, former Professor and Head, Department of Medicine, All India Institute of Medical Sciences, New Delhi and former Member, Planning Commission, Government of India.
May 28,	2003	"Bhoomi Pujan" to start the construction work of the Golden Jubilee Auditorium.
April 6,	2004	6th VPCI Oration by Prof. H.S. Randhawa, former Director, V.P. Chest Institute, University of Delhi, Delhi.

April 6,	2005	7th Prof. Raman Viswanathan-VPCI Oration by Prof. Naranjan S. Dhalla, Distinguished Professor and Director, Institute of Cardio-vascular Sciences, St. Boniface General Hospital and Research Centre, University of Manitoba, Winnipeg, Canada. The VPCI Oration was re-named as "Prof. Raman Viswanathan-VPCI Oration" in 2005.
September 24,	2005	1st Prof. A.S. Paintal Memorial Oration by Prof. M.S. Valiathan, Honorary Advisor, Manipal Academy of Higher Education, Manipal (Karnataka).
January 10,	2006	Inauguration of 8-bedded Intensive Care Unit by Prof. P.N. Srivastava, Chairman, Governing Body (VPCI).
April 6,	2006	8th "Prof. Raman Viswanathan-VPCI Oration" by Prof. C.N. Deivanayagam, Former Medical Superintendent, Hospital for Thoracic Medicine, Chennai.
September 24,	2006	2nd "Prof. A.S. Paintal Memorial Oration" by Prof. P.N. Tandon, President, National Brain Research Centre Society, Gurgaon.
December 8,	2006	Inauguration of the Golden Jubilee Auditorium by organising an International Symposium on Herbal Drug Research and Therapy.
March 2,	2007	The Hospital wing of the Institute, Clinical Research Centre has been renamed as "Viswanathan Chest Hospital" in honour of the Founder Director of the Institute and the Golden Jubilee Auditorium has been renamed as "Paintal Memorial Golden Jubilee Auditorium" in honour of the former Director of the Institute by a resolution of the Governing Body.

PAINTAL MEMORIAL GOLDEN JUBILEE AUDITORIUM

Outside view of the Auditorium

Main entrance of the Auditorium

Inside view of the Main Auditorium

Cafeteria

Inside view of one of the Seminar Rooms

Guest Room

THE INSTITUTE

The Vallabhbhai Patel Chest Institute (VPCI) is a post-graduate medical Institution devoted to the study of chest diseases. It is ideally located in the Delhi University main campus providing the requisite academic environment in which wide range of scientific facilities are available in various departments along with an excellent Central Science Library.

Objectives

The main objectives of VPCI in addition to education have been to conduct research on fundamental and clinical aspects of chest diseases, to develop new diagnostic technology and disseminate it to other institutes in the country and provide specialised clinical and laboratory services to patients. The training of post graduates in Pulmonary Medicine and allied subjects is another important objective of VPCI.

Administration

The VPCI is a maintained Institution of University of Delhi and is fully funded by the Grants-in-Aid received from the Ministry of Health and Family Welfare, Government of India. The Institute is governed and administered by its own Governing Body as Constituted under Ordinance XX (2) of the University of Delhi Act. The Director, who is appointed by the Executive Council of University of Delhi, is the Chief Executive of the Institute. The Director of the Institute also functions as Member-Secretary (Ex-Officio) to the Governing Body of the Institute. The composition of the Governing Body follows in the next page. The Institute also has a Standing Finance Committee constituted by the Governing Body to make recommendations about its budgetary requirements.

Organisation and Management

The organisation and management of the Institute is through Departmentation of activities based on various areas of specialisation and functions. The Academic, Scientific and Clinical services are organised under the Departments of Anaesthesiology, Cardiorespiratory Physiology, Respiratory Medicine, Thoracic Surgery, Clinical Research Centre housing Outdoor/Indoor patient care services, and Departments of Biochemistry, Clinical Biochemistry, Biostatistics, Medical Mycology, Microbiology, Pathology, Pharmacology, Physiology, Radiodiagnosis and Imaging, Respiratory Allergy and Applied Immunology and Respiratory Virology. These departments are headed by the Faculty Members in the concerned area. The General and Personnel Management including various maintenance activities required for the Institute are supported by administrative services of the Institute which are available through following three sections controlled by the Deputy Registrar who reports to the Director. These sections are: *1*. Administration – I, *2*. Administration – II, and *3*. Finance and Accounts. The administrative services and its sections functioning details are shown in the Administrative Structure chart in the succeeding pages.

GOVERNING BODY

CHAIRMAN	
The Vice-Chancellor, University of Delhi (Ex-Officio) or a person nominated by him	**Prof. P.N. Srivastava** *(till 12.11.2006)* Ex-Vice-Chancellor, J.N.U., New Delhi **Prof. N.K. Ganguly** *(13.11.2006 onwards)* Director General, I.C.M.R., New Delhi
MEMBERS	
Treasurer, University of Delhi (Ex-Officio)	**Mrs Janaki Kathpalia**
Two members of the Executive Council nominated by the Executive Council	**Prof. Surinder Nath** *(10.04.2006 onwards)* **Prof. S.K. Vij** *(23.02.2007 onwards)*
Dean, Faculty of Medical Sciences, University of Delhi	**Prof. P. Kar**
Three members nominated by the Ministry of Health and Family Welfare, Government of India, New Delhi	**Shri Raghubir Singh** Additional Secretary & Financial Advisor **Smt. Bhavani Thyagarajan** Joint Secretary **Dr R.K. Srivastava** Director General of Health Services
One Member, not connected with the University, appointed by the Executive Council	**Prof. J.N. Pande** Former Head, Department of Medicine, A.I.I.M.S., New Delhi
One Professor of the Institute by rotation according to seniority for a period of one year	**Prof. S.K. Chhabra** *(till 02.11.2006)* **Prof. S.K. Bansal** *(03.11.2006 onwards)*
One Reader or Lecturer of the Institute by rotation according to seniority for a period of one year	**Dr Vishal Bansal** *(till 02.11.2006)* **Dr Anuradha Chowdhary** *(03.11.2006 onwards)*
MEMBER-SECRETARY	
Director, Vallabhbhai Patel Chest Institute University of Delhi, Delhi (Ex-Officio)	**Dr V.K. Vijayan**

Standing Finance Committee

Shri Raghubir Singh — *Chairman*
Additional Secretary & Financial Advisor
Ministry of Health & Family Welfare
Government of India
Nirman Bhawan
New Delhi

Dr V.K. Vijayan — *Member-Secretary*
Director
V.P. Chest Institute
University of Delhi
Delhi

Joint Secretary or Nominee — *Member*
Ministry of Health & Family Welfare
Government of India
Nirman Bhawan
New Delhi

Prof. Mridula Bose — *Member*
Department of Microbiology
V.P. Chest Institute
University of Delhi
Delhi

Dr Binod Kumar Singh — *Member*
Deputy Registrar
V.P. Chest Institute
University of Delhi
Delhi

Scientific Advisory Committee

Prof. S.K. Jindal Head, Department of Pulmonary Medicine Post Graduate Institute of Medical Education & Research Chandigarh -160 012	*Chairman*
Dr V.K. Vijayan Director V.P. Chest Institute University of Delhi Delhi	*Member-Secretary*
DDG (M) Ministry of Health & Family Welfare Government of India Nirman Bhawan New Delhi	*Member*
Principal University College of Medical Sciences (UCMS) Shahdara Delhi-110 095	*Member*
Prof. Ashok Shah Department of Respiratory Medicine V.P. Chest Institute University of Delhi Delhi	*Member*
Prof. K. Ravi Head, Department of Physiology V.P. Chest Institute University of Delhi Delhi	*Member*

Ethics Committee

Prof. S.K. Jain — *Chairman*
Senior Consultant (Pulmonology)
Mool Chand Hospital
New Delhi

Dr V.K. Vijayan — *Member-Secretary*
Director
V.P. Chest Institute
University of Delhi, Delhi

Prof. Nomita Aggarwal — *Member*
Dean, Faculty of Law
University of Delhi, Delhi

Prof. S. Tandon — *Member*
Head, Department of Social Work
University of Delhi, Delhi

Prof. R. Dewan — *Member*
Head, Department of Medicine
Maulana Azad Medical College and
Associated LNJP & GB Pant Hospitals
B.L. Taneja Block, 1st Floor
New Delhi-110 002

Prof. S. Dwivedi — *Member*
Head, Department of Medicine / Preventive Cardiology
University College of Medical Sciences (UCMS)
Shahdara
Delhi-110 095

Prof. Ashok Kumar Saxena — *Member*
Department of Anesthesiology and Critical Care
University College of Medical Sciences (UCMS)
Shahdara
Delhi-110 095

Prof. B.D. Banerjee — *Member*
Department of Biochemistry
University College of Medical Sciences (UCMS)
Shahdara
Delhi-110 095

Dr Ashima Anand — *Member*
Principal Investigator
DST Project
V.P. Chest Institute
University of Delhi, Delhi

Animal Ethics Committee

Prof. M.K. Agarwal — *Chairman (till 06.03.2007)*
Head, Department of Respiratory Allergy and
Applied Immunology
V.P. Chest Institute
University of Delhi, Delhi

Prof. A. Ray — *Chairman (07.03.2007 onwards)*
Department of Pharmacology
V.P. Chest Institute
University of Delhi, Delhi

Prof. K. Ravi — *Member-Secretary*
Department of Physiology
V.P. Chest Institute
University of Delhi, Delhi

Prof. S.S. Thukral — *Member (till 06.03.2007)*
Head, Department of Microbiology
V.P. Chest Institute
University of Delhi, Delhi

Dr Mandira Varma — *Member (07.03.2007 onwards)*
Reader, Department of Microbiology
V.P. Chest Institute
University of Delhi, Delhi

Prof. Anita Kotwani — *Member (07.03.2007 onwards)*
Reader, Department of Pharmacology
V.P. Chest Institute
University of Delhi, Delhi

Dr Rameshwar Singh — *Member*
Veterinary Surgeon (Retd) - DIPAS
DG-II/199-D, Vikaspuri
New Delhi -110 018

Ms Geeta Seshamani — *Nominee of CPCSEA*
President
Friendicoes -SECA, Shop Nos. 271 & 273
Defence Colony Flyover Market (Jangpura Side)
New Delhi – 110 024

Prof. K. Muralidhar — *Nominee of CPCSEA*
Head, Department of Zoology
University of Delhi, Delhi

Dr Rajinder Bajaj — *Member*
Veterinarian
V.P. Chest Institute
University of Delhi, Delhi

Mrs Uma Tyagi — *Member*
Librarian
V.P. Chest Institute
University of Delhi, Delhi

ORGANISATIONAL STRUCTURE

DIRECTOR

V.K. Vijayan, MBBS, DTCD, MD, MAMS, PhD, DSc, FCCP, FNCCP (I), FCAI, FICC, FAMS

Biochemistry

H.G. Raj, MSc, PhD, CChem, FRSC
Professor

S.K. Bansal, MSc, PhD
Professor

Biostatistics

Mujeeb-ur-Rahman, MSc, PhD, PGDCP
Lecturer

Cardiorespiratory Physiology

S.K. Chhabra, MBBS, MD
Professor

Clinical Biochemistry

Vishwajeet Rohil, MBBS, MD
Lecturer

Medical Mycology

(Mrs) Anuradha Chowdhary, MBBS, MD
Reader

Microbiology

S.S. Thukral, MSc (Hons), PhD
Professor

(Mrs) Mridula Bose, MBBS, MD
Professor

(Mrs) Malini Shariff, MBBS, MD, PhD
Reader

(Mrs) Mandira Varma, MBBS, MD, DNB
Reader

Pathology

(Mrs) Ritu Kulshrestha, MBBS, MS (Biomedical Sciences), DNB (Pathology), MNAMS
Lecturer

Pharmacology

A. Ray, MBBS, MD, MNAMS, PhD
Professor

(Mrs) Anita Kotwani, MSc, PhD
Reader

(Mrs) Kavita Gulati, MSc, PhD
Lecturer

Physiology

M. Fahim, MSc, PhD, Av HF (Germany), FAMS
Professor

K. Ravi, MSc, PhD
Professor

Vishal Bansal, MBBS, MD, DNB
Lecturer

Respiratory Allergy and Applied Immunology

M.K. Agarwal, MSc, PhD, FCAI
Professor

Balakrishnan Menon, MBBS, DMRD, MD
Reader

Respiratory Medicine

Unit - I

V.K. Vijayan, MBBS, DTCD, MD, MAMS, PhD, DSc, FCCP, FNCCP (I), FCAI, FICC, FAMS
Director

Ashok Shah, MBBS, DTCD, MD, FNCCP (I), FCAI
Professor

Unit - II

S.N. Gaur, MBBS, MD, FCCP, FNCCP (I), FCAI
Professor

Raj Kumar, MBBS, MD, FNCCP (I), FCAI, MIAOH
Reader

Respiratory Virology

(Mrs) Madhu Khanna, MSc, PhD
Reader

Clinical Research Centre
Officer-in-Charge
V.K. Vijayan

Library

(Mrs) Uma Tyagi, MPhil (Physics), MLib. Sc.
Librarian

Animal House

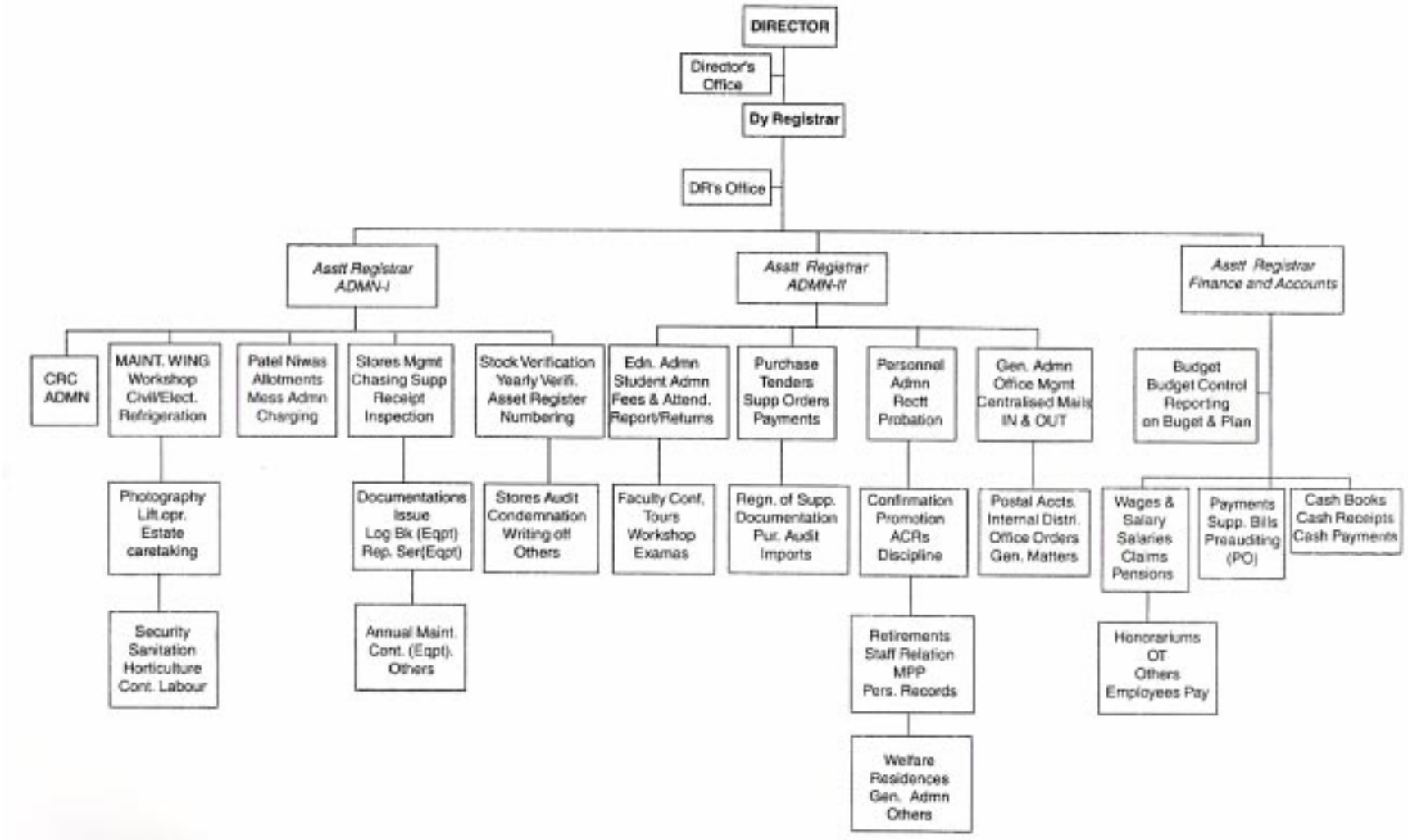
Rajinder Bajaj, BVSc & AH
Veterinarian

Administration

S.N. Subramanian, MSc
Deputy Registrar (up to 09.04.2006)

Binod Kumar Singh, MA (Publ. Admn), MA (Eng.), PGDPM, LLB, PhD
Deputy Registrar (w.e.f. 10.04.2006)

ADMINISTRATIVE STRUCTURE



The Institute organised an Exhibition on "Harmful Effects of Tobacco" and a "Tobacco Awareness March", jointly with the World Lung Foundation-South Asia, on 12th December 2006.

CENTRAL FACILITIES

Clinical Research Centre

The Clinical Research Centre (CRC) is the hospital wing of the Institute with the following Departments / Facilities:

1. Respiratory Medicine (Two units),
2. Cardiorespiratory Physiology,
3. Respiratory Allergy and Applied Immunology,
4. Radiodiagnosis and Imaging (including CT Scan Unit),
5. Out-patient / In-patient Facilities,
6. 24 Hours Respiratory Emergency,
7. Tobacco Cessation Clinic.

During the year 2006-07, the CRC continued to provide specialised investigations and treatment to patients referred to this Institute.

The detailed data of patients attending CRC are as follows:

Number of new patients attending OPD	:	7872
Number of visits of old patients to OPD	:	40015
Total		**47887**

Total number of indoor patients

General Wards	:	1742
Emergency Wards	:	1325
Total	**:**	**3067**
Emergency treatment provided	:	9437
Total number of patients treated in ICU	:	300

Number of specialised investigations done

Pulmonary function tests	:	16405
Arterial blood gases	:	3044
Bronchoscopy	:	233
Bronchoalveolar lavage	:	27
CT scans	:	1553
Ultrasound examinations	:	412
X-rays	:	16297
Electrocardiogram	:	2450
Polysomnograms	:	82
HIV testing	:	67
HBs Ag tests	:	05
Flowcytometry	:	1339
Clinical Biochemistry	:	10928

Tobacco Cessation Clinic

A Tobacco Cessation Clinic has been running on every Monday and Wednesday from 2:30 – 4:30 P.M.

Animal House

The Animal House of the Institute has completely renovated and upgraded to provide optimum environment for experimental animals and to meet international standards of animal experimental laboratories. It procures animals, breeds and supplies adequate number of good healthy animals to meet the requirement of the various departments of the Institute. It plays an important role in obtaining reliable and reproducible experimental results in biomedical and drug research.

The main activity of the Animal House are; ***a***. maintenance of adequate breeding status, *i.e.* rat, mice, guinea pig, etc., ***b***. to keep the animals healthy and disease free, ***c***. procurement, preparation and distribution of suitable food, ***d.*** design, fabrication, maintenance and supervision of cages, racks, etc., ***e***. prior preparation of animals for experiments and post-operative care, etc. The rooms of the Animal House are well-maintained, ventilated with filtered air and have climate and lighting control facility.

The staff of the Animal House and scientific community of the Institute are giving high priority to the welfare of laboratory animals and their judicious utilisation, and also make sure that all the procedures involved in animal handling are pain free and involve minimum stress to the animal.

The Animal House of the Institute is registered for Breeding and Experiments on animals with Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA), Animal Welfare Division, Government of India. It has also compliance (Assurance) with the standards of Public Health Service (PHS) Policy on Human Care and Use of Laboratory Animals, Office of Laboratory Animal Welfare (OLAW), National Institute of Health, Bethesda, U.S.A. Our Animal House is one of the seven institutions in India, which has a PHS approved Animal Welfare Assurance.

Library

The Institute has one of the best library in the field of Pulmonary Disease and Allied Sciences having 9,716 Books, 18,316 bound Journals, 115 CD's, 437 Thesis and 87 National and International Reports. A total of 94 Journals (90 International and 04 National) are being subscribed by the library, 20 Journals (07 International and 13 National) are being received on exchange programme with the Institute's Journal and 33 Journals (09 International and 24 National) are received on complimentary basis. Library is also subscribing four English and two Hindi newspapers.

Library renders its services not only to the scientists / research scholars of the Institute, but also to other Colleges and Institutes of the University of Delhi. Library is also affiliated with DELNET (Developing Library Network) to access various databases like Union Catalogue of Books / Periodicals for providing timely and current information. Much emphasis is also laid on to provide abstracts, references, current awareness service (CAS) and selective dissemination of information (SDI) services. Apart from this, online searches are being carried out for providing instant access of Information Resources to the desktop of researchers through LAN (Local Area Network). The Internet surfing and access has been provided right on the desktop of each Faculty Member through LAN and ISDN connectivity with 128 KBPS line from 8.00 AM to 7.00 PM. Library also provides inter-library loan facilities and reprographic services on demand.

In order to achieve the goal of establishing an automated library using state-of-the-art Information Technology, the Library has procured Libsys 4.0, library management software in March 2007, which would enable the library staff to provide efficient and effective online usage to users.

The Library services are available to Members / users of Delhi University from Monday to Friday {8.30 A.M. to 7.00 P.M.}.

PUBLICATION DIVISION

The Publication Division of the Institute has been publishing a quarterly periodical, ***the Indian Journal of Chest Diseases and Allied Sciences***, jointly with the National College of Chest Physicians (NCCP), India. The Journal started in 1959 by (late) Prof. R. Viswanathan, Founder-Director of VPCI. It has a wide national and international circulation and is indexed in Index Medicus, Excerpta Medica, Medline, IndMed, INSEAR, and Ulrich's Directory, etc. Full text articles published in the Journal (July-September 2003 onwards) can be accessed online through the following sites;

V.P. Chest Institute's site : **<http://www.vpci.org.in>,**

Indmed's site : **<http://medind.nic.in>**.

Moreover, the Division is also responsible for documentation and dissemination of research output through Annual Reports and other publications of the Institute.

DEPARTMENTAL ACTIVITIES

Biochemistry

Research

1. Studies on autoacetylation of calreticulin transacetylase (CRTAase) by mass spectrometry and in silico approach

Our earlier studies convincingly revealed the protein acetyl transferase function of calreticulin (CRT), a unique Ca^{2+} binding protein of mammalian cell endoplasmic reticulum utilising polyphenolic peracetates (PA) as the acetyl group donors. CRT was thus found to mediate the transfer of acetyl group from PA to certain functional protein such as glutathione S-transferase, cytochrome P-450, cytochrome P-450 reductase and nitric oxide synthase(NOS) resulting in the modulation of their catalytic activities and related biological properties. The protein acetyl transferase function of CRT was termed calreticulin transacetylase (CRTAase). The concomitant acetylation of CRT during CRTAase catalysed acetylation of proteins as described above was consistently observed. The acetylation of CRTAase by 7, 8-Diacetoxy-4-methylcoumarin (DAMC), a model PA was investigated in detail by electron spray ionization (ESI)-tandem mass spectrometry (MS) to localise the acetylated lysines. Accordingly nine lysines; Lys 48, 62, 64, 153, 159, 206, 207, 209 and 238 were found to be acetylated apart from oxidation of one metheonine residue Met257. It was interesting to note that the aforesaid autoacetylation of CRT was confined to only P and N-domains of CRT. The localisation of the acetylated sites in CRT was further analysed in relation with the neighbouring elements of secondary structure by computational approach. The tertiary structure of human CRT was predicted using homology modeling using the crystal structure of calnexin (PDB entry 1JHN) and the solution structure of calreticulin P-domain (PDB entry 1HHN) as templates, for analysing their interaction with neighbouring side chains and backbone atoms. The exploration of several energetic states of protein by different rounds of energy minimisation evidenced, in most cases, a loss of H-bonds of the ε-amino group lysine residues with its acidic counterparts in comparison with the unacetylated form. Acetylation of the ε-amino group of a lysine residue neutralises the positive charge, so the modification may affect interaction of the lysine residue with other protein by creating a new surface for protein association, thus facilitating protein-protein interaction.

2. Molecular cloning and characterisation of acetoxy drug: protein transacetylase from *Mycobacterium smegmatis*

Earlier work carried out in our laboratory highlighted the presence of acetoxy drug: protein transacetylase (TAase) in *Mycobacterium smegmatis.* Our previous investigations carried out in mammalian cells characterised TAase as calreticulin transacetylase (CRTAase). Since prokaryotes are not known to have calreticulin like proteins, the presence of CRTAase activity in prokaryotic organism like *M. smegmatis* was thought interesting. For this purpose in *M. smegmatis* TAase (M.TAase) was purified to homogeneity and was found to have M.wt. of 58 KDa. M.TAase catalysed protein acetylation was further substantiated by the ability of this enzyme to catalyse the acetylation of the receptor protein (RP), by DAMC, which avidly reacted with N-acetyl lysine antibody. These observations indicated that M.TAase mediated acetylation of lysine residues of the RP. The N-terminal sequencing of M.TAase exhibited 100% identity with Glutamine synthetase (GS) of *M. smegmatis.* The GS activity of M. TAase was also confirmed by the demonstration of various properties of GS. The commercially procured GS purified from *E. coli* exhibited considerable TAase activity. These observations attribute for the first time the acetyl transferase function of *M. smegmatis* Glutamine synthetase. The M.TAase protein exhibited similarities to the mycobacterial GS. Thus, M. TAase gene was cloned in an inducible expression system *i.e.* pTrcHis A to prove conclusively its identity with *M. smegmatis* GS. The recombinant M.TAase was purified through Ni-NTA affinity column. The purified recombinant M.TAase demonstrated all the properties of TAase as well as mycobacterial GS, leading to the conclusion that TAase is a novel, hitherto unknown function of mycobacterial GS.

3. Superiority of Tin protoporphyrins in modulating malaria induced haemolytic anaemia in experimental animal

The emergence of malaria parasites, resistant to conventional antimalarial agents, especially to

Chloroquine (CLQ), has stimulated urgent search for new antimalarial compounds. Metalloporphyrins may possess novel biological properties to intervene the malaria-associated jaundice and anaemia. Our aim was to investigate antimalarial activity of Chromium (CrPP) and Tin (SnPP) protoporphyrins alone and in combination with CLQ. From our experiment we have observed that metalloporphyrins has potential to treat malaria. The potential to treat malaria decreases in the order SnPP > SnPP + CLQ > CrPP > CrPP + CLQ > SnPP + CrPP + CLQ. Infrared spectroscopy was used to evaluate the effect of metalloporphyrins on hematin polymerization to β-hematin at acidic pH. Both molecules effectively inhibited the reaction. Complete inhibition of β-hematin formation was observed at haemin / CrPP ratio of 1:3 and hemin / SnPP ratio of 1:0.5. Combinationatorial inhibition of β-hematin by chloroquine and metalloporphyrins is under study.

4. Studies on mechanism of signal transduction during release of proinflammatory cytokines IL-1β and TNF-α by alveolar macrophages in asthma

Proinflammatory cytokines released by alveolar macrophages (AM), such as IL-1β and TNF-α, are known to play a significant role in airway inflammation in asthma. The release of these cytokines may be triggered by various extrinsic or intrinsic stimuli (*e.g.* asthmogens). Exposure of cells to stimulus is known to cause stimulus-receptor coupling, activation of transmembrane signalling and phosphorylation of some target proteins of protein kinase C (PKC). Phosphorylation changes the conformation of the proteins, which is necessary for several cellular functions. The expression of these cytokines by AM may be associated with the phosphorylation of some of these proteins. Based on these presumptions, the studies were conducted on AM of asthmatic patients and healthy subjects to evaluate the expression and release of IL-1β and TNF-α at mRNA and protein levels by various stimuli *viz.*, asthmogens (histamine, methacholine chloride; MCC), mitogen (LPS), agonists of PKC (PMA), antagonists of PKC (sphingosine) and bronchodilator (salbutamol), followed by identification of target proteins of PKC and changes in their phosphorylation.

The results suggest a significant increase in IL-1β and TNF-α levels in cell free bronchoalveolar lavage fluid (BALF) of asthmatic patients as compared to the healthy subjects without significant change in total number of cells in the BALF. Apparently, the AM of the asthmatic patients are primed to the triggers of asthma, the presence of which in the milieu may induce the early expression and release of these cytokines in comparison to the healthy subjects, which may be the cause of perpetuation and orchestration of inflammation in the airways. The changes in expression of IL-1β and TNF-α in AM caused by these stimuli were associated with the changes caused by them on phosphorylation of the proteins of 120, 66, 35 and 25 kDa, which were identified as target proteins of PKC by us in this study. Hence, it may be concluded that in asthma, alveolar macrophages remain primed to the triggers, and the expression and release of these cytokines by them could be associated with the phosphorylation of 120, 66, 35 and 25 kDa proteins through PKC mediated pathway.

5. Lipid rafts in bronchial asthma: a study on membrane lipid metabolism in asthmatic patients using erythrocyte membrane as the model

Lipid rafts are involved in signalling events and changes in their lipid composition may bring about changes in the functions of plasma membrane, leading to pathophysiology and disease manifestation. The study was continued on plasma membranes prepared from the RBCs obtained from the peripheral blood of asthmatic patients and healthy volunteers. The experiments on cholesterol and phospholipid analysis suggested that the total cholesterol level in asthmatics was reduced to almost half to that of healthy subjects. The ratio of cholesterol to sphingomyelin was significantly higher in asthmatics than in healthy subjects. These findings suggest that in asthma, there are changes in the composition of the lipids of the lipid rafts in the plasma membrane of erythrocytes.

6. Experimental asthma: a study on transmembrane signalling in airway smooth muscles and peripheral blood lymphocytes during the development of airway hypersensitivity in guinea pig

Our earlier studies have demonstrated the role of PKC mediated signal transduction pathway in bronchial asthma. However, the changes in the signalling mechanism at the onset of the disease are not known. Therefore, studies were planned to assess the changes in signal transduction pathway at the onset of the disease in lymphocytes and airway smooth muscle (ASM) in ovalbumin induced hypersensitivity in guinea pig as

model of asthma. We observed that in the sensitised animals, the onset of the airway and dermal hypersensitivity took place on day 9th, which was optimally present on day 14th and 28th as compared to the controls. The total cell counts in bronchoalveolar lavage fluid (BALF) increased on day 14th and 28th only, however, the differential cell count did not show any substantial change in various cell types at all the four intervals, except an increase in eosinophils in the BALF of sensitised animals on day 14th only.

7. Signalling mechanism in lymphocytes in COPD

Chronic obstructive pulmonary disease (COPD) is a slowly progressive disease characterised by chronic inflammation of the airways. Cigarette smoke and several other risk factors are known to be responsible for the development of the disease. The mechanism involved in the activation of inflammatory cells in the disease by cigarette smoke is not known. Nicotine is an active principle in the cigarette smoke, which may activate the inflammatory cells (such as lymphocytes) by activating protein kinase C (PKC) mediated signal transduction pathway, which in turn may release inflammatory mediators. These mediators may act on the target cells in the lungs and may cause the manifestations of the symptoms of the disease. In this investigation, we therefore, studied the effect of nicotine on PKC of lymphocytes obtained from peripheral blood of the COPD patients and compared the changes with those of the healthy subjects. The effect of agonist and antagonist of PKC and a bronchodilator *viz*., salbutamol, which is used for the treatment of COPD, was also studied to understand the mechanism of regulation of this enzyme. Our results show that in COPD the activity of PKC increases significantly in all the three stages as compared to the healthy subjects. This increase in each group has shown a significant reciprocal correlation with FEV_1 (% of predicted), suggesting that with the increase in the airway obstruction in COPD there is an increase in the PKC activity or vice versa *i.e.* the increase in the PKC activity might have lead to increase in the airway obstruction. The lymphocytes in the COPD patients seem to be primed for activation, since exposure to the nicotine caused an increased expression of PKC activity, which was significantly higher than the control group, suggesting increased potential of these cells in response to the external factors like nicotine. The effect of agonist and antagonist of PKC *viz*., PMA and sphingosine suggest that the enzyme activity is regulated by the action of these drugs in COPD, by their action on regulatory domain partially. The role of PKC in COPD gets supported by our studies on the effect of drug salbutamol, which decreased the activity of the enzyme in lymphocytes of COPD patients. However, the effect was not so pronounced in stage III as in stage I and stage II in comparison to control, suggesting that the PKC activity in stage III patients does not remain as sensitive to the action of salbutamol as in other lesser severe stages of COPD (*viz.* stage I and stage II) or healthy subjects. This may be speculated to be one of the reasons for poor response of salbutamol in COPD patients of stage III. These findings clearly demonstrate the role of PKC mediated signal transduction pathway in the development and perpetuation of manifestation of the symptoms of COPD.

8. ATP-binding cassette transporter (ABCD1) gene polymorphism in adrenoleukodystrophy

Adrenoleukodystrophy is the most common among leukodystrophies, which are genetically determined progressive disorders that affect the brain, spinal cord and peripheral nerves. It is X-linked disease and is the most common peroxisomal disorder. It is recessive, serious, progressive and neurodegenerative disorder in nature. It mainly affects the adrenal gland and white matter of the brain. It is caused by mutations in the ABCD1 (ATP-Binding cassette, sub-family D) gene, which encodes a peroxisomal ABC half-transporter (ALDP) involved in the import of very long-chain fatty acids (VLCFA) into the peroxisomes. Ten polymorphism have been identified by different groups in this gene (ABCD1) worldwide. However, studies on ABCD1 gene polymorphism in adrenoleukodystrophy in Indian population have not been conducted systematically so far. The gene has ten exons. In our study on screening these exons in the DNA of blood samples of controls (50 children) we observed the polymorphisms in exon 1, 6 and 10, supporting the findings of the western workers. In addition to these, we observed changes in some intron regions, whose role is still undefined. We identified two conserved region, one located in the sixth and the other in the eighth exon in this gene with the help of PLHost (Peptide Library Based Homology search tool). One polymorphism (1548 / G to A) in the conserved region of the sixth exon and other in the 3'UTR region (2288 / A to T) has been observed.

Biostatistics

The Department provides statistical assistance in planning, designing, analyses and execution for the research work of various departments of the Institute. It conducts teaching programmes for the postgraduate students as and when needed. The Department takes care of in- and out-patients' records. Additionally, it compiles reports to Government of Delhi and Government of India periodically pertaining to the institute.

Cardiorespiratory Physiology

Research

1. Time series study on air pollution and mortality for Delhi

This study is being carried out in collaboration with the Energy Research Institute, New Delhi. The aim of the study is to generate site-specific database on effect of air pollution on mortality for the city of Delhi. The specific objectives of this research study are: *(1)* to assess the time series data on air quality parameters and mortality to study the relationship between air pollution (mainly RSPM) and all-cause mortality in Delhi; and *(2)* to assess the daily change in mortality in relation with change in air quality after controlling for the exogeneous parameters. The study involves collection and analysis of retrospective time series data on air quality, weather parameters and registered data on death for the period of 2002-2004 and study the change in daily death rate due to change in air quality levels using a regression model. The model involves the following: Generalised Additive Model (GAM) with penalised spline smoothers in R Quasi Poisson function with mortality due to all natural causes as dependent variable; penalised spline smoothers for time, temperature and relative humidity. Exposure at 0-3 days and a cumulative two-day average of lags 0 and 1 are being considered. Exposure series of individual monitoring locations are used in sensitivity analysis. Preliminary results of the model indicate that the estimates for impacts of PM10 are in the range of 0.08% to 0.2% increase in all-cause mortality for increase of every 10 $\mu g / m^3$ of PM10 exposure levels. More detailed analysis with gender, age and cause specific mortality is in progress.

2. Assessment of the effects of high particulate pollutants on pulmonary health status in selected mega-cities of South Asia

Assessment of effects of particulate pollution on lung health in the Indian subcontinent is being carried out in selected mega-cities of India, Pakistan, Bangladesh, Nepal and Sri Lanka. In India, the studies are being carried out in Delhi and Kolkata. Both chronic and acute respiratory effects are being studied. For the chronic effects, prevalence of respiratory symptoms – cough, dyspnoea, wheezing and phlegm production; prevalence of asthma and COPD are the outcome parameters while for the acute effects, frequency of acute respiratory (upper/lower) symptoms in adults and children, healthcare utilisation and mortality are being studied. During the year, the baseline survey of 1050 subjects was completed for assessment of chronic respiratory morbidity. This was followed by a survey for acute effects carried out in December during periods of high particulate pollution and the second survey for acute effects in March when the pollution levels are intermediate. Data has also been received from the centre in Sri Lanka, data analysis is being carried out.

3. Predictors of emergency department use in asthmatics

Emergency visits and hospitalisations due to acute exacerbations of asthma account for most of the mortality in asthma as well as the economic burden due to the disease. Identification of factors that increase the likelihood of emergency room visits should help in formulation of therapeutic strategies specifically tailored to such patients. With this aim in view, a study was carried out to identify predictors of emergency department usage in asthmatics. In a cross-sectional design, 62 patients were included, 31 in the control group of patients not requiring any emergency visit in the last 6 months and 31 requiring 1 to 3, and more than 3 visits. Details of asthma symptoms including evaluation of dyspnoea, knowledge, inhaler technique, socio-economic factors, and degree of control, lung function, quality of life and degree of impairment were recorded. After adjustment of confounding variables, severity of disease measured in terms of FEV_1% predicted and delayed use of inhaled steroids emerged as the significant predictors of emergency visits. Further, perception of dyspnoea was found to be greater in emergency room users, irrespective of disease severity. These patients also had a poorer control of disease, poorer quality of life (all domains of disease-specific instrument, AQLQ) and greater impairment. The study reinforces the need for early initiation of inhaled steroid therapy that has been advocated in all guidelines but is grossly underused in practice at all levels of healthcare.

4. Evaluative and discriminative properties of an instrument, VACCQ, to measure control of asthma

The need to assess control in asthma in taking therapeutic decisions has been emphasised recently. Though instruments to assess control are available, these may not be suitable for use in the Indian population. There is a need for indigenous instruments. The study was carried out in an outpatient setting in stable adult asthmatics. An instrument, based on the clinical goals defined by the Global Initiative for Asthma (GINA) guidelines and labeled as the Vallabhbhai Patel Chest Institute Asthma Clinical Control Questionnaire (VACCQ), was developed to assess control of asthma in Indian patients. The Asthma Control Questionnaire (ACQ) developed by Juniper was taken as the reference standard to measure control. Control was assessed at baseline with the two instruments, ACQ and VACCQ, and in between the administration of the two questionnaires, the patients underwent spirometry. The patients were advised on their treatment and returned for a follow-up at 2 weeks and again at 4 weeks. The questionnaires were readministered in reverse order and spirometry was repeated. Discriminative properties (reliability and cross-sectional construct validity) and evaluative properties (responsiveness and longitudinal construct validity) were evaluated. A total of 38 patients were included in the study, 21 males and 17 females. On follow-up, based on the change in the ACQ scores, the patients were categorised as improved, deteriorated or unchanged (stable). The VACCQ was responsive and detected change in control in directions, improvement and deterioration, had a good test-retest reliability and reproducibility in stable patients, and had good construct validity, both longitudinal and cross-sectional. It was concluded that the VACCQ has acceptable evaluative and discriminatory properties and is therefore a valid instrument for quantification of the state of control of asthma in Indian subjects.

5. Regional variations in vital capacity in adult males in India: comparison of regression equations from four regions and impact on interpretation of spirometric data

Information on regional variations in vital capacity among adult males in India and on the impact of using different Indian prediction equations on interpretation of spirometric data is not available. In a retrospective study, spirometry data of 1672 male patients, aged 15 years and above was studied. Predicted values of FVC, labeled as $FVC_{North,}$ $FVC_{East,}$ FVC_{West} and FVC_{South} were calculated from the available regional prediction equations. Spirometry data was interpreted using these and the extent of agreement was analysed. FVC_{North} and FVC_{East} were close and greater than FVC_{West} and FVC_{South}, which were in turn, close to each other. Upto 40 years, the FVC_{North} exceeded FVC_{East}, FVC_{West} and FVC_{South} by 2.4%, 11.8% and 13.3%, respectively, while in the above-40 age group, it exceeded FVC_{East} and FVC_{West} by 5.01% and 9.67%, respectively. The differences, however, decreased substantially with increasing FVCs and even reversed at higher values with FVC_{East} tending to exceed FVC_{North} in both age groups, and FVC_{West} tending to exceed FVC_{North} in the above-40 age group. While northern and eastern, and, western and southern equations gave acceptable differences (less than 5%) in interpretation of abnormality in spirometric data in patients upto 40 years, differences among other pairs of equations in both age groups were larger and unacceptable. It was concluded that substantial regional variations exist in vital capacity in adult males in India. In general, northern and eastern equations, and, western and southern equations yield closer values. While the northern Indian equation gives the highest predicted vital capacity, this is true only for lower values of vital capacities and at higher values, this may be less than that predicted from eastern or western equations. The regional differences may result in unacceptable errors in interpretation of spirometry data if inappropriate prediction equations are used.

Medical Mycology

Research

1. Systemic mycoses in a New Delhi pediatric hospital: a study of their prevalence and species spectrum of etiologic fungi

The study was undertaken to determine the type and prevalence of mycoses in children in Kalawati Saran Children's Hospital, an affiliate of Lady Hardinge Medical College, New Delhi. A total of 127 specimens were collected from pediatric patients suspected of systemic and localised mycoses for mycological investigation. This included 83 blood, 21 BAL, 14 sputum, 4 tracheal aspirate, 2 nail, and one each skin biopsy, gastric aspirate and nasal polyp. The specimens were homogenized and examined microscopically (KOH wet mount / fungal stains such as PAS and GMS) and cultured on Sabouraud glucose agar, CHROM agar, yeast phosphate agar, simplified Staib's niger seed medium, etc. The inoculated media were incubated at 28 ^{0}C and examined periodically. Species identification of the yeast isolates was done, based on morphological characters seen on various culture media including corn meal agar and by ID 32 C carbohydrate assimilation profiles, detected by mini API system (bioMerieux, Marcy-I' Etoile, France). The mould isolates were identified by their detailed macroscopic and microscopic morphological characteristics on standard mycological media. The isolates which failed to develop characteristic features were identified by sequencing of internal transcribed spacer regions. Precipitating antibodies against pathogenic aspergilli such as *A. fumigatus*, *A flavus*, *A niger*, etc., were determined by Ouchterlony's double immunodiffusion test, using the in-house prepared antigens. Fifty-six cases of candidemia were diagnosed and the various *Candida* species isolated were *C. krusei* (60%), *C. glabrata* (11%), *C. pelliculosa* (9%), *C. utilis* (9%) followed by *C. dubliniensis*. Other rare non-albicans *Candida* species isolated were *C. tropicalis*, *C. lambica*, *C. sake* and *C. valida*. Also, *Scedosporium apiospermum*, a rare opportunistic pathogenic mould, was isolated from a case of fungemia in a patient with acute lymphoblastic leukemia. Our results highlight the fact that non-albicans *Candida* spp are emerging as important etiologic agents of candidemias in neonates. The fungi isolated from respiratory and gastric aspirate specimens were *A. fumigatus*, *A. flavus*, *Trichosporon* sp, *C. dubliniensis*, etc. Furthermore, a rare case of chromoblastomycosis, caused by *Exophiala spinifera*, was diagnosed in a child. The isolate was confirmed by sequencing of ITS region. The study emphasises the emergence of a wide spectrum of opportunistic fungal pathogens in a pediatric population.

2. Cryptococcosis in immunocompetent and in HIV positive patients

Cryptococcosis has worldwide distribution and is potentially fatal unless diagnosed and treated in early stage with appropriate antifungal therapy. Patients with AIDS and other immunodeficiencies are especially prone to cryptococcosis. In India, cryptococcosis has been increasingly reported recently due to an ever-rising population of immunocompromised individuals especially those with AIDS. The present study was undertaken to determine the prevalence of cryptococcosis in immunocompetent and in HIV positive patients in various hospitals in Delhi. A total of 84 isolates of the genus *Cryptococcus* were obtained from 73 patients suspected of cryptococcosis. Of these, 73 isolates originated from cerebro spinal fluid (CSF), four from sputum, three urine, two blood and one each from endotracheal secretions and bronchial aspirate. Based upon detailed clinical and laboratory evaluation, 73 patients were diagnosed as cryptococcosis. This included 66 males and seven females. Thirty five of the patients (48%) were HIV positive. All of the isolates were inoculated on niger seed agar (NSA) and incubated at 28 ^{0}C. Initial screening of *C. neoformans* and *C. gattii* on the inoculated plates was done by microscopic examination of variably brown yeast-like colonies developing on NSA. The suspected colonies were purified and identified by their morphological study and verification of salient physiological characteristics, employing the mini API system (bio- Mérieux, Marcy-l' Etoile, France). A detailed study of the isolates revealed that 78 isolates were *C. neoformans*, two *C. gattii* and four *C. laurentii*. The *C. gattii* and *C. laurentii* isolates were cultured from CSF of patients with meningitis who were HIV negative. Antifungal susceptibility testing of the 10 *C. neoformans* isolates was done by CLSI microbroth dilution method. The test antifungals included amphotericin-B, fluconazole, 5-flucytosine and itraconazole. Briefly, RPMI buffered to pH 7 with MOPS was used with an inoculum adjusted to 0.5 McFarland Standard for inoculating

the microtiter plates. The plates were incubated at 35 ^{0}C and MICs were read after 72 hrs of incubation. The isolates were susceptible to all of the antifungal agents tested and the MIC ranges were as follows; amphotericin B (0.25 µg / ml), fluconazole (2 µg / ml -4µg / ml), 5-flucytosine (2µg / ml- 4µg / ml) and itraconazole (0.06µg / ml- 0.125µg / ml). Our findings are in conformity with the recent observations of other investigators that incidence of cryptococcosis is increasing due to an ever-rising population of immunocompromised individuals especially those with AIDS in India.

Diagnostic Services

The Department continued to provide diagnostic mycological and serologic services to the Clinical Research Center of the Institute and to other hospitals in Delhi. A total of 978 clinical specimens were processed during the year. These included 435 blood, 371 sputum, 146 bronchial lavage / aspirate / washings, 12 tissue biopsies / skin scrapings, and 14 miscellaneous (urine / pus / FNAC / Blood culture / nail scrapings) specimens. Besides referral identification service for clinical isolates of fungi was extended to other institutions on request.

Microbiology

Research

1. Characterisation of extended spectrum β-lactamases (ESBLs) in gram negative bacteria by isoelectric focusing (IEF)

Extended spectrum β-lactamases (ESBLs) in clinical isolates of gram negative bacteria were identified and characterised using isoelectric focusing (IEF). All the ESBLs were found to be mainly variants of TEM and SHV enzymes. There was a higher prevalence of enzymes with isoelectric points consistent with TEM ESBLs (65-86%) than SHV ESBLs (~27-52%) amongst isolates of *E. coli*, *Klebsiella* spp. and *P. aeruginosa* while SHV ESBLs were present in a larger percentage (~62%) than TEM ESBLs (~53%) in isolates of *Proteus* spp. ESBLs at a pI of 5.4 (corresponding to PER or VEB ESBLs) were also identified in five *E. coli*, eight *Klebsiella* spp. and one *P. aeruginosa* isolates. Enzymes with isoelectric points consistent with CTX-M ESBLs were also detected in 1-15% of the isolates of all the species. In addition, OXA and LEN ESBLs were also identified in few isolates. A large percentage (~26% to ~59%) of isolates of all the species were shown to harbour two or more ESBLs.

2. Polymerase chain reaction (PCR): identification and characterisation of ESBLs in gram negative bacteria

A total of 199 ESBL producing clinical isolates *viz.*, *Escherichia coli* (69), *Klebsiella* spp. (55), *Proteus* spp. (35) and *Pseudomonas aeruginosa* (40) were subjected to PCR for the identification and characterisation of ESBL genes using bla_{TEM} and bla_{SHV} genes specific forward and reverse primers of bla_{TEM} genes were identified in 63 / 69 (~91%) of the *E. coli* isolates, 52 / 55 (~95%) of *Klebsiella* isolates, 24 / 35 (~69%) of *Proteus* isolates and 28 / 40 (70%) of *P. aeruginosa* isolates. On the otherhand, bla_{SHV} genes were identified in 19 / 69 (~28%) of the *E. coli* isolates, 44 / 55 (80%) of *Klebsiella* isolates, 28 / 35 (80%) of *Proteus* isolates and 22 / 40 (55%) of *P. aeruginosa* isolates. Both bla_{TEM} and bla_{SHV} genes were identified in 11 / 69 (~16%) of the *E. coli* isolates, 19 / 55 (~35%) of *Klebsiella* isolates, 20 / 35 (~57%) of *Proteus* isolates and 9 / 40 (~23%) of *P. aeruginosa* isolates. Hence, bla_{TEM} genes were more prevalent than bla_{SHV} genes amongst isolates of *E. coli*, *Klebsiella* spp. and *P. aeruginosa* while the latter was found to be more common than the former in case of *Proteus* isolates. The results obtained by using PCR for identification and characterisation of ESBLs as TEM and SHV ESBLs were in complete agreement with those obtained with IEF.

3. Minimum inhibitory concentration (MIC) determination of clinical isolates of *M. catarrhalis*

Thirty-four clinical isolates were subjected to MIC determination for ampicillin. Minimum inhibitory concentration ranged from 0.03 to >64 mg / l. Minimum inhibitory concentration results confirmed, results obtained by antimicrobial susceptibility test. For all the four ampicillin susceptible isolates, MIC was 0.03 mg / l. For the 30 ampicillin resistant isolates, MIC varied from 2 to >64 mg / l.

4. Randomly amplified polymorphic DNA analysis of clinical isolates of *M. catarrhalis*

A subset of 34 *M. catarrhalis* isolates was subjected to random amplification of polymorphic DNA (RAPD) analysis using primer RAPD1290. RAPD patterns consist of 5-8 bands per profile. All the isolates had unique RAPD patterns as shown by generating a dendrogram based on percentage similarity calculated using Dice coefficient and UPGMA clustering using computerised analysis and diversity database software.

5. Detection of AmpC β-lactamases in clinical isolates of *Escherichia coli*

A total of 104 isolates of *E.coli* were screened for cefoxitin (30µg) by Kirby Bauer disc diffusion method. Of these isolates, 27 (25.9%) showed reduced susceptibility to cefoxitin and were considered as screen positive. All the screen positive isolates were subjected to four different phenotypic tests *viz.*, modified three dimensional test, AmpC disk test, modified AmpC disk test., and inhibitor (Boronic acid) based detection method.

Modified three dimensional test and AmpC disc test detected 11(10.5%) isolates to be AmpC producers, where as modified AmpC disc test could detect only 6 (5.7%) isolates to be AmpC positive. Inhibitor based

detection method detected AmpC β-lactamases in 10 (9.6%) isolates of *E. coli.* Modified three dimensional test and AmpC disc test gave similar results and were the most sensitive of the four techniques.

6. Functional analysis of the mammalian cell entry (mce) proteins of mycobacteria

In an attempt to understand the localisation of *mce4a* protein of *M. tuberculosis*, cellular fractions of *M. tuberculosis* from log and stationary phase cultures were prepared by ultracentrifugation. Antibodies were raised in rabbit against *mce4a* proteins cloned and purified in our laboratory from recombinant *E. coli* expressing *mce4a* gene.

The rabbit antibody was used to perform western blot analysis with an aim to determine the presence of *mce4a* protein in the different cellular fractions of *M. tuberculosis*. Results of this study showed the probable localisation of the *mce4a* in the cell wall fraction of *M. tuberculosis.* Further analysis is in progress.

To investigate the possible role of the homologous proteins, namely, *mce1a, mce2a* and *mce3a* of the four *mce* operons of *M. tuberculosis* respectively, in invasion or cell entry function, cloning of *mce1a, mce2a, mce3a* and *mce4a* in p ET28a vector has been completed. Cell invasion studies are going on.

7. Functional analysis of *lprN* gene of *mce4* operon of *M. tuberculosis*

The previous results from our laboratory indicate that the expression *mce3* and *mce4* operons may be attributed to the infection phase in the animals. Therefore, the expression of proteins of *mce3* and *mce4* operon could provide an insight into the pathogenesis and immunity against *M. tuberculosis.* One of the genes of *mce* operons, the *lpr* genes, are predicted to code for lipoprotein precursors. The lipoproteins are reported to be powerful antigens that induce strong antibody and cell mediated immune response. Therefore, present study was initiated to understand the functional relevance of lipoprotein encoded by the *lprN* gene of *mce4* operon of *M. tuberculosis.*

The *lprN* gene was amplified as 1155bp product and cloned in pGEMTeasy vector with T overhangs which had been ligated with A overhangs generated during PCR reaction. The *lprN* gene was excised from pGEMTeasy vector and successfully subcloned in pET28b expression vector having C terminal his tag. The *lprN* gene of *mce4* operon was expressed at 30 ^{0}C, 0.1mM IPTG induction under T7 promoter of pET28b vector. The protein was purified as 41kDa protein by affinity chromatography using nickel-nitrilio acetic acid column at 300mM imidazole concentration. The purified protein will be subsequently injected subcutaneously in BALB/c mice to study the cell mediated immune response against the protein.

8. Functional analysis of *mce4a* gene of *M. tuberculosis* H37Rv using antisense approach

mce1a gene of *mce1* operon of *M. tuberculosis* was found to be implicated in cell entry and increased survival of bacteria inside macrophages. It has been observed that mycobacteria express *mce1* operon during log phase of growth and *mce4* operon under stress conditions such as stationary phase and during infection. The present work aims to investigate the function of *mce4a* gene which is a homologue of *mce1a* gene. It is hypothesised that *mce4a* gene provides same properties as that of *mce1a* during stress condition. To test this hypothesis antisense technique is utilised which employs possible binding of endogenously expressed mRNA of *mce4a* with mRNA expressed from recombinant plasmid harboring this gene in reverse orientation. Thus, duplex RNA prevents translation and inhibits protein synthesis. So far *mce4a* has been PCR amplified and cloned in a reverse orientation in *E.coli*- Mycobacteria shuttle vector. The clone has been confirmed by colony PCR, double digestion and sequencing. This recombinant plasmid has been used for electroporation of competent *M. tuberculosis* H37Rv cells. Initial experiments have shown reduction in *mce4a* protein expression by western blot analysis using rabbit polyclonal antibodies which are raised against *mce4a*. This reduction has no effect on *in vitro* growth of *M. tuberculosis.* However, effect on properties like invasion of HeLa cell line and survival inside THP1 macrophage cell line is under investigation.

9. Effect of *M. tuberculosis* infected macrophages on T cell viability: a co culture study

It has been reported that pulmonary tuberculosis patients show T-cell hypo responsiveness and the T-cells in these patients also show reduced response towards the antigens of *M. tuberculosis*. So the present

study was designed to find out whether the T-cell hypo responsiveness is because the T cells undergo apoptosis during infection since the mycobactericidal molecules such as TNF-α and nitric oxide are reported to be pro-apoptotic in nature. In this study we have correlated the T-cell death in co culture assays with nitric oxide and TNF-α.

To study the fate of antigen activated T-cells, peripheral blood mononuclear cells (PBMC)s from healthy subjects were activated with secretory culture filtrate protein (CFP) and WCL (whole cell lysate) antigens of mycobacteria. We have observed that when nonspecifically activated T-cells were co cultured with *M. tuberculosis* infected macrophages, the T-cells undergo cell death. In experiments, where CFP activated T-cells were co cultured with infected macrophages, less cell death was observed at five days of co culture. We concluded that antigen activated T-cells have better survival rate as compared to non specifically activated T-cells in healthy subjects. We have also observed that maximum TNF-α is produced by infected macrophages that are co cultured with antigen activated T-cells. This observation points towards the role of specifically activated T-cells which modulate the response of macrophages in a way that they produce more mycobactericidal TNF-α but they themselves express low CD95 and sustain their own survival in stress conditions. Thus, we hypothesised that in healthy individuals infected macrophages and specifically activated T-cells synergise their activity in a way that immune response is in favour of the host. This may be the reason behind the persistence of infection without developing the disease in healthy individuals.

10. Drug resistance profiling and molecular typing of *M. tuberculosis* isolates from a DOTS center and a private hospital in Delhi

DOTS is an important component of control of tuberculosis. However, a number of tuberculosis patients are still treated with different drug regimens which could add to the pool of multidrug-resistant (MDR) *M. tuberculosis*. The aim of the present study was to ascertain the incidence of initial drug resistance in *M. tuberculosis* isolates from patients in North Delhi, being treated through DOTS and in a non-DOTS set up, as well as to determine the genotypes of *M. tuberculosis* in the two groups of patients. Sixty-seven isolates of *M. tuberculosis* were tested for their drug susceptibility profile and genotype. Forty-seven of the isolates were obtained from patients attending a DOTS center and twenty from patients on antituberculous therapy in a private center. Susceptibility of the isolates of *M. tuberculosis* to Isoniazid, Rifampicin, Ethambutol and Streptomycin was tested by the standard proportion method. Resistance to antituberculosis drugs was 68% in the DOTS center and 50% in the private center. In the isolates obtained from the DOTS center resistance to isoniazid (INH), streptomycin (SM), ethambutol (EMB) and rifampicin (RIF) was found in 34%, 57.4%, 25.5% and 19% cases respectively. In the isolates obtained from the private center resistance to INH, SM, EMB and RIF was seen in 25%, 20%, 35% and 25% cases respectively. Thirty-five cases were followed up from the DOTS center and twelve cases were followed up from the private clinics. 62.5% of the follow-up isolates from the DOTS center were multidrug resistant while 50% of the follow-up isolates from private center were multidrug resistant. Of the 47 cultures tested from the DOTS center, 68% of the samples had IS6110 bands ranging from ten to sixteen. Four samples had single IS6110 bands. There was one true cluster consisting of two strains from the DOTS center which were obtained from members of the same family. These two strains also had the same mycobacterial inerspersed repetitive unit (MIRU) pattern. Therefore, these two strains were placed in the same transmission group. This clustering of cases denotes recent transmission of the disease. Amongst the private isolates, the number of bands ranged from one to seventeen, 75% being between nine and fifteen. None of the isolates had a single band. Only three isolates had a low copy number of IS6110 bands. One cluster was seen in these isolates. This cluster consisted of two strains with <6 bands. MIRU typing showed these two strains as being unique. Using IS6110 typing, 19% cases in the DOTS center and 15% cases in private were found to have <6 bands. Thus, IS6110 restriction fragment length polymorphism (RFLP) typing alone would not be sufficient to genotype all the strains in the community. A secondary typing method like MIRU would be required for at least 15-19% of the isolates. Cluster analysis of the dendrograms of RFLP patterns of isolates from DOTS and private centers did not show any shared patterns or clusters between these two groups. Evidence of recent transmission of infection was found only in one instance, in the members belonging to the same family. This emphasises the importance of education in control of tuberculosis. The strains of this cluster were drug resistant, though not MDR. There was no evidence of recent transmission in the other cases.

11. Analysis of rifampicin resistance mutations in the clinical isolates of *M. tuberculosis* by two wild type probes in a Dot Blot format

A Dot-Blot hybridization assay that detects all mutations occurring in the *M. tuberculosis rpoB* hot-spot region is being developed. The assay uses two probes (D and E) capable of binding to different target segments within the *rpoB* hot-spot region of the wild type *M. tuberculosis* genome. Absence of hybridization with any of the probes in the assay when a mutation is present indicates rifampicin resistance, a surrogate marker for multidrug resistant *M. tuberculosis*. The two probes are able to detect 75% of rifampicin resistance mutations. The present study is a preliminary investigation to assess the suitability of the assay for detection of resistance mutations in *rpoB* in clinical isolates of *M. tuberculosis* from Delhi, India. One hundred and twenty four patients of pulmonary tuberculosis, attending the Clinical Research Centre of the Institute and RBTB Hospital, Kingsway Camp, Delhi, were studied. The patients were asked to submit sputum samples for three consecutive days. Ziehl Neelsen staining and cultures for *M. tuberculosis* were performed on all the samples. Susceptibility testing of the 106 isolates obtained was carried out by Standard proportion method and BACTEC460TB system. Of the 106 samples tested for drug susceptibility, 43 (40%) isolates were resistant to rifampicin. Dot-Blot hybridization assay was carried out on 106 isolates with probes D and E. Of the 43 rifampicin resistant strains, only 10 gave a negative test in the Dot-Blot hybridization assay with probe D, and 15 of the resistant isolates gave a negative test with probe E. Of the 10 isolates not hybridizing with probe D, one was sequenced and was found to have a mutation at codon 526 (CAC→ GAC). Of the 15 isolates not hybridizing with probe E, eight had a mutation at codon 531 (TCG→ TTG) and one had a mutation at codon 533 (CTG→ CCG). These mutations were, thus, correctly detected by probes D and E in the assay. Nineteen rifampicin resistant isolates showed hybridization to both probes D and E. These isolates probably had a mutation outside the region covered by these probes (codons 523 to 527 for probe D; codons 528 to 533 for probe E). Three of these 19 isolates were sequenced. Two had a mutation at codon 516 and one had a mutation at codon 522. The assay was, thus, highly sensitive and specific when tested with probes D and E.

12. PCR restriction analysis in early identification of *M. tuberculosis*

An attempt was made to apply PCR-restriction fragment length polymorphism (PRA) technique for early detection and identification of *M. tuberculosis* directly in clinical samples. We studied 120 sputum samples from the same number of patients. Hsp65 PRA was applied on the DNA extracted directly from the sputa. We could detect and identify *M. tuberculosis* in 70.8% samples by PRA. Further analysis showed that PRA detected *M. tuberculosis* in 83 (75%) out of 111 AFB smear positive samples and two (22%) out of nine AFB smear negative samples. The positive predictive value of the assay was 97.64%.

To detect the sensitivity of the assay, DNA was extracted from serial dilutions (10, 10^2, 10^3, 10^4, 10^5, 10^6, 10^7 and 10^8 cells/ml) of H37Rv used to spike a smear negative sputum sample and used as template for *hsp*65 PCR. A reliable PCR restriction analysis was possible up to a concentration of 10^2 organisms/ ml.

Fifty culture positive samples were taken up for further characterisation and comparative analysis with direct PRA. The isolates were confirmed to be *M. tuberculosis* by biochemical reactions. The direct PRA from corresponding clinical samples had revealed the presence of *M. tuberculosis* in 44 of the samples 30 days before the culture report was made available. We further characterised the culture isolates (n=50) obtained by *IS6110* typing. All the isolates tested had a distinct banding pattern. Thus, polymorphisms at *IS6110* did not preclude the use of PRA for identification

The advantage of direct PRA was that it needed just 24 hours for identification after sample collection whereas biochemical reactions required at least 4 weeks from the time of first inoculation for final identification. PRA scored over conventional techniques in the rapid detection of *M. tuberculosis* directly from the samples. PRA proved to be a reliable and simple method for direct identification of clinically important mycobacteria to the species level. The assay does not need any high-cost instrumentation or technical expertise. PRA could prove to be a suitable rapid method of identification of *M. tuberculosis* directly from clinical samples.

13. Phenotypic and genetic characterisation of *Streptococcus pneumoniae* isolates from clinical samples

The study is being undertaken to delineate the serotype, antimicrobial susceptibility patterns, and genotypes of *S. pneumoniae* isolates recovered primarily from patients with chronic respiratory illnesses and

other illnesses in New Delhi.

A total of 40 strains were isolated and identified as *Streptococcus pneumoniae* from patients attending VPCI and Safdarjung Hospital, New Delhi, during the period May 2006 to March 2007, were included in the study. The samples included sputa from patients with respiratory illnesses like chronic obstructive lung diseases, bronchectasis, and acute exacerbation of bronchial asthma, blood from cases of septicemia and pneumonia and cerebro spinal fluid from cases of meningitis. Ages of the patients ranged from six months to 80 years. Further characterisation is in progress.

14. *Mycoplasma pneumoniae* infection in patients of acute exacerbation of COPD

Mycoplasma pneumoniae and *Chlamydia pneumoniae* are common etiological agents of atypical respiratory infections. Several recent studies have shown that these organisms play an important role in the acute exacerbation of bronchial asthma and chronic obstructive pulmonary disease (COPD). Therefore, the significance of atypical respiratory infections for the development of COPD is now being investigated. Very little data is available in India on the prevalence of *M. pneumoniae* in lower respiratory tract infections

We have studied 100 patients of acute exacerbation of COPD for evidence of *M. pneumoniae* infection. The patients were selected from the outpatient and inpatient wards in the Clinical Research Centre of the Institute and from the Lok Nayak Jai Prakash Narain Hospital, New Delhi.

Bacterial etiology could be established in 16 samples. The organism isolated most frequently was *Pseudomonas* sp which was recovered from eight cases. This was followed by isolation of *Streptococcus pneumoniae* from four, *Klebsiella* sp. from two; and *Acinetobacter* sp. and *Moraxella catarrhalis* from one case each. One of the cases was culture positive for *Pseudomonas* sp and also had *M. pneumoniae* specific IgG titer ≥ 100 U. This patient, thus probably had a mixed infection of *Pseudomonas* sp and *M. pneumoniae.* None of the samples were culture positive for *M. pneumoniae.*

On the basis of serology and antigen assay, at least 16% of the 100 patients of acute exacerbation of COPD studied showed evidence of *M. pneumoniae* infection. Of these, two patients had definite evidence of *M. pneumoniae* infection as they had raised antibody titers and *M. pneumoniae* specific antigen. The prevalence of *M. pneumoniae* infection in our study population was significantly higher than that in the control group. Thus, *M. pneumoniae* emerged as a significant cause of acute exacerbation of COPD.

Diagnostic Services

Details of diagnostic services provided to the indoor and outdoor patients are given below:

i. Bacteriology Laboratory

Clinical specimens processed for isolation and identification of aerobic pathogens

Nature of Specimen	***No.***
Sputum	417
Urine	35
Pleural fluid	09
Bronchoalveolar lavage (BAL)	35
Miscellaneous	22
Total	**518**

The specimens yielded 13 *S. pneumoniae*, 13 *H. influenzae*, 6 *Moraxella catarrhalis*, 17 *Klebsiella* spp., 10 *E.coli*, 65 *Pseudomonas aeruginosa*, and 27 isolates of *Acinetobacter* spp. Resistance to cephalosporins, aminoglycosides as well as to carbapenems were encountered in isolates of *P. aeruginosa* and *Acinetobacter* spp. A large majority of isolates of *M. catarrhalis* were β-lactamase positive.

ii. Mycobacteriology Laboratory

a) **Clinical specimens processed for diagnosis of tuberculosis**

Nature of Specimen	***No.***
Sputum	4959
Bronchial aspirate and BAL	212
Post broncoscopy sputum	160
Broncial wash	06
FNAC	26
Pleural Fluid	60
Endotracheal aspirate	14
Urine	07
Pus	08
Biopsy	12
Blood	02
Laryngeal swab	01
Semen	01
Total	**5468**

b) **Clinical specimens processed with BACTEC 460 TB system**

Nature of Specimen	***No.***
Sputum	59
Pleural fluid	05
Pus	04
Bronchial aspirate and BAL	06
Broncial wash	07
Urine	04
FNAC	10
Blood	02
Total	**97**

***c)* Antituberculosis drug sensitivity**

M. tuberculosis clinical isolates : 76

Pathology

Research

1. Evaluation of coagulation profile in patients of chronic obstructive pulmonary disease

Several mechanisms involving inflammation and hypercoagulability influence the clinical course of patients with chronic obstructive pulmonary disease (COPD). These patients have an ongoing prothrombotic state which could potentially account for thrombosis occurring in pulmonary blood vessels during exacerbations. Therefore, the necessity of dynamic trace of coagulation and hematological data in COPD patients in the stage of heavy chronic respiratory insufficiency is emphasised.

In this study, coagulation parameters (BT, CT, PT, APTT, TT, platelet count, mean platelet volume, D-dimer and FDP) are being assayed in patients of COPD. These will be correlated with hematological parameters (hemoglobin level, total and differential leucocyte count, hematocrit, ESR) and clinical parameters (age, sex, duration of disease, smoking status, and pulmonary function tes). The changes in coagulation profile during COPD exacerbations will be observed.

Developments

Pathology department was relocated to sixth floor of the Institute and underwent complete upgradation with establishment of four separate laboratories – one each for histopathology, cytopathology, molecular pathology laboratory and student laboratory. Coagulation laboratory was created in addition to existing clinical pathology laboratory in Clinical Research Centre of the Institute. Grossing room and room for performing fine needle aspiration were created and equipped.

Departmental library was established and latest editions of textbooks on histopathology – lung and systemic pathology, cytopathology, hematology, clinical pathology and oncology were obtained. Separate space for development of Museum was demarcated.

Diagnostic Services

Diagnostic services were provided to the indoor and outdoor patients of the Institute; in subdivisions of hematology, histopathology, cytopathology and clinical pathology.

A. Hematology

(i) All blood samples were analysed using automated five part analyser – Melet Schloesing 9-5.

(ii) Internal quality control programme was continued.

(iii) Absolute eosinophil count, manual platelet count and reticulocyte count were performed on regular basis.

(iv) Leukemia subtyping was done using Sudan Black and PAS Stain.

Hematology tests done	Number
Total number of blood samples examined	10,928
Hemoglobin estimation	10,412
Total leukocyte count	10,412
Differential leucocyte count	10,412
ESR	2,911
Absolute eosinophil count	201
Platelet count	970
Peripheral smear	131
P / S for malarial parasite	36
Reticulocyte count	01

B. Histopathology

(i) Diagnostic histopathology and special enzyme histochemistry was continued for categorisation of disease.

(ii) Processing of histopathology specimens was improved by addition of microtome with disposable blades.

(iii) Immunohistochemistry using monoclonal antibodies was standardised and started on regular basis on transbronchial lung biopsies and cell blocks made from fine needle aspiration biopsy specimen. This resulted in improved classification of lung cancer cases.

(iv) Polarizing microscopy facility was added. This resulted in improved categorisation of granulomatous lung diseases.

Surgical histopathology biopsies processed	Number
Transbronchial lung biopsy	180
Skin biopsy	01

C. Cytopathology

(i) Diagnostic cytopathology on percutaneous fine needle aspiration, with and without CT guidance and transbronchial fine needle aspiration biopsy specimen was continued

(ii) Exfoliative cytology was carried out on sputum and BAL samples.

(iii) All slides were stained with Papanicolau and Giemsa stain and special stains – PAS, mucicarmine, AFB were performed on regular basis

Cytology samples processed	Number
Sputum	205
Bronchial aspirate and BAL fluid	155
FNAC: Percutaneous	135
Transbronchial needle aspiration (TBNA)	19
Pleural fluid	57
Ascitic fluid	01
Bronchial brushing	01
Tracheal aspirate	01

d. Clinical Pathology

Urine analysis parameters added since December 2006 are:

a) Urine – bile salts, bile pigments,

b) Urine – Ketone bodies.

Urine examination	Number
Specific gravity	1997
pH	1997
Albumin	1997
Sugar	1997
Microscopic examination	1997
Ketone bodies	06

Coagulation Laboratory

Coagulation Laboratory was created in addition to existing clinical pathology laboratory in Clinical Research Centre of the Institute. Coagulation analysis was started since October 2006, using manual kits by Diagnostic Stago. The details are given below:

Coagulation test	**Number**
Prothrombin time	80
Activated partial thromboplastin time	74
D-Dimer	10
Fibrinogen degradation product	02
Bleeding time	219
Clotting time	219

Hematology and Clinical Pathology laboratories continued to function on all holidays for emergency, indoor and ICU patients.

Pharmacology

Research

1. Possible protective role of Livina (a polyherbal preparation) against anti-tubercular therapy (ATT)-induced hepatotoxicity

A single blind, randomized, placebo controlled study is being conducted to evaluate the efficacy of Livina (a polyherbal formulation) against anti-TB drug therapy induced hepatotoxicity. The study protocol has been approved by the Ethical Committee of the VPCI and after taking written informed consent, the patients were divided into two groups; one receiving Livina and the other receiving placebo. Baseline liver function tests were performed prior to the study, and subsequently at 2, 4 and 8 weeks after initiation of ATT / herbal drug therapy. A total of 44 patients have been enrolled out of which 30 have completed the initial intensive phase chemotherapy, and few patients are still continuing in the clinical trial. On analysis of the currently obtained qualitative and quantitative data, it appears that Livina has greater protective effects against ATT induced liver damage. The target is to complete 50 patients in each group and efforts are on to achieve the same.

2. A clinical study to evaluate the efficacy and safety of UNIM-352 (a polyherbal Unani formulation) in patients of bronchial asthma

A double blind, placebo controlled, randomized, parallel design, prospective study is being performed to evaluate the efficacy and safety of UNIM-352, a polyherbal Unani formulation, in patients of bronchial asthma. After taking the written informed consent, the patients were divided into two groups – one receiving UNIM-352 and the other receiving placebo. After baseline pulmonary function test (PFT) data was recorded the patients were put on standard anti-asthma treatment with bronchodilators and steroids as inhalation therapy. Pulmonary function test (PFT) data was recorded in both groups at 2, 4, 6, 8 and 12 weeks, as also the frequency of use of SOS salbutamol inhalers. Out of the 28 patients enrolled for the study, initial results indicate that the UNIM-352 group showed greater improvement in the PFT data / parameters as compared to the placebo group, and the frequency of use of SOS salbutamol was also less. A total of 100 patients are to be enrolled in this study, which is continuing.

3. A study to monitor adverse drug reactions in patients of chronic obstructive pulmonary disease (COPD)

This is the first study of this kind in which adverse drug reactions (ADR) were monitored in both outpatients and in patients of COPD attending the Clinical Research Centre of the Institute. The study protocol was approved by the Ethical Committee of the VPCI, and after taking into consideration the various inclusion and exclusion criteria, ADRs were systematically monitored in COPD patients receiving the various forms of drug therapy. The study was also part of the National Pharmacovigilance Programme initiated at the VPCI {sponsored by the WHO-CDSCO (Central Drug Standardization Control Organisation) collaboration}. Initially, a total of 60 COPD patients were enrolled and evaluated for ADRs, as the prescribed format provided by the CDSCO-DCGI. Thirty ADR reports are sent to the regional Pharmacovigilace Centre every month which are further compiled in the Zonal Centres. On evaluation of the ADR reports it was found that mostly ADRs followed a particular pattern in relation to the drug used, *viz.*, beta agonists, theophylline, corticosteroids, anticholinergics, antibiotics, etc., in these COPD patients. The most distinct ADRs were seen in patients receiving inhaled steroids (oropharyngeal thrush and voice disturbances) and / or oral theophylline (GI disturbances, anxiety and palpitations). Causality analysis was done by using Naranjo's scale and there was a more than probable association between drugs and ADR.

4. Adverse drug reaction monitoring in patients of bronchial asthma

The National Pharmacovigilance Programme has been initiated at the VPCI (sponsored by the WHO-CDSCO collaboration) and as part of this project a study is being conducted to assess ADR patterns in patients with bronchial asthma at the VPCI as well as from adjoining hospitals / clinics. After completing the initial formalities like Ethical Clearance, inclusion / exclusion criteria, informed consent, etc., patients of bronchial asthma are being enrolled for this study. Patients from OPD, wards as well as those partcipating in the various clinical trials in the institute / department are also being included to expand the data base. ADRs due to other concomitant diseases and drug treatments are also being recorded to give a more comprehensive

picture. This is an ongoing project and is providing interesting data for rationalising drug therapy in asthma.

5. Experimental studies on the role of free radicals in emotional and environmental stress

The effects of emotional and xenobiotic stressors on immune regulation and its modulation by free radicals are being studied. Pharmacological and biochemical data have showed that lipid peroxidation is associated with stress induced immunomodulation and anti-oxidants reverse this. Behavioural studies have shown a close correlation between behavioural patterns and immune responses. Using restraint stress as an emotional stressor and endosulphan as the xenobiotic stressor, it has been shown that both forms of stress resulted in enhanced lipid peroxide formation and lowered NO metabolites in the blood and the brain. Antioxidants (ascorbic acid, tocopherol, melatonin and n-actyl cysteine) reversed these immunosuppressive effects and also altered biochemical markers. This suggests that oxidative stress may be involved in such immunomodulation induced by psychological and environmental factors.

6. Studies to explore gender differences in stress responses with special emphasis on nitric oxide (NO)

It is well known that gender differences influence physiological and pharmacological responses. The present study was planned to explore the pharmacological basis for gender differences in stress responses in rats. Restraint stress (RS) induced biological changes are being assessed in both male and female rats, *viz.*, neurobehaviour, immunological and biochemical, and their possible correlation with NO ergic mechanisms are being assessed. Initial results indicate that males and females react differently to stress, and NO may be having a regulatory influence in this differential response.

7. Role of endogenous opioids and its interactions with nitric oxide (NO) during stress responses in rats

Endogenous opioids are important neuromoulators during stress reactions and the present experiments were designed to evaluate the possible association between opioids and NO in stress susceptibility and tolerance. Initial results of pharmacological studies are encouraging, and suggest that opioids like morphine may act through NO during stress ameliorating effects. Biochemical studies are being underetaken to confirm this hypothesis.

8. Impact of standard treatment guidelines (STG) and patient education on quality of asthma management

A baseline survey demonstrated that treatment of bronchial asthma was not in accordance with standard treatment guidelines in secondary care public facilities in Delhi. Educational intervention of prescribers had not much effect on the prescribing behaviour of doctors. Qualitative investigations revealed that the main reasons for irrational prescription for asthma management were:

1. Non adherence of prescribers to STGs;
2. Poor patient knowledge and
3. Non-availability of inhalers in public facility and patients expects to get free medicines from the public facility.

Hence, the present work is planed in a chest disease hospital, Vallabhbhai Patel Chest Institute (VPCI) where all prescribers are chest specialists and are expected to follow the STGs. Unlike other government hospitals of Delhi, medicines are not given free to patients in this hospital. Most of the times patients are referred to this institute for chest diseases and all patients purchase the prescribed medicines from private facilities (chemist shops).

Objectives:

1. To study the impact of standard treatment according to current guidelines on the quality of asthma management.
2. To study the effect of additional intervention with a formal educational program on the quality of management of asthma.

The study is carried out in out patient department of the Institute. After enrollment of patient according to the protocol, detailed baseline parameters are noted. Treatment is given according to STG to all patients.

Apart from the routine patient education imparted in the OPD, in one group of patients educational intervention is done. Patients are followed after 2, 4, 8, 12, and 24 weeks of enrollment. Follow-up of all patients will be completed by end of April 2007. After that data will be analysed.

9. Continued surveillance of antimicrobial resistance and use in the community and in-depth qualitative investigation for behaviour of antimicrobial drugs use for suitable interventions for rational use of antibiotics

Indiscriminate and irrational use of antimicrobial agents is the main cause of increasing antimicrobial resistance in the community. It is important to study drug use patterns in the community, understand the motivating factors for the current drug use patterns and develop appropriate sustainable interventions to improve antimicrobial use that can be adopted for the community. In India, prescriptions are kept by the patient and not with the pharmacist; and antibiotics may be obtained with or without a prescription. Therefore, determining antibiotic use is problematic mainly in private sector, since there are no prescription records. A one year pilot work was conducted to develop a surrogate measure for antibiotic use in the community. Two methods were used – bulk purchase data and exit interviews were conducted at enrolled pharmacies. Results of one year study revealed that both drug use methods are good indicators of antibiotic use in the community. In the second phase of study, we will use the exit interviews, since this method is less dependent on commitment of the pharmacists as well as being a means to collect additional information on patient perceptions and prescriber behaviour.

A collaborative work with the Microbiology Department of Sir Ganga Ram Hospital for resistance pattern is planed with WHO as co-partner.

Objectives of the study

1) Surveillance of consumption and resistance pattern as in Phase I.
2) Surveillance of antimicrobial use in the Public facilities and Private practitioners.
3) Dissemination of the results of Phase I study to all the stakeholders.
4) Investigate the reasons for irrational use of antibiotics with all stakeholders through focus group discussions and in-depth interviews.
5) In-depth group discussions and planning suitable and sustainable interventions with all stakeholders.

The pilot work for the study has started and the catchment area of the study is around 10 km radius of Ganga Ram Hospital.

10. Medicine price regulation and price component survey

India is well-known for its robust manufacturing sector, with dozens of manufacturers for each medicine. The government, at both central and state levels, shares responsibility for healthcare provision to the population. Seven medicine price surveys were conducted by World Health Organization-Health Action International (WHO-HAI) methodology in six states in India between 2003 and 2005 and showed low availability in the public sector and high out-of-pocket payments by patients and their families in the private sector. These surveys also showed an unexpected variation in prices between public and private sectors, among therapeutic equivalents, and between scheduled and non-scheduled medicines.

In order to investigate the relationship between medicine prices, price composition and pricing policy, a price components survey of medicine prices was conducted in Delhi in February and March 2007.

Medicine price regulation and drug policy of India was studied in detail. Procurement system of all health care providers in public sector was studied. In the private sector, numerous trade schemes were found between manufacturer, wholesaler and retailer: these schemes chiefly benefit the manufacturer and the retailer; savings are not passed on to patients. Price variations in the manufacturer's selling price between branded and branded-generic equivalents suggest that some branded medicines are priced well above their true manufacturing cost; instead prices are set at what the market will bear.

A detailed medicine price survey is required in the National Capital Territory of Delhi to find out the medicine prices and availability in public and private sector. The baseline work conducted will help in designing and implementing the future survey.

11. Role of free radicals in theophylline-induced seizures in experimental animals

Theophylline is now emerging as an important adjunct to therapy in bronchial asthma because of some newly discovered pharmacological effects. The anti-inflammatory and immunomodulatory effects of the drug are now known, but a safer toxicity profile could make its use more acceptable. Its close relationship with ROS and RNS is shown in its chemical / pharmacological effects and the present study was designed to evaluate the role of free radicals in theophylline toxicity. The study was designed to measure theophylline induced convulsions and correlates the anti-oxidant / pro-oxidant status in the brain. Modulation of these effects with anti-oxidants was seen and melatonin was particularly effective in this regard. Combination of melatonin with NO synthase inhibitors had a greater effect than melatonin alone. To simulate the condition of theophylline being given to epileptic patients with asthma, the procovvulsant potential of this drug were determined. The sub-ictal dose of theophylline *i.e.* 100mg / kg was combined with subthreshold electric shock (15 mA for 0.2 Sec.) and studies in respect of brain antioxidant status revealed that such seizures were associated with enhanced lipid peroxidation and lowered antioxidant defense in the brain. Anticonvulsant effects were also seen with the NO synthase inhibitor, L-NAME and 7-nitroindazole, and melatonin synergized with the NO synthase inhibitor effects. These neuroprotective effects are associated with attenuations in the brain oxidative damage as measured by biochemical markers of lipid peroxidation (MDA) and antioxidant defense (SOD and catalase). Further, brain NO metabolites were also lowered during the anti-convulsant effects with L-NAME or 7-NI.

12. Pharmacological studies on the role of nitric oxide (NO) in stress adaptation in rats

Nitric oxide (NO) is a ubiquitously present important bioregulatory molecule and its importance in health and disease is well recognised. Adaptation to stress is a basic prerequisite for maintenance of the biological homeostasis and complex cellular and molecular mechanisms are involved in this phenomenon. Free radicals (ROS and RNS) are crucial biomodulators at the cellular / molecular level, and may be involved in neural transmission. Some of the drugs used in cardiorespiratory medicine are known to act by free radical related mechanisms and also induce the development of tolerance resulting in attenuation of their effects. Thus, the molecular basis of stress tolerance is of considerable importance for devising strategies for drug therapy in such situations. Preliminary studies showed that subacute / chronic (repeated) stress induced differential attenuations in the normal stress responses, observed after single stress as assessed on behavioural and immunological parameters, and NO-modulators *viz.*, L-arginine, molsidomine, ISDN, L-NAME, 7-NI influenced these markers predictably. Preliminary pharmacological and biochemical data show that NO may be involved in the cellular / molecular events resulting in stress tolerance. Using neurobehavioural, endocrinal and visceral parameters as markers of stress, it was observed that repeated stress exposure attenuated acute stress responses and these were associated with parallel changes in plasma and brain NO metabolite levels. Pretreatment with NO modulators also influenced these stress markers and also modulated the biochemical parameters studied. RS induced immunomodulation after single and repeated stress exposures were also accompanied by differential elevations in plasma corticosterone levels, which were also under the modulatory influence of the NO-ergic agents used. Further, interaction between RNS and ROS during such stress reactions was also investigated and markers of oxidative stress *viz.*, MDA and antioxidants like reduced glutathione, catalase, superoxide dismutase, etc., were also found to be altered differentially.

Physiology

Research

1. Effect of morphine on neural regulation of blood pressure and behaviour in animals

Effect of epidural administration of morphine on arterial baroreflex in rats anaesthetised with α-chloralose was studied following cholinergic and adrenergic blockers. Arterial blood pressure was recorded through the femoral arterial catheter using a pressure transducer (BLPR) connected to a strain gauge coupler amplifier (WPI) and a digital oscilloscope. Arterial blood pressure was varied by intravenous injection of varying doses of phenylephrine or sodium nitroprusside through femoral vein. Epidural administration of morphine was done at $T_1 - T_2$ level of the spinal chord: morphine inhibited the baroreflex responses suggesting the involvement of sympathetic limb of the autonomic nervous system in morphine induced inhibition of the baroreflex. Epidural morphine did not produce a fall in BRS in atropinised rats. However, in propranolized animals a significant fall in BRS by epidural morphine persisted.

2. Mechanism of action of estrogen on hemodynamic parameters in rabbits

To examine action of estrogen (17 β-estradiol) on vascular smooth muscle, experiments were conducted on the isolated aorta of rabbits in the presence of various blockers of the endothelium dependent mechanisms *e.g.* NO synthase inhibitor L-NAME, K_{ATP} channel blocker glybenclamide and prostacyclin inhibitor indomethacin. 17 β-estradiol produced a concentration dependent contractile response that was probably mediated through prostaglandins and this contractile response was attenuated by glybenclamide suggesting a role of ATP activated K channels (K_{ATP}) in this response.

3. Bronchial reactivity in diabetic guinea pigs

In vitro experiments on isolated tracheal ring were conducted in an organ bath setup on tissues from normal, diabetic, hyper-reactive airways and diabetic plus hyper-reactive airways guinea pigs of and responsiveness of airway smooth muscle to Ach and Isoproterenol in these diseased conditions was examined. The role of epithelial mediators NO, K_{ATP} channels and prostaglandins were examined by using specific blockers L-NAME, Glybenclamide and Indomethacin.

4. Neural and cardiovascular responses during epilepsy in conscious animals

Arterial blood pressure (BP) and electroencephalogram (EEG) were monitored simultaneously in conscious rats with chronically implanted radiotelemetric device. Changes in mean arterial pressure (MAP) and heart rate (HR) during epileptiform seizures induced by intraperitoneal administration of pentylenetetrazole (PTZ) were monitored. We observed an increase in BP and variations in HR during seizures depending on the basal HR values. Pretreatment of valproic acid inhibited seizures at the doses of 100mg / kg and 50mg / kg but was not statistically significant at the dose of 20mg / kg. Thus, if we can block seizures we can achieve control over seizure induced hypertension. Also combination of Ca channel blocker Nifedipine and Valproic acid not only provided better control over PTZ induced seizures but also maintained BP and HR at normal range.

5. Evaluation of the mechanism of action of aspirin as a cardioprotective agent in experimentally induced cholesterolemic rats

We examined the effects of aspirin on serum cholesterol, and baroreceptor mediated blood pressure regulation during experimentally induced hypercholesterolemia. A systematic study was performed on the animals fed with normal pellet diet for 10 weeks. Hypercholesterolemic animals were fed with cholesterol mixed pellet diet (1% Cholesterol) for 10 weeks.

In order to evaluate the protective or preventive potential of aspirin in maintaining normal cardiovascular functions under hypercholesterolemic condition, animals were fed with 1% cholesterol pellet diet plus aspirin. Aspirin was administered in the dose of 100mg / kg / d, for 10 weeks. Effects of aspirin on serum lipid profile,

blood pressure, heart rate and baro-reflexes were studied. We observed a significant fall in the serum cholesterol and improvement in cardiovascular function in animals treated with aspirins.

6. Effect of remote preconditioning on myocardial reperfusion injury

Protection from ischemia reperfusion injury and reduction in infarct size was observed in rats by inducing ischemia of a distant organ to the heart known as 'Remote Preconditioning' (RPC). Mitochondrial K_{ATP} channels were found to be most important mediator in the cardioprotective effect of ischemic preconditioning (IPC). Our observations suggest that eNOS activates mitochondrial K_{ATP} channel *via* PKCε (Protein kinase C-ε) dependent mechanism in the cardioprotective action of IPC. Thus, providing evidence that NO plays an important role in the mechanism of both acute 'classic' as well as acute RPC. RPC has been found effective in significantly reversing the myocardial stunning due to ischemia/reperfusion injury when compared with control group.

In different groups various blockers were used in order to explore the possible mechanisms underlying this protective effect of RPC.

7. To study the vasoactive responses in animal models of non-cirrhotic portal hypertension (NCPH)

The tissues from control animals and from experimental animals (non-cirrhotic portal fibrosis) were tested with vasoconstrictors – phenylephrine and potassium chloride in an organ bath setup. There was biphasic response of acetylcholine and isoproterenol in the aortic rings from both the control and experimental animals. By inhibiting endothelium dependent mechanism individually by; NO blocker L-NAME; K channel blocker glybenclamide; prostacyclin inhibitor indomethacin the role of vascular endothelium in normal animals and aortic tissues from non-cirrhotic portal fibrosis animals was examined. We observed an altered vascular responsiveness. Similar experiments were performed in rats to test whether our observations were species dependent.

8. Role of free radicals in vascular responsiveness on mercury exposure in experimental animals.

Effect of mercury exposure on vascular responsiveness on isolated aortic rings was investigated *in vitro* in organ bath setup. Vascular smooth muscle activity in isolated aortic rings was recorded using force transducer, bridge amplifier and a data acquisition system (AD Instrument). The aortic rings were exposed to mercury (10^{-12} to 10^{-4} M) and response curve was recorded. Response to mercury was also recorded before and after incubation with L-NAME, glykenclamide, ouabain, superoxide dismutase and catalase, to examine the role of various endothelium dependent mechanisms. We used free radical scavengers, SOD and Catalase to examine the involvement of free radicals on mercury exposure.

9. Behaviour of pulmonary vagal sensory receptors during high altitude exposure and exposure to cigarette smoke

The Department continues the studies on the sensory mechanisms behind the respiratory symptoms associated with a) ascent to high altitude and b) exposure to cigarette smoke chronically. Suitable animal models have been created and the experiments are in progress.

10. Attenuation of angiotensin converting enzyme inhibitor induced cough by supplementation with iron

Angiotension converting enzyme inhibitors (ACE-I) are one of the first line drugs in the management of hypertension and heart failure. But, their use is limited because of their various side effects, the most troublesome and frequent being dry cough. Studies performed on patients taking ACE-I show that there is significant increase in NO level in most of the patients who develop cough. Daily iron intake not only decreases NO level significantly but also reduces cough score significantly. Thus, iron supplementation may be of therapeutic importance in such patients.

11. Effects of mitral regurgitation on the reflex diuresis to pulmonary lymphatic obstruction in rabbits

Previous studies have shown that obstruction of lymph drainage from the lung causes a reflex increase in urine flow resulting from activation of neuronal nitric oxide synthase (nNOS) in the renal medulla. In this

investigation we examined this reflex in rabbits with chronic pulmonary venous congestion resulting from mitral regurgitatioin induced surgically. Additionally, we also examined renal nNOS expression. It was found that this reflex was absent in rabbits with mitral regurgitation even when there were significant increases in medullary nNOS and cortical nNOS mRNA. The absence of the reflex diuresis which follows pulmonary lymphatic obstruction in animals with mitral regurgitation indicated the loss of a homeostatic mechanism capable of regulating extravascular fluid volume in animals with chronic pulmonary venous congestion.

Radiodiagnosis and Imaging

The Department continued to provide routine diagnostic services to the patients attending the Clinical Research Centre of the Institute. The Department consists of three units: *(i)* CT Scan Unit; *(ii)* Ultrasound Unit and *(iii)* X-ray Unit.

(i) CT Scan Unit

A total of 1553 CT examinations were done during the period as per the details given below:

Examination	Number
Chest CT	890
Head CT	15
PNS CT	533
Spine CT	02
Abdomen CT	03
CT guided FNAC	110
Total	**1553**

(ii) Ultrasound Unit

A total of 412 Ultrasound examinations were done during the period as per the details given below:

Examination	Number
Chest USG	170
Abdomen USG	181
USG guided FNAC	61
Total	**412**

(iii) X-Ray Unit

A total of 16297 X-ray examinations were done during the period as per the details given below. Out of a total of 16297 X-ray examinations made, 10108 were done on PACS and 6189 were done on X-ray films.

Examination	Number
Chest X-rays (Total)	16297
PACS*	
Chest X-ray (adult)	9144
Chest X-ray (child)	237
PNS X-ray	727
Total PACS X-ray	**10108**
FILM X Ray	
Chest X-ray (adult)	5598
Chest X-ray (child)	153
PNS X-ray	438
Total Film X-ray	**6189**

PACS* : Picture archiving and communication systems.

The Department continued to function on all holidays for emergency, indoor and ICU patients.

Respiratory Allergy and Applied Immunology

Research

1. Biochemical and clinico-immunologic characterisation of mosquito (*Culex quinquefasciatus*) allergens

Our earlier results provided evidence that mosquito derived allergens are present in the air and may serve as important inhalant allergens in Type I allergic respiratory disorders. In subsequent studies, allergenic proteins in *Culex quinquefasciatus (Cq)* whole body extract (WBE) were identified by immunoblot experiments with the pooled patients' sera [PPS (*Cq*)] and also with individual serum from skin prick test (SPT) as well as RAST positive patients (n=6). PPS *(Cq)* was prepared by pooling equal volumes of sera from 20 patients who showed highly positive skin reactions as well as high RAST ratios to *Cq* WBE. Of the various proteins of *Cq* WBE, separated by SDS-PAGE, seven proteins bound patients' IgE. IgE binding protein profiles varied from patient to patient in immunoblots when individual serum from different patients was used, giving evidence for heterogeneity of patients' IgE response to different proteins of *Cq* WBE. Allergenic proteins of 24, 30 and 33 kDa were found to be its major allergens as they were detected with more than 50% of the sera tested. Immunoblots using sera from normal healthy volunteers were uniformly negative.

2. Identification, purification and characterisation of components of clinically important insect allergens implicated in allergic rhinitis and bronchial asthma

Presence of cross reacting allergens in the three mosquito WBEs (*Culex quinquefasciatus, Aedes aegypti* and *Anopheles stephensi*) was studied in RAST inhibition and immunoblot experiments. Homologous as well as the two heterologous mosquito WBEs produced dose related inhibition of *Cq* RAST suggesting the presence of cross-reacting allergenic components in the three mosquito WBEs. Protein profiles of three mosquito WBEs were studied by SDS-PAGE. In our immunoblot experiments with PPS (*Cq*) two IgE binding major allergenic proteins of *Cq* extract (30 kDa and 33 kDa) were also detected in the two heterologous mosquito WBEs (*Aedes aegypti* and *Anopheles stephensi*). IgE binding major allergenic protein of 24 kDa was detected only in *Cq* extract. These results gave evidence that the allergenic proteins of 30 and 33 kDa were shared among the three mosquito species while major allergen of 24 kDa was species specific.

3. Assessment of biocontaminants from indoor environments

Sampling was carried out in two schools. Measurement of concentration of bacteria and fungi was done at selected locations. Volumetric sampling was done for simultaneous quantification of indoor and outdoor bio-loads in selected schools. Questionnaire study was carried out to work out the Sick Building Syndrome (SBS).

Integrative use of various sampling techniques for indoor bacteria and fungi was adopted in this project. New sampling practices *i.e.* swab sampling and gravimetric sampling technique were introduced to evaluate the concentration of bacteria and fungi of settled and surface dust respectively.

Endotoxins are released by Gram-negative bacteria (GNB) and *Enterobacter*. Inhalation of endotoxins carried out by airborne dust may cause adverse health effects. Sampling for endotoxin analysis has been done. Concentration of endotoxin released from the cell wall of GNB has to be determined using the LAL (Limulus amebocyte lysate) assay method. Quantitative estimation of endotoxin and its correlation with bacterial concentration has to be established.

4. Studies on aerobiological aspects, clinico-immunologic assessment of allergenic potential and biochemical characterisation of allergenic components of *Aspergillus* species

For the present study, four common *Aspergillus* species were selected *viz., A. fumigatus, A. niger, A. tamarii*, *A. flavus*. With a view to obtain appropriate amount of allergen powders of different *Aspergillus* species to prepare in-house standards for comparative *in vitro* studies, each *Aspergillus* species was mass cultured in a synthetic medium and allergen extracts were prepared using a standard technique. For *in vivo* studies,

allergen extracts of the four species have been procured from a commercial manufacturer, who has been given licence by the Drug Controller General of India for manufacturing these extracts for diagnosis and immunotherapy of the patients suffering with IgE mediated Type I allergic respiratory diseases. We have started performing skin prick tests on bronchial asthma and / or allergic rhinitis patients to evaluate and compare allergenic significance of the four species of *Aspergillus*.

Respiratory Medicine

The Department is involved in the patient care (Outdoor and Indoor), research on different aspects of respiratory diseases and teaching of the postgraduate students in the subject – Pulmonary Medicine (MD and DTCD) of University of Delhi. Beside routine lectures, clinical demonstrations along with seminars, clinical meetings and journal clubs, daily ICU meetings and mortality meetings were conducted regularly.

Research

1. To evaluate the occurrence and effect of sinusitis in patients with asthma and/or rhinitis

Consecutive patients with asthma and / or allergic rhinitis, with skin allergy test positivity, were evaluated for the occurrence of sinusitis on computed tomography (CT) of the paranasal sinuses. Two hundered and sixteen patients were categorised as asthma (*Group 1*, 27), allergic rhinitis (*Group 2*, 131) and asthma with allergic rhinitis (*Group 3*, 58). Sinusitis was present in 74%, 67% and 82% of patients respectively. The mean sinus CT score (maximum = 24) was 6.4, 5.7, and 9.5 respectively. Sinus mucosa was significantly thicker in *Group 3 versus Group 2* ($p = 0.05$). Mean number of sinuses involved (maximum = 10) was 4.8, 4.2 and 5.8 respectively. *Group 1* patients with sinusitis had significant history of nocturnal awakenings (16/20, $p = 0.05$), headache (18/20, $p = 0.03$), easy fatigability (18/20, $p = 0.03$) and halitosis (19/20, $p = 0.02$). They also had significantly higher mean symptom severity score for cough, easy fatigability, headache and halitosis ($p = 0.041$). In these patients, Rhinosinusitis Disability Index revealed significantly more were irritable ($p = 0.025$), tense ($p = 0.036$), missed daily activities ($p = 0.039$), fatigued ($p = 0.023$), and found sleep difficult ($p = 0.035$). *Group 1* and *3* patients with sinusitis had significantly lower FEV_1 and FEV_1/FVC ratio ($p = 0.041$). *Group 2*, patients with sinusitis had significantly more breathlessness (54/88, $p = 0.03$) while such *Group 3* patients had significant postnasal drip (46/48, $p = 0.028$). Sinusitis was present in three-fourths of the patients with asthma alone, without obvious nasal symptoms. Co-existent sinusitis increased the severity and morbidity caused by asthma and/or allergic rhinitis.

2. Nocturnal sleep disturbances, excessive daytime sleepiness and impairment in sleep specific quality of life (QOL) in patients with allergic rhinitis

Newly diagnosed patients of allergic rhinitis with skin allergy test positivity along with matched controls underwent computed tomography of paranasal sinuses (CT-PNS). Patients were categorised as allergic rhinitis (*Group 1*), allergic rhinitis with sinusitis (*Group 2*) and matched controls (*Group 3*). All subjects were evaluated for nocturnal sleep disturbances, excessive daytime sleepiness and sleep-specific QOL disturbances using the Pittsburgh Sleep Quality Index (PSQI), Epsworth Sleepiness Score (ESS) and Nocturnal Rhinoconjunctivitis Quality of Life Questionnaires (NRQLQ), respectively. Of the 104 patients (63 males, 41 females), 22 (21%) were categorised as group 1 and 82(79%) as *Group 2*. *Group 3* comprised of 20 controls. *Group 2* patients, as compared to *Group 1*, had higher mean scores for PSQI (9.2 *vs* 4.3, $p = 0.283$), ESS (13.2 *vs* 6.7, $p = 0.030$) and for NRQLQ (40.6 *vs* 19.4, $p = 0.030$). *Group 1* patients, compared to *Group 3*, had higher mean scores for PSQI (4.3 *vs* 1.0, $p = 0.010$), ESS scores (6.7 *vs* 2.1, $p = 0.001$) and NRQLQ (19.4 *vs* 5.0, $p = 0.001$). *Group 2* patients as compared to *Group 3*, too had higher mean PSQI (9.2 *vs* 1.0, $p = 0.001$), ESS (13.2 *vs* 2.1, $p = 0.0001$) and NRQLQ scores (40.6 *vs* 5.0, $p = 0.001$). Of the 104 patients, 62 (59.6%) had persistent, while 42 (40.4%) had intermittent disease. Mean PSQI, ESS and NRQLQ scores were significantly higher in persistent group (9.7 *vs* 3.9, $p = 0.008$, 13.3 *vs* 7.0, $p = 0.027$ and 41.0 *vs* 20.0, $p = 0.031$ respectively). Patients with persistent disease in *Group 2* (52, 83%) as compared to those in *Group 1* (10, 24 %), had significantly higher mean scores for PSQI (9.8 *vs* 5.1 $p = 0.005$), ESS scores (13.1 *vs* 8.6, $p = 0.042$) and NRQLQ (41.6 *vs* 24.5, $p = 0.004$). Patients with associated urticaria/eczema 33 (31.7%) had significantly higher mean scores on all three questionnaires (PSQI, 10.1 *vs* 8.1, $p = 0.038$, ESS 15.1 *vs* 10.2, $p = 0.003$ and NRQLQ, 46.4 *vs* 33.1, $p = 0.001$). Nocturnal sleep disturbances, excessive daytime sleepiness and impairment of sleep specific QOL were significant in patients with allergic rhinitis. These were significantly greater in those with associated sinusitis, persistent disease and urticaria/eczema.

3. Occurrence of upper airway symptoms and their impact on quality of life in patients with chronic obstructive pulmonary disease (COPD)

The occurrence of upper airway symptoms and their impact on quality of life in patients with chronic obstructive pulmonary disease will be studied by administering the Sino Nasal Outcome Test (SNOT) -20 and St George' s Respiratory Questionnaire (SGRQ) on 30 consecutive newly registered COPD patients without any comorbid conditions. Patients with nasal symptoms will undergo skin prick tests against aeroallergens and CT PNS. The patients will be reassessed with SNOT-20 and SGRQ after 12 weeks of initiation of treatment. COPD patients without upper airway symptoms will serve as controls.

4. Effect of indoor air pollution on respiratory system of women using different fuels for cooking in an urban slums of Delhi (India)

In India generally women are responsible for preparing the food for family. There are four types of fuels commonly used for cooking and other domestic work. The fuels are liquIfied petroleum gas (LPG), kerosene oil, biomass (fire wood and cow dung cakes) and mixture of two or more of the above. Some of the highest exposures to air pollutants in developing countries occur inside home where bio-fuels are used for cooking. The main toxic respiratory irritants produced after burning arc oxides of nitrogen and sulphur, and unburnt hydrocarbons, namely the suspended particulate matter.

A study was conducted to see the effect of air pollution on the respiratory symptoms of women aged 15-60 years using different fuels for cooking in urban slums of Delhi by the help of lung function tests and respiratory symptoms. The study participants were 100 women using bio-fuel, 100 using kerosene oil and 100 using liquid petroleum gases (LPG) selected from among 500 women aged 15-60 years of age. These women were interviewed at home to collect information about exposure to fuel smoke and presence of respiratory symptoms. Lung functions were assessed by measuring forced vital capacity (FVC), forced expiratory volume in the first second (FEV_1) and peak expiratory flow rate (PEFR). It was seen that women using bio-fuels experienced more respiratory symptoms (25%) than those using kerosene (15%, $p>0.05$) or LPG (10%, $p<0.05$). FVC, FEV_1, PEFR were significantly lower in bio-fuel user compared with the both kerosene ($p<0.01$) and LPG user ($p<0.001$). Lung function in kerosene user also was significantly poorer when compared with LPG user ($p<0.01$).

It was concluded that women exposed to bio-fuel smoke suffered more from respiratory illnesses and have decreased pulmonary function compared with women exposed to kerosene or LPG smoke. To reduce pollutant exposure, it is advised to use smokeless *chulhas* or cleaner fuels such as charcoal, biogas and kerosene.

5. Indoor air pollutants and rhinitis in children in Delhi: an exposure response study

Indoor air pollution, a major health problem in industrial workplace, has now been recognised as a significant problem in home and office. Pollution from cooking fuel used smoke, building material, furnishing and biological agents being increasingly found to cause respiratory allergy. A prospective study was planed to determine the role of indoor air pollution in development of respiratory allergy with special reference to rhinitis in children.

Three thousand four hundred fifty-six children aged 7-15 years from lower, middle and higher socio-economic classes at the industrial areas (Shahdara and Shahzada Bagh), residential areas (Ashok Vihar, Janakpuri, Siri Fort, Nizamuddin and I.T.O.) and urban villages (Jagatpur and Dallupura) of Delhi were studied. The demographic details including in house smoking, ETS exposure, children respiratory illness, etc., were collected. Indoor air samples were collected to measure SO_2, NO_2 and SPM level. Trace and major elements in SPM were also measured by Atomic Absorption Spectrophotometer (AAS).

There were 3456 (M=59.2% & F=40.8%) children age 7-15 years. 34.8% children were exposed to ETS. Overall 26.1% children have history of rhinitis, of which 39.2% from industrial areas, 25.8% from residential areas and 11.3% from urban villages. History of rhinitis was more in Shahdara (44.4%) followed by Shahzada Bagh (34.1%), Janakpuri (34.0%), Nizamuddin (33.1%), Ashok Vihar (27.7%), I.T.O. (18.8%), Siri Fort (15.5%), Dallupura (14.5%) and Jagatpur (8.1%). History of rhinitis was more in industrial areas followed by residential areas and urban villages. There was no correlation between socio-economic classes and rhinitis in children.

Indoor SPM level was 0.71±0.44 mg/m^3 (0.08 to 2.42 mg/m^3), SO_2 level was 4.73±5.69 µg/m^3 (0.00 to 77.43 µg/m^3) and NO_2 level was 31.42 ± 23.75 µg/m^3 (1.46 to 243.15 µg/m^3). History of rhinitis was significantly ($p>0.001$) more where indoor SPM levels was high. History of rhinitis was also more where indoor SO_2 and NO_2 level was high but was not significant. From industrial areas fourteen elements (8 trace and 6 major) were measured in SPM by AAS, out of which trace elements such as lead (Pb), cadmium (Cd), copper (Cu), cobalt (Co) and molybdenum (Mo) and major elements such as sodium (Na), magnesium (Mg) and iron (Fe) were higher where children had rhinitis but was not significant.

26.1% children (7-15 years) had rhinitis of which 39.2% from industrial areas, 25.8% from residential areas and 11.3% from urban villages. Rhinitis was significantly more in subjects having higher indoor SPM levels in houses. History of rhinitis was more where the concentration of Pb, Cd, Cu, Co, Mo, Na, Mg and Fe elements were high in houses. Industries play a significant role in increasing indoor air pollutants level and development of rhinitis.

6. Association of indoor and outdoor air pollution level with respiratory problem among children in India

The present perspective study was conducted at Sahdara industrial area of Delhi, India. The effect of indoor and outdoor air pollutants level on respiratory health was examined in 394 children aged 7-15 years. Majority of children had history of respiratory problems like cough, sputum production, shortness of breath, wheezing, common cold and throat congestion. The association of indoor and outdoor air pollutants levels showed that outdoor SO_2, NO_2 was significantly higher than indoor SO_2, NO_2 levels whereas mean indoor SPM level was significantly higher than outdoor SPM level. Indoor SPM level was also significantly high in houses where children had history of respiratory illness. This study suggests that both indoor and outdoor particulate exposure may be important risk factors in the development of respiratory illness of children.

7. IgE-mediated food allergy in asthma and rhinitis patients: rice, legumes and citrus fruits are major triggers

Studies show an association between food sensitivity, asthma and / or other atopic disorders. But the knowledge about true prevalence of food allergy in respiratory allergy patients is lacking. The present study is aimed to investigate the prevalence of food allergy and its association with asthma and / or rhinitis.

The patients were screened using standard questionnaire and skin prick-tested with common foods and aeroallergens. Specific IgE level was determined by ELISA and allergy was established by open and blinded food challenges.

Of 1860 patients screened, 1097 (58.9 %) gave history of food allergy. Of 470 patients (history positive) skin tested, 138 (29.3 %) showed positive reactivity to at least one food. Rice (6.2 %) was the top sensitizer followed by blackgram (5.9 %), lentil (5.5 %) and citrus fruits (5.3 %). Patients with history and SPT positivity showed elevated specific IgE levels (0.98-79 IU/ml) against respective food allergens than normal controls (0.06-0.08 IU/ml). Open food challenges (OFC) were positive with rice in most cases (21/52) followed by citrus fruits (15/33), banana (10/24), curd (9/22) and blackgram (6/16). Of 59 blinded challenges on 45 patients, 21 (47%) were assessed as positive. With double blind placebo controlled food challenge (DBPCFC) as the end point, the prevalence of food allergy was 1.1 % [(0.72-1.75) at 95 % confidential interval] of 1860 patients.

The perception of food-related symptoms is common among respiratory allergy patients but the actual prevalence is low. Food sensitization is significantly associated with asthma. The common offending foods are rice, blackgram, citrus fruits and banana.

Respiratory Virology

Research

1. Effect of fusion of conserved epitope of M1 protein (influenza virus) and Tat protein of HIV on inhibition of influenza A virus

M1 protein of influenza A virus is responsible for the proper assembly of the virus particle. Every year mutation occurs in the gene which helps the virus in escaping the immune system but there are certain conserved regions in this gene which can be exploited as a target to inhibit the propagation of the virus. We are using the nucleotide sequence corresponding to the Protein Transduction Domain of Tat protein of HIV, a medium to activate the APCs for the generation of immune response against the virus.

The synthetic nucleotide sequence corresponding to the M1 epitope and protein transduction domain (PTD) of Tat protein of HIV was cloned in a mammalian expression vector *viz.*, pSecTag 2A and then M1 epitopic portion was cloned just downstream to the PTD portion. Restriction digestion was performed to confirm the efficient cloning of the two sequences. On the other side, the bone marrow of the mice was isolated and cultured in MEM media containing 20% FBS. Interleukin-4 was added to the media for proper differentiation of the bone marrow into dendritic cells. The restriction digestion of the recombinant vector showed that the M1 epitopic portion was successfully cloned downstream to the PTD portion of Tat protein of HIV. The addition of IL-4 to the bone marrow culture led to their differentiation into the dendritic cells. The study is continued to see the effect of Tat protein of HIV on inhibition of influenza A virus.

2. Catalytic nucleic acids mediated silencing of influenza virus

The emergence of anti-sense technology has shown the ray of hope against many pathogens. The short catalytic nucleic acid with inherent specific endo-ribonuclease activity is the best candidates to bet upon. According to structural models, artificial nucleic acids have been designed that can potentially hydrolyze any chosen target RNA sequence in Trans at specific site. To target M1 gene of influenza A virus, we analysed secondary structure of viral RNA using computer based programme M-fold. We have constructed the DNA-enzyme (Dz) with the 10-23 catalytic motif and hammer head Ribozyme. The Dz was designed to cleave the M1 RNA at 137 nt position whereas Ribozyme targeted 163 nt in the same target. The cleaved products were separated on PAGE and analysed by autoradiography. These catalytic nucleic acids were highly efficient under the simulated physiological conditions.

DNA-enzymes and Ribozymes were used in the combination to check the rate of mutation of Influenza A virus. It was observed that when these enzymes were used in combination, the impact of DNA-enzymes and Ribozymes was more potent. This combinatorial strategy can be used to design multi target DNA-enzymes and Ribozymes to delay the appearance of escape mutants because of the low probability of simultaneous mutations in both the target RNA sites. Our data indicated that combination of DNA-enzymes and Ribozymes could be useful for the prevention against influenza A virus infection.

3. Multi-site monitoring of human influenza viruses in Delhi

Epidemics of influenza are one of the most feared outbreaks because of their potential threat to become a pandemic. A surveillance effort is being implemented that monitors the antigenic changes of influenza virus isolates in India. The extreme genetic variability of influenza viruses makes the design of useful molecular-based assays challenging. Our major research objective is to characterise the prevalent human influenza surveillance in Delhi region.

Throat swab and nasal swab specimens from patients (n = 233) in the age group of 6 months - 40 years, presenting respiratory tract infections with symptoms of fever, cough, cold, wheezing and acute exacerbation of asthma were collected from VPCI, Kalawati Saran Children's Hospital and Lok Nayak Jai Prakash Hospital (LNJP), New Delhi, between the period of time November 2006 to April 2007. The patient's consent was taken before collecting the specimens. Specimens were collected in sterile vials containing 5 ml of cold viral transport medium (Hanks Balanced Salt Solution with 0.5% BSA). The specimens were transported to the

laboratory and were maintained at 4 ^{0}C and processed within 48hr of collection.

Two hundred thirty three (233) samples were collected up to March 2007. Five samples were positive for influenza virus. Two isolates were H1N1, two H3N2 and two Influenza B positive. Study is continued for isolation of new variants of influenza.

4. Assessment of airway hyperreactivity and PKR signalling in influenza A virus induced murine model of allergic asthma

Airway hyperresponsiveness (AHR) is a characteristic feature of asthma and is described as the ability of the airways to narrow after exposure to constrictor agonists, as indicated by a smaller concentration of a constrictor agonist needed to initiate the bronchoconstriction response, a steeper slope of the dose response curve, and a greater maximal response to the agonist. The severity of AHR correlates with the severity of asthma. The purpose of this study was to determine influence of influenza A virus in the alteration of airway hyperreactivity in the murine lung after allergen sensitization and challenge. Airway hyperreactivity was determined by *in vitro* organ bath method. Its smooth muscles were stimulated through the addition of a bronchoconstrictor *i.e.* acetylcholine. The percent contraction of mouse tracheal rings was obseved maximum in acute phase group as compared to the ovalbumin group, thus depicting the fact that virus instillation enhanced the airway reactivity, and however, had no effect on recovery phase group.

Further we studied PKR expression which is an IFN-induced gene product. Influenza virus causes apoptotic death *in vitro* in cultured cell lines and also *in vivo* in infected animals. The virus infection results in the induction of immune system to produce interferon (IFN), which has potent antiviral, antiproliferative and immunomodulatory activity. IFN induces multiple numbers of cellular genes that leads to the dsRNA induced apoptosis. One of the most important antiviral, antiproliferative IFN-induced gene product is the double-stranded (ds) RNA-dependent protein kinase (PKR). The double-stranded (ds) RNA-dependent protein kinase is considered to play an important role in interferon's (IFN's) response to viral infection in normal cells. The fact that viruses have evolved a variety of mechanisms for down regulating PKR function, but it is not well established in virus induced allergic asthma.

PKR expression was assayed by performing western blot. A significant amount of PKR expression was observed in acute phase group, followed by moderate amount of PKR expression in the virus and recovery phase group while least expression is observed in the OVA phase group completely absent in control phase group. The phenomenon may be explained by the fact that viral dsRNA can induce activation of a host's anti viral protein kinase (PKR) and activation of PKR by dsRNA leads to expression of Th2-type immune responses, which in turn leads to the exacerbation of asthma. Thus, the study confirmed that influenza virus infection increases airway sensitization during acute phase, however doesn't affect recovery phase of viral infection.

5. Role of apoptosis in the pathogenesis of influenza A virus, correlation of virological and immunological parameters: a study in human and murine model

Influenza virus primarily infects epithelial cells, from which various chemotactic factors may be released, which in turn infiltrate the inflammatory cells such as lymphocytes, histiocytes and, thus, develop bronchial inflammation. The inflammatory response damages the epithelial cells of the respiratory tract by programmed cell death. The pathophysiology of influenza induced inflammatory process is regulated by complex network of mutually interacting cytokines. Cytokines play a critical role in orchestrating and perpetuating inflammation in airways. To understand the mechanism of pathogenesis we carried out pro-inflammatory and anti-inflammatory cytokines assay in human and murine model and further by modulation of expression of iNOS and PKR by rTGF-β1 and apoptotic markers during influenza virus induced apoptosis.

It was observed an increase of inflammatory cytokine IFN-γ, IL-1β on virus infection in human and murine model. However, the maximum level of anti-inflammatory cytokine IL-10 was observed in the late stage of virus infection. Administration of rTGF-β1 significantly decreased the level of inflammatory cytokines and increased the level of IL-10 in murine model. The increased expression of iNOS mRNA and PKR protein observed in virus infected group and a significant decrease in the expression of iNOS mRNA and PKR protein observed in rTGF-β1 administered mice with virus infection. Nitric oxide (NO) production also followed the same trend as it was by iNOS mRNA. The study of apoptotic markers also revealed significant

attenuation by rTGF-β1 administration in mice, which is confirmed by DNA fragmentation assay.

The inflammatory cytokines play an important role in the pathogenesis of influenza virus. The rTGF-β1 was significantly able to down regulate apoptosis hence helped animals to recover from leucopenia and lymphopenia. rTGF-β1 played an immunomodulatory role in which significantly down regulated overshooting immune response to protect lungs of influenza virus infected mice without affecting adversely virus clearance. The correlation of clinical study and mruine model demonstrated that overshooting immune response and increased apoptosis leads to destructive damage in the lung tissues which may indirectly contribute to the pathogenesis of influenza virus infection.

Dignitaries on dais during the "Symposium on Thoracic Imaging" on 5th April 2006; *left to right*: Dr V.K. Vijayan (Director, VPCI), Dr R.K. Srivastava (Director-General of Health Services, Government of India), Prof. P.N. Srivastava (Chairman, Governing Body, VPCI) and Dr Balakrishnan Menon (Reader, VPCI).

Dignitaries on the dais during the "6th CME: National Update on Interstitial Lung Diseases" on 23rd April 2006; *left to right:* Dr V.K. Vijayan (Director, VPCI), Prof. P.N. Tandon (Pro-Vice-Chancellor, University of Delhi) and Dr Raj Kumar (Reader, Respiratory Medicine, VPCI).

Postgraduate Training and Teaching

The Institute has been conducting PhD programmes (Medical Sciences) since its inception in various specialities relating to chest diseases, *e.g.*, allergy and immunology, bacteriology, respiratory medicine, mycology, pharmacology, physiology, virology, etc. Besides this, the Institute conducts MD courses in pulmonary medicine, biochemistry, microbiology, pharmacology and physiology. It also conducts a Diploma course in tuberculosis and chest diseases (DTCD).

DTCD

Session 2005-2007	Session 2006-2008
Dr Amita Singh	Dr Ajay Sagar
Dr Sumit Wadhawa	Dr Vaishali Khorwal
Dr Bhumika Agarwal	Dr Amica Joan Rynjah
Dr Jain Pankaj Fulchand	Dr Avishan
Dr Hitesh Verma	Dr Azeem Iqbal
Dr Saurabh Sharma	Dr Nalanda Debnath
Dr Jaya Kala	Dr Ravinder Kumar
Dr Shweta Gupta	Dr Madhu Kanodia
Dr Sandhya Sri Korbathina	Dr Shailesh Kumar
Dr Vibhu Kawatra	Dr Vivek Parate

MD Degrees (Awarded)

(Session: 2003-2006)

Name	Discipline
Dr Amit Bansal	Pulmonary Medicine
Dr Om Prakash	Pulmonary Medicine
Dr Vikas Mittal	Pulmonary Medicine
Dr Pankaj Chhabra	Pulmonary Medicine
Dr Nitin Goel	Pulmonary Medicine
Dr Ruchika Gulati	Med. Biochemistry
Dr Rashmi Puri	Microbiology
Dr Priyanka Narayan	Pharmacology

MD Theses (Submitted)

(Session: 2004-2007)

Sl No.	Name (Discipline)	Title of Theses	Supervisor(s)
1.	Dr Pankaj Sayal (Pulmonary Medicine)	Characterisation of lower respiratory tract inflammation and its relationship with changes in pulmonary patho-physiology and thoracic imaging in bronchial asthma	Dr V.K. Vijayan and Dr B. Menon
2.	Dr Amit Diwakar (Pulmonary Medicine)	A study of multi-drug resistant pulmonary tuberculosis cases to observe the initial clinical, bacteriological and radiological response to treatment correlated with modulation of TNF-α, nitric oxide and IFN-γ receptor response	Prof. S.N. Gaur and Prof. Mridula Bose
3.	Dr Sandeep Sahay (Pulmonary Medicine)	The occurrence of rhinosinusitis in patients with bronchial asthma and/or allergic rhinitis	Prof. Ashok Shah and Prof. Satish K. Bhargava (UCMS, Delhi)
4.	Dr Ravneet S. Grover (Pulmonary Medicine)	Breath carbon monoxide levels as a marker of clinical severity and control of asthma	Dr Raj Kumar
5.	Dr Usha Singh (Biochemistry)	Studies on acetoxy drug: protein transacetylase catalysed modification of the TNF-α mediated pathway in human peripheral blood mononuclear cells by polyphenolic acetates	Prof. H.G. Raj, Prof. S.K. Bansal and Prof. Mridula Bose
6.	Dr Latika Sharma (Microbiology)	Comparative analysis of *ex-vivo* mycobactericidal activity and activation markers of peripheral blood macrophages from pulmonary tuberculosis patients challenged with a multidrug-resistant strain of *Mycobacterium tuberculosis*	Prof. Mridula Bose and Prof. S.N. Gaur
7.	Dr Neeraj Tyagi (Pharmacology)	A study to monitor adverse drug reactions in patients of chronic obstructive pulmonary disease	Prof. A. Ray and Dr V.K. Vijayan
8.	Dr Monika Gupta (Physiology)	Cholesterol lowering potential of Seabuckthorn in rats	Prof. M. Fahim and Prof. K. Ravi

MD Theses (Pursued)

(Session: 2005-2008)

Sl No.	Name (Discipline)	Title of Theses	Supervisor(s)
1.	Dr Ankur Girdhar (Pulmonary Medicine)	Evaluation of systemic inflammation in patients with chronic obstructive pulmonary disease and asthma and effects of standard treatment on the level of inflammation in these patients	Dr V.K. Vijayan
2.	Dr Anupam Kumar Singh (Pulmonary Medicine)	A comparative study of inhaled and intravenous magnesium sulphate as an adjunct to standard treatment protocol for management of severe exacerbation of bronchial asthma	Prof. S.N. Gaur
3.	Dr Danish Jamal (Pulmonary Medicine)	The occurrence of nocturnal sleep disturbances, daytime sleepiness and sleep specific quality of life disturbances in patients with allergic rhinitis	Prof. Ashok Shah
4.	Dr Ramaraju Karthikeyan (Pulmonary Medicine)	Predictors of emergency departments use in asthmatics	Prof. S.K. Chhabra
5.	Dr Priyanka Aggarwal (Pulmonary Medicine)	Diagnostic yield of induced sputum and various bronchoscopic samples in sputum smear negative tuberculosis	Dr Raj Kumar
6.	Dr Anjali Vinocha (Biochemistry)	Biochemical studies on protein kinase-C in peripheral blood lymphocytes of COPD patients	Prof. S.K. Bansal and Dr. V.K. Vijayan
7.	Dr Archana Angrup (Microbiology)	Drug resistance profiling and molecular typing of *Mycobacterium tuberculosis* isolates from a DOTS centre and a private hospital in Delhi	Dr Mandira Varma
8.	Dr Gaurav Vishnoi (Pharmacology)	A study to monitor adverse drug reactions in patients of bronchial asthma	Prof. A. Ray and Dr V.K. Vijayan
9.	Dr Payal Bhalla (Physiology)	Attenuation of angiotensin converting enzyme inhibitor induced cough by supplementation with iron and anti-oxidants	Prof. K. Ravi

MD-Ist Year

(Session: 2006-2009)

Name	Discipline
Dr Amit Kumar Lohia	Pulmonary Medicine
Dr Avi Kumar	Pulmonary Medicine
Dr Nurul Haque	Pulmonary Medicine
Dr Rajnish Kaushik	Pulmonary Medicine
Dr Kripesh Ranjan Sarmah	Pulmonary Medicine
Dr Sant Ram	Biochemistry
Dr Jyoti Chaudhary	Microbiology
Dr Mohd. Imran	Pharmacology
Dr Tripat Deep Singh	Physiology

PhD Awarded/Submitted

Sl No.	Name (Discipline)	Title of Theses	Supervisor(s)	Status
1.	Mr Manoj Tyagi (Biochemistry)	Signalling mechanism during the expression of proinflammatory cytokines in asthma : a study on role of protein kinase C in macrophage activation and release of interleukin-1 beta	Prof. S.K. Bansal and Dr V.K. Vijayan	Awarded
2.	Dr Anurag Aggrawal (Physiology)	Effect of mucus hyper secretion on respiratory impedance in a murine model of asthma	Prof. M. Fahim and Dr Burton F. Dickey (MD Anderson Cancer Center, Houston)	Awarded
3.	Ms Garima Gupta (Biochemistry)	Studies on purification, characterization and molecular cloning of acetoxy drug: protein transacetylase from *Mycobacterium smegmatis*	Prof. H.G. Raj and Prof. Mridula Bose	Submitted
4.	Mr Vikram Srivastava (Microbiology)	Role of apoptosis in the pathogenesis of influenza A virus, correlation of virological and immunological parameters: a study in human and murine model	Dr Madhu Khanna and Dr V. K. Vijayan	Submitted
5.	Ms Mahin Dianat (Physiology)	Effect of morphine on neural regulation of blood pressure and behaviour in animals	Prof. M. Fahim and Prof. Mohd. Reza Zarrindast (Tehran Medical University, Iran)	Submitted
6.	Dr Vishal Bansal (Physiology)	Mechanism of action of estrogen on hemodynamic parameters in rabbits	Prof. M. Fahim and Prof. Rashmi Babbar (MAMC, New Delhi)	Submitted

PhD Theses (Pursued)

Sl No.	Name (Discipline)	Title of Theses	Supervisor(s)	Year of Registration
1.	Mr Anil Singh Baghel (Biochemistry)	Studies on molecular cloning and expression of acetoxy drug: protein transacetylase of *M. tuberculosis* with special reference to the role of polyphenolic acetates as antitu-berculous drugs	Prof. H.G. Raj and Prof. Mridula Bose	2005
2.	Mr Mohd. Adnan Kausar (Biochemistry)	Biochemical and clinico-immuno-logic characterisation of mosquito (*Culex quinquefasciatus*) allergens	Prof. S.K. Bansal, Prof. M.K. Agarwal and Dr V.K. Vijayan	2005
3.	Ms Prachi Gupta (Biochemistry)	Lipid rafts in bronchial asthma: a study on membrane lipid metabo-lism in asthmatic patients	Prof. S.K. Bansal and Dr V.K. Vijayan	2005
4.	Ms Shwetambari Arora (Biochemistry)	Studies on acetoxy drug: protein transacetylase in hypoxia induced pulmonary hypertension	Prof. H.G. Raj and Prof. Daman Saluja (ACBR, University of Delhi)	2005
5.	Mr Tapesh Kumar Tyagi (Biochemistry)	Studies on the novel enzyme acetoxy drug: protein transacetylase from mesophilic fungus *Starkeomyces Sp.*	Prof. H.G. Raj and Prof. R.K. Saxena (Microbiology Deptt., South Campus, University of Delhi)	2005
6.	Mr Neeraj Kumar (Biochemistry)	Molecular and biochemical basis of variation in clinical phenotypes of adrenoleukodystrophy	Prof. S.K. Bansal, Dr K.K. Taneja (IGIB, Delhi), Prof. Veena Kalara, Prof. Madhuri Behari (AIIMS, New Delhi) and Prof. S. Aneja (LHMC, New Delhi)	2006
7.	Mr Rakesh Kumar Mishra (Biochemistry)	Experimental asthma: a study on transmembrane signalling in airway smooth muscles and peripheral blood lymphocytes during the development of airway hypersen-sitivity in guinea pigs	Prof. S.K. Bansal, Prof. S.K. Chhabra and Dr Ritu Kulshrestha	2006

Sl No.	Name (Discipline)	Title of Theses	Supervisor(s)	Year of Registration
8.	Ms Amita Chandolia (Microbiology)	Functional analysis of *mce4* genes of *Mycobacterium tuberculosis* H37Rv using antisense approach	Prof. Mridula Bose, Prof. Vani Brahmachari (ACBR, University of Delhi) and Dr Pawan Malhotra (ICGEB, New Delhi)	2004
9.	Ms Monika Sharma (Microbiology)	To study the effect of *Mycobacterium tuberculosis* infection of macrophages on T-cell viability	Prof. Mridula Bose and Prof. H.G. Raj	2004
10.	Mr M.K.R. Khan (Microbiology)	A study of ESBLs and ESBL plasmids in clinical isolates of *E. coli, Klebsiella spp., Proteus spp*., and *Pseudomonas aeruginosa*	Prof. S.S. Thukral	2005
11.	Ms Rashmi Pasricha (Microbiology)	Functional analysis of lprN of *mce4* operon of *M. tuberculosis*	Prof. Mridula Bose and Prof. Vani Brahmachari (ACBR, University of Delhi)	2005
12.	Ms Ruqiaya Nazir (Microbiology)	Effect of programmed cell death and cytokines induced by influenza A virus infection in allergic asthma: a study in murine model	Dr Madhu Khanna	2005
13.	Ms Nupur Asthana (Microbiology)	Cloning, purification and functional studies of the *mce1D* protein of *M. tuberculosis*	Prof. Mridula Bose	2006
14.	Ms Maansi Vermani (Microbiology)	Studies on aerobiological aspects, clinico-immunologic assessment of allergenic potential and biochemical characterisation of allergenic components of *Aspergillus* species	Prof. S.S. Thukral, Prof. M.K. Agarwal and Dr V.K. Vijayan	2007
15.	Mr Rishi Pal (Pharmacology)	Experimental studies on the role of free radicals in emotional and environmental stress	Prof. A. Ray and Prof. B.D. Banerjee (UCMS, Delhi)	2004
16.	Mr Ayanabha Chakraborty (Pharmacology)	Studies to explore gender related differences in stress responses with special reference on the role of nitric oxide	Prof. A. Ray and Prof. B.D. Banerjee (UCMS, Delhi)	2005
17.	Ms Rashmi Anand (Pharmacology)	Experimental studies on the role of opioids in stress and their interactions with nitric oxide in rats	Prof. A. Ray	2006

Sl No.	Name (Discipline)	Title of Theses	Supervisor(s)	Year of Registration
18.	Mr Abdul Yasir (Physiology)	Responsiveness of airway rapidly adapting receptors and oxidant-antioxidant status to cigarette smoke inhalation in normal and sensitized rabbits	Prof. K. Ravi and Prof. S.K. Chhabra	2005
20.	Dr Swati Omnwar (Physiology)	Functional changes in vascular responsiveness following mercury exposure in rats	Prof. K. Ravi and Prof. M. Fahim	2005
21.	Ms Ruchi Bhagat (Physiology)	High altitude simulation on lung physiology and vagal afferent activity	Prof. K. Ravi and Dr Shashi Bala Singh (DIPAS, Delhi)	2007

Faculty Members Associated as Co-supervisors for PhD Theses of Other Institutions

Sl No.	Name (Discipline)	Title of Theses	Supervisor(s)	Status
1.	Ms Seema (Chemistry)	Studies on the characterisation and establishment of human placental acetoxy drug: protein transacetylase as calreticulin transacetylase	Prof. R.C. Rastogi (Chemistry Deptt., University of Delhi) and Prof. H.G. Raj	Awarded
2.	Mr M. Irfan Beig (Life Sciences)	Neural and cardiovascular responses during epilepsy in conscious animals	Dr Anju Katyal (Dr B.R. Ambedkar Centre for Biomedical Research, University of Delhi) and Prof. M. Fahim	Submitted
3.	Mr M. Shahid (Pharmacology)	Effect of remote preconditioning on myocardial reperfusion injury	Prof. K.K. Sharma (UCMS, Delhi) and Prof. M. Fahim	Submitted
4.	Mr M. Tauseef (Pharmacology)	Evaluation of the mechanism of action of aspirin as a cardioprotective agent in experimentally induced cholesterolemic rats	Prof. K.K. Sharma (UCMS, Delhi) and Prof. M. Fahim	Submitted
5.	Ms Bano Saidullah (Zoology)	Bronchial reactivity in diabetic guinea pigs/rats	Prof. K. Muralidhar (Zoology Deptt., University of Delhi) and Prof. M. Fahim	Submitted
6.	Ms Dolly Kumari (Biomedical Sciences)	Study of food allergens	Dr Susheela Sridhara, Dr B.P. Singh (IGIB, Delhi) and Dr Raj Kumar	Pursued
7.	Mr Neeraj Kumar Saini (Biomedical Sciences)	Functional analysis of mammalian cell entry (*mce*) proteins in mycobacteria	Prof. Sujata K. Das (Bundelkhand University, Jhansi), Prof. G.L. Sharma (IGIB, Delhi) and Prof. Mridula Bose	Pursued
8.	Ms Prija Ponnan (Computational Biochemistry)	*In silico* studies on structure, functions and application of a novel transacetylase mediating protein acetylation independent of acetyl CoA	Prof. R.C. Rastogi (Chemistry Deptt., University of Delhi) and Prof. H.G. Raj	Pursued

Sl No.	Name (Discipline)	Title of Theses	Supervisor(s)	Status
9.	Mr Jitendra K. Nagar (Geology)	Suspended particulate matter enriched aerosol areas and its relationship with human health	Prof. J.P. Shrivastava (Geology Deptt., University of Delhi) and Dr Raj Kumar	Pursued
10.	Ms Shipra Gupta (Med. Biochemistry)	Studies on isolation and mechanism of action of the antihyperglycemic and hypolipdemic compound(s) from the leaf extract of *Casssia auriculata* in experimentally induced diabetic animals	Prof. S.B. Sharma, Prof. K.M. Prabhu (UCMS, Delhi) and Prof. S.K. Bansal	Pursued
11.	Mr R. Rizvi (Physiology)	To study the vasoactive responses in animal models of non-cirrhotic portal hypertension (NCPH)	Prof. Rashmi Babbar (MAMC, New Delhi), Dr S.K. Sarin (G.B. Pant Hospital, New Delhi) and Prof. M. Fahim	Pursued

Distinguished Visitors

- **Dr Angel Cataldi,** Chairman, Department of Biotachnology, Instituto de Biotechnologia, CNIA-INTA, Los Reseros y Las Cabanas, 1712 Castelar, Argentina. Visited V.P. Chest Institute from September 18-29, 2006, as a visiting scieintist, under Indo-Argentine S & T Programme of Cooperation, DST, Govt of India.

  He delivered a lecture at VPCI, entitled "History, current status and molecular epidemiology of tuberculosis in Argentina" (September 21, 2006).

- **Dr Brahm Palache,** Director Medical Affairs, Solvey Pharmaceuticals, Netherlands. Delivered a lecture on "Influenza vaccine" (November 13, 2006).

Awards/Honours

Dr V.K. Vijayan

- **President,** Indian College of Allergy, Asthma and Applied Immunology, Delhi.
- **Vice President,** World Lung Foundation, South Asia.
- **International Regent,** American College of Chest Physicians, U.S.A.
- **Editor-in-Chief and Publisher**, *The Indian Journal of Chest Diseases & Allied Sciences*, an official publication of the V.P. Chest Institute and the National College of Chest Physicians (India).
- **Member** of the Executive Committee and Central Planning Committee, Asian Pacific Society of Respirology.
- **Chair,** Clinical Respiratory Medicine Assembly, Asian Pacific Society of Respirology.
- **Executive Committee Member,** Tuberculosis Association of India, New Delhi.
- **Member,** Editorial Advisory Board, *Chest*, an official publication of the American College of Chest Physicians, U.S.A.
- **Member,** Editorial Advisory Board, *Chest* (Indian Edition), an official publication of the American College of Chest Physicians, U.S.A.
- **Member,** Editorial Advisory Board, *Thorax* (South Asian Edition), an official publication of the British Thoracic Society, U.K.
- **Member,** Editorial Board, "*The Open Respiratory Medicine Journal*", an Open Access online Journal.
- **Member,** International Advisory Board, *Internal Medicine Journal of Thailand*, an official publication of the Royal College of Physicians of Thailand, Thailand.
- **Member,** Editorial Board, *Lung India*, an official publication of the Indian Chest Society.
- **Member,** Editorial Board, *Indian Journal of Tuberculosis*, an official publication of the Tuberculosis Association of India.
- **Member,** Editorial Advisory Committee, *Pulmon*, an official publication of the Academy of Pulmonary and Critical Care Medicine.
- **Member,** Editorial Board, *Indian Journal of Sleep Medicine*, an official publication of the Indian Sleep Disorders Association.
- **Member,** Programme Advisory Committee (PAC) on Health Sciences under Science & Engineering Research Council (SERC), Department of Science and Technology, Government of India, New Delhi.
- **Member,** Data Safety Monitoring Bureau (DSMB), Department of Biotechnology (DBT) project on "Efficacy and safety of immunomodulator *Mycobacterium w.* as an adjunct therapy in pulmonary tuberculosis".
- **Member,** Scientific Advisory Committee, New Delhi Tuberculosis Centre, New Delhi.
- **Expert Member,** Inter-departmental Review Panel, High Altitude Medical Research Centre (HAMRC), a joint venture between Defence Research and Development Organisation (DRDO) and Directorate General of Armed Force Medical Services (DGAFMS).
- **Expert Member,** Multicentric Task Force Project on Study on Epidemiology of Asthma and Atopy, ICMR, New Delhi.
- **Member,** Advisory Committee, L.R.S. Institute of Tuberculosis and Respiratory Diseases, New Delhi.
- **Expert Member,** Committee for formulating specifications for the purchase of Cardiac Monitors and Central Monitoring Unit for ICU, Department of Medicine, AIIMS, New Delhi.

- **Member,** Expert Panel for Development of Training Manual for General Practitioners to Manage COPD and Asthma sponsored by WHO and PGIMER, Chandigarh.
- **Chairman,** Project Review Committee for the Division of Non Communicable Diseases in the field of Environment, ICMR, New Delhi.
- **Member,** Expert Committee of the Project Review Group (PRG) for Indo–US Project Proposals in the area of Environmental and Occupational Health, ICMR, New Delhi.
- **Advisor,** Union Public Service Commission, to select candidates for the post of Assistant Professor (Medicine), New Delhi.

Prof. M. Fahim

- **Member**, Steering Committee to monitor progress of the project on "Development of Integrated Software for Quantification of Autonomic Tone" submitted by AIIMS, New Delhi, Funding Agency: Ministry of Information Technology, Govt. of India.
- Delivered **Frontier Lecture Series Oration**, University of Calicut, Calicut.
- **Member**, Expert Panel DST Centre at JNU, New Delhi.
- **Chairman,** Animal Ethical Committee, Dr B.R. Ambedkar Centre for Biomedical Research, University of Delhi, Delhi.
- **Honorary Member,** International Atherosclerosis Society, USA.
- **Consultant Director,** Physiotherapy and Rehabilitation Centre, Jamia Millia Islamia University, New Delhi.
- **Expert Panel**, Recruitment and Assessment Centre, Defence Institute of Physiology and Allied Sciences, Delhi and other DRDO Institutions.

Prof. M.K. Agarwal

- **Editor,** *Trends in Biosciences*.
- **Editor,** Biotechnology Society of India Newsletter.
- **External Expert,** for assessment of CSIR Scientist F, E1, C grade.

Prof. S.N. Gaur

- **Member**, Asthma Care Committee, Municipal Corporation of Delhi, Delhi.
- **Member**, Institutional Ethics Committee, IGIB (CSIR), Delhi.
- **Expert Member,** Research Advisory Committee, Ministry of Environment and Forest, Government of India, New Delhi.
- Delivered **Dr Mohd. Abu Moezuddin Oration** of Indian Medical Association (UP Chapter), Allahabad, September 17, 2006.

Prof. S.S. Thukral

- **External Expert Member**, Board of Postgraduate and Research Studies, Kurukshetra University, Kurukshetra.

Prof. A. Ray

- **President**, Society of Pharmacovigilance (India).
- **Member,** Editorial Board, *Indian Journal of Pharmacology*.
- **Member,** Editorial Board, *Journal of Pharmacovigilance and Drug Safety*.

Prof. Mridula Bose

- **Member**, Editorial Board, *The Indian Journal of Chest Diseases and Allied Sciences*, an official publication of the V.P. Chest Institute and the National College of Chest Physicians (India).

Prof. Ashok Shah

- **Member**, Scientific Advisory Committee, Indian Council of Medical Research – National Informatics Centre for Biomedical Information, National Informatics Centre, New Delhi.
- **Member**, Technical Board, Municipal Corporation of Delhi for the purchase of Bronchoscopy equipment.
- **Editor**, *The Indian Journal of Chest Diseases and Allied Sciences*, an official publication of the V.P. Chest Institute and the National College of Chest Physicians (India).
- **Associate Editor**, *Indian Journal of Tuberculosis*, an official publication of the Tuberculosis Association of India.
- **Member**, Editorial Board, *Clinical and Molecular Allergy*.
- **Member**, Editorial Board, *The Indian Journal of Allergy, Asthma and Applied Immunology*, an official publication of the Indian College of Allergy, Asthma and Applied Immunology.
- **Member**, Editorial Board, *Current Medical Trends*, Jaipur.
- **Member,** Editorial Board, *Lung India*, an official publication of the Indian Chest Society.

Prof. S.K. Chhabra

- **Advisor**, Environmental Health, The Energy Research Institute, New Delhi.
- **Associate Editor**, *The Indian Journal of Chest Diseases and Allied Sciences*, an official publication of the V.P. Chest Institute and the National College of Chest Physicians (India).
- **Member**, Editorial Board, *The Indian Journal of Allergy, Asthma and Applied Immunology*, an official publication of the Indian College of Allergy, Asthma and Applied Immunology.
- **Membe**, Editorial Board, *Lung India*, an official publication of the Indian Chest Society.
- **Member**, Selection Committee for recruitment of Scientists, Defence Research and Development Organisation, New Delhi.
- **Expert Member**, Purchase Committee for Pulmonary function machine and Video bronchoscope, Municipal Corporation of Delhi, Delhi.

Prof. S.K. Bansal

- **General Secretary**, Biotechnology Society of India.

Dr Anita Kotwani

- **Executive Member**, International Society for Pharmacoeconomics and Outcome Research (ISPOR) Indian chapter.
- **Project Member** and **Country Coordinator** for WHO-HAI project on Medicine Prices.

Dr Raj Kumar

- **Member**, Editorial Board, *International Journal of Occupational Health and Environmental Health*, U.S.A.
- **Member**, Editorial Board, *The Indian Journal of Chest Diseases and Allied Sciences*, an official publication of the V.P. Chest Institute and the National College of Chest Physicians (India).
- **Member**, Editorial Board, *The Indian Journal of Allergy, Asthma and Applied Immunology*, an official publication of the Indian College of Allergy, Asthma and Applied Immunology.

- **Member**, Project Review Committee, Department of Anthropology, University of Delhi, Delhi.

Dr Kavita Gulati

- Elected **Executive Member**, Society of Pharmacovigilance (India).

Dr Rajinder Bajaj

- **Member**, Animal Ethics Committee, Department of Biosciences, Jamia Millia Islamai, New Delhi.
- **Member**, Animal Ethics Committee, Institute of Genomics and Integrative Biology, Delhi.

Sponsored Research Projects

Sl No.	Faculty Member (Department)	Title of Project	Funding Agency, Date of Sanction/Implementation and Duration	Budget (in Rs.)
1.	Prof. H.G. Raj (Biochemistry)	Discovery of the new enzyme acetocxy drug: protein transacetylase from lung and liver - studies on isolation, purification and molecular cloning	D.B.T. June 3, 2002 (Four years)	36.35 Lakhs
2.	Prof. H.G. Raj (Biochemistry)	Development of novel therapeutics based upon natural products from Indian medicinal plants	Department of Scientific and Industrial Research, Ministry of Science and Technology, Govt. of India March 29, 2007 (One year)	57.28 Lakhs
3.	Prof. S.K. Bansal (Biochemistry)	Identification, purification and characterisation of components of clinically important insect allergens implicated in allergic rhinitis and bronchial asthma	I.C.M.R October 23, 2006 (Three years)	3.61 Lakhs
4.	Prof. S.K. Chhabra (Cardiorespiratory Physiology)	Assessment of the effects of high particulate pollutants on pulmonary health status in selected mega-cities of South Asia	National Physical Laboratory March 20, 2006 (Two years)	1.00 Lakh
5.	Prof. S.K. Chhabra (Cardiorespiratory Physiology)	Pulmonary function in normal children in Delhi region: development of reference standards for spirometry	I.C.M.R January 23, 2007 (Three Years)	5.88 Lakhs
6.	Dr Anuradha Chowdhary (Medical Mycology)	Environmental prevalence of *Cryptococcus neoformans*, its mycoserologic and genotypic characteristion and role in pulmonary infections	D.S.T. May 20, 2005 (Three years)	11.22 Lakhs
7.	Prof. S.S.Thukral (Microbiology)	Molecular charcterisation of respiratory isolates of *Moraxella catarrhalis*	I.C.M.R. January 14, 2005 (Three years)	8.12 Lakhs
8.	Prof. S.S. Thukral (Microbiology)	Molecular characterisation of ESBL plasmids responsible for resistance to III/IV generation cephalosporins in clinical isolates of *E. coli, Klebsiella* spp, *Proteus* spp and *Pseudomonas aeruginosa*	C.S.I.R. March 17, 2005 (Three years)	11.96 Lakhs
9.	Prof. S.S. Thukral (Microbiology)	Detection and characterisation of AmpC β-lactamases in clinical isolates of *Klebsiella* spp. and *E. coli*	I.C.M.R. March 29, 2007 (Three years)	4.48 Lakhs

Sl No.	Faculty Member (Department)	Title of Project	Funding Agency, Date of Sanction/Implementation and Duration	Budget (in Rs.)
10.	Prof. Mridula Bose (Microbiology)	Mycobacterial-epithelial interaction in innate immune response to tuberculosis and its role in transcriptional regulation of inducible nitric oxide synthase (iNOS)	I.C.M.R. December 5, 2003 (Three years)	13.28 Lakhs
11.	Prof. Mridula Bose (Microbiology)	Functional characterisation of *lspA* gene of *Mycobacterium tuberculosis*: cloning, expression and its role during pathogenesis	D.B.T. June 19, 2006 (Three years)	17.35 Lakhs
12.	Prof. Mridula Bose (Microbiology)	Functional genomics of mammalian cell entry (*mce*) operons in clinical isolates of *M. tuberculosis* : regulation and expression analysis using Knockout strains	D.S.T. September 5, 2006 (Three years)	11.16 Lakhs
13.	Dr Mandira Varma (Microbiology)	Prevalence of *Mycoplasma pneumoniae* infection in patients of acute exacerbation of COPD: evaluation by different diagnostic techniques	I.C.M.R March 12, 2003 (Upto July 31, 2006)	11.74 Lakhs
14.	Prof. A. Ray (Pharmacology)	Studies on the possible mechanisms involved in the effects of UNIM-352, a polyherbal, anti-asthmatic unani preparation in experimental animals	Department of Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homoeopathy (AYUSH) September 29, 2006 (Three years)	28.29 Lakhs
15.	Prof. A. Ray (Pharmacology)	Possible protective role of Livina (a polyherbal preparation) against anti-tubercular therapy (ATT)-induced hepatotoxicity	Day's Medical Stores Mfg. Ltd. June 6, 2003 (Three years)	2.99 Lakhs
16.	Prof. A. Ray (Pharmacology)	A study to assess the efficacy of UNIM-352 (ZN_5) in bronchial asthma	Central Council for Research in Unani Medicine March 11, 2005 (Three years)	4.21 Lakhs
17.	Dr Anita Kotwani (Pharmacology)	Impact of standard treatment guidelines and patient education on quality of asthma management	Health Action International Asia-Pacific December 23, 2005 (1½ years)	0.72 Lakhs
18.	Dr Kavita Gulati (Pharmacology)	Pharmacological studies on the role of nitric oxide (NO) in stress adaptation in rats	D.S.T. March 29, 2005 (Three years)	16.26 Lakhs

Sl No.	Faculty Member (Department)	Title of Project	Funding Agency, Date of Sanction/Implementation and Duration	Budget (in Rs.)
19.	Prof. M. Fahim, Prof. K. Ravi and Dr Vishal Bansal (Physiology)	Establishment of Patch Clamp Lab & Cell Culture Facility under Funds for Improvement in Science and Technology (FIST) programme	D.S.T. February 03, 2003 (Five years)	67.21 Lakhs
20.	Prof. M. Fahim (Physiology)	Antiatherogenic potentials of Seabuckthorn and Rhodiola in experimental animals	D.R.D.O. March 18, 2004 (Three years)	4.68 Lakhs
21.	Prof. M. Fahim (Physiology)	Bronchial reactivity in diabetic guinea pigs	I.C.M.R December 28, 2005 (Three years from September 5, 2006)	2.56 Lakhs
22.	Prof. M. Fahim (Physiology)	Regulation of pulmonary vascular tone during hypoxia induced pulmonary vasoconstriction	Life Sciences Research Board, D.R.D.O. December 13, 2006 (Three years)	14.41 Lakhs
23.	Prof. K. Ravi (Physiology)	Behaviour of pulmonary vagal sensory receptors during high altitude exposure	D.I.P.A.S. March 16, 2005 (Three years)	8.92 Lakhs
24.	Prof. K. Ravi (Physiology)	Responsiveness of airway rapidly adapting receptors to cigarette smoke inhalation in normal and sensitized rabbits	I.C.M.R. July 21, 2005 (Three years)	12.64 Lakhs
25.	Prof. K. Ravi (Physiology)	Behaviour of pulmonary vagal sensory receptors with myelinated afferents during oxidative stress induced airway hyperreactivity and its modulation by anti-oxidents in guinea pigs	D.S.T. November 08, 2005 (Three years)	23.78 Lakhs
26.	Dr V.K. Vijayan (Respiratory Medicine)	The effects of tiotropium bromide with or without inhaled fluticasone dipropionate and salmetrol on lung inflammation in bronchial asthma	Cipla Ltd. March 08, 2005 (Two years)	2.50 Lakhs
27.	Prof. S.N. Gaur (Respiratory Medicine)	Clinico-immunologic studies on allergen specific immunotherapy in patients of respiratory allergy	D.S.T. January 16, 2004 (Three years)	5.08 Lakhs
28.	Dr Raj Kumar (Respiratory Medicine)	Effect of indoor air pollution on respiratory function of children	Ministry of Environment and Forest October 07, 2003 (Four years)	20.97 Lakhs
29.	Dr Raj Kumar (Respiratory Medicine)	Tobacco Cessation Clinic at V.P. Chest Institute during the years 2006 and 2007, and conducting related activities	W.H.O. January 27, 2006 and February 05, 2007 (Two years)	4.82 Lakhs

Sl No.	Faculty Member (Department)	Title of Project	Funding Agency, Date of Sanction/Implementation and Duration	Budget (in Rs.)
30.	Dr Madhu Khanna (Respiratory Virology)	Genetic analysis of influenza virus in clinical specimens by rapid molecular techniques	D.S.T. October 01, 2003 (Three years)	18.27 Lakhs
31.	Dr Madhu Khanna (Respiratory Virology)	A combinatorial antiviral approach against influenza A virus using ribozyme and siRNA	D.B.T. March 21, 2006 (Three years)	44.53 Lakhs
32.	Dr Madhu Khanna (Respiratory Virology)	Multi-site monitoring of human influenza in India - Phase I	I.C.M.R. November 08, 2006 (One year)	12.65 Lakhs
33.	Dr Sujata K. Dass DST's SERC Fast Track Scheme for Young Scientist (Biochemistry)	A study of synthetic metalloporphyrins as potential antimalarials: *in vitro* screening and *in vivo* effects	D.S.T June 05, 2006 (Three Years)	17.00 lakhs
34.	Dr Yogesh Kumar Tyagi DST's SERC Fast Track Scheme for Young Scientist (Biochemistry)	Designing substrates specific for the acetoxy drug: protein transacetylase with a view to target functional proteins	D.S.T. June 12, 2003 (Three years)	11.94 Lakhs
35.	Dr Vinita Katiyar DST's SERC Fast Track Scheme for Young Scientist (Respiratory Allergy & Applied Immunology)	Assessment of biocontaminants from indoor environments	D.S.T. August 13, 2004 (Three years)	10.08 Lakhs
36.	Ms Seema Senior Res. Fellow *Guide:* Prof. H.G. Raj (Biochemistry)	Studies on the role of acetoxy drug: protein transacetylase of human placenta in the medication of steroid synthesis: implications in the development of therapeutic agents against hormone sensitive cancers	I.C.M.R March 28, 2006 (Two years)	1.56 Lakhs
37.	Ms Preeti Sinha Senior Res. Fellow *Guide:* Prof. Mridula Bose (Microbiology)	Systemic mycoses in a New Delhi pediatric hospital: a study of their prevalence, species spectrum of etiologic fungi, laboratory diagnostic and therapeutic aspects	I.C.M.R. October 03, 2006 (Three years)	1.54 Lakhs
38.	Mr Sujeet Kumar Senior Res. Fellow *Guide:* Dr Anuradha Chowdhary (Medical Mycology)	PCR and RFLP typing of the Indian *M. avium* strains using IS1245 insertion sequence marker.	C.S.I.R. August 01, 2001 (Five years)	6.19 Lakhs

Sl No.	Faculty Member (Department)	Title of Project	Funding Agency, Date of Sanction/Implementation and Duration	Budget (in Rs.)
39	Mr Ayanabha Chakraborti Senior Res. Fellow *Guide:* Prof. A. Ray (Pharmacology)	Studies of explore gender related difference in stress response with special emphasis on the role of nitric oxide	I.C.M.R May 29, 2006 (Three years)	1.56 Lakhs
40.	Ms Mitali Jindal Senior Res. Fellow *Guide:* Prof. M. Fahim (Physiology)	Role of free radicals in functional changes in cardiovascular regulatory mechanisms on mercury exposure in rats (*in vivo*)	I.C.M.R December 14, 2006 (Three years)	1.56 Lakhs
41.	Mr Mohd. Shahid Senior Res. Fellow *Guide:* Prof. M. Fahim (Physiology)	Remote preconditioning protect the myocardial from reperfusion injury	I.C.M.R. October 07, 2005 (Two years)	2.21 Lakhs
42.	Mr Mohammad Tauseef Senior Res. Fellow *Guide:* Prof. M. Fahim (Physiology)	Evaluation of the mechanism of action of aspirin as a cardioprotective agent in experimentally-induced hypercholesteroleic rats	I.C.M.R. October 19, 2005 (Two years)	2.34 Lakhs
43.	Ms Swati Omanwar Senior Res. Fellow *Guide:* Prof. M. Fahim (Physiology)	Role of free radicals in functional changes in cardiovascular regulatory mechanisms and vascular responsiveness on mercury exposure in rabbits	I.C.M.R. September 02, 2004 (Three years)	4.48 Lakhs
44.	Mr Vikram Srivastava Senior Res. Fellow *Guide*: Dr Madhu Khanna (Respiratory Virology)	Role of apotosis in the pathogenesis of influenza *A virus*, correlation of virological and immunological parameters: A study in human and murine model	I.C.M.R. September 11, 2003 (Four years)	5.98 Lakhs
45.	Dr Ashima Anand DST Project (Principal Investigator)	Studies on exertional breathlessness (Under development of practical applications arising from advances in visceral mechanisms *i.e.* J receptors, chemoreceptors, etc)	I.C.M.R. October 29, 2003 (Three years)	27.26 Lakhs
46.	Dr Ashima Anand DST Project (Principal Investigator)	A study of methods for reducing exertional breathlessness and increasing exercise capability	D.S.T August 30, 2006 (Three years)	37.70 Lakhs
47.	Prof. H.S. Randhawa (INSA Honorary Scientist)	*Cryptococcus neoformans:* A study of its natural habits, serotypes and reappraisal of selective isolation techniques	I.N.S.A. January 01, 2001 (Seven years)	2.75 Lakhs

Orations/Guest Lectures

Sl No.	Faculty Member	Title of Lecture	Organiser(s)	Conference, Place and Date
1.	Dr V.K. Vijayan	Hypersensitivity pneumonitis	American College of Chest Physicians, East India Chapter and the Indian Association of Sarcoidosis and Other Granulomatous Disorders	2nd Congress on Sarcoidosis and Other Granulomatous Disorders Kolkata August 26-27, 2006
2.	Dr V.K. Vijayan	Epidemiology of sleep related disorders in India	National College of Chest Physicians (India) and Indian Chest Society	National Conference on Pulmonary Diseases (NAPCON-2006) Nagpur November 1-5, 2006
3.	Dr V.K. Vijayan	Health benefits of smoking cessation	Delhi Institute of Pharmaceutical Sciences & Research	International Symposium on Recent Trends in Cardiovascular Sciences- Global Conference on Heart Diseases New Delhi February 14-15, 2007
4.	Prof. M. Fahim	Cardiovascular regulation in health and disease	University of Calicut	Frontier Lecture Series Calicut September 15, 2006
5.	Prof. M. Fahim	Laboratory work vital part of course in physiology	Defence Institute of Physiology & Allied Sciences	4th Congress of Federation of Indian Physiological Society (FIPS) Delhi January 11-13, 2007
6.	Prof. M. Fahim	Neural regulatory cardiovascular functions in health and disease	Delhi Institute of Pharmaceutical Sciences and Research	International Symposium on Recent Trends in Cardiovascular Sciences- Global Conference on Heart Diseases New Delhi February 14-15, 2007
7.	Prof. M.K. Agarwal	Allergy and immunology – basics insect allergy	National College of Chest Physicians (India) and Indian Chest Society	National Conference on Pulmonary Diseases (NAPCON-2006) Nagpur November 1-5, 2006

Sl No.	Faculty Member	Title of Lecture	Organiser(s)	Conference, Place and Date
8.	Prof. M.K. Agarwal	Basic immune response	Indian College of Allergy, Asthma & Applied Immunology and Association of Chest Physicians of Punjab	40th Annual Convention of the Indian College of Allergy, Asthma & Applied Immunology Jalandhar December 7-10, 2006
9.	Prof. S.N. Gaur	Dr Mohd. Abu Moezuddin Oration titled, "Difficult asthma"	Indian Medical Association (Uttar Pradesh Chapter)	Annual Conference of the Indian Medical Association (Uttar Pradesh Chapter) Allahabad September 17, 2006
10.	Prof. S.N. Gaur	Present and future aspects of allergen immunotherapy in respiratory diseases	Foundation for Chest, Critical Care and Sleep (FCCS)	2nd National Symposium on Pulmonology, Critical Care & Sleep Medicine - the 'CHEST SUMMIT - 2006' India Habitat Centre and Hotel Hyatt Regency New Delhi October 12-15, 2006
11.	Prof. S.N. Gaur	Hypersensitivity pneumonitis Chaired sessions on • Asthma • Interstitial lung diseases	National College of Chest Physicians (India) and Indian Chest Society	National Conference on Pulmonary Diseases (NAPCON-2006) Nagpur November 1-5, 2006
12.	Prof. S.N. Gaur	Management of bronchial asthma	Maulana Azad Medical College	Conference of National Medical Forum (GPCON-2006) New Delhi November 18, 2006
13.	Prof. S.N. Gaur	Allergen immunotherapy in asthma	Department of Chest Diseases and Tuberculosis, J.L.N. Medical College	6th RAJCON – 1st Midterm Chestcon-West India-2006 Ajmer December 1-3, 2006
14.	Prof. S.N. Gaur	Hypersensitivity pneumonitis	Department of Respiratory Medicine, Army Hospital R & R, Delhi Cantt.	Pulmonary Update – 2006 New Delhi December 3, 2006

Sl No.	Faculty Member	Title of Lecture	Organiser(s)	Conference, Place and Date
15.	Prof. S.N. Gaur	Key note address on Immuno-therapy in IgE mediated respiratory diseases – present and future	Indian College of Allergy, Asthma & Applied Immunology and Association of Chest Physicians of Punjab	40th Annual Convention of the Indian College of Allergy, Asthma & Applied Immunology Jalandhar December 7-10, 2006
16.	Prof. S.N. Gaur	Ranbaxy Robert Koch Oration titled, "Update on asthma management" Pulmonary rehabilitation in COPD	Department of Tuberculosis and Respiratory Diseases, R.N.T. Medical College	61st Annual Conference on Tuberculosis & Chest Diseases (NATCON-2006) Udaipur February 23-25, 2007
17.	Prof. A. Ray	Experimental and clinical studies on the role of nitric oxide (NO) in immunity and infection.	International Union of Basic and Clinical Pharmacology (IUPHAR)	IUPHAR Satellite Meeting on New Drug Discovery and Development Xian, China July 8-11, 2006
18.	Prof. A. Ray	Adverse drug reactions in respiratory medicine : an overview	Society of Pharmacovigilance (India) and M.S. Ramaiah Memorial Hospital	Pharmacovigilance and Drug Safety Conference 2006 Bangalore November 11-12, 2006
19.	Prof. A. Ray	Adverse drug reactions and pharmacovigilance : definitions and basic concepts	B.Y.L. Nair Hospital and World Health Organization	Update in Ayurveda Mumbai November 20-21, 2006
20.	Prof. A. Ray	Studies on the role of nitric oxide (NO) and health and disease	Indian Pharmacological Society and S.M.S. Medical College	39th Annual Conference of the Indian Pharmacological Society Jaipur December 21-23, 2006
21.	Prof. A. Ray	Signal detection and phamacovigilance	Lady Harding Medical College	Symposium on Pharmacovigilance New Delhi March 14, 2007
22.	Prof. Mridula Bose	Significance and relevance of molecular markers in MDR-TB	Indian Association of Medical Microbiologists (Delhi Chapter) and L.R.S. Institute of Tuberculosis and Respiratory Diseases	Annual Meeting of Indian Association of Medical Microbiologists New Delhi December 9, 2006

Sl No.	Faculty Member	Title of Lecture	Organiser(s)	Conference, Place and Date
23.	Prof. Ashok Shah	• Allergic bronchopulmonary aspergillosis • Smoking and tuberculosis • Sarcoidosis	Pakistan Chest Society	Annual Conference of the Pakistan Chest Society Karachi, Pakistan April 19-21, 2006
24.	Prof. Ashok Shah	• Asthma and allergy in Delhi, India • *Aspergillus* and allergy	Department of Otolaryngology, Yong Loo Lin School of Medicine	1st GA²LEN-PAO Meeting of the National University of Singapore Singapore July 26-27, 2006
25.	Prof. Ashok Shah	• Confusing nomenclatures-ATS/ERS classification and beyond • Sarcoidosis: local scenario	American College of Chest Physicians, East India Chapter and the Indian Association of Sarcoidosis and Other Granulomatous Disorders	2nd Congress on Sarcoidosis and Other Granulomatous Disorders Kolkata August 26-27, 2006
26.	Prof. Ashok Shah	Allergic bronchopulmonary aspergillosis	L.R.S. Institute of Tuberculosis and Respiratory Diseases	L.R.S. Institute of Tuberculosis and Respiratory Diseases New Delhi September 29, 2006
27.	Prof. Ashok Shah	Sarcoidosis: treatment issues	Department of Pulmonary Medicine, Postgraduate Institute of Medical Education and Research	21st Update on Pulmonary and Critical Care Medicine: Interstitial and Diffuse Parenchymal Lung Diseases Chandigarh October 8, 2006
28.	Prof. Ashok Shah	Sarcoidosis and tuberculosis: an enigma	Yugoslav Association of Sarcoidosis and Medical Faculty, University of Belgrade	VII Sarcoidosis Conference: Advances in the Management of Sarcoidosis and Interstitial Lung Diseases Serbia, Belgrade October 13-14, 2006
29.	Prof. Ashok Shah	Sarcoidosis: the presentation in India	National College of Chest Physicians (India) and Indian Chest Society	National Conference on Pulmonary Diseases (NAPCON-2006) Nagpur November 1-5, 2006

Sl No.	Faculty Member	Title of Lecture	Organiser(s)	Conference, Place and Date
30.	Prof. Ashok Shah	Tobacco : A death trap	Environment Club of the Acharya Narendra Dev College, University of Delhi	Acharya Narendra Dev College Delhi November 17, 2006
31.	Prof. Ashok Shah	• Medical literature search • Sarcoidosis: the presentation in India	Department of Chest Diseases and Tuberculosis, J.L.N. Medical College	6th RAJCON – 1st Midterm Chestcon-West India-2006 Ajmer December 1-3, 2006
32.	Prof. Ashok Shah	Asthma, rhinitis, and sinusitis: current concepts	Department of Respiratory Medicine, Army Hospital R & R, Delhi Cantt.	Pulmonary Update – 2006 New Delhi December 3, 2006
33.	Prof. Ashok Shah	*Aspergillus* and allergy	Indian College of Allergy, Asthma & Applied Immunology and Association of Chest Physicians of Punjab	40th Annual Convention of the Indian College of Allergy, Asthma & Applied Immunology Jalandhar December 7-10, 2006
34.	Prof. Ashok Shah	Smoking and tuberculosis	Department of Tuberculosis and Respiratory Diseases, R.N.T. Medical College	61st Annual Conference on Tuberculosis & Chest Diseases (NATCON-2006) Udaipur February 23-25, 2007
35.	Prof. S.K. Chhabra	Spirometry	Foundation for Chest, Critical Care and Sleep (FCCS)	2nd National Symposium on Pulmonology, Critical Care & Sleep Medicine - the 'CHEST SUMMIT - 2006' India Habitat Centre and Hotel Hyatt Regency New Delhi October 12-15, 2006
36.	Prof. S.K. Chhabra	Lung function in interstitial lung diseases	National College of Chest Physicians (India) and Indian Chest Society	National Conference on Pulmonary Diseases (NAPCON-2006) Nagpur November 1-5, 2006

Sl No.	Faculty Member	Title of Lecture	Organiser(s)	Conference, Place and Date
37.	Prof. S.K. Chhabra	COPD: current guidelines and approach to management	Department of Respiratory Medicine, Army Hospital R & R, Delhi Cantt.	Pulmonary Update – 2006 New Delhi December 3, 2006
38.	Prof. S.K. Chhabra	Air pollution in Delhi	Toxic Links and India International Centre	Symposium on Air Pollution During Winter in Delhi New Delhi December 19, 2006
39.	Prof. K. Ravi	R.S. Sinha Memorial Oration 2006 titled, "Unravelling the natural stimulus for airway rapidly adapting receptors – a unifying theory"	Annamalai University	94th Indian Science Congress Annamalai, Taminadu January 3-7, 2007
40.	Dr Anita Kotwani	Prices, availability and affordability of essential medicines in diferent states of India	Drug Policy Research Group, Department of Ambulatory Care and Prevention, Harvard Medical School and Harvard Pilgrim Health Care	Pharmaceutical Policy Fellowship Seminar Boston, U.S.A May 17, 2006
41.	Dr Anita Kotwani	Making medicines affordable and accessible	Indian Pharmacological Society (Gujrat Chapter)	Symposium–Making Medicines Consumer Friendly Ahmedabad October 1, 2006
42.	Dr Anita Kotwani	Field-testing a methodology to determine if the price a patient pays for a medicine differs from the price collected by a data collector in retail pharmacies, Delhi experience	World Health Organization-Health Action International	WHO-HAI Medicine Price Project Meeting Cairo November 28, 2006
43.	Dr Raj Kumar	Smoking cessation	Foundation for Chest, Critical Care and Sleep (FCCS)	2nd National Symposium on Pulmonology, Critical Care & Sleep Medicine - the 'CHEST SUMMIT - 2006' India Habitat Centre and Hotel Hyatt Regency New Delhi October 12-15, 2006
44.	Dr Anuradha Chowdhary	Molerulcar typing of fungal pathogens	Government Medical College Hospital	IX National Conference of Hospital Infection Society of India Chandigarh February 16-18, 2007

Sl No.	Faculty Member	Title of Lecture	Organiser(s)	Conference, Place and Date
45.	Dr Madhu Khanna	Inhibitory effect of zinc on influenza A virus induced programmed cell death in cultured cells	Department of Microbiology, Indian Agricultural Research Institute	Indian Agricultural Research Institute New Delhi October 9, 2006
46.	Dr Balakrishnan Menon	Picture archiving and communication systems (PACS) in VPCI	V.P.C.I. University of Delhi	National Symposium on Thoracic Imaging on the eve of 57 Foundation Day of V.P.C.I. Delhi April 5, 2006
47.	Dr Balakrishnan Menon	Respiratory effects of smoking	V.P.C.I. University of Delhi	World No Smoking Day Delhi May 31, 2006
48.	Dr Balakrishnan Menon	Interstitial lung disease: diagnosis and management	The Punjab Chest Association (Amritsar Branch)	Update on ILD Hotel Jaypee Amritsar October 15, 2006
49.	Dr Balakrishnan Menon	Picture archiving and communication systems (PACS) and its role in hospitals	Tuberculosis Research Centre	Tuberculosis Research Centre Chennai September 14, 2006
50.	Dr Balakrishnan Menon	Non allergic rhinitis	Indian College of Allergy, Asthma & Applied Immunology and Association of Chest Physicians of Punjab	40th Annual Convention of the Indian College of Allergy, Asthma & Applied Immunology Jalandhar December 7-10, 2006
51.	Dr Kavita Gulati	Differential neuromodulatory roles of nitric oxide in anxiety and seizures	International Union of Basic and Clinical Pharmacology (IUPHAR)	IUPHAR Satellite Meeting on New Drug Discovery and Development Xian, China July 8-11, 2006
52.	Dr Kavita Gulati	A study to monitor adverse drug reactions of theophylline in patients of obstructive airway disease	Society of Pharmacovigilance (India) and M.S. Ramaiah Memorial Hospital	Pharmacovigilance and Drug Safety Conference 2006 Bangalore November 11-12, 2006
53.	Dr Kavita Gulati	A clinical study to assess the possible protective role of Livina against antitubercular drug induced hepatotoxicity in patients of pulmonary tuberculosis	V.P.C.I. University of Delhi	International Symposium on Herbal Drug Research and Therapy Delhi December 8-10, 2006

Conferences/Symposia/Seminars/Workshops/CMEs

Sl No.	Participant	Role/Topic	Organiser(s)	Name, Venue and Date
1.	Dr V.K. Vijayan	Chaired a session on Imaging of single pulmonary nodule and chest tuberculosis	V.P.C.I. University of Delhi	National Symposium on Thoracic Imaging on the eve of 57 Foundation Day of V.P.C.I. Delhi April 5, 2006
2.	Dr V.K. Vijayan	Chaired a session on ILD – Definition, pathogenesis and classification	V.P.C.I. University of Delhi	6th CME: National Update on Interstitial Lung Disease Delhi April 23, 2006
3.	Dr V.K. Vijayan	Lecture on: Tobacco- the giant killer	World Lung Foundation, South Asia	CME on Tuberculosis and Lung Health New Delhi April 29, 2006
4.	Dr V.K. Vijayan	Chaired the "Arnold Naimark Feature Symposium"	National Research Forum for Young Investigators in Circulatory and Respiratory Health	Arnold Naimark Feature Symposium Winnipeg, Manitoba, Canada May 4-7, 2006
5.	Dr V.K. Vijayan	Chaired a session on General thoracic surgery	Association of Thoracic and Cardiovascular Surgeons of India and Mata Chanan Devi Hospital	Midterm CME New Delhi July 27, 2006
6.	Dr V.K. Vijayan	Chairman of the panel discussion on "Re-emergence of methyl xanthines	Dr Reddy's Laboratory Ltd	Symposium on Re-emergence of Methyl Xanthines New Delhi August 9, 2006
7.	Dr V.K. Vijayan	Patron Chaired a session on Sarcoidosis	American College of Chest Physicians, East India Chapter and the Indian Association of Sarcoidosis and Other Granulomatous Disorders	2nd Congress on Sarcoidosis and Other Granulomatous Disorders Kolkata August 26-27, 2006
8.	Dr V.K. Vijayan	Chairman, Symposium on Sarcoidosis	Postgraduate Institute of Medical Education and Research	21st Annual Update on Pulmonary and Critical Care Medicine (Interstitial & Diffuse Parenchymal Lung Diseases) Chandigarh October 8, 2006

Sl No.	Participant	Role/Topic	Organiser(s)	Name, Venue and Date
9.	Dr V.K. Vijayan	Lecture on: Pulmonary function tests: principles and methods	V.P.C.I. University of Delhi and Institute of Genomics & Integrative Biology	33rd Workshop on Respiratory Allergy: Diagnosis and Management Delhi October 9-14, 2006
10.	Dr V.K. Vijayan	Presented a paper on: Prevalence of obstructive sleep apnea syndrome (OSAS) in Delhi	American College of Chest Physicians	72nd Annual Scientific Conference of the American College of Chest Physicians (Chest 2006) Salt Lake City, Utah, USA October 21-26, 2006
11.	Dr V.K. Vijayan	Participated in the Editorial Board Meeting of the Journal "Chest"	American College of Chest Physicians	Editorial Board Meeting of the Journal "Chest" Salt Lake City, Utah, USA October 23, 2006
12.	Dr V.K. Vijayan	Chaired sessions on • State-of-the-art • COPD • Cough	National College of Chest Physicians (India) and Indian Chest Society	National Conference on Pulmonary Diseases (NAPCON-2006) Nagpur November 1-5, 2006
13.	Dr V.K. Vijayan	Member, Advisory Board	Association of Carbohydrate Chemists and Technologists of India (ACCTI) and Department of Chemistry, University of Delhi	XXI Carbohydrate Conference "Carbo XXI" Delhi November 26-29, 2006
14.	Dr V.K. Vijayan	Member, Advisory Committee	Dr B.R. Ambedkar Centre for Biomedical Research, University of Delhi	VII Annual Symposium on "Frontiers in Biomedical Research" Delhi November 30 - December 2, 2006
15.	Dr V.K. Vijayan	Advisor	Indian College of Allergy, Asthma & Applied Immunology and Association of Chest Physicians of Punjab	40th Annual Convention of the Indian College of Allergy, Asthma & Applied Immunology Jalandhar December 7-10, 2006

Sl No.	Participant	Role/Topic	Organiser(s)	Name, Venue and Date
16.	Dr V.K. Vijayan	Chaired a session on Current status of herbal drug research	V.P.C.I. University of Delhi	International Symposium on Herbal Drug Research and Therapy Delhi December 8-10, 2006
17.	Dr V.K. Vijayan	Participated in a teleconferencing session on Treatment of pulmonary tuberculosis	National Board of Examinations	Teleconferencing Session of the National Board of Examinations for the DNB Students New Delhi December 23, 2006
18.	Dr V.K. Vijayan	Chaired a session on Lung volume reduction procedures – a hope for advanced emphysema	Indian Association for Bronchology	12th Annual Conference of the Indian Association for Bronchology Kolkata January 5-7, 2007
19.	Dr V.K. Vijayan	Chaired a session on Endo-ultrasound (EUS) in thoracic diseases	Sir Ganga Ram Hospital	Live Endoultrasound Workshop – ENDOCON-2007 New Delhi February 10-11, 2007
20.	Prof. H.G. Raj	Member, Organising Committee	Association of Carbohydrate Chemists and Technologists of India (ACCTI) and Department of Chemistry, University of Delhi	XXI Carbohydrate Conference "Carbo XXI" Delhi November 26-29, 2006
21.	Prof. M. Fahim	Chaired a session on Neural plasticity	All India Institute of Medical Sciences	National Symposium on "Neural Plasticity and Repair" and Workshop on "Evaluation of Plasticity in Pain" New Delhi October 18-19, 2006
22.	Prof. M. Fahim	Chaired a session on Evaluation of cardiovascular drugs	Delhi Institute of Pharmaceutical Sciences and Research	International Symposium on "Recent Advances in Cardiovascular Sciences" (RACS) "Global Conference on Heart Diseases" Delhi February 14-15, 2007
23.	Prof. M.K. Agarwal	Chaired a session on Medical biotechnology	Institute of Home Economics in collaboration with Department of Microbiology, University of Delhi	UGC sponsored Symposium on Biotechnology: The Emerging Scenario in Indian Society Delhi December 21-22, 2006

Sl No.	Participant	Role/Topic	Organiser(s)	Name, Venue and Date
24.	Prof. M.K. Agarwal	Lecture on : Environment and health	Centre for Professional Development in Higher Education, School of Environmental Studies, University of Delhi	Refresher Course on Environmental Studies for College and University Teachers Delhi February 16, 2007
25.	Prof. M.K. Agarwal	IgE mediated Type I immune response in allergic respiratory diseases	Amity Institute of Microbial Sciences, Amity University	Seminar-cum-Workshop on Application of Nanotechnology in Microbial and Hebal Product Development Noida March 23-25, 2007
26.	Prof. S.N. Gaur	Chaired a session on Radiographic manifestations of lung malignancies and diagnostic and therapeutic interventions in the chest	V.P.C.I. University of Delhi	National Symposium on Thoracic Imaging on the eve of 57 Foundation Day of V.P.C.I. Delhi April 5, 2006
27.	Prof. S.N. Gaur	Chaired a session on Physiology, radiology and bronchoscopy in ILD	V.P.C.I. University of Delhi	6th CME: National Update on Interstitial Lung Disease Delhi April 23, 2006
28.	Prof. S.N. Gaur	Lectures on: • Clinical aspects of respiratory allergic disorders • Clinical demonstration of skin testing in allergic patients - methods and interpretation • Allergen immunotherapy - an overview • Management of difficult asthma	V.P.C.I. University of Delhi and Institute of Genomics & Integrative Biology	33rd Workshop on Respiratory Allergy: Diagnosis and Management Delhi October 9-14, 2006
29.	Prof. S.N. Gaur	Chaired sessions on • Clinical case presentation • Drug resistant TB	Foundation for Chest, Critical Care and Sleep (FCCS)	2nd National Symposium on Pulmonology, Critical Care & Sleep Medicine - the 'CHEST SUMMIT - 2006' India Habitat Centre and Hotel Hyatt Regency New Delhi October 12-15, 2006

Sl No.	Participant	Role/Topic	Organiser(s)	Name, Venue and Date
30.	Prof. S.N. Gaur	National Advisor Chaired sessions on • Asthma • Interstitial lung diseases	National College of Chest Physicians (India) and Indian Chest Society	National Conference on Pulmonary Diseases (NAPCON-2006) Nagpur November 1-5, 2006
31.	Prof. S.N. Gaur	Chaired a session on COPD and pulmonary infections	Department of Chest Diseases and Tuberculosis, J.L.N. Medical College	6th RAJCON – 1st Midterm Chestcon-West India-2006 Ajmer December 1-3, 2006
32.	Prof. S.N. Gaur	Member, Organizing Comittee Chaired a session on Basics of immunology	Indian College of Allergy, Asthma & Applied Immunology and Association of Chest Physicians of Punjab	40th Annual Convention of the Indian College of Allergy, Asthma & Applied Immunology Jalandhar December 7-10, 2006
33.	Prof. S.N. Gaur	Chaired a session on Role of bronchoscopy in staging of lung cancer	Sir Ganga Ram Hospital	CME on Thoraco-pulmonary Diseases – Converging Viewpoints New Delhi January 6, 2007
34.	Prof. S.N. Gaur	Chaired a session on Live demonstration of endoultrasound in lung workshop	Sir Ganga Ram Hospital	Live Endoultrasound Workshop – ENDOCON-2007 New Delhi February 10-11, 2007
35.	Prof. S.N. Gaur	Moderator, Symposium on COPD	Department of Tuberculosis and Respiratory Diseases, R.N.T. Medical College	61st Annual Conference on Tuberculosis & Chest Diseases (NATCON-2006) Udaipur February 23-25, 2007
36.	Prof. S.S. Thukral	Presented a paper on Idetification and characterisation of extended spectrum β-lactamases in clinical isolates of *E. coli*	Ministry of Health, Sultanate of Oman	2nd International Congress on Infectious Diseases Muscat December 4-7, 2006
37.	Prof. A. Ray	Lecture on: Experimental studies on the adaptogenic and immunomodulatory properties of neem leaf extract : possible therapeutic implications	Institute of Nuclear Medicine and Allied Sciences	CME on Herbs for Health: Application in Armed Forces Delhi October 30 - November 3, 2006

Sl No.	Participant	Role/Topic	Organiser(s)	Name, Venue and Date
38.	Prof. A. Ray	Member, National Advisory Committee	Indian Pharmacological Society and S.M.S. Medical College	39th Annual Conference of the Indian Pharmacological Society Jaipur December 21-23, 2006
39.	Prof. Ashok Shah	Chaired scientific sessions on • Functional imaging of ventilation by MRI • Virtual bronchoscopy & 3D imaging of thorax	V.P.C.I. University of Delhi	National Symposium on Thoracic Imaging on the eve of 57 Foundation Day of V.P.C.I. Delhi April 5, 2006
40.	Prof. Ashok Shah	Chaired scientific sessions on • Tuberculosis • Interstitial lung diseases	Pakistan Chest Society	Annual Conference of the Pakistan Chest Society Karachi, Pakistan April 19-21, 2006
41.	Prof. Ashok Shah	Chaired sessions on • IPF: diagnosis and management • Diagnosis of ILD - Indian perspective and our problems • Drug induced ILD	V.P.C.I. University of Delhi	6th CME: National Update on Interstitial Lung Disease Delhi April 23, 2006
42.	Prof. Ashok Shah	Lectures on: COPD – a neglected disease Chaired a session on Looking beyond asthma	Delhi Medical Association	CME on Recent Advances in Asthma and COPD Hotel City Park, Pitampura Delhi May 28, 2006
43.	Prof. Ashok Shah	Chaired the main symposium on Air pollution and aerobiology Presented a paper on Occurrence of sinusitis in patients with bronchial asthma and/or allergic rhinitis	European Academy of Allergology and Clinical Immunology (EAACI)	XXV Congress of the European Academy of Allergology and Clinical Immunology (EAACI), Vienna, Austria June 10-14, 2006
44.	Prof. Ashok Shah	Member, Organising Committee Chaired a session on Diffuse parenchymal lung diseases: general aspects	American College of Chest Physicians, East India Chapter and the Indian Association of Sarcoidosis and Other Granulomatous Disorders	2nd Congress on Sarcoidosis and Other Granulomatous Disorders Kolkata August 26-27, 2006

Sl No.	Participant	Role/Topic	Organiser(s)	Name, Venue and Date
45.	Prof. Ashok Shah	Lectures on: • Allergic rhinitis – diagnosis and management • Self-mangement and patient education in bronchial asthma • Allergic bronchopulmonary aspergillosis	V.P.C.I. University of Delhi and Institute of Genomics & Integrative Biology	33rd Workshop on Respiratory Allergy: Diagnosis and Management Delhi October 9-14, 2006
46.	Prof. Ashok Shah	Chaired a session on Update in bronchoscopy	Sir Ganga Ram Hospital and Sun Pharmaceuticals	Update in Bronchoscopy Hotel Hans Plaza New Delhi November 18, 2006
47.	Prof. Ashok Shah	Chaired a session on Does lung cancer staging influence treatment	Sir Ganga Ram Hospital	CME on Thoraco-Pulmonary diseases : Converging Viewpoints New Delhi January 6, 2007
48.	Prof. Ashok Shah	Chaired a session on Live demonstration	Sir Ganga Ram Hospital	Live Endoultrasound Workshop – ENDOCON-2007 New Delhi February 10-11, 2007
49.	Prof. Ashok Shah	Participated in a panel discussion on Bronchial asthma	Department of Tuberculosis and Respiratory Diseases, R.N.T. Medical College	61st Annual Conference on Tuberculosis & Chest Diseases (NATCON-2006) Udaipur February 23-25, 2007
50.	Prof. S.K. Chhabra	Chaired a session on CT in respiratory diseases	V.P.C.I. University of Delhi	National Symposium on Thoracic Imaging on the eve of 57 Foundation Day of V.P.C.I. Delhi April 5, 2006
51.	Prof. S.K. Chhabra	Lecture on: Symptoms and signs in interstitial lung diseases pathophysiology of COPD	V.P.C.I. University of Delhi	6th CME: National Update on Interstitial Lung Disease Delhi April 23, 2006
52.	Prof. S.K. Chhabra	Chaired a session on Balloon brochoplasty and tracheao-bronchial stenting	Max Superspeciality Hospital	CME on Pulmonology – Interventional Bronchoscopy New Delhi September 30, 2006

Sl No.	Participant	Role/Topic	Organiser(s)	Name, Venue and Date
53.	Prof. S.K. Chhabra	Course Director: Workshop on pulmonary function tests	Foundation for Chest, Critical Care and Sleep (FCCS)	2nd National Symposium on Pulmonology, Critical Care & Sleep Medicine - the 'CHEST SUMMIT - 2006' India Habitat Centre and Hotel Hyatt Regency New Delhi October 12-15, 2006
54.	Prof. S.K. Chhabra	Lectures on: • Epidemiology and pharmacological treatment of bronchial asthma; pulmonary function testing demonstration • Management of asthma in special situations	V.P.C.I. University of Delhi and Institute of Genomics & Integrative Biology	33rd Workshop on Respiratory Allergy: Diagnosis and Management Delhi October 9-14, 2006
55.	Prof. S.K. Chhabra	Organised workshop on Lung function tests and delivered a lecture on spirometry	National College of Chest Physicians (India) and Indian Chest Society	National Conference on Pulmonary Diseases (NAPCON-2006) Nagpur November 1-5, 2006
56.	Prof. S.K. Chhabra	Lecture on: Spirometry (in the post conference workshop)	V.P.C.I. University of Delhi	International Conference on Cardiopulmonary Regulation in Health and Disease: Molecular and Systemic Integration Delhi February 22-24, 2007
57.	Prof. K. Ravi	Chaired a session on Clinical research with herbal drugs	V.P.C.I. University of Delhi	International Symposium on Herbal Drug Research and Therapy Delhi December 8-10, 2006
58.	Prof. K. Ravi	Chaired a session on Medical curriculam	Defence Institute of Physiology & Allied Sciences	4th Congress of Federation of Indian Physiological Society (FIPS) Delhi January 11-13, 2007
59.	Prof. S.K. Bansal	Member, Organising Committee	Biotechnology Society of India and Centre for Cellular and Molecular Biology	4th Annual Conference of the Biotechnology Society of India, Biotech-2006: Over Expression Systems and Challenges Hyderabad November 26-28, 2006

Sl No.	Participant	Role/Topic	Organiser(s)	Name, Venue and Date
60.	Prof. S.K. Bansal	Organising Secretary	Biotechnology Society of India	11th Foundation Day Lecture on "Issues, problems and progress in the development of an AIDS vaccine" (by Dr. Shahid Jameel, ICGEB, New Delhi) V.P.C.I., Delhi January 9, 2007
61.	Dr Anita Kotwani	Presented papers on • A standardised methodology to measure medicine prices, availability, affordability and price components in developing and transitional countries • Medicine prices, availability and affordability in Rajasthan, India	International Society for Pharmacoeconomics and Outcome Research (ISPOR)	Eleventh ISPOR Conference Philadelphia, U.S.A. May 20-24, 2006
62.	Dr Raj Kumar	Chaired a session on PET scanning and digital radiography and PACS	V.P.C.I. University of Delhi	National Symposium on Thoracic Imaging on the eve of 57 Foundation Day of V.P.C.I. Delhi April 5, 2006
63.	Dr Raj Kumar	Lecture on: Diagnosis and management of food allergy including transgenic(GMF) Clinical demonstration on skin testing	V.P.C.I. University of Delhi and Institute of Genomics & Integrative Biology	33rd Workshop on Respiratory Allergy: Diagnosis and Management Delhi October 9-14, 2006
64.	Dr Anuradha Chowdhary	Presented a poster on Incorporation of fluconazole in peptone glucose agar yields rapid and enhanced isolation of *Aspergillus fumigatus* from respiratory tract of bronchopulmonary aspergillosis patients colonized by *Candida albicans*	International Society for Human and Animal Mycology (ISHAM)	The 16th Congress of the International Society for Human and Animal Mycology Paris, France June 25-29, 2006
65.	Dr Madhu Khanna	Presented a paper on Inhibitory effect of zinc on influenza A virus induced programmed cell death in cultured cells	All India Institute of Medical Sciences	7th Congress of Asia-Pacific Congress of Medical Virology APCMV -2006 India Habitat Centre New Delhi November 13-15, 2006

Sl No.	Participant	Role/Topic	Organiser(s)	Name, Venue and Date
66.	Dr Madhu Khanna	Presented a poster on Transforming growth factor- β1 modulator of nitric oxide synthase induced inflammation during experimental influenza virus infection in mice	Department of Biochemistry, All India Institute of Medical Sciences	33rd Immunology Society Conference (IMMCON–2007) New Delhi January 28-31, 2007
67.	Dr Balakrishnan Menon	Chaired a session on Definition, pathogenesis classification of ILD	V.P.C.I. University of Delhi	6th CME: National Update on Interstitial Lung Disease Delhi April 23, 2006
68.	Dr Balakrishnan Menon	Lecture on: MDR-TB: the Indian scenario	Delhi State TB Association	CME on MDR-TB New Delhi August 8, 2006
69.	Dr Balakrishnan Menon	Chaired a session on Pediatrc echocardiography	Cardiology Department, Sunder Lal Jain Hospital	XIV Comprehenshive Course on Echocardiography Delhi October 1-6, 2006
70.	Dr Balakrishnan Menon	Conducted clinical demonstrations and skin testing	V.P.C.I. University of Delhi and Institute of Genomics & Integrative Biology	33rd Workshop on Respiratory Allergy: Diagnosis and Management Delhi October 9-14, 2006
71.	Dr Balakrishnan Menon	Presented a paper on Clinico-immunologic investigations on mosquito (*Culex quinquefasciatus*) allergy in India	The Korean Academy of Asthma, Allergy and Clinical Immunology (KAAACI) and World Allergy Organization (WAO) Joint Congress 2006 and the 9th West Pacific Allergy Symposium (WPAS)	KAAACI – WAO Joint Congress and 9th WPAS Grand Hilton Seoul, Seoul, South Korea November 3-5, 2006
72.	Dr Balakrishnan Menon	Lecture on: HIV and TB	Delhi State TB Association and Babu Jagjijivan Ram Hospital	CME on Tuberculosis New Delhi March 24, 2007
73.	Dr Mandira Varma	Presented a poster on Drug resistance profiling and molecular typing of *Mycobacterium tuberculosis* isolates from a DOTS center and a non-DOTS center in North Delhi	Indian Association of Medical Microbiologists (Delhi Chapter) and L.R.S. Institute of Tuberculosis and Respiratory Diseases	Annual Meeting of Indian Association of Medical Microbiologists (Delhi Chapter) New Delhi December 9, 2006

Sl No.	Participant	Role/Topic	Organiser(s)	Name, Venue and Date
74.	Dr Kavita Gulati	Presented a poster on Studies on the mechanisms of anxiolytic and neuroprotective effects of melatonin in rats	University of Pittsburgh Schools of the Health Sciences	6th International Congress of Neuroendocrinology Pittsburgh, Pennsylvania, U.S.A. June 19-22, 2006
75.	Dr Kavita Gulati	Presented a paper on Experimental studies on the modulatory role of nitric oxide in stress susceptibility and adaptation	International Union of Pharmacology and Chinese Pharmacological Society	15th World Conference of International Union of Pharmacologists Beijing International Convention Center China July 2-7, 2006
76.	Dr Kavita Gulati	Lecture on: Clinical and experimental studies on adverse drug reactions of theophyline	All India Institute of Medical Sciences	Symposium cum Workshop on Therapeutic Drug Monitoring for Better Therapeutics and Drug Development New Delhi February 2-3, 2007
77.	Dr Ritu Kulshrestha	Presented a poster on Transbronchial lung biopsy in diffuse cystic lung lesions – a diagnostic dilemma, report of two cases	Indian Association of Pathologists and Microbiologists and National Institute of Mental Health and Neurosciences	APCON 2006 – 55th Annual Conference of Indian Association of Pathologists and Microbiologists Bangalore December 7-9, 2006
78.	Dr Amit Diwakar (MD Student) *Guide: Prof. S.N. Gaur*	Presented a paper on A case of cavitating lung lesion	National College of Chest Physicians (India) and Indian Chest Society	National Conference on Pulmonary Diseases (NAPCON-2006) Nagpur November 1-5, 2006
79.	Dr Vinita Katiyar DST's SERC Fast Track Scheme for Young Scientist (Respiratory Allergy & Applied Immunology)	Presented a poster on Measurement of indoor biocontaminants: a tool to judge indoor environment inequalities.	New Castle University (UK)	ESRC / NERC Transdisciplinary Seminar Series New Castle University (UK) January 16-17, 2007

Sl No.	Participant	Role/Topic	Organiser(s)	Name, Venue and Date
80.	Ms Shwetambri Arora (PhD Student) *(Guide: Prof. H.G. Raj)*	Presented a poster on Calreticulin transacetylase mediated nitric oxide synthase independent enhancement of NO levels in human platelets by polyphenolic acetates	William Bill Sessa, Chair, Gordon Research Committee	Nitric Oxide Conference Ventura California, U.S.A. February 4-9, 2007
81.	Ms Prachi Gupta (PhD Student) *(Guide: Prof. S.K. Bansal)*	Presented a paper on Changes in the composition of lipids representing lipid rafts in erythrocyte membrane of asthmatic patients	V.P.C.I., University of Delhi	International Conference on Cardiopulmonary Regulation in Health and Disease: Molecular and Systemic Integration Delhi February 22-24, 2007
82.	Ms Maansi Vermani (PhD Student) *(Guide: Prof. M.K. Agarwal)*	Presented a poster on Effect of Azelastine nasal spray on histamine and allergen induced skin wheal response in patients with allergic rhinitis	All India Institute of Medical Sciences	33rd Indian Immunology Society Conference (IMMCON-2007) New Delhi January 28-31, 2007
83.	Ms Maansi Vermani (PhD Student) *(Guide: Prof. M.K. Agarwal)*	Presented a poster on Specific immune response in patients suffering with respiratory allergic diseases to male and female cockroach allergens: identification of 'major' & 'minor' allergens and heterogeneity patients' immune response	V.P.C.I., University of Delhi	International Conference on Cardiopulmonary Regulation in Health and Disease: Molecular and Systemic Integration Delhi February 22-24, 2007
84.	Mr Mohd. Adnan Kausar (PhD Student) *(Guide: Prof. M.K. Agarwal)*	Presented a poster on Immunochemical analysis of mosquito allergens including studies on shared/specific allergenic components in three mosquito species with worldwide distribution	All India Institute of Medical Sciences	33rd Indian Immunology Society Conference (IMMCON-2007) January 28-31, 2007
85.	Mr Mohd. Adnan Kausar (PhD Student) *(Guide: Prof. M.K. Agarwal)*	Presented a poster on Etiologic agents in allergic respiratory diseases: allergenic significance of housefly, its immuno-chemical quantification in the air and identification of major and minor allergens	V.P.C.I., University of Delhi	International Conference on Cardiopulmonary Regulation in Health and Disease: Molecular and Systemic Integration Delhi February 22-24, 2007

Sl No.	Participant	Role/Topic	Organiser(s)	Name, Venue and Date
86.	Mr Neeraj K Saini (PhD Student) *(Guide: Prof. M. Bose)*	Presented a poster on Expression of a stationary phase protein of *M. tuberculosis* and its characterisation	International Centre for Genetic Engineering and Biotechnology	International Symposium on New Frontiers in Tuberculosis Research New Delhi December 4-6, 2006
87.	Ms Rashmi Pasricha (PhD Student) *(Guide: Prof. M. Bose)*	Presented a poster on Genetic polymorphism in *mce* 1 and *mce* 4 operons of *M tuberculosis* in clinical isolates and standard strains	International Centre for Genetic Engineering and Biotechnology	International Symposium on New Frontiers in Tuberculosis Research New Delhi December 4-6, 2006
88.	Ms Monika Sharma (PhD Student) *(Guide: Prof. M. Bose)*	Presented a poster on MDR strains of *M. tuberculosis* interferes with the host immune machinery to create a safe niche	International Centre for Genetic Engineering and Biotechnology	International Symposium on New Frontiers in Tuberculosis Research New Delhi December 4-6, 2006
89.	Ms Ruqiaaya Nazir (PhD Student) *(Guide: Dr Madhu Khanna)*	Presented a poster on Phase dependent inflammatory and apoptotic mechanisms of influenza A virus infection in induced murine model of allergic asthma	V.P.C.I., University of Delhi	International Conference on Cardiopulmonary Regulation in Health and Disease: Molecular and Systemic Integration Delhi February 22-24, 2007

Participation in Advanced and Specialised Training Programme

Sl No.	Participant (Department)	Course Title/ Topic	Training Duration	Host
1.	Dr Anita Kotwani (Pharmacology)	• Short course on "Pharmacoeconomics for Decision-Makers" • Short course on "Pharmaceutical/Biotech Pricing"	May 20-21, 2006	International Society of Pharmacoeconomics & Outcome Research, Philadelphia, U.S.A.
2.	Dr Anita Kotwani (Pharmacology)	Statistical Package for Social Sciences	January 29, 2007 - February 9, 2007	Computer Centre University of Delhi, Delhi
3.	Dr Balakrishnan Menon (Respiratory Allergy and Applied Immunology)	Advanced Training on Echocardiography	July 23, 2006	Moolchahand Medicity and Delhi Medical Association, New Delhi
4.	Dr Raj Kumar (Respiratory Medicine)	Pneumoconiosis – ILO classification	July 29 - August 04, 2006	ILO, Geneva in association with Indian Association of Occupational Health, Dhanbad branch at India Habitat Centre, New Delhi
5.	Mrs Uma Tyagi (Library)	Sensitisation Workshop on Information Literacy	December 23, 2006	Delhi College of Engineering & SALIS (Society for the Advancement of Library and Information Science), Delhi NCR Chapter (supported by UNESCO), Delhi
6.	Mrs Uma Tyagi (Library)	Refresher Course in Library and Information Science	February 07-28, 2007	UGC-ASC (Academic Staff College) Aligarh, Uttat Pradesh

Short Term Specialised Trainings Imparted by Faculty Members

Sl No.	Name, Subject and Organisation	Course Title/Topic	Faculty Member (Department)	Period
1.	Mr Rahul Sharma, Mr Indeewar Sehgal, Mr Arun Ramani, Mr Gurpinder Singh B.A.Sc. (Hons) Instrumentation Bhaskaracharya College of Applied Science, University of Delhi, Delhi	Techniques in biochemistry	Prof. S.K. Bansal (Biochemistry)	May 16 - June 29, 2006
2.	Ms Ramandeep Kaur (M.Sc. Biotechnology) Punjab Technical University Punjab	Training in molecular biology	Prof. Mridula Bose (Microbiology)	November 20, 2006 - February 20, 2007
3.	Mr Himanshu Sharma (M.Sc. Microbiology) Department of Microbiology Choudhary Charan Singh University, Meerut	Drug resistance profiling and molecular typing of *mycobacterium tuberculosis* isolates from a DOTS center and a non DOTS center in Delhi	Dr Mandira Varma (Microbiology)	January - June 2006
4.	Ms Aditi Ray (M.Sc. Microbiology) H.N.B. Garhwal University, Uttarakhand	Study of apoptosis induced by influenza A virus in Hela cell line using comet assay	Dr Madhu Khanna (Respiratory Virology)	(April 1 – June 30, 2006)
5.	Ms Deepika Mishra (M.Sc. Microbiology) Amity Institute of Biotechnology, Noida, (U.P.)	Kinetic study of apoptosis induced by influenza A virus in MDCK cell line	Dr Madhu Khanna (Respiratory Virology)	(March 1 – May 31, 2006)

Cultural and Sports Activities

During this year, the staff of the Institute had a very eventful and memorable time. The performances (songs and dances, mono-actions, jokes, etc.) of the staff members at the Annual Function of the Delhi University Staff Club were highly appreciated.

In the Sports and Games events the staff members of the Institute had participated in various Annual Tournaments and Annual Athletic Meet of Delhi University Staff Club and won awards in various events as per details given below:

- Mr Santosh Kotch (Pathology Department) stood second place in the Singles category of Table Tennis event.
- Mr D.K. Sahu (Publication Division) stood second place in the Doubles category of Table Tennis event.
- Mr Eric Harrison (Library) and Mr Santosh Kotch (Pathology Department) stood third place in the Doubles category of Table Tennis event.

List of Publications

1. Agrawal A, Rengarajan S, Adler KB, Ram A, Ghosh B, Fahim M, Dickey BF. Inhibition of mucin secretion with MARCKS-related peptide improves airway obstruction in a mouse model of asthma. *J Appl Physiol* 2007; 102: 399-405.
2. Agarwal MK. Etiologic significance of environmental insects as inhalant allergens in India. In: Jain VK, Arora A, editors. *Clinical Allergy: Principle, Practice and Management*. Bikaner: Madhu Publications. 2007; pp 49-55.
3. Agarwal MK. Immunodiagnosis of Type I allergic respiratory disorders. In: Jain VK, Arora A, editors. *Clinical Allergy: Principle, Practice and Management*. Bikaner: Madhu Publications. 2007; pp 91-103.
4. Agarwal MK, Bansal SK. Immune response in health and disease with special reference to respiratory allergy. In: Jain VK, Arora A, editors. *Clinical Allergy: Principle, Practice and Management*. Bikaner: Madhu Publications. 2007; pp 1-12.
5. Agarwal MK, Vermani M. Clinico-immunologic and physicochemical studies on insects as sources of inhalant allergens. In: Agarwal MK, Awasthi SK, editors. *Immunology in Health and Disease*. Kanpur: Institute of Life Sciences, C.S.J.M. University. 2006; pp 72-82.
6. Bose Mridula. The archetype of laboratory diagnosis in tuberculosis: the shape of things to come. *Indian J Chest Dis Allied Sci* 2006; 48: 167-9.
7. Chhabra SK. Chronic obstructive pulmonary disease and cardiovascular disease. *Indian J Chest Dis Allied Sci* 2006; 48: 95-6.
8. Chhabra SK. Assessment of control in asthma: current scenario and instruments for measurement. *Indian J Chest Dis Allied Sci* 2007; 49:5-7.
9. Chhabra SK, Chugh T, Chhabra P. Evolution from typical to atypical radiological appearance – report of two patients of sarcoidosis. *Indian J Radiol Imag* 2006; 16: 869-73.
10. Chhabra SK, Vijayan VK, Vasu T. Inhaled formoterol *versus* ipratropium bromide in chronic obstructive pulmonary disease. *Indian J Chest Dis Allied Sci* 2006; 48: 97-102.
11. Chakraborti A, Gulati K, Banerjee BD, Ray A. Possible involvement of free radicals in the differential neurobehavioral responses to stress in male and female rats. *Behav Brain Res* 2007; 179: 321-5.
12. Chowdhary A, W. Lee-Yang BA, Lasker Brandt ME, Warnock DW, Arthington-Skaggs B. A comparison of multilocus sequence typing (MLST) and Ca3 fingerprinting for molecular subtyping of epidemiologically-related clinical isolates of *Candida albicans*. *Med Mycol* 2006; 44: 405-18.
13. Chugh IM, Khanna P, Shah A. Nocturnal symptoms and sleep disturbances in clinically stable asthmatic children. *Asian Pac J Allergy Immunol* 2006; 24:135-42.
14. Dhyani A, Arora N, Gaur SN, Jain VK, Sridhara S, Singh BP. Analysis of IgE binding proteins of mesquite (*Prosopis juliflora)* pollen and cross-reactivity with predominant tree pollens. *Immunobiology* 2006; 211:733-40.
15. Gaur SN. Hypersensitivity pneumonitis, In: Shaikh WA, editor. *Principle and Practice of Tropical Allergy and Asthma*. Mumbai: Vikas Medical Publishers. 2006; pp. 463-76.
16. Gaur SN, Gupta K, Rajpal S, Singh AB, Rohatgi A. Prevalence of bronchial asthma and allergic rhinitis among urban and rural adult population of Delhi. *Indian J Allergy Asthma Immunol* 2006; 20: 90-7.
17. Gaur SN, Khan ZU, Kumar R. Youngest patient of ABPA in Indian subcontinent – A case report. *Indian J Allergy Asthma Immunol* 2006; 20: 37-40.

18. Gulati K, Ray A. Studies on the mechanisms of anxiolytic and neuropeotective effects of melatonin in rats. *Frontiers Neuroendocrinol* 2006; 27 : 129 -30.

19. Gulati K, Ray A, Masood A, Vijayan VK. Involvement of nitric oxide (NO) in the regulation of stress susceptibility and adaptation in rats. *Indian J Exp Biol* 2006; 44: 809-15.

20. Gulati K, Ray A, Vijayan VK. Free radicals and drug toxicity: focus on theophylline. In: Ray A, Gulati K, editors. *Current Trends in Pharmacology*. New Delhi: I.K. International Publishing House Pvt. Ltd. 2007; pp 443-60.

21. Gulati R, Kumar A, Bansal S, Tyagi YK, Tyagi T, Ponnan P, Malhotra S, Jain SK, Singh U, Bansal SK, Raj HG, Dwarkanath BS, Chaudhury NK, Vij A, Vijayan VK, Rastogi RC, Parmar VS. Calreticulin transacetylase (CRTAase): identification of novel substrates and CRTAase-mediated modification of protein kinase C (PKC) activity in lymphocytes of asthmatic patients by polyphenolic acetates. *Pure Appl Chem* 2007; 79: 729-37.

22. Gupta N, Fahim M. Lead acetate induced contraction in rat tracheal smooth muscle is independent of epithelium. *Indian J Physiol Pharmacol* 2007; 51: 49-54.

23. Hazbon MH, Brimacombe M, Bobadilla del Valle M, Cavatore M, Guerrero MI, Varma-Basil M, Billman-Jacobe H, Lavender C, Fyfe J, Garcia-Garcia L, Leon CI, Bose M, Chaves F, Murray M, Eisenach KD, Sifuentes-Osornio J, Cave MD, Ponce de Leon A, Alland D. Population genetics study of isoniazid resistance mutations and evolution of multidrug-resistant *Mycobacterium tuberculosis*. *Antimicrob Agents Chemother* 2006; 50: 2640-9.

24. Kapoor Lata, Eideh HK, Ahmad Shamweel, Lal Pankaj, Deb Monorama, Thukral SS. Molecular typing of *Salmonella* Worthington isolates from cases of infantile diarrhoea. *Indian J Med Res* 2006; 123: 691-6.

25. Khanna M, Srivastava V. Clinical and laboratory diagnosis of influenza virus. In: Tripathi M. Mathew, Thankam Mathew, editors. *Influenza and Its' Global Public Health Significance*. NJ, U.S.A: Thajema Publishers. 2006; pp 138-51.

26. Khanna M, Srivastava V. Influenza pandemic preparedness. In: Tripathi M. Mathew, Thankam Mathew, editors. *Influenza and Its' Global Public Health Significance*. NJ, U.S.A: Thajema Publishers. 2006; pp 192-201.

27. Khanna M, Srivastava V. Structure and classification of influenza virus. In: Tripathi M. Mathew, Thankam Mathew, editors. *Influenza and Its' Global Public Health Significance*. NJ, U.S.A: Thajema Publishers. 2006; pp 11-23.

28. Khanna M, Nazir R, Srivastava V. Prophylaxis prevention and treatment for influenza A, B, C. In: Tripathi M. Mathew, Thankam Mathew, editors. *Influenza and Its' Global Public Health Significance*. NJ, U.S.A: Thajema Publishers. 2006; pp 169-91.

29. Kumar A, Singh BK, Sharma NK, Gyanda K, Jain SK, Pandey M, Tyagi YK, Sharma SK, Prasad AK, Jain SC, Rastogi RC, Raj HG, Watterson AC, der Eycken EV, Parmar VS. Specificities of acetoxy derivatives of coumarins, biscoumarins, chromones, flavones, isoflavones and xanthones for acetoxy drug: protein transacetylase. *Eur J Medicinal Chem* 2007; 42: 447-55.

30. Kumar A, Tyagi YK, Seema, Ponnan Prija, Rohil V, Prasad AK, Raj HG, Dwarakanath BS, Parmar VS. Ellagic acid peracetate is superior to ellagic acid in the prevention of genotoxicity due to aflatoxin B_1 in bone marrow and lung cells. *J Pharmacy Pharmacol* 2007; 1: 81-6.

31. Kumar R, Singh BP, Srivastava Prakriti, Sridhara Susheela, Arora N, Gaur SN. Relevance of serum IgE estimation in allergic bronchial asthma with special reference to food allergy. *Asian Pac J Allergy Immunol* 2006; 24: 191-9.

32. Kumar R, Srivastava Prakiriti, Sridhara S, Arora Naveen, Gaur SN, Singh BP. Rice (*Oryza Sativa*) allergy in rhinitis and asthma patients: a clinico-immunologic study. *Immunology* 2007; 212: 141-7.

33. Kumar S, Singh BK, Pandey AK, Kumar A, Sharma SK, Raj HG, Prasad AK, der Eycken EV, Parmar VS, Ghosh B. A chromone analog inhibits TNF-α induced expression of cell adhesion molecules on human endothelial cells *via* blocking NF-kB activation. *Bioorganic Medicinal Chemistry* 2007; 15: 2952-62.

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35. Manchanda V, Singh NP, Eideh HK, Ahmad Shamweel, Thukral SS. Molecular epidemiology of clinical isolates of AmpC producing *Klebsiella pneumoniae* at Guru Teg Bahadur Hospital, Delhi, India. *Indian J Med Microbiol* 2006; 24: 177-81.

36. Menon B, Singh P, Arora R. Interlobar hydropneumothorax. *Indian J Chest Dis Allied Sci* 2006; 48: 207-8.

37. Menon B, Sharma A, Kripalani J, Jain S. Giant cell interstitial pneumonia in a 60 year old female without hard metal exposure. *Respiration* 2006; 73: 833-5.

38. Menon B, Aggarwal B, Sharma S. A case of complicated hydatid cyst with daughter cysts. *Br Med J (South Asia Edition)* 2006; 22: 685-6.

39. Mittal V, Khanna P, Panjabi C, Shah A. Subjective symptom perceptual accuracy in asthmatic children and their parents in India. *Ann Allergy Asthma Immunol* 2006; 97: 484-9.

40. Pal R, Gulati K, Banerji BD, Ray A. Role of free radicals in stress-induced neurobehavioral changes in rats. *Indian J Exp Biol* 2006; 44: 816-20.

41. Prakash Om, Kumar R, Rahman M, Gaur SN. The clinico-physiological effect of inhaled tiotropium bromide and inhaled ipratropium bromide in severe chronic obstructive pulmonary disease. *Indian J Allergy Asthma Immunol* 2006; 20: 105-11.

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43. Randhawa HS, Choudhary A, Sinha KP, Kowshik T, Vijayan VK. Evaluation of peptone glucose fluconazole agar as a selective medium for rapid and enhanced isolation of *Aspergillus fumigatus* from the respiratory tract of bronchopulmonary aspergillosis patients colonised by *Candida albicans*. *Med Mycol* 2006; 44: 343-8.

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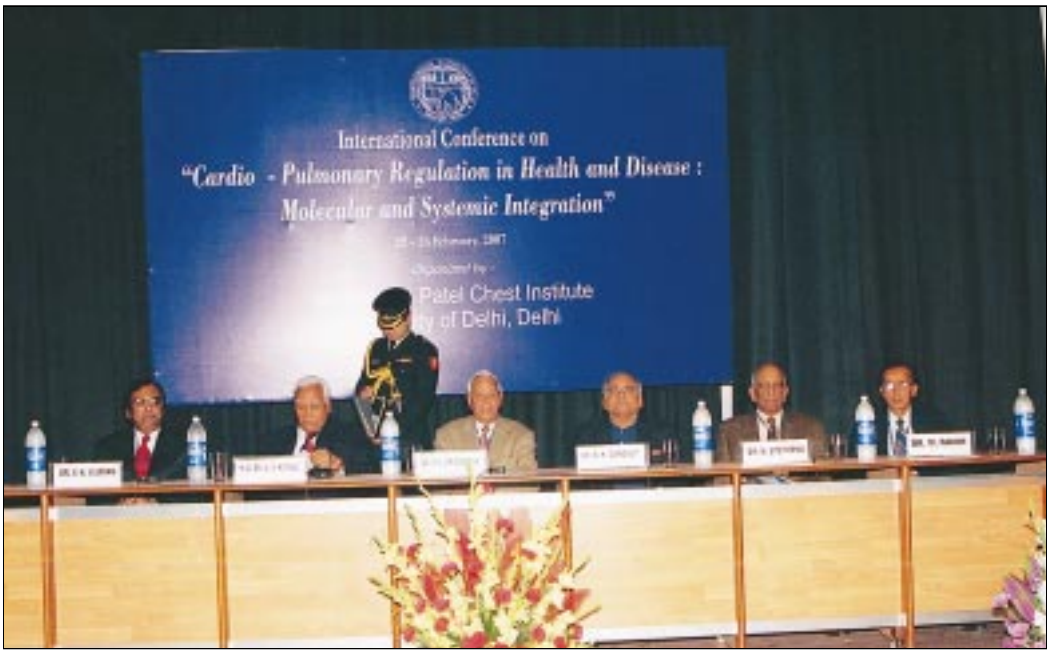
Professor C.N. Deivanayagam, former Medical Superintendent, Hospital for Thoracic Medicine, Chennai, receiving the memento from the Director of the Institute Dr V.K. Vijayan, after delivering the 8th Professor Raman Viswanathan – VPCI Oration on the occasion of the 57th Foundation Day Celebrations on 6th April 2006.

Professor P.N. Tandon, President, Brain Research Centre Society, Gurgaon, delivered the 2nd Professor A.S. Paintal Memorial Oration on 24th September 2006.

International Symposium on "Herbal Drug Research and Therapy" from 8-10 December 2006. ***Dignitaries on the dais (left to right):*** **Dr V.K. Vijayan (Director, VPCI), Prof. Michael J. Mulvany (UAGSHS, Denmark), Mr Verghese Samuel (Joint Secretary, AYUSH, Ministry of Health and Family Welfare, Govt. of India), Prof. Deepak Pental (Vice-Chancellor, University of Delhi) and Prof. A. Ray (Pharmacology, VPCI).**



International Conference on "Cardio-pulmonary Regulation in Health and Disease: Molecular and Systemic Integration" from 22-24 February 2007. ***Dignitaries on the dais (left to right):*** **Dr V.K. Vijayan (Director, VPCI), Prof. A.R. Kidwai (His Excellency Governor of Haryana), Prof. P.N. Srivastava (Chancellor, Manipur Central University), Prof. N.K. Ganguly (Director-General, ICMR and Chairman Governing Body, VPCI), Prof. Newman L. Stephens (University of Manitoba, Canada), Prof. M. Fahim (Physiology, VPCI).**