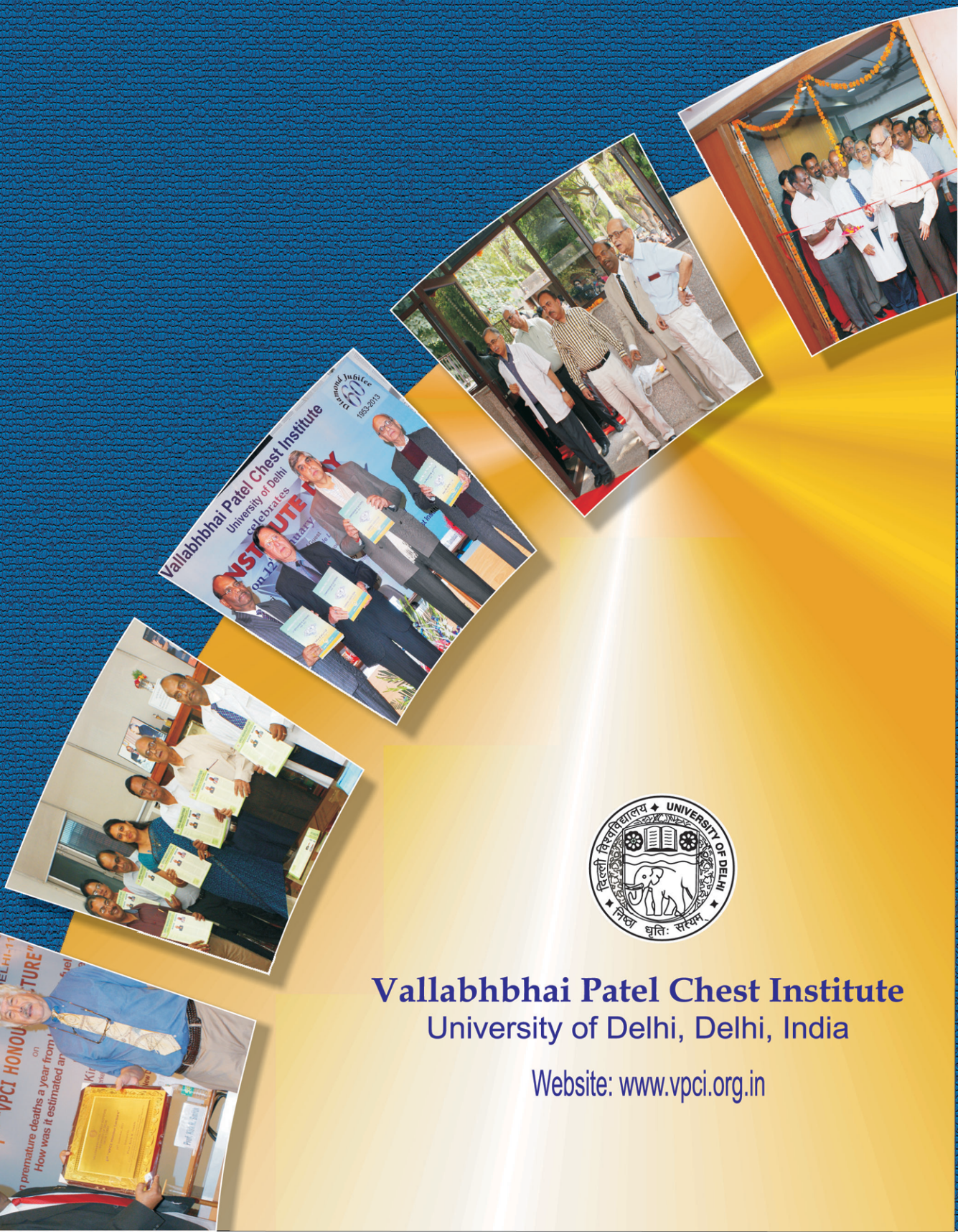
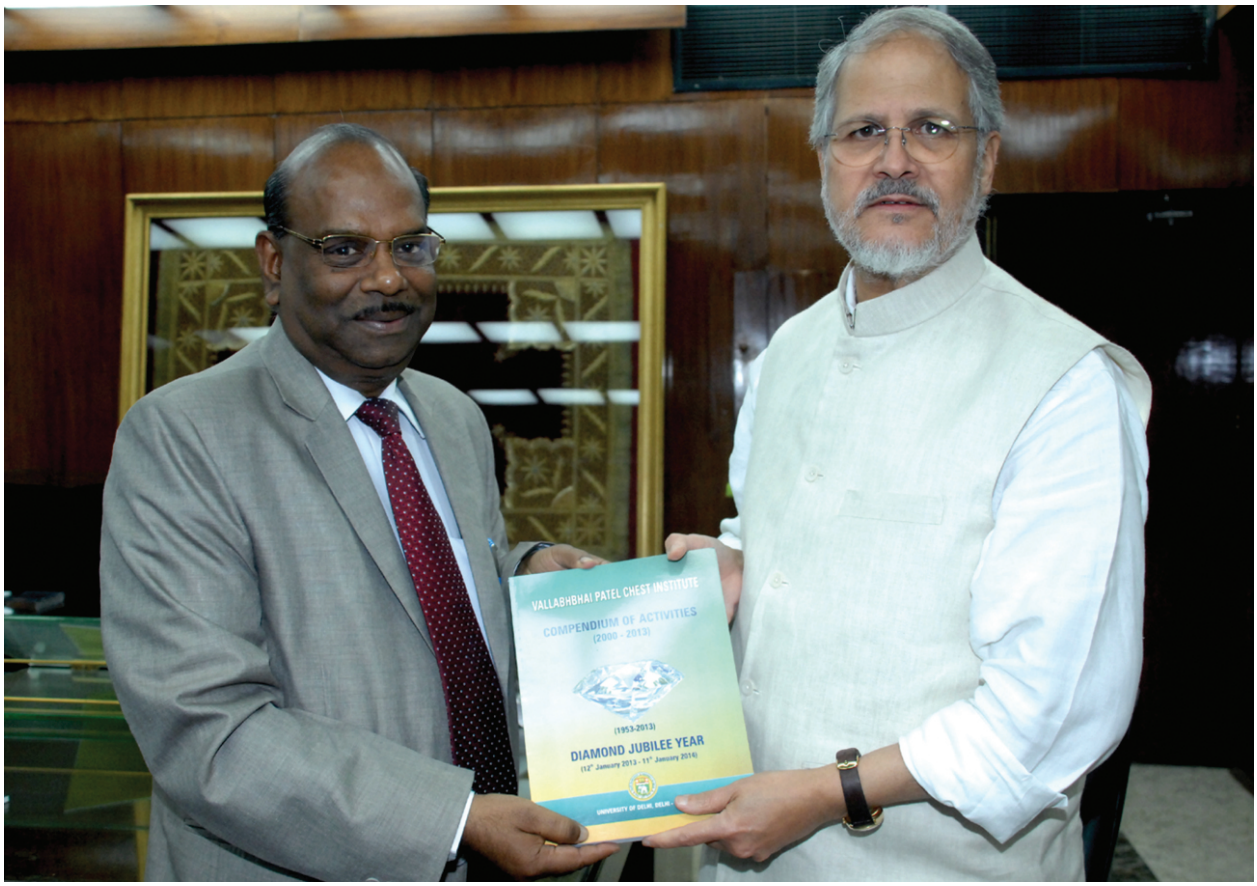
ANNUAL REPORT
2013-14



Vallabhbhai Patel Chest Institute
University of Delhi, Delhi, India

Website: www.vpci.org.in

The Institute Day was celebrated on 12th January 2014. Prof. Dinesh Singh, Honourable Vice-Chancellor, University of Delhi released the "Commpendium of Activities 2000-2013" of the Institute on this occasion. Other dignitaries on dais (from left): Prof. Rajendra Prasad, Director, VPCI, Prof. Hari Gautam, former Chairman, UGC, Prof. P.N. Tandon, Chairperson, G.B. VPCI, Prof. A. Ray, Head Department of Phamacology, VPCI.



Shri Najeeb Jung, Honourable Lieutenant Governor, Delhi, receiving a copy of the Compendium of Activities (2000-2013) of VPCI from Prof. Rajendra Prasad, Director of the Institute.

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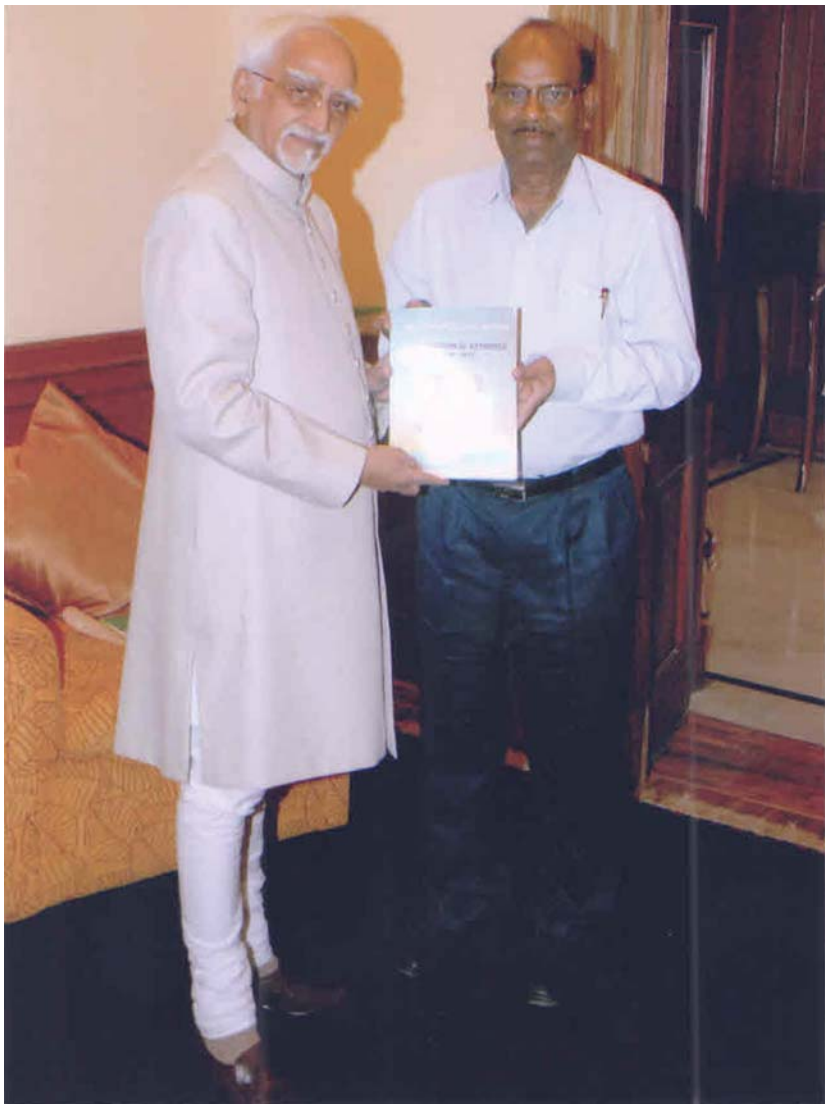
Vallabhbhai Patel Chest Institute
University of Delhi, Delhi, India



Shri Mohammad Hamid Ansari, Honourable Vice President of Republic of India, receiving a copy of the Compendium of Activities (2000-2013) of VPCI from Prof. Rajendra Prasad, Director of the Institute.

Published and printed by Professor Rajendra Prasad, Director, Vallabhbhai Patel Chest Institute, University of Delhi, Delhi-110 007; Phone: 27402435, 27667102, 27667441, 27667667, 27666182, and printed at Bengal Offset Works, 335, Khajoor Road, Karol Bagh, New Delhi-110 005 (Phone: 23610455, 23674614).

From the Director's Desk

It is my proud privilege to present the Annual Report of the Vallabhbhai Patel Chest Institute (VPCI) for the year 2013-14. This report provides an overview of the wide range of activities and achievements of the Institute in the areas of post-graduate medical education, research and patient care.

The main objectives of VPCI are to conduct research in basic and clinical aspects of chest diseases, to train post-graduates in Pulmonary and Critical Care Medicine and allied disciplines, to develop new diagnostic technology and disseminate scientific knowledge related to Chest Medicine to other institutions in the country and, over and above all, to provide specialized investigative and treatment services to patients. With the support of the University of Delhi and Ministry of Health and Family Welfare, Government of India, the Institute has been able to achieve its objectives to the cause of the society. As on date, the Institute has made tremendous progress with respect to research activities and inparting training to many students from different parts of the country and fulfilling the national need for providing relief to large number of patients suffering from chest diseases in the community. It has eminently discharged its role and with the efforts of its vibrant Faculty, staff and students, has earned a unique place in the field of Chest Medicine and Allied Sciences.

VPCI undertakes teaching and training of students pursuing DM in Pulmonary Medicine and MD in Pulmonary Medicine, Microbiology, Biochemistry, Physiology and Pharmacology and DTCD. This year, 5 DM, 26 MD and 10 DTCD students are pursuing their degrees from this Institute. In addition, VPCI also has the privilege of training PhD students in various subjects. An additional 25 are pursuing PhDs at the moment. A large number of physicians, paramedical staff and students from other institutions / colleges were imparted training in various disciplines at the Institute during the year.

Continuing its emphasis on medical education, several programmes were carried out during the year, including a Spirometry Technician's Training Workshop, the 38th Workshop on Respiratory Allergy: Diagnosis and Management, CME programmes on evaluation of drug safety, Thoracic Oncology and Lung Cancer, Chronic Obstructive Pulmonary diseases, Health Associated Infections and workshops and symposia on Essential Medicine Concept, Price and Availability of Essential Medicines, Hands-on Training in Molecular Techniques in Biotechnology and New Trends on Interventional Bronchoscopy, the details of which are provided in this report.

Research in both basic and clinical sciences is one of our major objectives. Several research projects have been undertaken by the dynamic faculty of this Institute. The VPCI have 40 research projects amounting to funds over two crores at present and have been funded by various agencies like ICMR, DST, DBT, CSIR and Ayush. The research contributions from the Institute are widely acclaimed. The vibrancy of these research projects / activities can be well judged from the list of publications in peer-reviewed journals, orations, guest lectures delivered and papers presented in the International and National conferences by the faculty members and students of the Institute. The faculty members also received several Awards and Honours in their field of specialisation. The details of work done under the various ongoing research projects, awards and honours received by the faculty and publications during the year have been presented in this report.

The Institute organised several conferences and workshops where eminent experts from all over the world participated and shared their experiences. As in the previous years, the well-known Raman Viswanathan and

Paintal Memorial orations were delivered during the year. The research laboratories are being equipped with the latest technology to keep pace with the rest of the world. The work on establishment of a centralized Multidisciplinary Research Unit (MRU) by the Govt. of India has started.

The Viswananthan Chest Hospital (VCH), the clinical wing of the Institute, is a tertiary care Chest Hospital with state-of-the-art patient-care facilities. It continues to provide excellent diagnostic and treatment services including critical care management to patients from Delhi, other parts of the country and neighbouring countries suffering from Respiratory Diseases. It also continues to provide other facilities including pulmonary function studies, skin testing, bronchoscopy, sleep studies, pulmonary rehabilitation and various biochemical, pathological and microbiological investigations. A 44 bedded new ward was inaugurated in the multistorey building increasing the bed strength of the Institute to 128. Several diagnostic facilities have been updated during the year with the acquisition of equipment for impulse oscillometry, cardiopulmonary exercise testing, ultrasonography and biochemistry analysis. A laboratory for anaerobic culture facility was inaugurated during the year. In addition, a DOTS center was started at VPCI on 7th May this year and a patient waiting hall was inaugurated the same day.

The National Center of Respiratory Allergy, Asthma and Immunology (NCRAAI) pollen count station was started on 28th May 2013. The Tobacco Cessation Clinic at VCH, a resource Centre for Tobacco Control is running with an aim to educate people to quit smoking and use of tobacco from all spheres through awareness campaigns and counselling. The main focus is on college students because most of the tobacco users get into this habit in the initial college years. The critical care unit has expanded its facilities with acquisition of more ventilators, replacement of other equipments as necessary and continuous emphasis on better management. The state-of-art management is protocol-based and is comparable to the best. Comprehensive cardiopulmonary rehabilitation programme comprising of both educational and training sessions is continuing at Cardio-pulmonary Rehabilitation Clinic at VCH.

Certain new initiatives were taken up during the year. Several Guest Lectures have been organized by the Research cell. VPCI Honour Lecture series was also started this year. To educate the general public about the important chest diseases and allied problems, a Public Lecture series was started this year. The Institute also released its first biannual newsletter on 23rd August, 2013. From this year onwards, January 12, the day on which the Institute was formally inaugurated in 1953 will be celebrated every year as the “Institute Day”.

With the aim to disseminate scientific knowledge and latest developments in the field of chest diseases and allied sciences, the Institute continued the publication of its reputed quarterly publication *The Indian Journal of Chest Diseases & Allied Sciences*, in collaboration with the National College of Chest Physicians (India). The journal has wide national and international circulation.

The Institute continues to expand its patient care and research facilities by increasing the range of investigations and facilities for diagnosis and management. Thrust areas identified for special attention in near-future include lung cancer, pulmonary function testing and critical care, thoracoscopy and interventional bronchology, paediatric pulmonology, stem cell research, pharmacogenomics, mycobacteriology and anaerobe bacteriology. Research in the major areas especially those which are relevant to the country’s needs is a continuous process that will be pursued with renewed vigour besides continuing educational activities.

I hope this presentation of our activities will provide an adequate overview into the contributions made by the Institute towards meeting its objectives and fulfilling its mandate during the year 2013-14.

Prof. Rajendra Prasad

ANNUAL REPORT (2013-14)

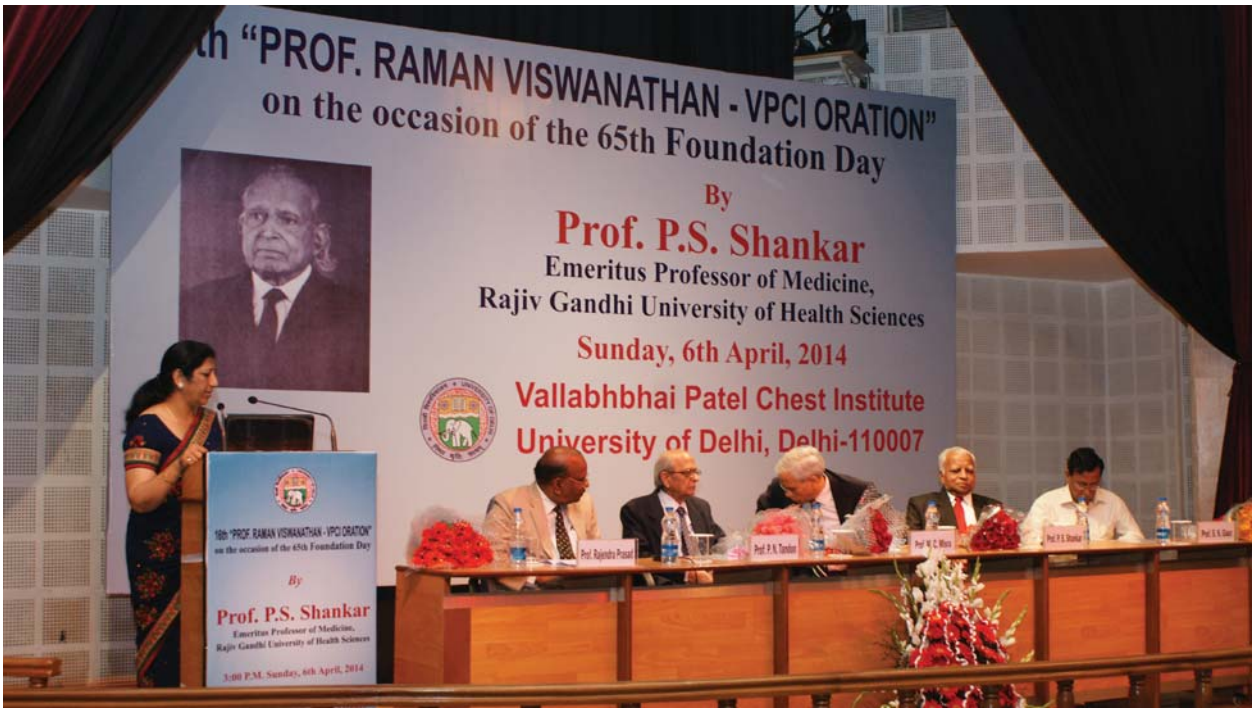
CONTENTS

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 Founder-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 Prof. Rajendra Prasad, President of the Republic of India.
January 24,	1959	Indian Association for Chest Diseases was inaugurated by Sir A.L. Mudaliar. It was renamed 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-designated as "Diploma in Tuberculosis and Chest Diseases" (DTCD) from XIV Course. The XV DTCD Course started from July 1960.
April 6,	1961	Foundation Day Celebrations 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 the 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	Prof. A.S. Paintal was elected General President of the Indian Science Congress Association [1984-85].
	1985	Prof. H.S. Randhawa was elected Vice-President of the International Society for Human and Animal Mycology [1985-88].
	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	Prof. A.S. Paintal was elected President of the Indian National Science Academy [1986-88].
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. VPCI Oration was started.
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.
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	Dr V.K. Vijayan was elected International Regent, American College of Chest Physicians [2000-06].
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 and Family Welfare, Govt. of India.
November 21,	2001	Tobacco Cessation Clinic was started.

August 14,	2002	A State-of-the-Art Oxygen Plant was inaugurated by Prof. P.N. Srivastava, Chairman, Governing Body (VPCI).
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.
May 28,	2003	"Bhoomi Pujan" to start the construction work of the Auditorium.
	2004	Launching of the Institute website: <www.vpci.org.in>.
September 24,	2005	Prof. A.S. Paintal Memorial Oration was started.
January 10,	2006	An 8-bedded Intensive Care Unit was inaugurated by Prof. P.N. Srivastava, Chairman, Governing Body (VPCI).
December 8,	2006	Inauguration of the Golden Jubilee Auditorium by organising an International symposium on Herbal Drug Research and Therapy in Chest Medicine.
March 2,	2007	The Hospital wing of the Institute, Clinical Research Centre has been re-named as "Viswanathan Chest Hospital" in honour of the Founder-Director of the Institute and the Golden Jubilee Auditorium has been re-named as "Paintal Memorial Golden Jubilee Auditorium" in honour of the former Director of the Institute by a resolution of the Governing Body.
June 22,	2007	Yoga Therapy and Research Centre [in collaboration with the Morarji Desai National Institute of Yoga (MDNIY), New Delhi], was inaugurated.
September 18,	2007	Cardio-pulmonary Rehabilitation Clinic was inaugurated.
September 17,	2009	Approval by the University of Delhi to start Superspeciality DM Course in Pulmonary Medicine in VPCI with an intake of two seats per year.
August 3,	2010	Approval by the University of Delhi to start Diploma Course in Allergy and Clinical Immunology in VPCI with an intake of two seats per year.
February 12,	2011	Inauguration of the National Centre of Respiratory Allergy, Asthma and Immunology by Prof. P.N. Tandon, President, National Brain Research Centre Society and Chairman, Governing Body, V.P. Chest Institute, Delhi.
March 15,	2011	Permission from Medical Council of India to start DM (Pulmonary Medicine) course with annual intake of two students per year from the academic year 2011-12.
November 21,	2012	Prof. Rajendra Prasad joined as the Director of the Institute.
May 7,	2013	DOTS Centre was inaugurated by Prof. P.N. Tandon, Chairman, Governing Body, VPCI.
August 18,	2013	DMA Centenary Institution Award received from Mrs Sheila Dikshit, the Hon'ble Chief Minister, Govt. of NCT Delhi for the "Outstanding Contribution in the Field of Patient Health Care" at Maulana Azad Medical College, New Delhi.
August 23,	2013	New Ward (44 beds) was inaugurated by Prof. P.N. Tandon, Chairman, Governing Body, VPCI.
		VPCI Newsletter was inaugurated by Prof. P.N. Tandon, Chairman, Governing Body, VPCI.



Prof. P.S. Shankar, Emeritus Professor of Medicine, Rajiv Gandhi University of Health Sciences, Bangalore, delivered the Prof. Raman Viswanathan - VPCI Oration on 6th April 2013.

On World Asthma Day, the Institute organized a patient education and awareness programme for the public.

Prof. R. Viswanathan-VPCI Orations

1st Oration	April 6, 1999	Prof. N.K. Ganguly, Director-General, Indian Council of Medical Research, New Delhi.
2nd Oration	April 6, 2000	Prof. A.S. Paintal, former Director-General, ICMR and former Director, VPCI.
3rd Oration	April 6, 2001	Dr S. Lakshminarayanan, University of Washington School of Medicine, Washington, Seattle, USA.
4th Oration	April 6, 2002	Dr S. Padmavati, President, All India Heart Foundation and Director, National Heart Institute, New Delhi.
5th Oration	April 7, 2003	Prof. J.S. Bajaj, former Member, Planning Commission, Government of India and former Professor and Head, Department of Medicine, All India Institute of Medical Sciences, New Delhi.
6th Oration	April 6, 2004	Prof. H.S. Randhawa, former Director, V.P. Chest Institute, University of Delhi, Delhi.
7th Oration	April 6, 2005	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.
8th Oration	April 6, 2006	Prof. C.N. Deivanayagam, Former Medical Superintendent, Hospital for Thoracic Medicine, Chennai.
9th Oration	April 6, 2007	Prof. K.K. Talwar, Director, Postgraduate Institute of Medical Education and Research, Chandigarh.
10th Oration	April 6, 2008	Prof. C.R. Babu, former Pro-Vice-Chancellor, University of Delhi, Delhi.
11th Oration	April 7, 2009	Prof. Peter J. Barnes, Head of Respiratory Medicine, Imperial College, London and Professor of Thoracic Medicine and Head of Airway Disease at the National Heart and Lung Institute and Honorary Consultant Physician at Royal Brompton Hospital, London.
12th Oration	April 6, 2010	Prof. M.K. Bhan, Secretary, Government of India, Department of Biotechnology, New Delhi.
13th Oration	April 6, 2011	Dr Vishwa Mohan Katoch, Secretary to the Government of India, Department of Health Research, Ministry of Health and Family Welfare and DirectorGeneral, Indian Council of Medical Research, New Delhi.
14th Oration	April 6, 2012	Prof. Sami Bahna, Chief, Allergy and Immunology Section, Lousiana State University, LA, USA, and Past-President, American College of Allergy, Asthma and Immunology, USA.
15th Oration	April 6, 2013	Dr W. Selvamurthy, Former Distinguished Scientist and Chief Controller (R and D) (LS and IC), DRDO, Ministry of Defence, Government of India, New Delhi.

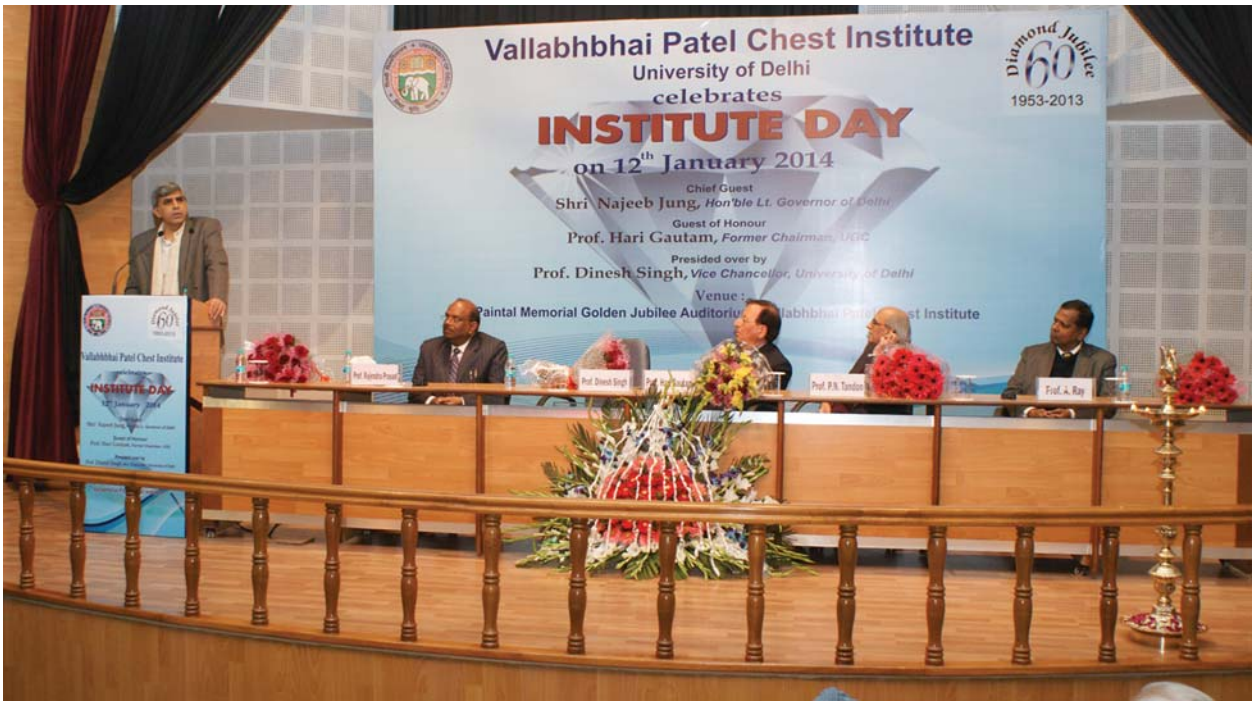
The Institute started VPCI Oration from 1999 onwards. The VPCI Oration was re-named as Prof. R. Viswanathan-VPCI Oration in 2005.

A CME programme on "Health Care Associated Infections" was organized on the eve of 9th Prof. Autar Singh Paintal Memorial Oration on 23rd September 2013. Prof. (Mrs) Roshnara A. Bhujwala, Guest of Honour addressed the audience. Dr L.S. Chauhan, Director, National Centre for Disease Control, Delhi was the Chief Guest.

Prof. Autar Singh Paintal Memorial Oration was delivered by Prof. Samir K. Brahmachari, Director General, CSIR and Secretary, Government of India, Department of Scientific and Industrial Research on 24th September 2013.

Prof. A.S. Paintal Memorial Orations

1st Oration	September 24, 2005	Prof. M.S. Valiathan, Honorary Adviser, Manipal Academy of Higher Education, Manipal (Karnataka).
2nd Oration	September 24, 2006	Prof P.N. Tandon, President, National Brain Research Centre Society, Gurgaon.
3rd Oration	September 24, 2007	Prof. P.N. Srivastava, First Chancellor, Manipur Central University, Imphal and former Vice-Chancellor, Jawaharlal Nehru University, New Delhi.
4th Oration	September 24, 2008	Prof. Nanduri R. Prabhakar, Director, Centre for System Biology of Oxygen Sensing, Department of Medicine, University of Chicago, USA.
5th Oration	September 24, 2009	Prof. Arun Dharmarajan, Winthrop Professor, School of Anatomy and Human Biology, Faculty of Life and Physical Sciences, The University of Western Australia, Nedlands, Perth, Western Australia.
6th Oration	September 24, 2010	Prof. Chulani Tissa Kappagoda, Professor of Medicine, University of California, Davis, USA.
7th Oration	September 23, 2011	Prof. J.S. Guleria, Senior Consultant (General Medicine), Sitaram Bhartia Institute of Science and Research, New Delhi and former Professor and Head, Department of Medicine, and Dean, AIIMS, New Delhi.
8th Oration	September 24, 2012	Prof. S.K. Jain, Senior Consultant, Respiratory Medicine, Max Hospital, NOIDA, Coordinator, DNB (Respiratory Medicine), Metro Hospital, NOIDA, Ex-Advisor and Member, Scientific Advisory Committee, NIREH (ICMR), Bhopal and Ex-HOD, Cardio-respiratory Physiology, VPCI.
9th Oration	September 24, 2013	Prof. Samir K. Brahmachari, Director General, CSIR and Secretary, Government of India, Department of Scientific and Industrial Research, New Delhi



Prof. Dinesh Singh, Vice-Chancellor, University of Delhi, addressing the audience on Institute Day at VPCI, on 12th January 2014. Prof. Hari Gautam, former Chairman, UGC was the Guest of Honour.

On "World Environment Day", the Director, with other faculty members and staff planted a sapling at the VPCI residential complex at Maurice Nagar, Delhi.

THE INSTITUTE

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

Objectives

The main objectives of VPCI have been to conduct research on basic and clinical aspects of chest medicine, to train post graduates in Pulmonary Medicine and allied subjects, to develop new diagnostic technology and disseminate it to other institutions in the country and to provide specialised clinical and investigative services to patients.

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 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, Cardio-respiratory Physiology, Radiodiagnosis and Imaging, Respiratory Allergy and Applied Immunology, Pulmonary Medicine and Thoracic Surgery. These Departments along with Outdoor/Indoor patient care services and Respiratoy Emergency section are housed in Viswanathan Chest Hospital. The other Departments of the Institute include Biochemistry, Clinical Biochemistry, Biostatistics, Medical Mycology, Microbiology, Pathology, Pharmacology, Physiology and Respiratory Virology. These Departments are headed by the Faculty Members in the respective fields. 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 Section at Viswanathan Chest Hospital is controlled by the Nursing Sperintendent. 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. Tandon** President, National Brain Research Centre Society, 1, Jagriti Enclave, Vikas Marg Extn Delhi - 110092
MEMBERS	
Treasurer, University of Delhi (Ex-Officio)	**Mrs Janaki Kathpalia**
Two members nominated by the Executive Council, University of Delhi	**Prof. Anil Tyagi** **Prof. S.C. Bhatla**
Dean, Faculty of Medical Sciences, University of Delhi	**Prof. Reva Tripathi**
Three members nominated by the Ministry of Health and Family Welfare, Government of India, New Delhi	**Shri S.K. Srivastava** Additional Secretary and Financial Advisor
	Shri Vishwas Mehta Joint Secretary
	Shri Anshu Prakash Joint Secretary
	Dr Jagdish Prasad Director General of Health Services
One member, not connected with the University, nominated by the Executive Council, University of Delhi	**Dr Satyajit Rath** Staff Scientist, National Institute of Immunology, Aruna Asaf Ali Marg, New Delhi-110067
One Professor of the Institute by rotation according to seniority for a period of one year	**Prof. S.K. Chhabra** *(till 02.11.2013)* **Prof. S.K. Bansal** *(03.11.2013 onwards)*
One Reader or Lecturer of the Institute by rotation according to seniority for a period of one year	**Dr Anita Kotwani** *(till 02.11.2013)* **Dr Mandira Varma-Basil** *(03.11.2013 onwards)*
Representative of Non-teaching Staff (as Special Invitee) of the Institute by rotation, according to seniority for a period of one year	**Mrs Saroj Bala** *(w.e.f. 07.11.13)*
MEMBER-SECRETARY	
Director Vallabhbhai Patel Chest Institute, University of Delhi, Delhi (Ex-Officio)	**Prof. Rajendra Prasad**

Standing Finance Committee

Additional Secretary and Financial Advisor — *Chairman*
Ministry of Health and Family Welfare
Government of India
Nirman Bhawan
New Delhi-110 001

Joint Secretary or Nominee — *Member*
Ministry of Health and Family Welfare
Government of India
Nirman Bhawan
New Delhi-110 001

Prof. A. Ray — *Member*
Department of Pharmacology
V.P. Chest Institute
University of Delhi, Delhi -110 007

Shri P.R. Santhanam — *Member*
Deputy Registrar
V.P. Chest Institute
University of Delhi, Delhi-110 007

Prof. Rajendra Prasad — *Member-Secretary*
Director
V.P. Chest Institute
University of Delhi, Delhi-110 007

Scientific Advisory Committee

Prof. S.K. Jindal — *Chairman*
Head, Department of Pulmonary Medicine
Post Graduate Institute of Medical Education and Research
Chandigarh -160 012

DDG (M) — *Member*
Ministry of Health and Family Welfare
Government of India
New Delhi-110 001

Principal — *Member*
University College of Medical Sciences (UCMS)
Delhi-110 095

Prof. A. Ray — *Member*
Department of Pharmacology
V.P. Chest Institute
University of Delhi, Delhi-110007

Prof. Raj Kumar — *Member*
Department of Respiratory Allergy and Applied Immunology
V.P. Chest Institute
University of Delhi, Delhi-110007

Prof. Rajendra Prasad — *Member-Secretary*
Director
V.P. Chest Institute
University of Delhi, Delhi-110007

Human Ethics Committee

Prof. S.K. Jain *Chairman*
Senior Consultant (Pulmonology)
Mool Chand Hospital
New Delhi-110 024

Prof. Gurdeep Singh *Member*
Dean, Faculty of Law
University of Delhi, Delhi-110 007

Prof. Sushma Batra *Member*
Head, Department of Social Work
University of Delhi, Delhi-110 007

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

Prof. S. Dwivedi *Member*
Dean / Principal,
Hamdard Institute of Medical Sciences and Research (HIMSR),
Hamdard Nagar
New Delhi – 110062

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-110 007

Prof. Rajendra Prasad *Member-Secretary*
Director
V.P. Chest Institute
University of Delhi, Delhi-110 007

Animal Ethics Committee

Prof. A. Ray — *Chairman*
Head, Department of Pharmacology
V.P. Chest Institute
University of Delhi, Delhi-110 007

Prof. K. Ravi — *Member-Secretary*
Head, Department of Physiology
V.P. Chest Institute
University of Delhi, Delhi-110 007

Dr Anuradha Chowdhary — *Member*
Associate Professor, Department of Medical Mycology
V.P. Chest Institute
University of Delhi, Delhi-110 007

Dr Ritu Kulshrestha — *Member*
Assistant Professor, Department of Pathology
V.P. Chest Institute
University of Delhi, Delhi-110 007

Dr D.N. Rao — *Main Nominee of CPCSEA*
Professor, Department of Biochemistry
All India Institute of Medical Sciences
Ansari Nagar
New Delhi - 110029

Dr Om Singh — *Link Nominee of CPCSEA*
National Institute of Immunology (in the event of non availability of
Aruna Asaf Ali Marg Dr D.N. Rao)
New Delhi - 110067

Dr B.B. Batra — *Nominee of CPCSEA*
A-316, Sarita Vihar (Non Scientific Socially Aware
New Delhi – 110076 Member)

Dr (Mrs) Promodkumari — *Nominee of CPCSEA*
Professor, Department of Pharmacology (Scientist from outside the
University College of Medical Sciences Institute)
University of Delhi, Delhi-110095

Dr Rajinder Bajaj — *Member*
Veterinarian
V.P. Chest Institute
University of Delhi, Delhi-110 007

ORGANISATIONAL STRUCTURE

DIRECTOR

RAJENDRA PRASAD, MD, DTCD, FAMS, FCCP (USA), FRCP (Glasgow), FNCCP, FCAI FIAB, FIMSA, FCCS, DSc (Hon. Causa)

Biochemistry

S.K. Bansal, MSc, PhD
Professor

Biostatistics

Mujeeb-ur-Rahman, MSc, PhD, PGDCP
Assistant Professor

Cardio-respiratory Physiology

S.K. Chhabra, MD
Professor

Clinical Biochemistry

Vishwajeet Rohil, MD
Assistant Professor

Medical Mycology

(Mrs) Anuradha Chowdhary, MD
Associate Professor

Microbiology

(Mrs) Malini Shariff, MD, PhD
Associate Professor

(Mrs) Malini Shariff, MBBS, MD, PhD
Associate Professor

(Mrs) Mandira Varma-Basil, MD, DNB
Associate Professor

Pathology

(Mrs) Ritu Kulshrestha, MS (Biomedical Sciences), DNB (Pathology), MNAMS
Assistant Professor

Pharmacology

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

(Mrs) Anita Kotwani, MSc, PhD
Associate Professor

(Mrs) Kavita Gulati, MSc, PhD
Associate Professor

Physiology

K. Ravi, MSc, PhD
Professor

Vishal Bansal, MD, DNB, PhD, MNAMS, FCCP (USA)
Assistant Professor

Respiratory Medicine

Rajendra Prasad, MD, DTCD, FAMS, FCCP (USA), FRCP (Glasgow), FNCCP(I), FCAI, FIAB, FIMSA, FCCS, DSc (Hon. Causa)
Director, Professor

S.N. Gaur, MD, PhD (Medicine), FCCP (USA), FNCCP (I), FCAI
Professor

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

Dr Shweta Bansal, MD
Assistant Professor (Adhoc) (Joined on 06.09.2013)

Respiratory Allergy and Applied Immunology

Raj Kumar, MD, MNASc, FNCCP (I), FCAI, MIAOH, MAAAAI
Professor

Balakrishnan Menon, MD, DMRD
Associate Professor

Dr Nitin Goel, MD
Assistant Professor (Adhoc)

Respiratory Virology

(Mrs) Madhu Khanna, MSc, PhD
Associate Professor

Viswanathan Chest Hospital
Officer-in-Charge
Rajendra Prasad

Library

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

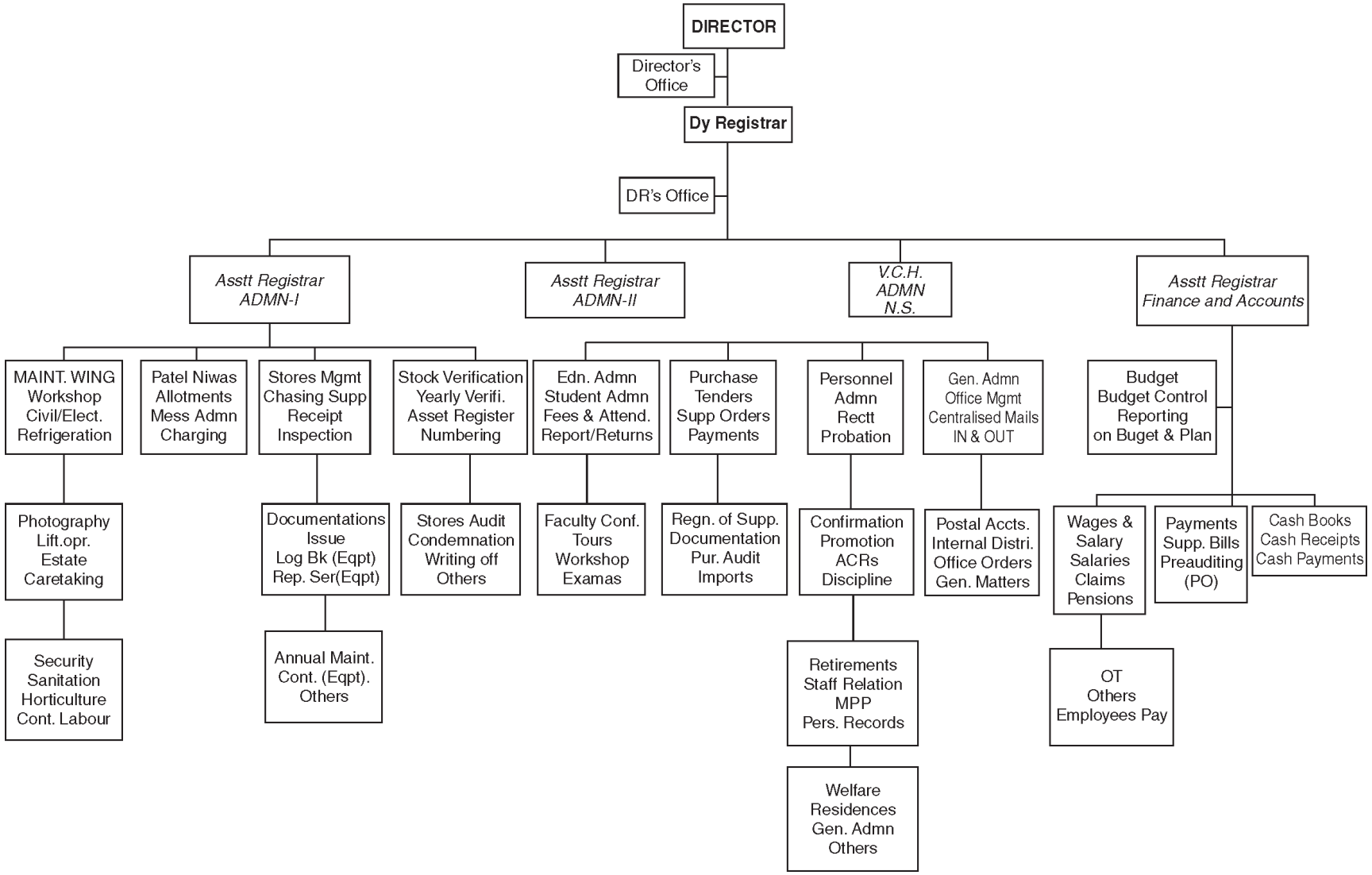
Animal House

Rajinder Bajaj, BVSc and AH
Veterinarian

Administration

P.R. Santhanam, MA (Publ Admn), MHRM, MBA, LLB, PGDPM
Deputy Registrar

ADMINISTRATIVE STRUCTURE



Viswanathan Chest Hospital

The Viswanathan Chest Hospital (VCH), formerly known as Clinical Research Centre, is the hospital wing of the Institute with the following Departments. It provides specialised investigations and treatment to patients referred to this Institute.

- Respiratory Medicine
- Respiratory Allergy and Applied Immunology
- Cardio-respiratory Physiology
- Radiodiagnosis and Imaging
- Clinical Laboratories of Biochemistry and Microbiology
- Anaesthesia
- Thoracic Surgery

Facilities at Viswanathan Chest Hospital

- Outpatient Department
- In-patient Facility with 128 beds
- 24 Hours Respiratory Emergency
- 8 bedded Respiratory Intensive Care Unit (with facilities of 6 ventilators),
- Pulmonary Function Laboratory
- Sleep Laboratory
- ECG
- Allergy and Applied Immunology Laboratory
- Clinical Hematology and Pathology Laboratory
- Clinical Biochemistry Laboratory
- Radiology Unit
- 64 Slice MDCT Scan Center
- Microbiology Laboratory
- Tobacco Cessation Clinic
- Yoga Therapy and Research Centre
- Cardio-pulmonary Rehabilitation Clinic
- Picture Archiving and Communication Systems (PACS)
- Medical Records Section

Specialized investigations at VCH

- Pulmonary function tests
- Arterial blood gases
- Electrocardiogram
- Polysomnograms (Sleep Laboratory)
- Fibreoptic bronchoscopy
- Medical Thoracoscopy
- Respiratory Allergy Skin Tests
- Clinical Immunology

- Computed Tomography
- Plain Radiography
- Ultrasound
- Guided FNAC / Biopsy
- BACTEC System for Tuberculosis

Detailed data of patients attending VCH during the year:

Number of new patients attending OPD	:	12637
Number of old patients visiting OPD	:	52485
Total		**65122**

Number of indoor patients

General Wards	:	2234
Emergency Wards	:	2035
Total		**3873**
Emergency treatment provided	:	16999
Total number of patients treated in ICU	:	410

Number of routine and specialised investigations done at VCH

Pulmonary function tests	:	19172
Bronchoscopy	:	282
Bronchoalveolar lavage	:	54
CT scans	:	3662
Ultrasound examinations	:	21
X-rays	:	22713
Electrocardiogram	:	7037
Polysomnograms	:	196
Arterial blood gases	:	9732
HIV testing	:	435
Serum IgE	:	3770
ANA, c-ANCA, p-ANCA, SCL-70	:	700
HBsAg + HCV	:	32
Clinical biochemistry	:	49325
Skin tests	:	1336

Mycology (VPCI and other hospitals)

Nature of Specimen		*No.*
Sputa	:	1492
Blood specimen	:	1057
Bronchial lavage / aspirate / washings / Endotracheal aspirate / pleural fluid	:	395
Tissue biopsies / nasal polyps / skin scrapings	:	47
Miscellaneous (Blood culture, Urine , swabs / CSF / FNAC)	:	344
Total		**3335**

Bacteriology Laboratory

Clinical specimens processed for isolation and identification of aerobic pathogens

Nature of Specimen		*No.*
Sputum	:	3044
Urine	:	202
Bronchial aspirate	:	240
Pleural fluid	:	77
Blood	:	241
Endotracheal aspirate	:	162
Pus / (FNAC / Tips)	:	29
Cerebrospinal fluid (CSF)	:	01
Total	**:**	**3996**

Mycobacteriology Laboratory

Clinical specimens processed for acid-fast bacilli (AFB) (Direct smear and culture examination)

Nature of Specimen		*No.*
Sputum	:	6483
Mycobacterial growth indicator tube (MGIT)	:	369
Bronchial aspirate	:	323
Pleural fluid	:	55
Endotracheal aspirate	:	112
Pus	:	29
Knee aspirate	:	04
Biopsy	:	10
Urine	:	02
Fine needle aspiration cytology (FNAC)	:	22
Cerebrospinal fluid (CSF)	:	02
Blood	:	01
Endobronchial lung biopsy (EBLB)	:	02
Chest tube clot	:	01
Lymph node	:	02
Total	**:**	**7417**
Drug susceptibility testing - LJ Medium	*:*	*50*

Pathology

Section		***No.***
Haematology	:	22112
Coagulation laboratory	:	715
Histopathology	:	361
Cytopathology	:	557
Clinical Pathlogy	:	1597

Cell Culture Laboratory

The Cell Culture laboratory was established and made fully functional during this period. Research work on the A549 human alveolar epithelial cell line is presently being performed. The Insulin Growth factor signalling pathway, IGFBP5, IGF-1, SP-C, TGF-ß levels are being studied by immunocytochemistry, semiquantitative PCR and real-time PCR.

Tobacco Cessation Clinic

Tobacco Cessation Clinic (TCC) at VPCI, Delhi, a specialised service for peoples who are habituated or addicted to smoking / tobacco chewing are provided assistance and support to quit the use of tobacco. The aim of the TCC is to educate people from all spheres through awareness campaigns, with main focus on college students because most of the tobacco users get into this habit in the initial college years.

The TCC is being operational since November 2001 under the supervision of Prof. Raj Kumar, Head, National Centre of Respiratory, Allergy, Asthma and Immunology, VPCI, Delhi. The clinic provides free counselling, examination and diagnostic testing (Monday to Friday; 9 AM to 5 PM). The TCC also conducts programmes outside the Centre, therby helping the smokers / tobacco habitués to quit their addictions effectively, and also maintaining long-term and even permanent abstinence by cessation techniques, counselling and pharmacotherapy.

The TCC conducted workshops regularly in different parts of Delhi, to train the physicians, counsellors, volunteers and other stake holders involved in smoking cessation. Since inception, TCC conducted 55 educational programmes for physicians, paramedical professionals and general public.

The activities of TCC were expanded in the year 2002 with the financial support from World Health Organization (WHO) and Ministry of Health and Family Welfare, Government of India to make it a more comprehensive programme Centre. Further, the TCC was upgraded in the year 2009 as Resource Centre for Tobacco Control.

The TCC has prepared educational materials in the form of booklets, pamphlets, stickers, etc., for physicians and general public. Prof. Raj Kumar edited a book on Smoking Cessation and was released by Chief Guest Hon'ble Justice Shri K.G. Balakrishnan, Chairman, National Human Right Commission (NHRM) and Former Chief Justice of India on 30.05.2013 on the occasion of World No Tobacco Day 2013.

Till date, 5915 new tobacco users and 2409 follow up tobacco users were availed the services of TCC. The tobacco users seen during camps and various educational programmes have not been included here.

The TCC is committed to help the people who want to quit smoking / tobacco use.

The Institute in association with the Society for Tobacco Control organized an "Uptade on Chronic Obstructive Pulmonary Disease (COPD)" on 8th September 2013.

Yoga Therapy and Research Centre

The Yoga Therapy and Research Centre [in collaboration with the Morarji Desai National Institute of Yoga (MDNIY), New Delhi], runs on every Moday to Saturday from 8 AM to 4 PM at VPCI under the guidance of a Nodal Officer (Dr B.K. Menon) and VPCI Director. The Centre has a staff of four members with one yoga physician, two yoga instructors and an attendant.

Yoga classes runs in different batches from 8-9 AM (Training classes), 9-10 AM, 10-11 AM, 11 AM -12PM, 12-1 PM and 1-2 PM, 3-4 PM for therapy.

Yoga sessions are specially designed for the management of different health disorders, like bronchial asthma, hypertension, stress, obesity etc. Patient first reports to yoga OPD at VCH of VPCI (9.00 AM -3.00 PM) every Tuesday, Wednesday, Thursday and Friday of the week. After obtaining case history of the patient, necessary counselling is given by the yoga physician. Then the patient is advised to undergo yoga training and educational session, according to individual's health status for a particular period. Once the training sessions are completed, the patient is re-examined to note the improvement made by him / her by the yoga physician. Then patient is advised for home programme with an advice to attend the training sessions once or twice a week at the Yoga Centre for better health and quality of life and to keep their records. Special yoga sessions for staff of VPCI are also arranged time to time.

Following numbers of patients were attended the Yoga Therapy and Research Centre during the year:

Outdoor Patients	435
Indoor Patients	1262
Promotional Health Programme	304
Total	**2001**

Outdoor Patients

Bronchial asthma	64
Stress	13
Chronic obstructive pulmonary disease	11
Hypertension	56
Obesity	100
Cervical spondylitis	13
Migraine	27
Backache	45
Allergic rhinitis	22
Arthritis	40
Diabetes	42
Tuberculosis	02

Indoor Patients

Bronchial asthma	324
Chronic obstructive pulmonary disease	697
Interstitial lung disease	67
Sinusitis	67
Pneumonia	36
Tuberculosis	71

Under the public lecture series initiated by Director, VPCI, Dr Iswar V. Basavaraddi, Director, Morarji Desai National Institute of Yoga, New Delhi gave a talk on "Yoga for Health and Disease" on 19th March 2014.

Cardio-pulmonary Rehabilitation Clinic

Cardio-Pulmonary Rehabilitation Clinic at Vishwanathan Chest Hospital, VPCI is involved in the management of patients with chronic respiratory diseases such as Chronic Obstructive Pulmonary Disease (COPD), Bronchial Asthma (BA), Interstitial Lung Diseases (ILD), Bronchiectasis, Post-TB sequelae and Obstructive Sleep Apnoea (OSA) who have exercise limitation and are often disabled in activities of daily living (ADL) due to shortness of breath despite being on optimal pharmacological treatment including non-invasive ventilation (NIV) and long-term oxygen therapy (LTOT). This disability leads to functional dependence, loss of job, social isolation and depression. Recurrent medical expenses and hospital admissions along with loss of income adds to socio-economic burden on the family and health care resources.

Patients attending Vishwanathan Chest Hospital, VPCI, are referred for consultation and enrollment in this programme, which is designed to help patients to improve their functional capacity so that they can live independently in the community.

Clinic Timings: **Monday to Friday: 9.00 A.M. to 2.00 P.M.**

The comprehensive rehabilitation programme includes:

- Assessment of patients prior to the enrollment-in or -discharge from the rehabilitation programme.
- Supervised exercise training and education sessions for enrolled patients.
- Breathing retraining, education and scheduling for rehabilitation of newly referred patients.

Comprehenshive rehabilitation programme comprises of both educational and training sessions, that include topics on energy conservation, lung health, bronchial hygiene, chest physiotherapy, nutrition, optimization of medication intake, domiciliary oxygen usage, stress management, breathing retraining, inspiratory muscle training and strength and endurance training of upper and lower limbs.

Numbers of patients attended in Cardio-pulmonary Rehabilitation Clinic during the year.

o Breathing retraining and education	:	265
o Chest Physiotherapy	:	747
o Supervised Rehabilitation Programme (Intensive and Maintenance)	:	69

Animal House

The Institute Animal House is registered with the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA), Animal Welfare Division, Government of India, for breeding and conducting experiment on small Laboratory Animals vide registration no. 170/1999/CPCSEA. Dated 1st December, 1999

The Animal House of the Institute provide optimum environment for experimental animals, which is essential for obtaining reliable experimental research. The most reliable result will be obtained from animals that are healthy, unstressed and at ease with their surroundings.

The different species and strains of small laboratory animals are bred and maintained to supply the quality animals as per the requirement. Institute's Animal Ethical Committee (IAEC) keeps a check to promote the humane approach of animal experimentation with the basic objective of providing specifications that will enhance animal care and quality in the pursuit of advancement of scientific knowledge that is relevant to humans and animals.

The Animal House is managed by a well qualified Veterinarian. The other staff includes, Technical Assistant and Attendants who are experienced and trained in modern methods of animal care, breeding and husbandry. The Animal House has a compliance (Assurance) with the standards of Public Health Services (PHS), Policy on Human Care and Use of Laboratory Animals, Office of Laboratory Animal Welfare (OLAW), National Institutes of Health, Bethesda, USA.

Library

The VPCI Library is providing patient care information support and catering to the academic needs of the faculty members, resident doctors, researchers and students alike for research purposes. It forms a part of Institute support services and acquires thought process, collect and disseminates global information in the field of Biomedical Sciences with specialization in pulmonary diseases and allied sciences. The library started in 1955, but it has back volumes of several journals more than 100 years old. Most of the journals have complete sets of volumes originating right from their treatises of medicine which are readily available for basic and historical insights. It also has a very good comprehensive collection of serial publications like Annual Reviews, Years books, Recent advances. The Institute has one of the best library in the field of Pulmonary Disease and Allied Sciences having 10,038 Books, 23,157 bound Journals, 150 CD's, 508 Thesis and 105 National and International Reports. A total of 112 Journals (105 International and 07 National) are being subscribed by the library, 16 Journals (06 International and 10 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. To cover the need for daily coverage of news related to the medical field, Library is also subscribing four English and four Hindi newspapers. This has encouraged the inculcation of reading habits of all alike.

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, reference and specific information, if required. 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 services have been provided right on the desktop of each Faculty Member through LAN and Leased line connectivity of 2 Mbps form MTNL. Library also provides inter-library loan facilities and reprographic services on demand.

The Library follows an open access system. Library is equipped with modern information technology equipment's and continues to provide Internet / e-mail services to the users to access CAS (Current Awareness Services) and SDI (Selective Dissemination of Information) services. These services are provided to the users in the form of online / offline through e-mail and print during the year. Library uses "LibSys 4.0" Software package, which is an integrated multi-user library management system that supports all in-house operations of the Library. The ''LibSys 4.0'' consists of modules on acquisition, cataloguing, circulation, serials, article indexing and OPAC. The library OPAC (Online Public Access Catalogue) can be accessed through web via http: / / 192.168.1.129:8080 / jopacv11 / html / SearchForm

The Library facilities are available to Members / Users of Delhi University from Monday to Friday from 8:30 AM to.7:00 PM and on Saturday's from 9.00 to 5:00 P.M.

PUBLICATION DIVISION

Publication Division of the Institute has been publishing a quarterly periodical, ***the Indian Journal of Chest Diseases and Allied Sciences*** **(IJCDAS)**, in collaboration with the National College of Chest Physicians (India). The Journal was started in 1959 by (late) Prof. R. Viswanathan, Founder-Director of VPCI. The Journal has a wide national and international circulation and is indexed in PubMed, 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>.

The Division is also responsible for documentation and dissemination of research output through Annual Report and other publications of the institute.

Ist Newsletter of the Institute was released by Prof. P.N. Tandon, Chairman, G.B. of the Institute.

DEPARTMENTAL ACTIVITIES

Biochemistry

Research

1. Studies on erythrocyte membrane protein profile and oxidant and antioxidant status of blood in bronchial asthma

This study aimed to investigate the oxidative imbalance in asthma and its effect on protein profile of erythrocyte membranes.

In this study, patients with asthma showed increased oxidative stress which was evidenced by increased protein carbonyls ($P<0.0001$), increased lipid peroxidation products ($P<0.0018$), decreased glutathione peroxidase activity ($P<0.0035$), increased total glutathione ($P<0.0023$), decreased SOD activity ($P<0.0059$) and decreased catalase activity ($P<0.0125$) in red cells. The protein profile of the erythrocyte membrane in 2-dimensional electrophoresis study showed down-regulation and up-regulation of some proteins in bronchial asthma as compared to controls, which may be correlated to the oxidative imbalance.

2. Erythrocytic membrane proteins: expression proteomics and their significance in bronchial asthma

The present study using proteomic technology reconfirmed our preliminary study which showed different expression patterns of membrane proteins of erythrocytes in the pH range of 4.0 – 5.5 and of molecular weight upto 200kDa in asthmatic subjects as compared to healthy controls.

3. Pharmacogenomics of bronchial asthma: a study on polymorphism in beta$_2$ adrenoceptor (*ADRB2*) and corticotropin releasing hormone receptor 1 (*CRHR1*) genes in responders and non-responders to salbutamol and budesonide

The study was conducted to identify the genetic variations in beta$_2$ adrenoceptors (*ADRB*2) and the corticotropin releasing hormone receptors 1 (*CRHR*1) genes in responders and non-responders to beta$_2$ agonist (salbutamol) and corticosteroids (budesonide) in asthmatic patients and healthy individuals in Indian population.

In this study, we observed that there was no detectable deviation from Hardy-Weinberg equilibrium in either data set. Genotype percentage were in the order of CC>AC>AA in controls and AC>CC>AA in patients. X^2 test was performed to examine whether there was any significant difference between cases and controls. It showed $X^2= 21.3$, $p<0.001$(Yates corrected) which was significant. In the subjects having A allele, the calculated odds ratio was 5.31, suggesting an association of *CRHR1* gene polymorphism with asthma. The studies are being continued to find out the association of other polymorphisms in *ADRB2* and *CRHR1* genes with bronchial asthma in north Indian population.

Biostatistics

The Department of Biostatistics plays a vital role and forms a supportive department of the research activities of the Institute. This department provides statistical support for the research activities i.e. from planning stage of studies or surveys, protocol development designing study schedules / forms, sample size and power determination, collection and validation of data, collation, compilation, generating tables and graphics, analyses of data, and interpretation of the results of various research studies, in order to quantify the effect of risk factors and health interventions on individuals or population. The statistical analysis is being carried out using Statistical Package for Social Sciences (SPSS).

The Department of Biostatistics conducts regular teaching programs for the postgraduate (MD / DTCD) and doctoral (DM / PhD) students. The Department also has the responsibility of documenting and maintaining the database of various research protocols of DM / PhD / MD and studies conducted in the institute. The Department has identifiable and collaborative research projects with other department of the Institute.

The Department has also been entrusted with the responsibility of preparing various reports (monthly, quarterly, half yearly and yearly) of VPCI (pertaining to patients care, patients investigations, patient status, morbidity pattern, communicable and non-communicable diseases; students, faculty and staff, income, expenditure, infrastructure, etc.) and their timely submission to various governmental agencies such as, Ministry of Health and Family Welfare, Government of India; Directorate of Health Services, Government of Delhi; University of Delhi, UGC etc. The Department also shoulders the responsibility of online reporting of vital events (death registration) of VPCI.

Research

1. To assess the prevalence, screening and recognition of anxiety and depression in chronic obstructive pulmonary disease patients

Chronic obstructive pulmonary disease (COPD) is a disease with multiple co-morbidities. Two of the most common and least treated co-morbidities of COPD are 'Anxiety and Depression'. However, only a few prospective studies have addressed how to diagnose and manage these disorders and determine their impact on health status among patients with COPD. No studies in India have examined the joint occurrence of anxiety and depression together in the COPD patients.

A total number of 153 patients with age ranged 40 to 82 years (61.66 ± 8.94) were screened for anxiety and depression, using Generalized anxiety disorder (GAD-7) and Patient health questionnaire (PHQ-9)] schedules, the prevalence of anxiety and depression present in COPD patients was found to be 82% and 89% respectively.

2. To translate, validate and psychometric profile of 'Hindi' version of depression, anxiety and stress scale 42-item (DASS-42)

The Depression Anxiety Stress Scales (DASS) has been used across the world as research instrument to measure psychological aspects such as depression, anxiety and stress. This instrument has been translated in 28 other international languages. Patients with chronic airway lung disease such as chronic obstructive pulmonary disease (COPD) often experience depression, anxiety and stress. The co-morbid, psychiatric disturbances are frequently overlooked or regarded as natural feature of the lung disease. A co-morbid, psychiatric disorder is possible to treat, and successful treatment leads to improved quality of life and less restricted general functioning.

A total number of 115 patients with age ranged from 40 to 79 years were administered Hindi version of the DASS-42 questionnaire to the patients with COPD. The reliability (internal consistency) was measures through Cronbach's alpha of each subscale were high (DASS42-D subscale 0.92; DASS42-A subscale 0.86; DASS42-S subscale 0.82). The overall score, which includes all items, also had high consistency (Cronbach's alpha = 0.95). Mean and standard deviation of scores were 12.22±10.41, 14.20±8.43, 15.89±8.17 for subscales depression, anxiety and stress respectively. Overall, score which includes all the three subscales were 42.30±24.74.

Cardio-respiratory Physiology

Research

1. Development of reference standards for spirometry, static lung volumes and single breath diffusion capacity for different regions in India

Most of the studies on spirometry in India are several decades old and were carried out with equipment and measurement protocols that have since changed due to technological advancements. Thus, their current utility and validity are questionable. No equations have been developed for diffusion capacity parameters in India. Recognizing this unmet need, we completed a multicentric study to develop regression equations for spirometric parameters, lung volumes and diffusion capacity, coordinated by the Institute and funded by the Indian Council of Medical Research at four centers: North (Delhi), South (Bangalore), East (Kolkata) and West (Mumbai). Similar methodology and equipments as per the standardisation guidelines of the American Thoracic Society-European Respiratory Society was used at all the centers. More than 1600 subjects were finally included on the basis of technically acceptable tests. FVC, FEV_1 and PEFR and other flow rates FVC, FEV_1, FEV_1 / FVC ratio, PEFR, F_{50}, F_{75} and F_{25-75}, were found to have a good correlation with height and age with weight making only a small contribution to PEFR. The FEV_1 / FVC ratio was found to decrease with increasing age. Diffusion capacity was observed to decrease with age. Both linear and nonlinear equations were developed to select the ones with the best fit to the data.

This is multicentric study using a standardized and uniform methodology to develop regression equations in different populations in the country is the first one of its kind in India. It is hoped the equations will enable a more accurate diagnostic assessment and monitoring of patients with chest diseases.

2. Heart rate variability in chronic obstructive pulmonary disease: association with systemic inflammation and clinical implications

Cardiac autonomic dysfunction is an independent determinant of adverse outcomes in many diseases. Though reported in chronic obstructive pulmonary disease (COPD), literature on the relative changes in sympathetic and parasympathetic components is equivocal, their association with clinical and physiological parameters is poorly defined and the relationship with systemic inflammation has not been explored. Considering the evolving importance of systemic inflammation and cardiovascular morbidity in COPD, we investigated the cardiac autonomic modulation using Heart Rate Variability (HRV) measurements to address these gaps in knowledge. Sixty three patients of COPD and 36 controls underwent spirometry, estimation of diffusion capacity, six-minute walk test and measurement of serum interleukin-6 and high-sensitivity C-Reactive protein. Cardiac autonomic activity was evaluated by standard five-minute HRV recordings to obtain time- and frequency-domain indices. We observed that HRV indices of overall autonomic modulation, the standard deviation of time intervals between consecutive normal beats (SDNN) and total power, were greater in patients with higher levels of indices of both parasympathetic and sympathetic activity. The heart rate was significantly higher in patients indicating an overall sympathetic dominance and was inversely correlated with diffusion capacity. Serum interleukin-6 was inversely correlated with pNN50, an index of parasympathetic activity, and positively with LF / HF ratio, that reflects sympathetic: parasympathetic balance. None of the HRV indices was significantly correlated with physiological parameters of disease severity. It was concluded that patients with COPD have increased cardiac autonomic modulation with sympathetic dominance. This is associated with decreased lung diffusion capacity and with systemic inflammation.

3. Sequential or concurrent occurrence of tuberculosis and sarcoidosis

We carried out a retrospective review of case records of patients who had been under treatment with a regular follow-up for sarcoidosis during the last ten years at our center**.** Records of 148 patients with histologically confirmed sarcoidosis were reviewed. Patients in whom there was an unequivocal evidence of tuberculosis either before or after the diagnosis of sarcoidosis were included. Those who had developed active tuberculosis during treatment of sarcoidosis with corticosteroids were excluded. The basis of diagnosis of tuberculosis and sarcoidosis in these patients was retrieved from the records. Four cases where both diseases were diagnosed unequivocally either concurrently or sequentially, spaced by asymptomatic periods

were identified. Our observations and other reports in literature serve to emphasize that recurrence of symptoms after an apparently satisfactory treatment of one of these diseases may not be a relapse of the same disease but the appearance of the second disease in sequence.

4. Nocturnal hypoxaemia and endothelial dysfunction in chronic obstructive pulmonary disease

Several studies have shown that recurrent transient hypoxemia during sleep is frequent in patients with chronic obstructive pulmonary disease (COPD) with upto 50% patients experiencing it. The documented role of intermittent hypoxaemia in the pathogenesis of endothelial dysfunction provides a hypothesis that conditions of intermittent hypoxaemia other than OSAHS may be associated with endothelial dysfunction. Nocturnal hypoxaemia in COPD may be looked upon as a state of intermittent hypoxaemia. A study was therefore started to study the clinical, physiological and radiological predictors of nocturnal hypoxaemia in COPD, to assess the functional impact of nocturnal hypoxaemia on patients, to study night-time symptoms in patients and evaluate their association with nocturnal hypoxaemia, to investigate the association between endothelial dysfunction, systemic inflammation and autonomic dysfunction and non-apnoeic nocturnal hypoxaemia and to study the association between nocturnal hypoxemia and cardiac arrhythmias in COPD. Fifty eight subjects have been studied so far. Nocturnal hypoxaemia was detected in more than 80% of patients. The study is continuing.

Clinical work and specialized diagnostic investigations carried out in the department

(a) Clinical

Patients of different respiratory diseases were investigated and treated in the clinical unit of the department. Patients for research in various areas of Pulmonary Medicine and Cardiorespiratory physiology were also recruited from here. A total of nearly 2000 new cases were examined and treated while 12000 already registered cases were followed-up for continued management.

(b) Critical Care

In the intensive care units, 410 patients were admitted. Majority of patients belonged to the category of acute type II respiratory failure, most often due to acute exacerbation of COPD. Pneumonia with severe sepsis, acute respiratory distress syndrome, acute severe asthma, chest infections complicating bronchiectasis and previous tuberculosis were the other major diseases managed. 125 cases received mechanical ventilation while 225 cases received noninvasive ventilation.

The ICU acquired two new transport ventilators, four multiparameters monitors, one hemodynamic monitor and two capnographs.

(c) Laboratory Diagnostic Services

Lung function testing (spirometry, lung volume estimation, diffusion studies, exercise challenge tests) was carried out in patients attending the VCH. A total number of 19172 lung function tests were carried out. Out of these, 1100 included lung volume and diffusion tests. 125 exercise challenge tests were performed.

Clinical Biochemistry

The Department of Clinical Biochemistry is providing diagnostic services for the patient care and also actively involved in the research and teaching of MD (Medical Biochemistry) and PhD students. The Department is also providing summer training to students from other institutions / colleges.

Research

1. Studies on implications of epigenetic modulation due to histone hyperacetylation in tumor cells induced by drugs targeting protein acetylation system through a novel mechanism

We have extended our previous studies to assay CRTAase in human non-small cell lung cancer A549 cell line culture tumor cells *in vitro* and CRTAase catalyzed modification of Histone by various combinations of PAs [Ellagic acid peracetate, Querecitin Pentaacetates, 6-Acetoxy Quinolone and 7, 8-Diacetoxy-4-Methyl Coumarin (DAMC)] and valproic acid as histone deacetylase (HDAC) inhibitor. Apoptosis studies are being carried out by florescent microscopy and Flow-cytometric analysis. Extent of histone protein acetylation is being determined by Western blotting using commercially available specific anti-acetyl histone (Ac-Lys) H3 and H4 Antibodies.

The obtained data clearly demonstrated increased apoptosis in all treatment groups compared to DMSO control. Alone all polyphenolic acetates (DAMC, EAA, QPA and 6-AQ) showed significant increase in apoptosis compared to control and CAL alone. VA and CAL alone did not show any significant increase in apoptosis compared to control. G1, G2 and S phase showed decreased % of cell in all treatment groups compared to control.

2. To investigate the role of calreticulin transacetylase mediated histones hyperacetylation induced epigenetic modulation by polyphenolic acetates in genes implicated in lung tumorigenesis

The objectives of the study were the following: *(i)* to establish the human non-small cell lung cancer A549 cell line culture, *(ii)* to establish transacetylation activity of calreticulin using histone protein as target, *(iii)* micro-array profiling, *(iv)* to validate, confirm and quantify the transcription product of the selected genes after micro-array profiling along with the above mentioned genes of interest by real-time–PCR, *(v)* to transfect the cells with Calreticulin R (Cal R) gene, to induce Hyperacetylation by treating the CRTAase gene transfected cells with various polyphenolic acetates, and *(vi)* to study histone hyperacetylation induced modulation of gene expression of various genes by real-time-PCR which are responsible for Tumor suppression, cell cycle arrest and apoptosis and also by micro-array profiling.

3. To elucidate the molecular mechanism of development of COPD in smokers in north Indian population

In this study, quantification and single nucleotide polymorphism in ADAM 33, MMP1, MMP9 and MMP12 gene products in blood of all the subjects in the study were done. Additionally, the association of COPD and smoking with SNPs in the candidate genes- ADAM33, MMP1, MMP9 and MMP12 genes in North Indian population was studied.

The presence of increased concentration of Matrix metalloproteinases (ADAM33, MMP1, MMP9 and MMP12) in COPD and smokers along with 2 SNPs in ADAM33 and MMP9 genes and their positive correlation with COPD and smoking showed that the genetic factors too play a role in development of COPD in smokers.

4. A study to correlate the activity of ADAM 33 gene protein with oxidative stress in asthma

The study was conducted in patients with asthma, and healthy control subjects.

The objectives of the studies were to determine the lipid peroxidation, vitamin C and glutathione (GSH) levels, to estimate ADAM-33 gene protein levels in all the groups under study and to correlate ADAM-33 protein levels with MDA levels, vitamin C and GSH levels in all the groups under study.

In patients with asthma, there was an increase in the ADAM33 level, an increase in MDA level and a decrease in vitamin C and GSH in the serum compared to the control. There is also significant negative correlation between ADAM33 level and vitamin C and GSH but not between ADAM33 and MDA level.

Medical Mycology

Research

1. Multilocus sequence typing of *Candida africana* from patients with vulvovaginal candidiasis in New Delhi, India

Candida africana is an opportunistic yeast pathogen that was proposed as a new species within the *Candida albicans* species complex. Based on commonly used methods in most clinical microbiology laboratories, this species is likely to be misidentified as the typical *C. albicans* because of their close phenotypic resemblance. We investigated the prevalence of vulvovaginal candidiasis due to *C. africana* in an STD clinic in India and analyzed the genetic relatedness of these *C. africana* isolates with those outside India. A total of 283 germ-tube-positive yeasts were identified by VITEK2. Molecular characterisation of all isolates was carried out by *hwp1*- gene-specific PCR. Of 283 germ-tube-positive yeast isolates, four were identified as *C. africana* using *hwp1*-gene-specific PCR. All *hwp1* PCR positive *C. africana* were subjected to antifungal susceptibility testing, ITS and D1/D2 region sequencing and were typed by using MLST approach. Similar to *C. africana* isolates from the United Kingdom and unlike those from Africa, the Indian *C. africana* grew at 42 °C. Sequencing of eight gene fragments in MLST identified all four strains to have different genotypes not reported previously. Furthermore, though the Indian *C. africana* isolates were susceptible to most of the 14 tested antifungal drugs, differences in susceptibility were observed among the four strains. Our results indicate genetic and phenotypic heterogeneity among *C. africana* from different geographical regions. Due to lack of data on epidemiology and genetic variability of this underreported yeast, more studies using molecular methods are warranted.

2. Multidrug-resistant endemic clonal strain of *Candida auris* in India

Candida auris has recently been described as an agent of fungemia, It is notable for its antifungal resistance. We characterized 12 clonal *C. auris* strains from bloodstream infections from as many patients, collected during 2009–2011 at 2 hospitals in Delhi, India. In addition, a total of 15 *C. auris* isolates, originating from seven cases of fungemia, three cases of diabetic gangrenous foot, and one case of bronchopneumonia from a tertiary care hospital in south India, were also investigated. All of the isolates were identified by sequencing and 14 of the south Indian isolates along with 12 *C. auris* isolates Delhi, two each from Japan and Korea were genotyped by amplified fragment length polymorphism. *In vitro* antifungal susceptibility testing by broth microdilution method. *Candida auris* isolates were misidentified as *Candida haemulonii* by VITEK. All the north Indian isolates showed high MICs of fluconazole whereas south Indian isolates were resistant to fluconazole and 11 isolates were resistant to voriconazole (MIC $\geq$1 µg/ml). Forty-seven percent of the *C. auris* isolates were resistant to flucytosine (MIC $\geq$64 µg/ml) and 40% had high MIC ($\geq$1 µg/ml) of caspofungin. Breakthrough fungemia developed in 28.6% of patients and therapeutic failure in 4 (66.7%) patients. Interestingly, the 26 Indian *C. auris* isolates were clonal and distinct from Korean and Japanese isolates. *Candida auris* is a potential emerging pathogen that can cause a wide spectrum of human mycotic infections. The prevalence of a *C. auris* endemic clonal strain resistant to azoles and other antifungals in Indian hospitals is worrisome.

3. *Candida nivariensis* as an etiologic agent of vulvovaginal candidiasis in a tertiary care hospital of New Delhi, India

Candida nivariensis is a cryptic species, phenotypically indistinguishable from *Candida glabrata* and identified by molecular methods. Of 100 phenotypically identified *C. glabrata* isolates originating from vaginal swabs, 4 were identified as *C. nivariensis* by polymerase chain reaction and confirmed by sequencing. All of the *C. nivariensis* isolates exhibited white colonies on CHROMagar. Phylogenetic analysis revealed genotypic diversity in the *C. nivariensis* isolates originating from within or outside of India. Barring a solitary *C. nivariensis* isolate with MIC, 16 µg/mL of fluconazole, the rest were susceptible to voriconazole, itraconazole, posaconazole, isavuconazole, amphotericin B, and echinocandins. The patient with high fluconazole MIC did not respond to fluconazole therapy. It is suggested that the prevalence of this species is likely to be much higher than apparent from the sporadic published reports.

Microbiology

Research

1. Phenotypic and molecular characterisation of drug resistant *Pseudomonas aeruginosa* Isolates from clinical samples

The objective of the study was to study the prevalence of various ß-lactamases among the resistant clinical isolates of *P. aeruginosa* by phenotypic and molecular methods. To type these resistant isolates by randomly amplification of polymorphic DNA (RAPD) and multi locus sequence typing (MLST) and to compare with world isolates.

Sixty non-repetitive clinical isolates of *Pseudomonas aeruginosa* from patients attending Vallabhbhai Patel Chest Institute , Delhi and were tested for antibiotic susceptibility. Resistant isolates were screened for various ß-lactamases. They were further confirmed by phenotypic methods and PCR. RAPD was done on 55 isolates and analysed for clonal types. MLST was done for 27 isolates and were compared with world data.

Resistance varied from 50-100% to various antibiotic groups and 8.3% to colistin. Out of the 60 isolates 40 (66.66%) were MDR, out of which 31(51.66%) were XDR and 1 (1.66%) was PDR. 100%, 100%, 100%, 98.3% and 31.7%, 25%, 98.3%) 16.7% were screening and phenotypic confirmatory test positive for Carbepenemases, MBLs, ESBLs, AmpC, respectively. Twenty (33.89%) were found to be positive for MBL genes, with 4$bla_{VIM,}$ 8 bla_{IMP}, 1 $bla_{SPM,}$ 7 bla_{NDM}, Two (13.33%) were positive for ESBL genes and none were positive for AmpC by PCR. RAPD of 55 isolates showed 45 distinct patterns with a good correlation between the clones by different characters. Discriminatory index of the test was found to be 0.99. All 27 isolates showed distinct new ST types in MLST. No published data on ST types of Indian isolates is available in the data base.

2. Hospital infection control surveillance

Routine surveillance of the hospital is performed at regular intervals to screen for the presence of pathogens. Various samples from ICU and ward like suction ports, oxygen masks and ports, mattresses, airbed, bed railings, hand swabs from health professionals working in these units, environment samples etc were collected regularly for assessing hospital infections. The reports were submitted along with the recommendations.

3. Anaerobic laboratory: Standardisation of the methodology to isolate and identify micro-organisms from bronchial aspirate, pleural fluid has been done.

4. Host cholesterol utilisation by *Mycobacterium tuberculosis*: role of *Mce4A* protein

Invasion of the host cells by mycobacteria through mammalian cell entry operon (*mce*) leads to sustained infection. Four *mce*'s have been reported to be involved in invasion as well as import of carbon source. The *mce4*, is specifically involved in import of host cholesterol for *Mycobacterium tuberculosis* survival. It was reported from our laboratory that *mce4A* (*Rv3499c*) gene of *mce4* operon is expressed during stationary phase and has a role in entry of *M. tuberculosis* inside the host cell. In this study, the gene *mce4A* for its role in cholesterol import and utilization in MTB was explored. The *mce4A* overexpressing MTBgrew two times faster in cholesterol supplemented medium. Increased cholesterol utilization by MTB was visualized by, Infecting THP-1 derived macrophages with recombinant and wild type MTB and staining using filipin. It was observed that cholesterol was more well distributed and localized in case of *mce4A* overexpressing MTB infected THP-1 than the wild type where it was randomly distributed. The electron microscopy results confirmed that *mce4A* overexpressing MTB obtained a thicker cell wall than the other strains. By performing TLC analysis, increased PDIM levels were observed in *mce4A* overexpressing MTB. This increased cell wall diameter which lead to altered impermeability of drugs changed the MIC values. The results suggest that *mce4A* gene facilitates the survival of *M. tuberculosis* in nutritionally depleted environment inside the host by efficient utilization of host cholesterol and thickening its lipid layer imparting a profound effect on the pathogenic potential of *M. tuberculosis*.

5. Expression analysis of an array of genes of *M. tuberculosis* clinical isolates from pulmonary tuberculosis and lymph node tuberculosis: search for mycobacterial factors associated with differential clinical manifestation

Tuberculosis generally infects the lungs. But, the bacilli also cause extra-pulmonary tuberculosis. Lymph node tuberculosis is the most common extra-pulmonary manifestation of tuberculosis. It is still not clear why *M. tuberculosis* causes pulmonary TB in some individuals and extra-pulmonary TB in others. In the present study clinical isolates of *M. tuberculosis* from 10 cases ach of pulmonary TB and lymph node TB will be analysed in detail to address this question. Mycolic acid of *M . tuberculosis* H37Rv, three LNTB and three PTB isolates, grown under stress conditions, have been extracted and analyzed through thin layer chromatography. Efforts to quantify the mycolic acid by using High performance liquid chromatography are ongoing. In addition, real time expression of genes associated with lipid metabolism is also being analyzed. Quantification through qRT-PCR has been performed. The study is ongoing and the final analysis shall be performed once all the isolates have been studied.

6. Genetic association study reveals heterozygous protection of *LTA4H* variant in north Indians with tuberculosis

Immunoregulatory eicosanoids have been implicated in the regulation of immune response to tuberculosis (TB). Recently, the heterozygosity at two intronic variants, variant 1, variant 2; and one promoter variant (variant 3) in the *LTA4H* gene, encoding the leukotriene A4 hydrolase (LTA4H) enzyme of the eicosanoid pathway showed a protective association with respect to TB. It was also proposed that host genotype specific therapies targeting these variants could be effective in TB treatment. Here, we investigated the role of the above mentioned variants of *LTA4H* gene in north Indians. We genotyped 185 TB cases comprising of both pulmonary (PTB) and lymph node TB (LNTB) and 120 healthy regional controls on SequenomMassarray platform (for variants 1 and 2) and by taqman genotyping (variant 3).

We could not find any allelic or genotypic association in either PTB or LNTB in north Indians. Applying the proposed heterozygosity model we found that heterozygosity at variant 1 was protective for TB. To the best of our knowledge, this is the first report showing that heterozygosity at variant 1 of the *LTA4H* gene is protective for TB in a north Indian population. When segregated analysis for PTB and LNTB for variant 1 was done after multiple corrections, only LNTB showed protective with PTB remaining only marginally significant.

These results suggest that the variant1 in the *LTA4H* gene might have a protective role from pulmonary or extra-pulmonary TB in north Indians.

7. Drug resistance profiling of *M. tuberculosis* isolates from a DOTS center, a non-DOTS center and private centers in North Delhi

DOTS (Directly Observed Treatment, short-course) is an important component of Revised National Tuberculosis Control Programme. However, a number of tuberculosis patients are treated with different drug regimens which could add to the pool of multidrug-resistant (MDR) *Mycobacterium tuberculosis*. The present study had been planned to ascertain the incidence of drug resistance in *M. tuberculosis* isolates from patients in North Delhi being treated in the private setting, DOTS center and non-DOTS centers to find out the accurate drug resistant profile from different community centres in North Delhi. Sputum specimens were obtained from 565 patients suspected of pulmonary tuberculosis and attending the three centers. The specimens were subjected to sputum microscopy and culture for *M. tuberculosis*. All the 317 isolates of *M. tuberculosis* obtained from the 565 specimens were subjected to drug susceptibility testing (DST) by standard proportion method for Isoniazid, rifampicin, ethambutol and streptomycin. The MDR isolates were further subjected to second-line DST.

Of the 317 isolates tested, 18.3% (n=58) were found to be resistant to isoniazid, 28.4% (n=90) were resistant to rifampicin, 37.53 % (n=119) were resistant to streptomycin and 12.6% (n=40) to ethambutol. Of these, 8.2% (n=26) of the strains were multidrug resistant and only one isolate (0.3%) was extensively drug resistant (XDR). There was no statistical difference between the drug resistance patterns from the three centers.

The present study demonstrated a high prevalence of drug resistance amongst *M. tuberculosis* isolates obtained from patients of pulmonary tuberculosis from North Delhi.

8. Efflux mechanisms in *M. tuberculosis*: to study the effect on drug susceptibility profile

Minimum inhibitory concentrations of 93 isolates were determined for four first line and two second line drugs. Of the 93 *M. tuberculosis* isolates, 56 (60%), 78 (84%), 20 (22%), 86 (92%), 24 (26%) and 7 (8%) were found to be resistant to streptomycin, isoniazid, rifampicin, ethambutol, kanamycin and ciprofloxacin, respectively. Five drug resistant and 5 drug susceptible isolates of *M. tuberculosis* were selected for further studies.

To study the expression profile of putative efflux genes in drug susceptible and drug resistant clinical isolates, primers for 10 putative efflux genes and two housekeeping genes were designed and standardized. Melting curve analysis was performed for all the primers to make sure that only a single peak was formed for each primer.

Real-time expression of all the 10 genes was studied in the standard laboratory strain H37Rv and four clinical isolates exposed to sub-inhibitory concentrations of the drugs STR, INH, RIF, EMB, KAN and CIP. No clear correlation between gene expression and drug resistance across the clinical isolates was observed under any of the antibiotic stress conditions.

The minimum inhibitory concentrations of the efflux pump inhibitors has been calculated which will be used in studying the effect of inhibitors on overexpressed strain of H37Rv.

9. Recent trends in isolation of clinically relevant non-tuberculous mycobacteria in a mycobacteriology laboratory in Delhi

The role of non-tuberculous mycobacteria (NTM) as aetiological agents in the causation of pulmonary and extrapulmonary infections has seldom been systematically studied in India. A species identification of these organisms is required to ensure appropriate treatment. However, the conventional methods of speciation are labour intensive, and hence, NTM infections are often ignored. The *Hsp65* PCR-restriction fragment length polymorphism (PRA) technique to differentiate NTM and *M. tuberculosis* complex was applied on 905 isolates from patients suspected of suffering from tuberculosis and two isolates from patients of breast abscess.

We could identify NTM in 215 (24%) isolates. Species identification was performed for 102 isolates. Of these, *M. intracellulare* were isolated from 27.45% (n=28), *M. fortuitum/M. smegmatis*in 24.50% (n=25), *M. fortuitum/M. senegalense*in 11.76% (n=12), while *M. kansasii* constituted 11.76% (n=12) of the isolates. *M. abscessus* was isolated from 10 (9.80%) patientsand *M. avium*constituted 6.86% (n=7) of the NTM. Of the 215 NTM isolated, clinical significance was established in 24 (11.16%) isolates. Two *M. avium* isolates were obtained from the same patient. Thirteen of the *M. intracellulare* isolates were also obtained from repeated samples and were probably pathogenic. Two isolates of *M. abscessus* were isolated from two different patients of breast abscess, while four other isolates were obtained from the sputum of two patients repeatedly. The laboratory contaminant *M. gordonae* was identified in four samples.

Our results highlight the importance of speciation of mycobacteria, for appropriate diagnosis, and also to rule out laboratory contamination. In conclusion, the most common aetiology of NTM disease *M. intracellulare*; the incidence of infections by *M. abscessus* is rising in Delhi.

Pathology

Research

1. Effects of oral N-acetylcysteine on oxidant/antioxidant imbalance in pulmonary fibrosis

The lung is exposed to multiple environmental air borne pollutants which can lead to oxidative lung injury. At the cellular level, the disturbances in the normal redox state (oxidant / antioxidant imbalance) cause toxic effects through the production of peroxides and free radicals that damage all components of the cell, including proteins, lipids, and DNA and cause tissue injury, apoptosis and repair. These oxidants are thought to activate several genes related to cell growth, cell death, fibroblast proliferation and onset of the innate immune response. The effects of N-acetyl-L-cysteine monotherapy (NAC), a known precursor of major antioxidant, glutathione, in regulating the oxidant-antioxidant imbalance in pulmonary fibrosis and attenuating lung fibrosis was studied. Male Wistar rats (n=90) were divided into five groups: Group1(intratracheal bleomycin BLM, 7 IU / kg). Group II, low dose (0.3mmol / Kg / day P.O, NAC + BLM). Group III, high dose (3mmol / Kg / day P.O, NAC + BLM); Group IV (Saline control), Group V (NAC control). Animals were euthanized on 7, 14, and 28 days after BLM exposure. Lung histopathology, morphometry, lipid peroxidase (LPO nmoles / mg), Glutathione Peroxidase (GPx, ìmoles NADPH oxidized / min / g) levels were studied.

In bleomycin treated animals, a progressive increase in LPO levels as compared to controls was observed. This was associated with a reduction in endogenous antioxidant levels, GPx on all the days. On treatment with NAC, a dose related improvement in the oxidant-antioxidant imbalance caused by bleomycin injury and in parenchymal remodeling was seen. From day 7, itself the LPO levels declined after treatment with NAC (0.3 mmol and 3 mmol). The GPx levels showed a significant improvement on Day 7 only with 3 mmol NAC. On day 14, improvement was seen at both doses (0.3 mmol NAC) (3 mmol NAC). This rise in antioxidant levels persisted significantly upto day 28. Thus, improvement in oxidant-antioxidant imbalance was seen to be dose related in initial days after therapy. We conclude that NAC prevents parenchymal remodelling and epithelial myoepithelial transition in lung, at least in part through replenishment of intracellular glutathione stores in dose related manner. These effects of NAC on oxidant-antioxidant imbalance and parenchymal remodelling may prove to be helpful in improving the management of patients with lung fibrosis at lower doses and need to be studied further.

2. Study of differentiation, proliferation potential of lung carcinomas using panel of immunohistochemical markers

The histopathological heterogeneity and differentiation of lung carcinomas is well known to affect its therapeutic responsiveness and prognosis. The differential diagnosis of primary poorly differentiated lung carcinoma from metastatic carcinomas is difficult on morphologic basis alone. In order to improve the diagnostic accuracy, we are analysing a panel of IHC markers, including, surfactant protein C (SP-C), CK-7, synaptophysin, chromogranin-A, common leucocyte antigen (CD 45) and correlating with histopathology in lung cancer patients. Strong cytoplasmic positivity for SP-C and focal positivity for CK-7, was helpful in confirming the primary site of origin from lung and ruling out metastatic urothelial carcinoma with squamous differentiation in one case.

The proliferating capability of the tumour cells is being assessed by studying the increase in cytoplasmic expression of proapoptotic marker, Caspase-3 and down regulation of antiapoptotic marker, Bcl2. The metastatic potential of the cancer cells, is being studied using a panel of IHC markers, VEGF-1, alfa-SMA, bFGF. The present study also gains significance with the use of VEGF and VEGF receptor antibodies as potential treatments for lung cancer.

3. Regulation of tumour necrosis factor-alpha (TNF-alpha) expression and abrogation of lung fibrosis by N-Acetylcysteine

Cytokine secretion has been implicated as a fundamental component of the lung fibrotic process observed in response to bleomycin (BLM). The cytokine networks that have been proposed, include; TNF-alpha, IL-6,

and IL-1 secretion from airway epithelial cells and resident alveolar macrophages. These chemokines in turn recruit additional macrophages and lymphocytes to the expanding inflammatory lesion. In the present study, we studied the expression of TNF-alpha during BLM-induced lung injury and the effect of N-acetylcysteine (NAC), in regulating the expression of TNF-alpha and modulation of early inflammatory responses in rat model. The TNF-alpha levels were studied in lung tissue homogenates and correlated with lung histopathology and morphometry.

After BLM injury, increased TNF-alfa levels were detected from day 7 onwards upto day 14 and then decreased on day 28. These correlated with increasing lung parenchymal inflammation up to 14 days after BLM injury. Morphometry revealed a significant increase in solid area of parenchymal fraction from control from day 7 onwards. Treatment with N-acetylcysteine (NAC) resulted in improvement in TNF-alpha levels on comparison with BLM on all days and histopathological improvement in lung inflammation and fibrosis. However there was no dose related difference in the expression of TNF-alpha cytokine levels seen. The NAC treated lungs showed better response in parenchymal remodeling with high dose as compared to low dose NAC. In the high dose NAC group, the solid area of fraction, decreased from day 14 onwards) until day 28 whereas the low dose NAC treated lungs, a significant decrease in the solid area of fraction was seen only on day 28. NAC monotherapy was seen to attenuate TNF-alpha production and reverse the parenchymal inflammation leading to the subsequent attenuation of bleomycin induced lung parenchymal fibrosis.

4. Effects of phosphodiesterase-5 inhibition on inflammatory response in bleomycin induced lung injury

Pulmonary hypertension (PH) is common in interstitial lung disease (ILD), with reported prevalence ranging from 32% to 85%. It is found to be associated with increased mortality in ILD. Phosphodiesterase(PDE5) is an enzyme which catalyses phosphodiester bonds and is abundant in the pulmonary vasculature, where it catabolises cGMP, the second messenger of NO. Inhibition of PDE-5 by sildenafil has been shown to lower pulmonary vascular resistance by augmenting cGMP and may be beneficial in patients of PH with ILD. We hypothesized that reactive oxygen species signalling (ROS) and oxidant-antioxidant imbalance is abrogated by PDE5 inhibition to improve pulmonary vascular remodelling and right ventricular function. Further we studied its effect on inflammatory mediators like bFGF and TNF-alpha and inflammatory response in BLM induced lung injury. Male Wistar rats and control animals (n=72), were euthanized on 7, 14 and 28 days after BLM exposure and lung histopathology, morphometry, bFGF, LPO, GPx and TNF-alpha levels were studied.

On exposure to BLM, the increasing grade of parenchymal fibrosis and vascular remodelling, was seen to be accompanied by an increased expression of bFGF in peribronchiolar and perivascular region and TNF-alfa levels, from day 7 onwards. After sildenafil therapy, an improvement in parenchymal inflammatory infiltrate and remodelling was observed to be associated with a decrease in the levels of profibrotic cytokine, bFGF and a significant reduction of TNF-alpha expression. LPO levels were seen to decrease after 14 days of treatment and were associated with increasing GPX levels from day 7 upto day 28. These results are indicative of antioxidant effect of sildenafil which need to be evaluated further. Also the cytokine levels are seen to correlate with lung histopathology and need to be evaluated as biomarkers of disease progression. This correlation may prove to be useful for therapeutic as well as prognostic purposes in patients of pulmonary fibrosis with or without PH.

5. Vascular remodelling in bleomycin induced lung fibrosis: a morphometric analysis

Patients of pulmonary fibrosis are known to be predisposed to develop pulmonary hypertension (PH). In these patients, lung vascular remodelling manifests as vascular smooth muscle cell (VSMC) hypertrophy, intimal hyperplasia, vascular obstruction. The development of the vascular changes and their progression in relation with parenchymal remodelling needs to be studied to prevent the occurrence of PH and reduce mortality in pulmonary fibrosis. Therefore, we evaluated the vascular remodelling in bleomycin induced model of lung fibrosis and hypertension and also studied the dose related vascular effects of N-acetylcysteine (NAC) monotherapy at different time intervals in this model. The animals were euthanized on 7, 14 and 28 days after BLM exposure and lung histopathology and morphometry were studied. The distal arterioles accompanying the distal bronchioles ranging from 50µm to 200µm in diameter were morphometrically evaluated for; (i) mean thickness of tunica media (degree of muscularisation / medial hypertrophy), (ii) mean internal arteriolar diameter / internal arteriolar area (degree of vasoconstriction), (iii) vascular perimeter.

In bleomycin exposed group, a significant increase in muscularisation of the distal arterioles was seen from day 7 up to day 28 as compared to saline control. This was accompanied by a reduction in the mean internal arteriolar diameter from early phase of fibrosis as compared to saline control group. A progressive reduction of the mean internal arteriolar area was also seen. Thus, arteriolar vasoconstriction was seen to inversely correlate with degree of muscularisation of arterioles after bleomycin exposure. Monotherapy with N-acetylcysteine (NAC) was seen to ameliorate pulmonary fibrosis, however vascular remodelling associated with VSMC hypertrophy and vasoconstriction, persisted, in the bleomycin exposed animals. The effect of NAC on parenchymal remodelling, results from its antioxidative effect from the early phase of fibrosis. The persistence of vascular changes signifies a separate ongoing pathogenetic mechanism in the VSMC. These cellular mechanisms which cause pulmonary vascular remodelling are complex and are being further elaborated.

An "Update on Lung Cancer" was organized on 26th July 2013.

Pharmacology

Research

1. Experimental studies with chelidonic acid, a molecule of plant origin with possible therapeutic potential in bronchial asthma

The present study was designed to investigate in detail the effects of chelidonic acid in specific immune markers with relevance to bronchial asthma. Our experiments showed that chelidonic acid (3, 10 and 30 mg / kg) dose dependently attenuated histamine release from rat peritoneal mast cells in ovalbumin immunized + challenged animals, enhanced cell mediated immune responses and marginally suppressed humoral immunity. Additionally, it caused a significant reduction in PFC counts in the sensitized rats and reduced the neutrophil counts of both blood and BAL fluids effects which were comparable to those seen after prednisolone. These findings are of translational value and are strongly suggestive of an anti-inflammatrory and immunomodulatory effect of chelidonic acid, which could emerge as an important plant derived for the treatment of bronchial asthma and related allergic disorders.

2. Pharmacological studies on the possible mechanisms involved in theophylline induced cardiotoxicity in rats

Cardiotoxicity and neurotoxicity are two of the major safety concerns with methylxanthines and the present study evaluated the possible mechanisms involved in theophylline induce cardiotoxicity with an aim to device strategies for the safe and effective use of this pharmacoeconomically viable agent. Experiments were conducted in albino rats and theophylline was administered interperitoneally in graded doses (50, 100 and 150 mg / kg) and heart rate and blood pressure (BP) were recorded and electrocardiographic (ECG) tracing taken by using the software based BIOPAC device. Blood was collected for assay of oxidative stress markers. The results showed that theophylline dose relatedly induced tachycardia and marginal increases in BP, the most prominent effect being seen after a dose of 150 mg / kg. The ECG tracing showed ST depression at this dose suggestive of myocardial ischemia. These changes were accompanied by increases in blood MDA and SOD levels and reductions in glutahthione (GSH) levels. An elevation in the SGOT levels was also noted. Pretreatment with alpha tocopherol (20 and 40mg / kg) differentially attenuated the theophylline induced changes in hemodynamic, ECG and biochemical markers. These preliminary results indicate that theophylline induced cardiotoxicity may involve oxidative mechanisms.

3. Pharmacological studies on stress-induced modulation of inflammation and immunity in rats

Restraint stress (RS) was used as the experimental stressor and the effects of NO ergic agents were evaluated on lung markers of inflammation and immunity. Both humoral- and cell-mediated immune responses as well as markers of innate immunity were evaluated. Our experiments showed that chronic but not acute stress influenced markers of both innate and adaptive immunity. Studies on oxidative and nitrosative stress markers showed that acute RS significantly reduced glutahthione (GSH) levels in blood and these changes were only influenced by pre-treatments with either L-arginine or L-NAME. However, chronic RS induced markedly greater suppressions in GSH levels which were attenuated by L-arginine pretreatment. Chronic RS induced marked increases in MDA levels as compared to the control values, which were attenuated with L-arginine pretreatment and aggravated by the NO synthase inhibitors. There was a marked suppression in NOx levels in blood after chronic RS which were reverted back to near normalcy in the presence of the NO precursor, L-arginine. The results are suggestive of RNS-ROS interactions during stress-induced inflammation and immunity and could have an impact on the airway disease.

4. Brain nitric oxide and high altitude stress

The effects of high altitude stress were assessed on the neurobehavioral profile in rats. Hypoxia simulating high altitude at 8000 (HI) and 12000 (HII) ft was induced in hypoxia chamber designed for the study. Non-cognitive functions (anxiety) were assessed by the elevated plus maze (EPM) and cognitive function was measured by the Morris Water Maze (MWM) test. Brain homogenates of different treatment groups were assayed for oxidative stress markers (MDA and GSH). Exposure to hypobaric hyopoxia (simulated high altitude), resulted in increase in anxiety-like behavior in the EPM test with the effect of hypoxia at 12,000 ft being more marked as compared to hypoxia at 8,000ft. When a combination of both restraint stress (RS) and

hypoxia were given the effects of HI (8000 ft) were potentiated in the EPM test for anxiety. All the above responses were attenuated after L-Arginine treatment, whereas, L-NAME aggravated the same. Assay for brain oxidative stress parameters showed that MDA levels were found to be highest in the group treated with RS + HII and lowest in the group treated with HII+ L-Arginine. GSH levels were found to be highest in the group treated with HII + L-Arginine and lowest in the treatment group of RS+ HII+ L-NAME. Studies for cognitive effects in the Morris Water maze showed that learning and memory were affected by acute exposure to hypobaric hypoxia and / or RS which showed improvement in the group treated with L-Arginine. These results suggest that NO may be involved as a regulator in hypoxia induced anxiogenesis and cognitive dysfunction and that interactions between reactive nitrogen and reactive oxygen species may play a crucial role in this phenomenon.

5. Calcium phosphate nanoparticles (CPNP) co-encapsulating neurotherapeutic gene and drug for targeted therapy of neurodegenerative disorders

CPNP nanoparticles were synthesized as per standard techniques and injected into rats for assessing in vivo toxicity. Female Wistar rats (180-220 g) were used for in vivo acute toxicity studies. The drug was dissolved in distilled water and administered by oral route at the dose of 2000 mg / kg (single dose) and then these rats were observed daily for 14 days, as per the OECD guidelines. The results of the *in vivo* toxicity studies showed that there were no overt physical signs like animal appearance, salivation, lacrimation, vocalisation, rearings, sedation, or convulsions, no changes in body weight, locomotor activity (in photoactometer), and motor coordination (in rota rod) in CPNP treated group in comparison to vehicle treated control rats ($p > 0.05$). Further, no mortality was observed during 14 days observation period. Macroscopic examination of vital organs did not show any change in stomach, liver, lungs, heart or ovary in either control or CPNP group. These results demonstrate the CPNP nanoparticles are non-toxic and have potential for effective use for imaging and drug delivery.

6. Experimental studies on the association between Alzheimer's disease (AD) and diabetes mellitus (T2DM): a novel approach to possible therapeutic strategies

The present study would investigate the role of NO in AD associated with T2DM in experimental models. Cognition impairment will be induced by intraventricular injection of streptozotocin (STZ) to normal and T2DM rats (induced by STZ and high fat diet). Neurobehavioral, biochemical, molecular and histopathological parameters would be assessed in both groups. The effects of NO modulators on above parameters, NOS gene expression (hippocampus and prefrontal cortex), and brain NO metabolites (NOx) would be observed in both groups. Experiments have been initiated to standardize the techniques to study neuroendocrinal basis of behavioral changes associated with AD.

7. Studies to evaluate the pre-clinical toxicity of UNIM-051, a polyherbal unani formulations with therapeutic potential in sinusitis

The present study was designed to assess the chronic toxicity (180 days) profile of UNIM-051in order to predict its safety prior to validation of therapeutic effects. A preclinical chronic toxicity study was carried out with the polyherbal Unani formulation UNIM-051 for evaluating the safety profile of this drug according to the guidelines for assessing safety / toxicity of clinically used and newer Unani drugs and formulations (as per Ayush and OECD guidelines – 407 & 425). Male and female Wistar rats (150-200 g) and n=5 per group were used for the study. The drug, UNIM-051 (500 mg tablet obtained from CRIUM, Hyderabad) was crushed in pestle and mortar and dissolved in distilled water and was administered orally by gavage to rats daily for a period of 180 days. Results showed that UNIM-051 (125 - 2000 mg / kg) had differential effects on spontaneous locomotor activity as assessed in the photoactometer. The effects became apparent after at least 4 weeks of treatment and the general tendency was to reduce locomotor activity as compared to the vehicle control group. The most marked effects were seen at doses of 1000 and 2000 mg / kg, with locomotor activity as compared to controls. There was no significant effects on body weight of the animals after 180 day treatment as compared to controls ($p > 0.05$). In the rota rod test for motor coordination, the retention times in the rota rod were significantly greater with doses of 500, 1000 and 2000 mg / kg after chronic treatment ($p < 0.05$). None of the doses of UNIM-051 used exhibited seizurogenic peoperties. The mortality rate after 180 days of treatment was 40% and 60% respectively after 1000 and 2000 mg / kg ($p < 0.05$) whereas the lower dose levels had no significant effect on mortality after chronic treatment with the drug ($p > 0.05$). Hematological tests showed

that there was no significant changes found in Hb, TLC, DLC (polymorph, lymphocyte, monocyte, eosinophil and basophil) and ESR in the UNIM-051 treated groups. Blood urea levels were marginally but significantly increased by UNIM-051 treatment at a dose of 1000 mg / kg as compared to control group ($p < 0.05$). There was also a 50% decrease in the bilirubin level by UNIM-051 at (500mg / kg) and a marginal yet significant reduction in blood glucose levels with UNIM-051 (1000mg / kg). No significant changes were seen in SGOT, SGPT, serum alkaline phosphatase, and serum creatinine levels, after different doses of UNIM-051 treatment. Macroscopic examination of organs showed that UNIM-051 treatment for 180 days induced no significant changes in stomach, liver, kidney, lung and ovary weights at all doses tested. There were no apparent structural abnormality in the UNIM-051 treated groups (at different dose levels) and no remarkable changes were visible in the stomach, liver, kidney, heart, lungs, ovary (in females) and organ-body weight index as compared to the control group. At the higher doses, occasional animals had hemorrhagic spots in the lungs. Microscopic picture showed that at higher doses of 1000 and 2000 mg / kg, distortions in hepatic organizations were observed in a few rats, viz. dilation and congestion of blood sinusoids, some hypertrophied hepatocytes with vacuolated cytoplasm and deeply stained nuclei, while some other hepatocytes showed hyalinized cytoplasm. Microscopic examination of the kidneys showed that none of the doses of UNIM-051were able to influence the kidney architecture except at the dose of 2000 mg / kg, where, congestion and dilation were seen in renal corpuscles in a few rats. None of the other viscera (stomach, ovary, heart) showed and significant microscopic changes that could be suggestive of any kind of organ damage.

8. Effect of Indian almond and sweet almond in diabetes induced nephropathy and cataract in rats

Almonds have been used and promoted for centuries in India for good health. *Prunus amygdalus* (sweet almond), has been shown to decrease blood sugar in normal rats. *Terminalia catappa* (Indian almond) has shown to decrease blood sugar in diabetic rats. There is little data indicating effect of sweet almond and Indian almond in diabetes, not much work is reported regarding their mechanism of action and effect on diabetes induced complications. Therefore, the present work was planned to study in detail the effect of two types of almonds in diabetes and their effect on diabetes induced cataract (retinopathy) and nephropathy.

The objectives were to study the effect of *Terminalia catappa* (Indian almond) and *Prunus amygdalus* (Sweet almond) on blood sugar level in diabetic rats, various biochemical parameters of diabetes induced nephropathy in rats, diabetes induced cataract in rats, antioxidant status and oxidative stress and to find the role of free radicals in diabetes and diabetes induced complications.

Control experiments have just been started and some of the chemicals have been procured.

9. Study on assessing the price and availability of essential medicines in Delhi before the implementation of National Pharmaceutical Pricing Policy 2012

Inequitable access to medicines is a major weakness in the Indian health care system. Baseline data needed to develop effective public health policy and provide equitable access to essential medicines. Out-of-pocket payments account for up to 80% of health financing in India. Additionally, 70% of health spending on outpatient treatment goes towards purchasing medicines. This means that access to treatment is heavily dependent on availability of affordable medicines.

The government had drafted a new National Pharmaceutical Pricing Policy, 2011 and after a lot of debates and consultations with various stakeholders, the National Pharmaceutical Pricing Policy (NPPP) was notified in December 2012. The NPPP 2012 has proposed to bring all the medicines mentioned in the National essential medicine list (NEML)-2011 in the strength mentioned under price control but instead of cost-based-pricing system the new policy is proposed to have market-based-pricing (MBP). A new Drug Price Control Order 2013 included all the essential medicines listed NEML 2011 under price control with effect from June 2013.

To study the impact of new pricing policy and price control it is required to have baseline data before implementation of the policy. A survey was needed to find out the prices and availability of common essential medicines under NEML 2011 before implementation of DPCO 2013. Later in 2014 a repeat survey will be able to reveal the impact of NPPP 2012 and DPCO 2013.

The objectives of this project were to collect data on prices and availability of common essential medicines mentioned in National Essential Medicine List 2011 before implementation of DPCO 2013 and to conduct a

workshop to disseminate the findings and sensitize the stakeholders to access to essential medicines, concept of essential medicines, pharmaceutical pricing policy of India and prices and availability of essential medicines.

Data was collected on 120 formulations of common essential medicines mentioned in NEML 2011. Out of 120 formulations, 43 formulations (medicines) had more than one rupee price variation in unit prices for highest to lowest version, 22 formulations (medicines) had price between 0.50 to0.99 rupee for highest and lowest version, 55 medicines had price difference less than 0.50 rupee. Out of these 54, 26 formulations (medicines) were under price control,and15 formulations had usually one version available in the market .

Nine formulations under DPCO 1995 had huge price variation.The challenge of improving access to affordable essential medicines is multi-faceted and therefore the responsibility for rising to it lies with many actors. Political commitment and multidisciplinary team is required to improve access to essential medicines with continuous monitoring of access to medicines and policies.

10. Pharmacological studies on the possible role of nitric oxide (NO) and NO-mediated signaling pathways in the regulation of stress induced immunological changes in rats

The effects of different NO modulators were assessed in anxiety and stress in view of the increasing evidence for the role of NO as a chemical messenger in CNS and also because of reported differences in NO synthase expression. In the present study, effects of NO modulators were assessed in acute and chronic stress of predictable and unpredictable nature. L-Arginine (L-Arg) consistently reversed the RS(x1) induced suppression of behavioral markers in the elevated plus maze. Attenuation of stress induced behavioral suppression was also observed by pretreatment with isosorbide dinitrate (ISDN, 5 and 10 mg / kg), an organic nitrate that reacts with endogenous thiols to release NO. Chronic stress RS(x15) also had differential behavioral and biochemical effects in rats. RS(x15) again showed a trend towards behavioral suppression and brain NOx levels were also reduced. Treatment with NO mimetics had a protective effect while NO synthase inhibition tended to aggravate RS(x15) induced behavioral and biochemical changes.

In the present study, RS(x15) suppressed IFN-γ as well as IL-4 levels - indicating that repeated stress exposure induces dysregulation of the Th1 / Th2 cytokine profile. Pretreatment with Sildenafil (1mg / kg) significantly decreased the % change in paw volume in response to booster dose of Keyhole Limpet Hemocyaninon administered on 14 day of KLH immunization as compared to vehicle treated group. The DTH response was accompanied with significant reduction in the level of proinflammatory cytokine, IFN-g and elevation in IL-4 levels.The results are complex and suggest that reduction in the cell mediated immune response to unpredictable stress may be regulated by the differential enhancement of the nNOS and iNOS - mediated effects by phosphodiestrase inhibition.

11. Experimental studies on the possible role of nitric oxide (NO) during acute and chronic morphine in normal and stressed rats

The data obtained from the present study showed that acute restraint stress (RSx1) suppressed NOx levels as compared to their controls. Pretreatment with morphine (5 mg / kg), increased brain NOx levels markedly. On the other hand, decreases in brain NOx levels were seen with naltrexone after RS.Pretreatment with the NO precursor, L-Arginine (500 and 1000 mg / kg), significantly increased RS-induced suppression of brain NOx levels in dose dependent manner, whereas, L-NAME (30mg / kg) showed opposite effects. In the interaction studies, combined treatment with L-arginine and morphine, both at sub threshold doses, 500 and 1 mg / kg respectively, induced synergistic effects in reversing RS induced suppression of brain NOx. Single administration of morphine (1 or 5 mg / kg) in control rats (no RS) as well as acute RS increased the levels of Hsp 70 in brain homogenates of rats in a dose related manner Administration of morphine (1 and 5 mg / kg) 30 min prior to RS, further augmented the levels of Hsp 70. Rats exposed to repeated immobilization stress (RSx15), showed near fivefold increase in Hsp70 levels, in comparison to vehicle control rats. Interestingly, pretreatment with morphine at (1 and 5mg / kg) lowered the Hsp70 levels as compared to those seen after RS (x15) alone. Taken together, it appears that morphine provides protection against the behavioral suppression, and oxidative stress during restraint stress and it is proposed that such morphine effects may be due, at least in part, to the induction or facilitation of the Hsp 70 and brain NOx level and reducing the corticosterone level.

12. Experimental studies on the possible mechanisms involved in the effects of UNIM-352, a polyherbal, anti-asthmatic, Unani preparation

The study was conducted to assess the cellular and molecular mechanisms in the anti-inflammatory and immunomodulatory effects of UNIM-352 in experimental model of bronchial hyperreactivity : the roles of Transcription factors (NF-kB) and associated cytokines (TNF-a, GM-CSF, IL-4 and IL-8) (in blood and BAL fluids), Cytology of blood and BAL fluids (eosinophils and neutrophils). Wistar rats (150-200g) were sensitized and challenged with ovalbumin. Post sensitization they were treated with UNIM-352 and prednisolone (10 mg/kg, i.p.). After 24 h of ovalbumin challenge, rats were anesthetized and blood and bronchoalveolar lavage (BAL) fluid were collected for the assay of cytokine levels (TNF-alfa and IL-4), eosinophil and neutrophil cell counts. The polyherbal agent reduced TNF-alfa, IL-1alfa and IL-4 levels in blood and BAL fluid, of both normal and stressed rats – an effect that was not seen with the placebo Further, UNIM-352 significantly reduced blood MDA levels and elevated GSH and SOD levels as compared to placebo treated groups. These levels were found to be significantly reduced by UNIM-352 in a dose dependent manner. Further, the effects were in the same direction as observed by prednisolone. The study suggests that UNIM-352 could be a potential adjunct for treatment of bronchial asthma.

13. Experimental studies on the cellular and molecular mechanisms in the effects of *Withania somnifera* during chronis stress responses in rats: Possible role of nitric oxide

This study has been designed to evaluate the cellular and molecular mechanisms in the effects of Withania somnifera during chronic stress responses in rats and possible role of nitric oxide during such responses. The plant has been purchased from Rehan Matab and authenticated from National Institute of Science Communication and Information Resources (NISCAIR). The method for extract preparation, reduced glutathione estimation, nitrates and nitrites assay and measurement of plasma corticosterone level have been standardized.The study is very much in progress.

14. Studies on the anti-inflammatory and immunomodulatory effects of *Albizia lebbeckand Solanum xanthocarpum* in experimental models of bronchial asthma

The proposed study would investigate in detail the efficacy and pharmacodynamics of extracts of two medicinal plants- *Albizia lebbeck* and *Solanum xanthocarpum*, with reference to their potential therapeutic benefit in bronchial asthma. During screening to find novel candidates as anti-inflammatory agents, the extracts of *Albizia lebbeck* and *Solanum xanthocarpum* have been shown to exhibit inhibitory activity in experimental models of inflammation in some preliminary studies. The study has just been started.s

The Institute conducted a CME on "Evaluation of Drug Safety" on 5th April 2013

Physiology

Research

1. Continuation of the studies on the role of posterior hypothalamus in high altitude pulmonary oedema

The present study explored the role of central neurotransmitters such as GABA and nitric oxide (NO) in the modulation of sympathetic outflow and lung water content in rats exposed to hypobaric hypoxia. To increase the level of GABA in the posterior hypothalamus, the $GABA_A$ receptor agonist muscimol was chronically infused into the posterior hypothalamus for 7 days; similarly for NO, the NO donor SNAP was administered. On the sixth day, rats were placed in the high altitude simulation chamber and were exposed to hypobaric hypoxia (24,000 feet) for 24 h.

With chronic infusion of muscimol into the posterior hypothalamus, there were significant attenuations in the increases in renal sympathetic nerve activity (RSNA), lung wet weight / dry weight ratio and Evans blue dye leakage associated with hypobaric hypoxia exposure. No such attenuation was evident with chronic infusion of SNAP into posterior hypothalamus.

The results indicate that while GABA-ergic system in the posterior hypothalamus has a significant role, the NO-ergic system has only a limited role to play in the pulmonary edema associated with hypobaric hypoxia.

2. Modulation of hypoglossal motoneuron activity by NMDA receptors in rats exposed to chronic intermittent hypoxia (CIH)

We hypothesized that CIH, modelling the hypoxia-reoxygenation patterns alone of severe OSA, would result in decreased glutamatergic excitation of the hypoglossal nerve leading to collapsibility of upper airway muscles. Further, this altered responsiveness along with increased oxidative stress due to CIH could contribute to disease progression in persons with this disorder.

Adult male Wistar rats were exposed to CIH for 8h per day with an automated CIH system, or room air, for 35 days. The body weight and food intake were measured every day throughout the experiment. At the end of the exposure, the rats were fasted overnight, and subjected to the standard Glucose Tolerance Test. In the anesthetized preparation, hypoglossal nerve activity was recorded before and after unilateral administration of serotonin, glutamate and glutamate antagonist MK801 into the hypoglossal nucleus.

The body weight gain was lower, the fasting blood glucose level was higher and glucose clearance slower in the CIH rats compared to the controls. There were significant increases in mean arterial blood pressure and heart rate in the CIH rats. The GSH levels were decreased and MDA levels were increased significantly. In the CIH rats, there was a significant reduction in the amplitude of baseline hypoglossal nerve activity. For both serotonin and glutamate injections, there was a decreased responsiveness. However, the response to serotonin alone was significant. With MK-801, there was a greater decrease in hypoglossal nerve activity compared to the control group. The work is in progress and awaits detailed analysis.

3. Effect of chronic intermittent hypoxia (CIH) on contractile properties of the upper airway muscles in rats

Intrinsic upper airway (UA) muscle dysfunction could be a major factor in the pathophysiology of obstructive sleep apnea (OSA). It is now well established that both resting and contracting skeletal muscles produce reactive oxygen species and reactive nitrogen species. There is the possibility that CIH occurring during OSA could result in oxidative damage to both proteins and lipids in the contracting myocytes leading to UA muscle dysfunction.

Chronic episodic hypoxia affects UA muscle function by interfering with the bioenergetics and in vitro contractile properties of geniohyoid muscles.

Adult male Wistar rats were exposed to CIH for 8h per day with an automated CIH system, or room air, for 35 days. After the stipulated treatment period either with room air or CIH, the geniohyoid muscles along with the hypoglossal nerve were removed for contractile studies. Following nerve or muscle stimulation,

isometric twitch tension, tetanic tension, twitch / tetanic tension ratio, contraction time, half-relaxation time, the tension-frequency relationship, fatigue, and recovery from fatigue were measured. This work is in progress.

4. Continuation of the studies on higher nervous control of pulmonary renal reflex

The aim of the present study was to investigate the modulatory roles of GABA and NO administered into the paraventricular nucleus (PVN) on the pulmonary renal reflex.

Experiments were performed on anesthetized and artificially ventilated New Zealand white rabbits (2-3 kg). After creating an isolated venous pouch in the right external jugular vein in the neck for causing pulmonary lymphatic obstruction and after cannulating the urinary bladder for collection of urine, the rabbit was placed on stereotaxy apparatus; the, cranium was exposed and the PVN on either side was approached using rabbit brain atlas. Cannulae were placed in the PVN for microinjection of $GABA_a$ antagonist (Bicuculline) and nitric oxide synthase inhibitor (L-NAME).

Before bicuculline, pulmonary lymphatic obstruction increased urine flow from 8.4 ± 0.4 to 12.5 ± 0.6 ml / 10 min. After bicuculline,the basal urine flow increased significantly to 11.3 ± 0.8 ml / 10 min. Even then, after pulmonary lymphatic obstruction, the urine flow increased significantly to 14.2 ± 0.9 ml / 10 min**.**

Before L-NAME, pulmonary lymphatic obstruction increased urine flow from 8.9 ± 0.6 to 13.2 ± 1.1 ml / 10 min. After L-NAME, the basal urine flow decreased significantly to 5.9 ± 1.1 ml / 10 min. Even then, after pulmonary lymphatic obstruction, the urine flow increased significantly to 9.48 ± 1.2 ml / 10 min.

The study is very much in progress. The effects of spinal injections of glutamate antagonists and ADH antagonists on the pulmonary renal reflex are being investigated.

5. Effect of hypobaric hypoxia on synaptic plasticity and strength: role of Ca^{2+} signaling

Hypobaric hypoxia decreases synaptic strength and plasticity in the hippocampal region. These changes could be reversed partially by exogenous administration of BDNF into the hippocampus. Calcium channels may have a role to play in these synaptic modulations.

In rats, hypobaric hypoxia for 7 days decreased synaptic strength as evident from decreased levels of synaptic proteins synaptophysin, PSD-95 and synapsin-1. Following chronic administration of BDNF into the hippocampus for 7 days, there was partial recovery of these synaptic proteins. Differential expression analysis in hippocampus revealed that maximum changes occurred in CA3 and DG regions. There was partial reversal of the hypobaric hypoxia induced decreased dendritic arborization after BDNF administration. The study is in progress.

6. Comparative evaluation of cardio-respiratory responses during six-minute walk test (6MWT) in chronic obstructive pulmonary disease and interstitial lung diseases

COPD and ILD differ in their etio-pathogenesis. Even when the degree of breathlessness and age are comparable in both the groups, their walk test distance are found to be different. It is anticipated that the oxygen requirement and heart rate, dyspnea & leg fatigue responses during field based functional capacity evaluation done by six-minute walk test would be different in both the groups.

Comparison of differences in these responses will assist in understanding the pathophysiological mechanisms of the disease process and development of the specific management strategies. Data collection and its analysis is in progress.

7. Effect of pulmonary rehabilitation on cardiac autonomic dysfunction in chronic obstructive pulmonary disease

Pulmonary rehabilitation has been shown to improve overall health related quality of life and various cardio-respiratory parameters in chronic respiratory patients.

Present study is investigating the impact of physical training on heart rate variability (HRV) parameters in patients with chronic obstructive pulmonary disease (COPD) who are enrolled in intensive, supervised pulmonary rehabilitation programme at VPCI. Data collection and its analysis is in progress.

Respiratory Allergy and Applied Immunology

Research

1. Evaluation of Vitamin D levels in COPD and its correlation with disease severity and frequency of exacerbations

There is increasing interest in the role of Vitamin D in COPD. Some studies have shown that vitamin D deficiency is highly prevalent in COPD. Others have suggested that VitD supplementation reduces exacerabtions in severe COPD. We carried out a study to evaluate VitD levels in COPD and to correlate its levels with severity of disease and exacerbation rate

62 patients were recruited. They were staged as per GOLD staging. BODE index and CCQ was calculated. Severity and Exacerbation rate was assessed as per GOLD guidelines. Vitamin D and CRP levels were assessed on TECAN automated ELISA processor. The mean Vitamin D level was 23.33+17.56. 15 subjects were in GOLD severity grade A, 6 in grade B, 7 in grade C and 34 in grade D. Vitamin D levels were seen to decrease with increasing severity of disease. Mean levels in patients having Gold severity grade A was 41.02+14.12, in grade B was 31.57+12.49, in grade C was 17.63+8.51 and in grade D was 16.91+7.89. Vitamin D correlated negatively with GOLD severity grade (-0.406), BODE index (-0.408), CCQ (-0.495), exacerbation rate (-0.536) and GOLD staging (-0.369).These were highly significant. The study showed that Vitamin D levels were decreased in COPD. It decreased with increasing severity and showed highly significant correlation with CCQ, BODE index, exacerbation rate and severity of disease.

2. Spectrum of interstitial lung disease at a tertiary care centre in India

We retrospectively studied 289 patients diagnosed with ILD during the years 2001–2013 at one of the respiratory units of Vallabhbhai Patel Chest Institute. Mean age at presentation was 44.24 years; females comprised 54.68% of the patients. Prior to presentation at our centre,14.84% patients had been treated with antituberculous therapy due to misdiagnosis of tuberculosis. In the pool of ILDs analysed, sarcoidosis (37.3%) was found to be the most common subgroup, followed by IPF (27.6%) and NSIP (25.6%). Cough (92.97%) was the most common presenting symptom; exertional dyspnoea was found in 79.2% of patients. Digital clubbing was commonest in IPF, found in 30% of patients. Significant desaturation on six-minute walk test was most frequently seen (50%) in NSIP patients. The most common pattern on chest roentgenogram was reticular / reticulo-nodular pattern (80.2%) and on HRCT - interstitial fibrosis (49.9%). Mean of predicted total lung capacity (TLC) was 64.3%, the lowest being in the IPF group (58.88%). Mean of predicted DLCO was 50.56%, the lowest being in the IPF group (42.75%). The overall diagnostic yield of bronchoscopic biopsy was 83.04%, the highest yield being among sarcoidosis patients (96.29%). We found sarcoidosis, IPF and NSIP to be the most common ILDs in northern India. ILDs are still frequently misdiagnosed as TB, and increased awareness, education and diagnostic facilities are required to diagnose ILDs at an early stage.

3. Bronchoscopy in immediate diagnosis of smear negative tuberculosis

The present study was planned to assess the role of bronchoscopy in immediate diagnosis of smear negative pulmonary tuberculosis. It was a retrospective analysis of 132 sputum smear negative tuberculosis suspects who underwent bronchoscopic evaluation during the period 2002–2013. The diagnosis of tuberculosis was based on the finding of bacilli in aspirate or in tissue biopsy or the demonstration of caseous necrosis on tissue biopsy. The present study showed that bronchoscopy could lead to immediate, accurate diagnosis in 68.2% of suspected smear negative cases. Bronchial aspirate and bronchoalveolar lavage alone were diagnostic in 51.5% of such cases while tissue biopsy added to the yield in another 16.5% cases. The results of the present study suggests an important place of bronchoscopy in immediate diagnosis of suspected smear negative tuberculosis, thus avoiding inadvertent delays in diagnosing and instituting appropriate treatment.

4. Association of heavy metals composition of particulate matter with environmental tobacco smoke and cooking fuels in indoor air of Delhi

The present study was carried out in the industrial locations of Delhi with the primary objective to find out the association of heavy metals composition of suspended particulate matter (SPM) with environmental

tobacco smoke (ETS) and cooking fuels in indoor air of Delhi, India. Indoor SPM level was measured by the handy air sampler and the concentration of heavy metals were determined in indoor SPM using atomic absorption spectrometer. The mean level of indoor SPM was 1080.0±482.4 ?g / m3. The Concentration of indoor SPM was greater in the houses where ETS exposure was recorded in the family, and where families were using biomass fuels for cooking. The heavy metals such as Cr, Co, Pb, Ni, Zn, Cu, Mo, Cd, were identified in indoor SPM. The mean level of Co and Pb was significantly higher in the houses where ETS exposure was noticed when compared to the houses without ETS exposure. Other heavy metals like Cr, Ni, Zn, Cu and Cd were also associated with ETS exposure in the houses. The mean level of Co, Ni, ZN, Pb, Cu, Mo and Cd were higher in the houses where families were using biomass fuels (coal, wood, cow dung cakes and kerosene) for cooking as compared to families using liquefied petroleum gas (LPG). This study revealed that ETS and biomass cooking fuels increased the concentration of SPM with heavy metals in the indoor environment. The high concentration of indoor SPM and heavy metals may be harmful for human health and may caused different types of diseases in the family members.

5. Aeroallergen sensitization in asthma and rhinitis

The aim of the present study was to assess the pattern of various aeroallergens sensitization in asthma and / or rhinitis subjects. Diagnosed patients of asthma and or rhinitis were evaluated for sensitization to 58 different types of allergens, which included 5 grass pollens, 16 weed pollens, 11 tree pollens, 4 dusts, 12 fungi, 6 insects, house dust mite, kapok cotton, wool, and silk antigens. Histamine diphosphate (5mg / mL) and phosphate buffer saline (PBS) were used as positive and negative controls, respectively. There were 3,236subjects who underwent SPT with 1,818 (56.2%) being males and 1,418 (43.8%) being females. The mean age of the subjects was 31.4yrs; most common (27.65%) age group being 21-30 yrs. 1,595 subjects had asthma concomitant with rhinitis, 848 subjects were diagnosed as asthma and 803 subjects had only rhinitis. Significant skin positive reactions were found in 2460 (76.01%) subjects. Insects (43.00%) followed by weed pollens (26.22%), dust (15.01%), tree pollens (13.27%), house dust mite (11.17%), grass pollens (7.40%), fungal spores (6.95%), silk (5.0 %), kapok cotton (3.6%), and wool (1.6%) were the offending allergens. Among insects, most common positive SPT was against mosquito (42.92%) and least common against rice weevil (26.97%). On comparison for individual allergens, most common positive SPT was against mosquito (42.92%) and least common against *ehretia* (1.5 %). In asthma and or rhinitis subjects, 2460 (76.01%) suffered from poly sensitization from different aeroallergens.

***6. Aspergillus* sensitization in allergic airway disorders**

Sensitization to fungus *Aspergillus* causes a large number of allergic diseases such as aspergillus sensitive asthma, allergic Bronchopulmonary aspergillosis, rhinitis, allergic sinusitis and hypersensitivity pneumonitis. The aim of the present study was to assess the frequency of *Aspergillus* sensitization in asthma and rhinitis subjects. Diagnosed patients of asthma and or rhinitis were evaluated for sensitization to *Aspergillus* species. The skin prick testing (SPT) was done against4common *Apergillus* species (*A. fumigatus, A. flavus, A.niger and A.tamari*). Histamine diphosphate (5mg / mL) and phosphate buffer saline (PBS) were used as positive and negative controls, respectively. A marked positive skin test was indicated by wheal size e" 3 mm than negative control. There were 2,950 (asthma and rhinitis patients) who underwent SPT and 838 (28.4%) of them showed positive reaction to *Aspergillus* spp. Overall, *A. fumigatus* (24.57%)was the commonest sensitizing agent. Of 838 sensitized subjects, 723 had asthma and 115 had asthma concomitant with rhinitis. Males (58.8%, n= 493) were higher in number in comparison to females (41.2%, n= 345). The mean age of the sensitized subjects was 34.26±16.24 years. 23.74% of sensitized subjects were between 40-50 years of age group. The mean duration of symptoms prior to be diagnosed as sensitized was 11.06±9.2 years. About 44.86% of sensitized subjects had duration of symptoms of less than 10 years. Of 838 sensitized subjects, *A.fumigatus*(86.5%) was the most common species. More than one-fourth of asthma and rhinitis patients have sensitization to *Aspergillus spp.* Aspergillus sensitive asthma patients should be evaluated for Allergic bronchopulmonary aspergillosis (ABPA).

7. Association of body mass index with severity of obstructive sleep apnea

Obesity has reached epidemic proportions in India in the present century, with National Family Health Survey 2007, showing 12% males and 16% females to be obese. Obesity is one of the most powerful reversible risk factor for obstructive sleep apnea (OSA). The present study was planned to assess the association

between body mass index in adults on the severity of obstructive sleep apnea. The present study is a retrospective analysis of the sleep studies done in Vallabhbhai Patel Chest Institute over a period of one year from 1 January to 31 December 2012. The patients were divided into 2 groups based on their body mass index (BMI) into non-obese (18.50 - 24.99 kg / m^2) and obese ($\geq$ 25kg / m^2). The patients from these groups were then assessed for apnea hypopnea index (AHI). There were 81 subjects who underwent sleep study in 2012 comprising of 52 males and 29 females with the mean age of 52.62 ± 10.03 years. Most of the subjects belonged to obese group (n = 75) whereas non-obese group comprised of only 6 subjects. 66.67% subjects in non-obese group and 78.66% subjects in obese group had severe obstructive sleep apnea (AHI e" 30 / hour). The difference in occurrence of severe OSA in non-obese versus obese subjects was not statistically significant (p>0.05). OSA has high occurrence in obese individuals and severity of OSA may not be related to obesity alone.

8. Effect of household air pollution from biomass combustion on respiratory related illness in women

Indoor air pollution is third leading cause of disease burden in South East Asia as per Global burden of disease study 2010 published in lancet. The most significant sources of indoor air pollution in developing countries are combustion of solid fuels, including biomass or coal and active and passive smoking. Females are much more susceptible to household air pollutants as they spend most of their time indoors. The present study was planned to assess the correlation between respiratory symptoms in women and levels of indoor air pollution as assessed by particulate matter 2.5 (PM 2.5) and volatile organic compounds (VOCs). The present study is a cross sectional study of adult women from 77 households in a rural setting (Village Khanpurjupti, Loni, Ghaziabad) of Delhi NCR region. A questionnaire based assessment for respiratory illness related symptoms (cough, sputum, breathlessness) was done in women of these houses. In these houses assessment of PM 2.5 and VOCs levels were done by standard instruments. A total of 190 adult women from 77 households were included in the study. A total of 56 women from 44 households had history of respiratory illness related symptoms. The PM 2.5 and VOC levels were measured from all 77 households. The average PM 2.5 concentration was found to be significantly higher in houses with respiratory illness as compared to controls (10.13mg / m^3 versus 4.36mg / m^3). The average level of VOCs was also higher in these households as compared to controls but could not reach statically significant value. Household air pollution from biomass fuel use and smoking resulted in increased levels of PM2.5 and VOCs in household air, which may be responsible for increased level of respiratory illness in women.

9. Sensitization to food allergens – an Indian study

Sensitization to food results from an interaction between genetic, cultural and dietary factors. The IgE mediated sensitization affecting 3-4% adults, clinically manifests as atopic dermatitis, urticaria, asthma and rhinitis. The present study aims at evaluating presence of food sensitization in asthma and rhinitis. Diagnosed patients of asthma and / or rhinitis and / orurticaria were evaluated for sensitization to food allergens. The skin prick testing (SPT) was done against67 common food allergens. Histamine diphosphate (5mg / mL) and phosphate buffer saline (PBS) were used as positive and negative controls, respectively. A marked positive skin test was indicated by wheal size eH 3 mm than negative control. 156 patients gave history of food allergy based on standard questionnaire and underwent skin prick testing; 91 (58.34%) had sensitization to at least one food allergen. Males (60.24%) had more frequent sensitization. The patients suffering from asthma had highest sensitization (68.1%), followed by patients suffering from asthma concomitant with rhinitis (61%). The least sensitization was reported in patients diagnosed with urticaria (40%). The four most common food sensitizations found were against prawn (30%), rajma (21.9%), banana (21.9%), dal raungi(20.8%). In asthma and rhinitis food sensitization is present in more than 50% of subjects. The common food allergiesfound are against prawn (30%), rajma (21.9%), banana (21.9%) and dal raungi (20.8%).

National Centre of Respiratory Allergy, Asthma and Immunology

The National Centre of Respiratory Allergy, Asthma and Immunology (NCRAAI) was established with aim to conduct research and training on various aspects of allergy and asthma (aetiopathogenesis, diagnosis and treatment). A brief description about the activities of NCRAAI during the year is given below;

Study in Villages: The NCRAAI is conducting population based study ndoor air pollution and asthma exacerbation in children. During the period under report a total of 1525 peoples in 210 houses have been surveyed by detailed questionnaires. Further, the research work in the villages is being continued.

NCRAAI Pollen Count Station

The NCRAAI has set-up a **'NCRAAI – Pollen Count Station'** V.P. Chest Institute which was inaugurated by Prof. Rajendra Prasad, Director, VPCI on 28.05.2013.

This Pollen Station have 7 days and 24 hours Burkard Volumetric spore trap system that collects samples of airborne pollens. The Pollen data from air sampler has been collected and analyzed on daily bases. Seven-day sampler's 199 days slides and 130 slides of 24hrs sampler's (total 329 slides) have been studied till date for the pollen count.

Quiz Programme

A Quiz Programme for Post-Graduate Students of Respiratory Medicine (MD / DNB / DM / DTCD) and General Medicine was organized on 16th April 2013 at Paintal Memorial Golden Jubilee Auditorium, of the Institute. More than 50 physicians were participated from different medical institutions of Delhi and nearby states. Winners were awarded with prizes.

Bronchoscopy Training Course

A one-day Training Course on Bronchoscopy was organized on 28th February 2014 by NCRAAI, in collaboration with the Society for Tobacco Control (STC) and National College of Chest Physicians Institute (NCCP) India.

After the scientific / lecture session, Hands on Training on Bronchoscopy was provided by Olympus India. The training included Basic Bronchoscopy, Video Bronchoscopy, and Medical Thoracoscopy artificial simulator. More than 50 Doctors from different institutes of Delhi and also from Iraq attended the course and shared their views on Bronchoscopy atr this event.

The National Centre of Respiratory Allergy, Ashtma and Immunology (NCRAAI) under the Department of Respiratory Allergy and Applied Immunology organized a "Bronchoscopy Training Course" on 28th February 2014.

Research Activities: The NCRAAI is engaged in the following research activities:

- Measurement of exhaled nitric oxide (FeNO) in normal, atopic and asthmatic children.
- Study of sino-nasal involvement in patients with interstitial lung diseases.

- Correlation of exhaled FeNO, nasal FeNO and atopic status : a cross channel study in bronchial asthma and rhinitis.
- A study of skin sensitivity to various aeroallergens in patients having bronchial asthma and/ or allergic rhinitis in India.
- To study food allergy and food intolerance in patients having bronchial asthma and chronic obstructive pulmonary diseases (COPD).
- Prevalence of food intolerance in bronchial asthma in India.
- Indoor air pollution and asthma exacerbation in children: a population-based study in the villages of Delhi.

Flag hoisting Ceremony at Institute.

Respiratory Medicine

The Department is involved in the patient care (Outdoor and Indoor) at Viswanathan Chest Hospita (VCH), the clinical wing of VPCI. The faculty is involved in individual research and thesis work on different aspects of respiratory diseases as well as teaching of the postgraduate students in the subject - Pulmonary Medicine (DM, MD and DTCD) of University of Delhi. The Department conducts routine lectures, clinical demonstrations along with seminars, clinical meetings and journal clubs, ICU meetings, mortality meetings etc., regularly, as a part of teaching curriculum.

Research

1. To study the effect of nasal polyposis on nocturnal sleep disturbances, daytime sleepiness, and sleep specific quality of life disturbances in patients presenting with allergic rhinitis

Allergic rhinitis (AR), sinusitis and nasal polyps (NP) are known to coexist frequently. AR and sinusitis are known to cause impairment in the quality of life and affect sleep quality. Some studies have suggested that NP independently affect the quality of life and cause sleep disturbances in patients with allergic rhinitis.

The study comprised 106 consecutive patients (males / females, 60 / 46), 18 to 60 years with AR enrolled from outpatients department of VP Chest Institute, University of Delhi. AR was diagnosed according to ARIA guidelines. Patients were categorised into “sneezers and runners” (Group1, 73 patients) and “blockers” (Group2, 33 patients) according to their predominant symptoms. CT-PNS, done in all patients, assessed chronic rhinosinusitis / NP and was scored with Lund Mackey Score (LMS). To assess the severity of the disease and impact on quality of life, patients responded to Visual Analogue Scale (VAS) and Sinonasal Outcome Test 22 (SNOT-22) respectively. To study the effect of NP on sleep, patients were subjected to SNOT-22, Nocturnal Rhinoconjunctivitis Quality of Life Questionnaire (NRQLQ), the Epworth Sleepiness Scale (ESS) and the Pittsburgh Sleep Quality Index (PSQI).

Of the 106 patients, 72 (67.9%) had CRS. Of these, 36 (50%) had NP. CRS was seen in 50 / 73(68.5%) patients in group 1 and 22 / 33(66.6%) in group 2. NP was seen in 26 / 73 (35.6%) and 10 / 33 (30.3%) in groups 1 and 2 respectively. In group 1, occurrence of NP increased mean Global VAS score from 7.17 to 7.73 ($P<0.001$), SNOT 22 scores from 46.9 to 68.6 ($P<0.001$), NRQLQ scores from 33.3 to 59.8 ($P<0.001$), ESS scores from 9.4 to 11.6 ($P<0.001$) and Global PSQI scores from 6.4 to 13.4 ($P<0.001$). In group 2, NP increased mean Global VAS score from 7 to 8.8 ($P<0.001$), SNOT 22 scores from 42.5 to 74.4 ($P<0.001$), NRQLQ scores from 32.1 to 72 ($P<0.001$), ESS scores from 10.5 to 13.8 ($P<0.001$) and Global PSQI scores from 8.8 to 14.1 ($P<0.001$). The study showed that NP was seen in nearly one-third (33.9%) of patients with AR. QoL and sleep were significantly impaired when AR was complicated with NP.

Respiratory Virology

Research

1. Evaluation of virus like particle (VLPs) and bacterial toxin adjuvants as vaccine candidate for influenza A virus

Virus-like particles (VLPs) are highly effective type of subunit vaccines which resemble infectious virus particles that mimic the overall structure of virus particles without the requirement of containing infectious genetic material. For the construction of the VLP, viral RNA have been extracted from A / Puerto Rico / 8-V24 / 1934(H1N1) influenza virus followed by Reverse transcription, polymerase chain reaction (RT-PCR) with specific oligonucleotide primers for gene HA and M1 gene. The produced fragments were visualized by agarose gel electrophoresis. The PCR-amplified genes containing appropriate restriction sites are being cloned for its expression under *in vitro* conditions.

2. Profile of antibody responses and duration of protection following influenza vaccination for adults >65 years old

Annual epidemics and occasional pandemics of Influenza virus are affecting millions of lives world-wide. Vaccination is the only way for protecting individuals from influenza infections and saving economical loss. Vaccination is essential for children, elders, health care workers, pregnant women etc. The above said project involves Vaccination of e"60 year's elders with trivalent inactivated influenza vaccine and the study of vaccine efficacy via antibody response study. During the study 57 individuals of 60 years and above, with their written consent, were enrolled in the study at two specialized hospitals of Delhi, All India Institute of Medical Sciences (AIIMS) and V. P. Chest Institute (VPCI) where they were vaccinated. Pre-vaccinated serum samples were tested for antibody titer with WHO HAI kit. It was observed by HemmagglutinationInhibition Assay that the older age individuals have sufficient amount of antibodies in the serum even before vaccination.

3. Study of antigenic diversity and cross reactive antibody generation to influenza virus in human samples

A total of 1118 respiratory samples were collected from patients with influenza like symptoms were collected from various hospitals from Delhi throughout the year and also some samples were collected during the endemic period. The viral RNA from all the clinical samples was isolated and screened for influenza virus by real-time PCR. Of the 1118 samples screened, 230 were found positive for influenza A virus of which 41 were positive for pandemic H1N1 and 189 for seasonal influenza strain. The positive samples were amplified by conventional PCR for HA gene of influenza A virus and further sequenced for phylogenetic analysis by MEGA with NJ method having 100 bootstraps. hemagglutination inhibition (HAI) assay was performed on the patient sera collected 21 day after infection. The antigens used for this assay were H1 (2009)-A / California / 7 / 2009, H1-A / N.Caledonia / 20 / 99 and H3-A / Panama / 207 / 99, which are the control antigens provided by WHO. HAI was performed to check the cross reactivity of antibodies against influenza A virus in serum samples. It was found that mostly the patients had a sufficiently high antibody titer against infected strain and less cross- reactivity to other strains. While the serum antibodies of patients infected with pH1N1 / 09 virus or seasonal H1N1 virus were found to cross-react with the H3 and / or sH1 antigen at 2 to 4- fold lower titers, the cross reactive antibody titer of the H3N2 positive sample was 4- fold higher with sH1 antigen.

4. Evaluation of antiviral activity of medicinal plant extracts against influenza A virus

Influenza viruses are respiratory pathogens of major concern globally, contributing to high rates of morbidity and mortality annually. The viruses continuously evolve through antigenic changes bypassing the host's acquired immunity against them. Due to frequent antigenic and genetic changes, vaccines need to be formulated yearly and old vaccines are not effective against newly emerging viruses. Moreover, these vaccines have to be administered annually in order to prevent influenza. Hence, there is a growing need for developing new and effective chemotherapeutic agents to treat influenza. Natural products, derived from medicinal plants have shown to be of great value in preventing and or / ameliorating viral diseases in preclinical and clinical trials. The study aims at evaluating the antiviral efficacy of medicinal plant extracts, having

expected antiviral activity for the development of an alternative and effective therapy against influenza A viruses. Appropriate parts of certain plants, known to have medicinal properties, have been procured from the local vendors, and the extracts prepared in 100% commercial grade ethanol at room temperature. The extracts were filtered using 0.22µM syringe filter and aliquoted at -20° C for future use. The percentage yield was calculated accordingly. MTT assay was performed at different time points in A549 cells at different concentration and IC_{50} value was calculated. Further evaluation of the anti-influenza activity of the extracts under *in vitro* conditions is under process.

5. Nano-therapeutic application of small interfering RNA and micro RNA against human influenza virus

Influenza A virus causes the most prevalent infection of the respiratory tract in humans. Influenza is an infectious disease that infects birds and mammals. It is considered a relatively benign disease slightly worse than cold. The most characteristic features are weakness, fatigue, muscle ache, headache, fever etc. Every year, almost 10–20% of the world population suffers from influenza virus, resulting in up to 0.5-1 million deaths. Many recent reports indicates that the level of XO in plasma is elevated in ARDS and that XO mediates lung injury by neutrophil-elastase and hyperoxia. These suggestive data prompted to hypothesize that XO causes O^2 generation, which could produce highly toxic –OH in the pathogenesis of influenza virus infection. The potential siRNA has been designed against Xanthine Oxidase gene which is up regulated during influenza virus infection. Currently the HeLa cell line is being established for down-regulation studies and maintained in exosomes free serum media. The siRNA was designed against xanthine oxidase and the cloning of PB1 gene of influenza virus has been done. For delivery of siRNA and miRNA, exosome isolation procedure is under standardization.

The Institute organized a "Hands on Training Programme in Molecular Techniques in Biotechnology" from 23-24 December 2013. A manual was released on this occasion.

6. Generation, characterisation and biological relevance of human monoclonal antibodies against pandemic influenza 2009 (H1N1) and seasonal influenza virus

Antibodies are a major component of specific immune protection against influenza and remain the established immune correlate of protection for influenza vaccines. Human antibodies obtained from the patients of influenza provide an important role in immunotherapy for human influenza virus infection. The

hemagglutinin glycoprotein is the primary target of antibodies that confer protective immunity to influenza viruses. On a monoclonal level, only antibodies specific for the viral hemagglutinin have been shown to block/neutralize infection. In this study, neutralizing human monoclonal antibodies against A(H1N1)pdm2009 and seasonal H3N2 influenza virus were generated from influenza sero-positive patients. The blood samples of thirteen influenza positive patients was collected and profiled for presence of antibodies to influenza virus by ELISA and hemagglutination inhibition reaction. The PBMCs were isolated and transformed before fusion with human X mouse heteromyeloma HMMA2.5 cells. These fusion clones were screened for the detection of neutralizing antibody secreting clones. Total of 5 stable fusion clones were established out of which four secreted monoclonal antibodies against A(H1N1)pdm2009 and one clone secreted antibody against seasonal H3N2 virus. These five monoclonal antibodies were characterized and it was concluded that all the antibodies bound to their respective viruses and neutralized them, although the degree of neutralization varied according to the antibody being used. In the in vivo model (Balb/c mice), the monoclonal antibodies delayed death of the animals and were found to be effective, both prophylactically and therapeutically. These monoclonal antibodies may be used in future in human population for protection against influenza virus.

7. Construction and characterization of functional ScFv antibodies against NP and NS1 proteins of pandemic influenza H1N1 (2009) virus

The study aimed at developing recombinant single chain variable fragment (scFv) antibodies against the recombinant (nucleocapsid) NP and non-structural (NS1) proteins of the pandemic influenza H1N1 (2009) virus for development of an ELISA-based sero-diagnostic test, which efficiently differentiated among the vaccinated and influenza A virus infected individuals. NP is a type-specific and relatively conserved antigen, which is distinct for each of the influenza A, B and C viruses. The scFv antibodies were developed from spleen cells of the mice, hyper-immunized with pandemic influenza H1N1 (2009) virus. Phage display antibody library against the viral proteins was generated. The antigen-specific scFv- phages, showing high yield in phage ELISA, were used for production and purification of functional scFv antibodies in bacterial cells.The antibodies were purified and analyzed for their antigen binding efficacy. The phage displayed antibodies were used to develop an competitive inhibition-enzyme linked immunosorbent assay (CI-ELISA) test. A total of 31 samples were tested, of which 18 samples were from patients, who acquired natural infection of influenza A (H1N1) virus, 7 from individuals vaccinated against influenza virus and 6 as healthy controls. Anti- NS1 antibodies were detected only in the influenza virus infected patients, except 3 H3N2 samples, whereas anti-NP antibodies were found in both virus infected and vaccinated samples. To conclude the recombinant anti-NS1 and anti-NP scFv antibodies developed are significant for sero-diagnosis of influenza A virus infection among human population. The data generated from the test may be used for evaluation of existing immunity, thereby determining the efficacy of vaccines in providing immune protection against the emerging or re-emerging influenza virus strains.

8. Generation, characterization and epitope mapping of recombinant monoclonal antibodies against pandemic influenza 2009 (H1N1)

The project aimed to generate influenza virus neutralising antibodies using phage display technology. The antibody phage display library was constructed from B cells of Balb/c mice hyperimmunised with inactivated pandemic H1N1 influenza virus. The antibody expression was localised in the bacterial cells and the respective fractions were purified by metal affinity chromatography under native or denaturating conditions. The antibodies were used for mapping B-cell epitopes on the HA antigen of influenza A virus by peptide ELISA and a commercially available phage display epitope mapping kit. The antibodies showed potent neutralizing activity as observed in microneutralisation and haemagglutination inhibition assays.

9. Evaluation of ER stress inhibitor on chikungunya virus infection

Chikungunya virus infection is known to induce ER stress pathways in the host cell, which help in folding of viral protein and ultimately assist viral replication. We are targeting ER stress pathways with specific inhibitors to evaluate their effect on viral replication. MTT assay for these inhibitors has been done to study the toxicity of these compounds. PCR primes has been standardize for all the important gene involves in UPR pathways.

10. To study the heterosubtypic immunity provided by pandemic influenza A H1N1 (2009) virus infected cells

Dendritic cells are professional antigen presenting cells. In the current study *in vitro* influenza primed dendritic cells will be studied for their protection against different influenza A virus strains. Protocol has been standardized for differentiation of bone marrow derived stem cells to dendritic cells in the presence of murine GM-CSF. Characterization of differentiated dendritic cells has been done with FACS. Expression of dendritic cells maturation markers and type 1 inteferon has been compared between influenza infected and non infected cell using real time PCR.

11. Role of microRNA on influenza pathogenesis

We have found some microRNA, differentially expression during influenza infection. Few of them are known to regulate innate immune response. We are studying the association of these microRNAs with influenza pathogenesis. Expression of immunoregulatory microRNAs has been compared between influenza infected and non infected cells by real time PCR. Experiments on microRNA transfection in lung epithelial cell lines and association of these microRNAs with interferon expression are still ongoing.

Postgraduate Training and Teaching

The Institute was initially started with a Diploma course in Tuberculosis and Chest Diseases (DTCD). Later the MD and PhD courses were started. The Institute continues to conduct the MD and PhD courses in pulmonary medicine, biochemistry, microbiology, pharmacology and physiology, and DTCD. The Institute is also running DM course in Pulmonary Medicine.

DTCD

Session 2012 - 2014	Session 2013 - 2015
Dr Anupriya Aggarwal	Dr Harish Bhatia
Dr Sachin Baliyan	Dr Saurabh Burman
Dr Vikas Jaiswal	Dr Tinu Garg
Dr Upasna Jelia	Dr Manish
Dr Davinder Kumar Kundra	Dr Ajay L. Parmar
Dr Neethu Sukumaran	

DM Theses (Submitted)

(Session: 2011-2014)

Sl No.	Name (Discipline)	Title of Theses	Supervisor(s)
1.	Dr Vikas Dogra (Pulmonary Medicine)	Body mass index and quality of life in different CT phenotypes in male patients of COPD : a comparative study	Prof. S.N. Gaur and Dr B.K. Menon

DM Theses (Pursued)

(Session: 2012-2015)

Sl No.	Name (Discipline)	Title of Theses	Supervisor(s)
1.	Dr Pawan Gupta (Pulmonary Medicine)	Characterisation of nocturnal hypoxemia in chronic obstructive pulmonary disease	Prof. S.K. Chhabra
2.	Dr Mandeep Singh (Pulmonary Medicine)	Effect of obesity and metabolic syndrome on severity, quality of life, sleep quality and inflammatory markers in patients of bronchial asthma	Prof. Rajendra Prasad Prof. Raj Kumar and Prof. S.N. Gaur

DM Theses (Pursued)

(Session: 2013-2016)

Sl No.	Name (Discipline)	Title of Theses	Supervisor(s)
1.	Dr Mohd Yousoof Dar (Pulmonary Medicine)	Study of inflammatory markers in sputum positive patients of pulmonary tuberculosis and its response to anti-tubercular treatment	Dr B.K. Menon
2.	Dr Vikas Chanra Pilaniya (Pulmonary Medicine)	Occurrence of bronchial anthracofibrosis in respiratory symptomatics with history of exposure to biomass fuel smoke	Prof. Ashok Shah

MD Degrees (Awarded)

(Session: 2010-2013)

Name	Discipline
Dr Kshitiz Aggarwal	Pulmonary Medicine
Dr Swati Behera	Pulmonary Medicine
Dr Seema Kumari	Pulmonary Medicine
Dr Swapna Ramaswamy	Pulmonary Medicine
Dr Mayank Saxena	Pulmonary Medicine
Dr Jitender Sharma	Biochemistry
Dr Dabet Rynga	Microbiology
Dr Razi Akhtar	Pharmacology
Dr Puneet Kumar	Physiology

MD Theses (Submitted)

(Session: 2011-2014)

Sl No.	Name (Discipline)	Title of Theses	Supervisor(s)
1.	Dr Devi Jyoti Das (Pulmonary Medicine)	Endothelial dysfunction in chronic obstructive pulmonary disease	Prof. S.K. Chhabra and Dr Vishal Bansal
2.	Dr Gaki Nima (Pulmonary Medicine)	Evaluation of vitamin D in asthma: its effect on inflammatory markers and impact on management	Prof. S.N. Gaur and Dr B.K. Menon
3.	Dr Nitesh Gupta (Pulmonary Medicine)	Correlation of fractional exhaled nitric oxide, nasal nitric oxide with atopic status in bronchial asthma, allergic rhinitis	Prof. S.N. Gaur and Prof. Raj Kumar
4.	Dr Shweta Paul (Biochemistry)	A study to correlate the activity of ADAM33 gene protein with oxidative stress in asthma	Dr Vishwajeet Rohil Prof. S.K. Bansal Prof. Ashok Shah and Dr M. Rahman
5.	Dr Anshu Mittal (Microbiology)	Detection, identification and profiling of mycobacterial isolates from patients of pulmonary and lymph node tuberculosis in Delhi	Dr Mandira Varma-Basil and Prof. Mridula Bose
6.	Dr Poornima Sen (Microbiology)	Role of TLR expression in innate activity during virus infection in acute asthma	Dr Madhu Khanna and Prof. S.N. Gaur
7.	Dr Sandeep Madhukar Wankhede (Microbiology)	Phenotypic and molecular characterisation of clinical isolates of *Candida* species with special reference to *Candida dubliniensis*	Dr Anuradha Chowdhary
8.	Dr Santosh Kumar (Pharmacology)	Antimicrobial drug prescribing pattern in hospitalised patients of community-acquired pneumonia: a retrospective study	Dr Anita Kotwani and Prof. S.N. Gaur

MD Theses (Pursued)

(Session: 2012-2015)

Sl No.	Name (Discipline)	Title of Theses	Supervisor(s)
1.	Dr Punit Agarwal (Pulmonary Medicine)	Utility of high attenuating mucus (HAM) and other radiologic features (ORF) in diagnosed cases of allergic broncho-pulmonary aspergillosis: a retrospective and prospective study	Prof. S.N. Gaur and Dr Anuradha Chowdhary
2.	Dr Kamal Kumar (Pulmonary Medicine)	To study the effect of nasal polyposis on nocturnal sleep disturbances, daytime sleepiness and sleep specific quality of life disturbances in patients presenting with allergic rhinitis	Prof. Ashok Shah
3.	Dr Ankit Mittal (Pulmonary Medicine)	Correlation of inflammatory markers and vitamin D levels with the severity of disease and frequency of acute exacerbations of chronic obstructive pulmonary disease	Dr B.K. Menon and Prof. S.N. Gaur
4.	Dr Jayanthi G. (Microbiology)	Phenotypic and molecular characterization of drug resistant *Pseudomonas aeruginosa* isolates from clinical samples	Dr Malini Shariff
5.	Dr Ruby Stella R. (Physiology)	Phenotypical variations in cardio-respiratory responses and gait characteristics during sub-maximal exercise in chronic obstructive pulmonary disease	Dr Vishal Bansal and Prof. S.K. Chhabra

MD-Ist Year
(Session: 2013-2016)

Name	Discipline
Dr Viswesvaran B.	Pulmonary Medicine
Dr Gaurav Bhati	Pulmonary Medicine
Dr Richa Mittal	Pulmonary Medicine
Dr Muhammed Noufal Poongadan	Pulmonary Medicine
Dr Archana Bhandekar	Microbiology
Dr Stuti Gupta	Microbiology
Dr Gajbhiye Sachinkumar Pancham	Pharmacology
Dr Raman Ghai	Physiology
Dr Rohit Singh	Physiology

PhD Awarded/Submitted

Sl No.	Name (Discipline)	Title of Theses	Supervisor(s)	Status
1.	Abhimanyu (Microbiology)	Genetic variants in the host innate and acquired immune response: search for risk loci in north Indians	Prof. Mridula Bose Dr Mandira Varma-Basil and Dr J.N. Banavalikar (RBIPMT, Delhi)	Awarded
2.	Mr Binod Kumar (Microbiology)	Catalytic nucleic acid mediated gene silencing of M2 ion channel of influenza viruses	Dr Madhu Khanna and Dr M.K. Daga (MAMC, New Delhi)	Awarded
3.	Ms Kushal Garima (Microbiology)	Expression analysis and protein profiling of drug efflux transporters in clinical isolates of *M. tuberculosis*	Prof. Mridula Bose and Dr Mandira Varma-Basil	Submitted
4.	Ms Latika (Microbiology)	Generation, characterisation and biological relevance of human monoclonal antibodies against pandemic H1N1 (2009) and seasonal influenza virus	Dr Madhu Khanna and Dr Sunil K. Lal (ICGEB, New Delhi)	Submitted
5.	Ms Roopali Rajput (Microbiology)	Construction and characterisation of functional scfv antibodies against nucleocapsid protein and non-structural protein1 proteins of pandemic influenza H1N1 (2009) virus	Dr Madhu Khanna and Dr H.K. Pradhan (WHO, New Delhi)	Submitted
6.	Ms Nisha Rathor (Microbiology)	Regulation of expression of mce4 operon of *M. tuberculosis*: search for upstream promoter activity and regulatory proeins	Prof. Mridula Bose and Dr Mandira Varma-Basil	Submitted

PhD Theses (Pursued)

Sl No.	Name (Discipline)	Title of Theses	Supervisor(s)	Year of Registration
1.	Mr Manoj Kumar (Biochemistry)	Studies on erythrocyte membrane protein profile and oxidant and antioxidant status of blood in bronchial asthma	Prof. S.K. Bansal Prof. Rajendra Prasad and Prof. S.K. Chhabra	2013
2.	Mr Anupam Prakash (Microbiology)	A study of *Cryptococcus* species in immunocompromised patients	Dr Anuradha Chowdhary and Prof. H.S. Randhawa	2010
3.	Mrs Shallu Kathuria (Microbiology)	*Histoplasma capsulatum*: a study of its natural reservoirs and role in respiratory and systemic infections in immunocompromised patients	Dr Anuradha Chowdhary and Prof. H.S. Randhawa	2010
4.	Ms Anshika Narang (Microbiology)	Efflux mechanism in *Mycobacterium tuberculosis:* to study the effect on drug susceptibility profile	Dr Mandira Varma-Basil and Prof. Mridula Bose	2011
5.	Mr Naresh Kumar (Microbiology)	Expression analysis of an array of genes of *Mycobacterium tuberculosis* clinical isolates from pulmonary tuberculosis and lymph node tuberculosis: search for mycobacterial factors associated with different clinical manifestations	Dr Mandira Varma-Basil and Prof. Mridula Bose	2012
6.	Ms Pooja Singh (Microbiology)	Utilisation of cholesterol by *mce4A* (Rv3499) overexpressed *M. tuberculosis* H37Rv and the effect of calcium blockers	Dr Mandira Varma-Basil and Prof. Mridula Bose	2012
7.	Ms Cheshta Sharma (Microbiology)	Molecular mechanisms of triazole antifungal resistance in *Aspergillus fumigatus* and *Aspergillus flavus* originating from clinical and environmental sources	Dr Anuradha Chowdhary	2013
8.	Mr Pradeep Kumar Singh (Microbiology)	Phenotypic and molecular characterisation, antifungal susceptibility profiles and clinical significance of *Basidiomycetes* molds occurring in patients with respiratory disorders	Dr Anuradha Chowdhary and Prof. S.N. Gaur	2013

Sl No.	Name (Discipline) Registration	Title of Theses	Supervisor(s)	Year of
9.	Ms Shraddha Porwal (Microbiology)	Phenotypic and genotypic indicators of pre MDR tuberculosis: prediction of the development of MDR tuberculosis	Dr Mandira Varma-Basil Prof. Mridula Bose and Prof. Rajendra Prasad	
10.	Mr Dibya Ranjan Pati (Microbiology)	Nano-therapeutic application of small interfering ribonucleic acid (RNA) and micro RNA against human influenza virus	Dr Madhu Khanna and Dr A.C. Banerjee (NII, New Delhi)	2012
11.	Mr Dhirendra K. Singh (Pharmacology)	Experimental studies with chelidonic acid, a molecule of plant origin, with possible therapeutic potential in bronchial asthma	Prof. A. Ray and Dr Kavita Gulati	2010
12.	Ms Meenakshi Sharma (Pharmacology)	Studies on the possible role of nitric oxide in high altitutde stress induced neurobehavioural and immunological changes in rats	Prof. A. Ray Prof. K. Ravi and Dr Kavita Gulati	2011
13.	Mr Jagdish Chander Joshi (Pharmacology)	Experimental studies on the possible role of nitric oxide during acute and chronic morphine in normal and stressed rats	Dr Kavita Gulati and Prof. A. Ray	2011
14.	Mr Nishant Rai (Pharmacology)	Experimental studies on the cellular and molecular mechanisms of action of UNIM-352, a polyherbal Unani preparation to validate its use in bronchial asthma	Dr Kavita Gulati and Prof. A. Ray	2011
15.	Mr Md. Shamsuzzaman (Pharmacology)	Pharmacological studies on the possible mechanisms involved in theophylline induced cardiotoxicity in rats	Prof. A. Ray and Dr Kavita Gulati	2012
16.	Mr Tarun Takhur (Pharmacology)	Pharmacological studies on the possible role of nitric oxide (NO) and NO mediated signalling pathways in the regulation of stress-induced imunomodulation in rats	Prof. A. Ray and Dr Kavita Gulati	2012

Sl No.	Name (Discipline)	Title of Theses	Supervisor(s)	Year of Registration
17.	Ms Sulekha Chaudhary (Pharmacology)	Studies on the anti-inflammatory and immunomodulatory effects of *Albizia lebbeck and Solanum xanthocarpum* in experimental models of bronchial asthma	Dr Kavita Gulati and Prof. A. Ray	2013
18.	Dr Ritu Kulshrestha (Physiology)	Pathophysiological studies in bleomycin induced pulmonary hypertension and fibrosis in rat model	Prof K. Ravi and Prof. A.K. Dinda (AIIMS, New Delhi)	2009
19.	Mr Ravindra Sharma (Physiology)	Hypothalamic regulation of high altitude pulmonary oedema	Prof. K. Ravi Prof. A. Ray and Dr P.K. Reddy (DIPAS, Delhi)	2011
20.	Mr Rishabh Charan Choudhary (Physiology)	Higher nervous control of the pulmonary renal reflex	Prof K.Ravi and Dr Kavita Gulati	2011

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

Sl No.	Name (Discipline)	Title of Theses	Supervisor(s)	Status
1.	Ms Anju Sharma (Biochemistry)	To investigate the effect of histone hyperacetylation on the expression of genes involved in lung carcinogenesis	Prof. Jayashree Bhattacharjee (Vardhman Mahavir Medical College and Safdarjung Hospital, New Delhi) and Dr Viswajeet Rohil	Awarded
2.	Ms Karuna Sharma (Biochemistry)	Genetic polymorphism of matrix metalloproteinases-9 (MMP-9) and its correlation with the maternal serum level of biomarkers (PAPP-A, free beta-hCG) and proinflammatory cytokines in preeclampsia in north Indian population	Prof. Ritu Singh (Dept. of Biochemistry, Lady Harding Medical College, New Delhi, Prof. Jayashree Bhattacharjee (Vardhman Mahavir Medical College and Safdarjung Hospital, New Delhi) and Dr Viswajeet Rohil	Pursued
3.	Mr Jamal Ali Moiz (Physiotherapy)	Effect of the addition of balance training to pulmonary rehabilitation for patients with COPD	Prof. M. Ezaj Hussain Prof. S.N. Gaur and Dr Vishal Bansal	Pursued

Distinguished Visitors

- Dr Naveen Mehrotra, MD, PA, 1315 Stelton Road, Piscataway, NJ 08854, USA visited the Respiratory Allergy and Applied Immunology Department and discussed about future collaboration in the field of allergy and immunotherapy (13th May 2013).

- Dr Pawan Sharma, Senior Consultant-Healthcare, NER-BPMC programme of DBT, Govt. of India visited the Institute and discussed collaborative work of VPCI and NER Institutes (25th September 2013).

- Prof. D.K. Mitra, Department of Transplant Immunology and Immunogenetics, All India Institute of Medical Sciences (AIIMS), New Delhi visited the Institute and discussed on the collaboration in the areas of Tuberculosis and Sarcoidosis among the departments of Respiratory Medicine, Microbiology and Pathology of VPCI and AIIMS (21st November 2013).

- Dr Richard E. Goodman, Research Professor, Food Science and Technology Department, University of Nebraska, Lincoln, USA visited the Respiratory Allergy and Applied Immunology department and he discussed modalities about future collaboration in the field of food allergy (19th December 2013).

Awards/Honours

Prof. Rajendra Prasad

- **Fellowship** of Royal College of Physicians and Surgeons of Glasgow.
- **TAI Oration Award** of Tuberculosis Associtions of India received during the 68th National Conference on Tuberculosis and Chest Diseases (NATCON-2013), New Delhi.
- **Chairman**, Standing Technical Committee, Tuberculosis Association of India.
- **Vice-Chairman**, National Task Force RNTCP for involvement of medical colleges.
- **Vice President**, Uttar Pradesh Tuberculosis Association.
- **Editor-in-Chief and Publisher**, *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).
- **Editorial Advisor**, *Journal of Clinical Epidemiology and Global Health* of IndiaClen.
- **Member**, Diagnosis and Management of TB under RNTCP, Govt. of India.
- **Member**, Sub-Committee for Drug Regimen for TB and HIV, Health and Family Welfare, Govt. of India.
- **Member**, Working Group for Indian Initiative on Obstructive Sleep Apnea (INOSA) Guidelines, Department of Health Research, Ministry of Health and Family Welfare, Govt. of India.
- **Member**, Developing Curriculum and Training Module on High Altitude Mountain Medicine, Govt. of India.
- **Member**, Indian Standard of TB Care, Govt. of India.
- **Chairman**, Ethical Committee, National Institute of Tuberculosis and Respiratory Diseases, New Delhi.
- **Member**, Faculty Selection Committee, AIIMS, New Delhi.
- **Member**, Faculty Selection Committee, Hamdard University, New Delhi.
- **Member**, Faculty Selection Committee, National Institute of TB and Respiratory Diseases, New Delhi.
- **Member**, Working Group for Guidelines for Diagnosis and Management of COPD in India, Indian Chest Society and National College of Chest Physicians (India).

Prof. S.N. Gaur

- **Secretary**, National College of Chest Physicians (India).
- Awarded **Certificate of Recognition** for outstanding contribution to the success of the Asia Pacific Congress of Allergy, Asthma and Clinical Immunology (APCAACI) - Taipei Taiwan.
- **Member**, various Sub Committees of American Academy of Allergy Asthma and Immunology (AAAAI) 2014-2015.
- **Executive Council Nominee**, Governing Council, V.K.R.V. Rao Hostel, University of Delhi, for 2013-2015.
- **Chairman**, Ethics Committee, New Delhi Tuberculosis Centre, New Delhi.
- **Founder Fellow**, Academy of Pulmonary Sciences (India), Chandigarh.
- **Editor-in-Chief**, *Indian Journal of Allergy, Asthma and Immunology*, an official publication of the Indian College of Allergy, Asthma and Applied Immunology.

- **Member**, Editorial Board, *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).
- **Advisor**, Editorial Board, *Indian Journal of Geriatric Care*, Delhi.
- **Expert**, Committee to frame National Guidelines on Obstructive Sleep Apnea, AIIMS.
- **Member**, Working Group for Guidelines for Diagnosis and Management of COPD in India, National College of Chest Physicians (India) and Indian Chest Society.
- **Expert**, Faculty Selection Committee, Himachal Pradesh Public Service Commission, Shimla.
- **Expert**, Faculty Selection Committee, King George's Medical University (KGMU), Lucknow, Uttar Pradesh.
- **Member**, Programme Advisory Committee for Environment Research Programme (EnvRP), Ministry of Environment and Forest, Govt. of India, NewDelhi.
- **Observer**, Super Speciality Entrance Test (SET), University of Delhi, Delhi.
- **Member**, Faculty Selection Committee, Centre for Physiotherapy, Jamia Millia Islamia, New Delhi.

Prof. A. Ray

- **Member**, DBT-Task Force on Medicinal and Aromatic Plants, New Delhi.
- **Member**, Institutional Ethical Committee, Rajan Babu Institute for Pulmonary Medicine and Tuberculosis, Delhi.
- **Convener**, MD (Pharmacology) Examination of University of Delhi at VPCI.
- **Chairman**, Selection Committee for ICMR-CCRAS (Department of AYUSH) Ministry of Health and Family Welfare, Govt. of India, New Delhi.
- **Secretary**, Society for Nitric Oxide and Allied Radicals (SNOAR).
- **Expert Member**, Academic scientific / decision / policy making committees of ICMR, DST, DBT, DRDO, UGC,AYUSH, CDSCO / DCG-I, CDRI-CSIR, Central Universities (JNU, Jamia Hamdard, BHU, GGIPU).
- **Member**, Committee of Courses and Studies (CCS) of Pharmacology, Faculty of Medical Sciences, University of Delhi.
- **Member**, Departmental Research Committee (DRC) of Pharmacology, Faculty of Medical Sciences, University of Delhi.
- **Visiting Scientist**, St. Boniface Hospital, Univ of Manitoba, Winnipeg, Canada.
- **Co-ordinator**, Adverse Drug Reaction Monitoring Centre (AMC) at the VPCI under the Pharmacovigilance Programme of India (Govt of India).
- **Expert**, DCG-I for GMP Compliance of Pharmaceutical Manufacturing Facility.
- **Chairperson**, 11th Annual Conference of International Society for Heart Research (Indian Section), Mohali.
- **Assessor**, Medical Council of India (MCI) for recognition of MD (Pharmacology) course at Maharajah Institute of Medical Sciences, Vizianagaram Distt. (Andhra Pradesh).

Prof. Ashok Shah

- **Fellow**, the National Academy of Medical Sciences (India).
- **Indian Editorial Advisor**, *European Respiratory Journal*.
- **Editor**, *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.
- **Associate Editor**, *Indian Journal of Allergy*, *Asthma and Immunology*, an official publication of the Indian College of Allergy, Asthma and Applied Immunology.
- **Section Editor** (Infectious Diseases), *Lung India*, an official publication of the Indian Chest Society.
- **Member**, Editorial Board, *European Respiratory Journal* of the European Respiratory Society.
- **Member**, Editorial Board, *European Respiratory Reviews* of the European Respiratory Society.
- **Member**, Editorial Board, *Clinical and Molecular Allergy*, a Biomedical Central Journal.
- **Member**, Editorial Board, *Asian Pacific Allergy Journal* of the Asia Pacific Association of Allergy, Asthma and Clinical Immunology (APAAACI).
- **Member**, Editorial Board, *Open Allergy Journal.*
- **Member**, Editorial Advisory Board, *Chest* (Indian Edition), an official publication of the American College of Chest Physicians, USA.
- **Member**, Editorial Board, *Current Medical Trends*.
- **Member**, Technical Screening Committee of Biotech Consortium India Limited (BCIL).
- **Technical Advisor**, Faculty Standing Selection Committee, All India Institute of Medical Sciences, New Delhi.
- **External Expert**, Technical Committee, National Institute of Tuberculosis and Respiratory Diseases, New Delhi.
- **Assessor**, National Board of Examinations, New Delhi.
- **Member**, National Committee on "*Bibliographic Biomedical Database from Indian Literature*", Indian Council of Medical Research - National Informatics Centre, New Delhi.

Prof. S.K. Chhabra

- **Editor**, *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).
- **Assistant Editor**, *Indian Journal of Allergy*, *Asthma and Immunology*, an official publication of the Indian College of Allergy, Asthma and Applied Immunology.
- **Section Editor** (Pulmonary Circulation), *Lung India*, an official publication of the Indian Chest Society.
- **Expert**, Selection Committee, Defence Research and Development Organization, Government of India.
- **Expert**, Technical Evaluation Committee, National Institute of Tuberculosis and Respiratory, Delhi.
- **Expert**, Technical Evaluation Committee, Rajan Babu Institute of Pulmonary Medicine, Delhi.

Prof. K. Ravi

- **Expert Member**, Committee for the Advancement of Physiological Sciences, Indian Council of Medical Research, New Delhi.
- **Expert Member**, Project Review Committee, ICMR, New Delhi.

Prof. S.K. Bansal

- **Fellow**, Indian College of Allergy and Applied Immunology (FICAAI).

- **Vice President**, Association of Clinical Biochemists of India (Delhi Chapter).
- **Member**, Board of Research Studies, Faculty of Medical Sciences, University of Delhi.
- **Member**, Academic Council, University of Delhi, India.
- **Member**, Delhi University Court, University of Delhi.

Prof. Raj Kumar

- **Fellow**, International Medical Sciences Academy (IMSA), New Delhi.
- **Member**, Central Committee, the Tuberculosis Association of India.
- **Member**, Board of Studies, Department of Tuberculosis and Chest Diseases, Banaras Hindu University (BHU), Varanasi, Uttar Pradesh.
- **Member**, Board of Studies, Department of TB and Chest, Aligarh Muslim University, Aligarh, Uttar Pradesh.
- **Member**, Editorial Board**,** *International Journal of Occupational and Environmental Health*, USA.
- **Member,** Editorial Board, *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).
- **Assistant Editor**, *Indian Journal of Allergy, Asthma and Immunology*, an official publication of the Indian College of Allergy, Asthma and Applied Immunology.
- **Section Editor (Occupational Disorders and Research Methods)**, *Lung India*, an official publication of the Indian Chest Society.
- **Member**, Editorial Board, *Current Allergy and Asthma Report*.
- **Editor**, *Tobacco Control Bulletin*, an official publication of the Society for Tobacco Control, Delhi.
- **Member**, Central Committee, Tuberculosis Association of India, New Delhi.
- **Secretary**, Society for Tobacco Control.
- **Treasurer**, South Asia Associacion of Asthma, Allergy and Clinical Immunology.
- **Member**, National Academy of Sciences India (NASI).
- **Member**, National Academy of Medical Sciences (NAMS).
- **Member**, American Academy of Allergy, Asthma and Immunology.
- **Member**, **Governing Council**, South Asia Thoraric Society (SATS).
- **Member**, **Governing Council**, National College of Chest Physicians (India).
- **Member**, **Governing Body**, Indian Chest Society.
- **Fellow**, Indian Chest Society.

Dr Madhu Khanna

- **Editor**, *Journal of Virology Research*.
- **Editor**, *International Journal of Immunology Research*.
- **Secretary General**, Biotechnology Society of India.
- **Joint Secretary**, International Association of Medical and Pharmaceutical Virologists.
- Awarded **'Bill and Melinda Gates Foundation's 'Global Health Award'** to attend Keystone symposia on "Advancing vaccine in the genomic era", Brazil.

Dr Anuradha Chowdhary

- **Expert**, World Health Organization for the Development of the Global Report on Antimicrobial Resistance (AMR).
- **Deputy Editor**, *Mycoses*, an official Journal of the Europeon Confedration of Medical Mycology.
- **Academic Editor**, *PLoS One*, an international, peer-reviewed, open-access, online publication from Public Library of Science.
- **Member**, Editorial Board, *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).
- **External Examiner**, Microbiology, Stellen-Bosch University, South Africa.
- **Member Expert**, Dutch Society for Medical Mycology, for opinion on the Management of Azole Resistance in *Aspergillus fumigatus*.
- **Dr G.P. Agarwal Young Scientist Award** for a joint paper presented at 10th National Conference of the Society for Indian Human and Animal Mycologists (SIHAM), Coimbatore, Tamil Nadu.
- **Best Oral** presentation for a joint paper at 10th National Conference of the Society for Indian Human and Animal Mycologists (SIHAM), Coimbatore, Tamil Nadu.
- **Best Poster Award** at 10th National Conference of the Society for Indian Human and Animal Mycologists (SIHAM), Coimbatore, Tamil Nadu.
- **ALLFUN Fellowship** for participation in 6th Advances Against Aspergillosis held at Madrid, Spain.

Dr Mandira Varma-Basil

- **Special Invitee**, Screening Committee, DBT for the review of proposals received under the Twinning (R and D) program for NER 2013-14 (Medical Biotechnology area).
- **Expert**, Societal Research Fellowship Scheme – Disha Programme Group Monitoring Workshop (GMW), DST.
- **Second Best Poster Award**, at Vth Annual Conference (Micro-D-Con 2013) on "Human Microbiome in Health and diseases", organized by Indian Association of Medical Microbiologists (IAMM), Delhi and NCR Chapter.
- **Best Paper Award**, for a joint paper presented at First Chapter Meet of IAMM (Delhi Chapter).

Dr Anita Kotwani

- **Member**, Committee to steer the activities related to Antimicrobial Stewardship Programme in India, ICMR, New Delhi.
- **Member**, Steering Committee to Assess, Review and form Guidelines on Antimicrobial Resistance, under "National Programme on Containment of Antimicrobial Resistance", DGHS, Ministry of Health and Family Welfare, Govt. of India
- **Member**, Task Force Committee to Assess, Review and Suggest measures on Antimicrobial Resistance, and to develop a National Antibiotic Policy, DGHS, Ministry of Health and Family Welfare, Govt. of India.
- **Member**, National Working Group, Global Antibiotic Resistance Partnership (GARP)-India.
- **Invited** to present paper at Oxford University Clinical Research Unit, National Hospital of Tropical Diseases, Hanoi, Vietnam.
- **Expert** in a collaborative Indo-Norway workshop on "Antimicrobial Resistance: Understanding Challenges and Identifying Future Approaches", ICMR, New Delhi.

- **Expert** to provide technical support to the India and Nepal research team on WHO Medicines Indicators on Health Policy and System Research project; Access to medicines in low and middle-income countries.
- **Member**, Editorial Board, *Journal of Health Policy and Programs and Governance*.

Dr Kavita Gulati

- **Treasurer**, Society of Nitric Oxide and Allied Radicals (SNOAR).
- **Expert** for review of projects and progress at Central Council for Research in Homeopathy, AYUSH (Govt. of India).

Dr Vishwajeet Rohil

- **Expert**, the Sixth, Seventh, Eighth and Ninth Meeting of Executive Board Meeting to review the progress of XIFYP project; 'Human performance enhancement under different operational environment", DIPAS, DRDO, Ministry of Defence, Govt. of India.
- **Best Poster Award** for a joint paper presented at the 40th National Conference of Association of Clinical Biochemists of India (ACBICON 2013), New Delhi.

Dr Vishal Bansal

- **Member**, Editorial Board, *Journal of Krishna Institute of Medical Sciences University*, an official publication of Krishna Institute of Medical Sciences University, Karad, Maharashtra.

Dr M. Rahman

- **Member**, Editorial Board, *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).

Dr Ritu Kulshrestha

- **Councilor Member**, Asian Pulmonary Pathology Society (APPS).

Mr Binod Kumar (PhD Student)

- **"Bill and Melinda Gates Foundation" Fellowship** to attend "Options for the Control of Influenza VIII" conference at Cape Town, South Africa.

Ms Latika (PhD Student)

- **Travel Grant** by International Society of Antiviral Research (ISAR), Immunology Foundation Bursary to attend 26th International Conference of Antiviral Research, at San Francisco, California, USA.

Ms Roopali Rajput (PhD Student)

- **Travel Grant** by International Society of Antiviral Research (ISAR) to attend 26th International Conference of Antiviral Research, at San Francisco, California, USA.

Sponsored Research Projects

Sl No.	Faculty Member (Department)	Title of Project	Funding Agency, Date of Sanction/Implementation and Duration	Budget (in Rs.)
1.	Dr Vishwajeet Rohil (Clinical Biochemistry)	To investigate the role of calreticulin transacetylase mediated histones hyperacetylation induced epigenetic modulation by polyphenolic acetates in genes implicated in lung tumorigenesis	D.B.T. November 6, 2013 (One and half year)	24.16 Lakhs
2.	Dr Anuradha Chowdhary (Medical Mycology)	*Histoplasma capsulatum*: a study of its natural reservoirs and role in respiratory and systemic infections in India	I.C.M.R. August 1, 2012 (Three years)	23.36 Lakhs
3.	Dr Anuradha Chowdhary (Medical Mycology)	Multi-laboratory evaluation of a synthetic peptide based ELISA (AfuPEPLISA) for detection of *Aspergillus fumigatus* specific antibodies in patients of asthma and pulmonary tuberculosis	D.B.T. September 24, 2012 (Three years)	4.65 Lakhs
4.	Dr Mandira Varma-Basil (Microbiology)	Expression profile of efflux related pumps in drug resistant *M. tuberculosis*	D.B.T. October 21, 2011 (Three years)	29.97 Lakhs
5.	Dr Mandira Varma-Basil (Microbiology)	Development of aminocoumarins as candidate drugs for the treatment of multi-drug resistant (MDR) tuberculosis	D.B.T. October 30, 2013 (Two years)	41.21 Lakhs
6.	Dr Ritu Kulshrestha (Pathology)	Role of angiogenesis, vascular remodelling, pulmonary receptor changes and their inhibition by phosphodiesterase-5 inhibitors in bleomycin-induced pulmonary hypertension and fibrosis	D.S.T. (Fast Track Project) June 30, 2010 (Three years)	18.50 Lakhs
7.	Dr Ritu Kulshrestha (Pathology)	The study of molecular mechanisms of epithelial myoepithelial transition in pathogenesis of pulmonary fibrosis	C.S.I.R. April 2, 2012 (Three years)	28.55 Lakhs
8.	Dr Ritu Kulshrestha (Pathology)	Molecular mechanisms of pulmonary vascular hypertension associated with respiratory diseases and hypoxia	I.C.M.R. August 23, 2012 (Three years)	24.25 Lakhs

Sl No.	Faculty Member (Department)	Title of Project	Funding Agency, Date of Sanction/Implementation and Duration	Budget (in Rs.)
9.	Prof. A. Ray (Pharmacology)	Pharmacological studies on the role of nitric oxide (NO) and NO mediated signalling pathways in acute and chronic hypoxia induced behavioural and immunological changes in rats	D.R.D.O. May 6, 2011 (Two years)	4.00 Lakhs
10.	Prof. A. Ray (Pharmacology)	Calcium phosphate nano-particles co-encapsulating neurotherapeutic gene and drug for targeted therapy of neurodegenerative disorders	D.B.T. June 24, 2011 (Three years and six months)	2.11 Lakhs
11.	Prof. A. Ray (Pharmacology)	Pharmacological studies on the effects of stress on inflammation and immunity in rats	U.G.C. June 29, 2011 (Three years)	6.33 Lakhs
12.	Prof. A. Ray (Pharmacology)	Experimental studies on the association between Alzheimer's disease and diabetes mellitus: a novel approach to possible therapeutic strategies	D.S.T. October 17, 2013 (Three years)	15.80 Lakhs
13.	Dr Anita Kotwani (Pharmacology)	Prices and availability of common essential medicines under National essential medicines list 2011 before implementation of NPPP 2012 and dissemination workshop for stakeholders	W.H.O. September 6, 2013 (Four months)	2.52 Lakhs
14.	Dr Anita Kotwani (Pharmacology)	Effect of Indian almond and sweet almond in diabetes induced nephropathy and cataract in rats	AYUSH / Central Council for Research in Ayurvedic Sciences (CCRAS) January 25, 2014 (Two years)	12.08 Lakhs
15.	Dr Kavita Gulati (Pharmacology)	Experimental studies on the possible role of nitric oxide (NO) during acute and chronic morphine in normal and stressed rats	C.S.I.R. November 1, 2010 (Three years)	15.37 Lakhs
16.	Dr Kavita Gulati (Pharmacology)	Experimental studies on the cellular and molecular mechanisms of action of UNIM-352, polyherbal Unani formulation, to validate its use as a drug for bronchial asthma	C.C.R.U.M. April 28, 2011 (Three years)	19.00 Lakhs

Sl No.	Faculty Member (Department)	Title of Project	Funding Agency, Date of Sanction/Implementation and Duration	Budget (in Rs.)
17.	Dr Kavita Gulati (Pharmacology)	Studies on the anti-inflammatory and immunomodulatory effects of *Albizzia lebbeck* and *Solanum xanthocarpum* in experimental models of bronchial asthma	D.B.T. March 10, 2014 (Three years)	20.88 Lakhs
18.	HoDs (Pharmacology and Pulmonary Medicine)	To augment the post-graduate teaching and research facilities in the Departments of Pharmacology and Respiratory Medicine, VPCI under FIST Programmeme	D.S.T. January 19, 2011 (Five years)	29.50 Lakhs
19.	Prof. K. Ravi (Physiology)	Brain nitric oxide and high altitude stress	D.I.P.A.S. February 9, 2010 (Till August, 2013)	53.50 Lakhs
20.	Prof. K. Ravi (Physiology)	Higher nervous control of the pulmonary renal reflex	C.S.I.R. March 1, 2012 (Three years)	11.75 Lakhs
21.	Prof. Raj Kumar (Respiratory Allergy and Applied Immunology)	Genetic association study of polymorphisms related to chronic obstructive pulmonary disease (COPD) and its measures in north Indian population: COPD Genetics Consortium	D.B.T. September 29, 2011 (Three years)	7.30 Lakhs
22.	Dr Madhu Khanna (Respiratory Virology)	Generation, characterisation and epitope mapping of recombinant human monoclonal antibodies against pandemic influenza 2009 (H1N1)	D.S.T. January 1, 2011 (Three years)	33.00 Lakhs
23.	Dr Madhu Khanna (Respiratory Virology)	Study of antigenic diversity and cross-reactive antibody generation to influenza virus in human samples	D.R.D.O. April 6, 2011 (Three years)	42.71 Lakhs
24.	Dr Madhu Khanna (Respiratory Virology)	Profile of antibody responses and duration of protection following influenza vaccination in adults >65 years of age	Asia-Pacific Alliance for the Control of Influenza (APACI) December 19, 2012 (Two years)	30604 USD
25.	Dr Madhu Khanna (Respiratory Virology)	To study the heterosubtypic immunity provided by pandemic influenza A H1N1 (2009) virus infected cells	C.S.I.R. December 10, 2013 (Three years)	4.97 Lakhs

Sl No.	Faculty Member (Department)	Title of Project	Funding Agency, Date of Sanction/Implementation and Duration	Budget (in Rs.)
26.	Dr Madhu Khanna (Respiratory Virology)	Evaluation of antiviral activity of medicinal plant extracts against influenza A virus	AYUSH / CCRAS January 25, 2014 (Three years)	8.61 Lakhs
27.	Dr Rajendra Singh Post-doctoral Fellow (Biochemistry) *(Supervisor: Prof. S.K. Bansal)*	Erythrocytic membrane proteins: expression proteomics and their significance in bronchial asthma	U.G.C.- Dr D.S. Kothari Post-doctoral Fellowship April 18, 2013 (Three years)	5.37 Lakhs
28.	Mr Manoj Kumar (Senior Research Fellow) *(Supervisor: Prof. S.K. Bansal)*	Studies on erythrocyte membrane protein profile and oxidant and antioxidant status of blood in bronchial asthma	D.B.T. April 18, 2011 (Five years)	8.55 Lakhs
29.	Mr. Anupam Prakash (Senior Research Fellow) *(Supervisor: Dr Anuradha Chowdhary)*	Molecular characterisation of *Cryptococcus neoformans* species complex originating from immuno-compromised patients and from their environment	I.C.M.R. December 3, 2013 (Two years)	1.18 Lakhs
30.	Ms Anshika Narang (Senior Research Fellow) *(Supervisor: Dr Mandira Varma-Basil)*	The role of efflux pumps in drug resistance of *M. tuberculosis*	I.C.M.R. August 11, 2011 (Three years)	8.51 Lakhs
31.	Ms. Pooja Singh (Senior Research Fellow) *(Supervisor: Dr Mandira Varma-Basil)*	Cholesterol utilisation by *mce4*A overxpressed *M. tuberculosis* H37RV and effect of verapamil	I.C.M.R. January 1, 2014 (Three years)	1.77 Lakhs
32.	Dr Rashmi Anand (Research Associate) *Supervisor: Dr Kavita Gulati (Pharmacology)*	Experimental studies on the cellular and molecular mechanisms in the effects of *Withania somnifera* during chronic stress responses in rats: possible role of nitric oxide	I.C.M.R. December 5, 2012 (Three years)	5.55 Lakhs

Sl No.	Faculty Member (Department)	Title of Project	Funding Agency, Date of Sanction/Implementation and Duration	Budget (in Rs.)
33.	Mr. Dhirendra Kumar Singh (Senior Research Fellow) *(Supervisor: Prof. A. Ray)*	Experimental studies with chelidonic acid, a molecule of plant origin, with possible therapeutic potential in brochial asthma	I.C.M.R. November 8, 2011 (Three years)	9.07 Lakhs
34.	Ms. Meenakshi Sharma (Senior Research Fellow) *(Supervisor: Prof. A. Ray)*	Experimental studies on the role of nitric oxide (NO) and NO-mediated signalling pathways in cognitive changes during emotional and environmental stress	I.C.M.R. January 1, 2014 (Two years)	1.50 Lakhs
35.	Dr Vishal Jain (Post-doctoral Fellow) *(Supervisor: Prof. K. Ravi)*	Effect of hypobaric hypoxia on synaptic plasticity and strength: role of Ca2+ signalling	D.S.T. May 22, 2013 (Two years)	7.44 Lakhs
36.	Mr Ravindra Sharma (Senior Research Fellow) *(Supervisor: Prof. K. Ravi)*	Localization and functions of anterior hypothalamus in high altitude pulmonary oedema	I.C.M.R. December 7, 2012 (Three years)	5.51 Lakhs
37.	Mr Rishabh Charan Choudhary (Senior Research Fellow) *(Supervisor: Prof. K. Ravi)*	Higher nervous control of pulmonary renal reflex	U.G.C. August 10, 2010 (Five years)	9.95 Lakhs
38.	Mr Binod Kumar (Senior Research Fellow) *(Supervisor: Dr Madhu Khanna)*	Catalytic nucleic acid mediated gene silencing of M2 ION channel of influenza virus	I.C.M.R. December 22, 2010 (Three years)	9.34 Lakhs

Sl No.	Faculty Member (Department)	Title of Project	Funding Agency, Date of Sanction/Implementation and Duration	Budget (in Rs.)
39.	Ms. Anju Gautam (Senior Research Fellow) *(Supervisor: Dr Madhu Khanna)*	Evaluation of virus like particles (VLPs) and bacterial toxin adjuvants as vaccine candidate for influenza A virus	I.C.M.R. January 17, 2014 (Three years)	1.77 Lakhs
40.	Ms Latika Sharma (Senior Research Fellow) *(Supervisor: Dr Madhu Khanna)*	Study of gentic changes in the HA gene of influenza virus and their effects on the efficiency of viral neutralisation	C.S.I.R. May 18, 2009 (Five years)	13.97 Lakhs
41.	*Ms Roopali Rajpoot (Senior Research Fellow)* *(Supervisor: Dr Madhu Khanna)*	Construction and characterisation of functional ScFv antibodies against NP and NSI proteins of pandemic influenza H1N1 (2009) virus	I.C.M.R. June 7, 2012 (Three years)	6.01 Lakhs
42.	Dr Ashima Anand (Principal Investigator) DST Project	Evaluation of a physiological intervention for reducing exercise induced breathlessness in healthy patients with interstitial lung disease (ILD) patients with Eisenmenger syndrome	D.S.T. November 16, 2010 (Four years)	66.00 Lakhs
43.	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 1, 2001 (Fourteen years)	7.20 Lakhs

Orations/Guest Lectures

Sl No.	Faculty Member	Title of Lecture	Organiser(s)	Conference, Place and Date
1.	Prof. Rajendra Prasad	Smoking and lung diseases	V.P.C.I., University of Delhi and Society for Tobacco Control	On the eve of World No Tobacco Day, "Smoking and Lung Health Public Awareness Programme"Delhi May 30, 2013
2.	Prof. Rajendra Prasad	Biomarkers in lung diseases	Dept. of Biochemistry, Shri Guru Ram Rai Institute of Medical and Health Sciences	National Symposium on Biomarkers in Health and Diseases: Bench to Bedside Dehradun July 3-4, 2013
3.	Prof. Rajendra Prasad	Lung cancer: Indian scenario	V.P.C.I., University of Delhi	Update on Lung Cancer Delhi July 26, 2013
4.	Prof. Rajendra Prasad	Epidemiology, risk factors, diagnosis and assessment of COPD	V.P.C.I., University of Delhi and Society for Tobacco Control	Update on COPD Delhi September 8, 2013
5.	Prof. Rajendra Prasad	MDR-XDR TB: current status	Santosh University	International Pulmonary Update Ghaziabad October 5, 2013
6.	Prof. Rajendra Prasad	Pattern of pulmonary diseases in India	Era Medical College	National Conference on Lung and Skin Pathology Lucknow October 14, 2013
7.	Prof. Rajendra Prasad	Adverse drug reactions in the treatment of multi drug resistant tuberculosis	American College of Chest Physicians	79th Annual International Scientific Association of American College of Chest Physicians (Chest 2013) Chicago, USA October 26-31, 2013
8.	Prof. Rajendra Prasad	Pulmonary disease in India with special reference to tuberculosis	Mid-Western University	Mid-Western University Chicago, USA October 31, 2013

Sl No.	Faculty Member	Title of Lecture	Organiser(s)	Conference, Place and Date
9.	Prof. Rajendra Prasad	Treatment outcome of multi-drug resistant tuberculosis patients in modified DOTS-PLUS: a new strategy-two years' experience	International Union Against Tuberculosis and Lung Diseases (The UNION)	International Union Against Tuberculosis and Lung Diseases (The UNION) Paris, France October 30-November 3, 2013
10.	Prof. Rajendra Prasad	TB in elderly: how different?	Geriatic Society of India	National Conference of Geriatic Society of India Delhi November 17, 2013
11.	Prof. Rajendra Prasad	Diagnosis of MDR-TB: pitfall	National College of Chest Physicians (India) and Indian Chest Society, and Dept. of Pulmonary Medicine, SRMC and IT, Sri Ramachandra University	15th National Conference on Pulmonary Diseases (NAPCON-2013) Chennai November 27-30, 2013
12.	Prof. Rajendra Prasad	Yoga and reseaech	Indian Association of Yoga and Naturopathy	Seminar on Yoga and Naturopathy Lucknow December 3, 2013
13.	Prof. Rajendra Prasad	Clinical approach to allergy diseases	Indian College of Allergy, Asthma and Applied Immunology and Mahatma Gandhi Medical College and Hospital	47th Annual Convention of the Indian College of Allergy, Asthma and Applied Immunology (ICAAICON) 2013 Jaipur December 13-15, 2013
14.	Prof. Rajendra Prasad	Pearls in bronchoscopy	V.P.C.I., University of Delhi	Symposium on New Trends on Interventional Bronchoscopy Delhi December 24, 2013
15.	Prof. Rajendra Prasad	Smoking and lung health	Bharat Seva Sansthan and Association of Ayurvedic Professionals of North America	10th International Conference on Ayurveda and Lifestyle Disorders Lucknow February 15, 2014

Sl No.	Faculty Member	Title of Lecture	Organiser(s)	Conference, Place and Date
16.	Prof. Rajendra Prasad	Pearls in bronchoscopy	Indian Association for Bronchology and Jaipur Golden Hospital	19th Annual Conference on Bronchology and Interventional Pulmonology (BRONCHON-2014) New Delh February 21-23, 2014
17.	Prof. Rajendra Prasad	TAI Oration on Biomass fuel exposure and respiratory health MDR-TB management: practitioner's viewpoint	Tuberculosis Association of India and National Institute of Tuberculosis and Respiratory Diseases (NITRD)	68th National Conference on Tuberculosis and Chest Diseases (NATCON-2013) New Delhi February 24-26, 2014
18.	Prof. S.N. Gaur	Allergen immunotherapy and prevention of anaphylaxis	Institute of Genomics and Integrative Biology, CSIR	Kick off Meet of the Genetically Engineered Allergens for the Component - Resolved Diagnosis and Immunotherapy of Airway Allergies (GENALL) Delhi October 3-6, 2013
19.	Prof. S.N. Gaur	Fatal allergic reactions: preventable with immunotherapy	Asia Pacific Association of Allergy, Asthma and Clinical Immunology	Asia Pacific Congress of Allergy, Asthma and Clinical Immunology (APCAACI) 2013 Taipei, Taiwan November 14-17, 2013
20.	Prof. S.N. Gaur	Prevention of anaphylaxis by allergen immunotherapy	National College of Chest Physicians (India) and Indian Chest Society, and Dept. of Pulmonary Medicine, SRMC and IT, Sri Ramachandra University	15th National Conference on Pulmonary Diseases (NAPCON-2013) Chennai November 27-30, 2013
21.	Prof. S.N. Gaur	Immunotherapy in clinical practice	Indian College of Allergy, Asthma and Applied Immunology and Mahatma Gandhi Medical College and Hospital	47th Annual Convention of the Indian College of Allergy, Asthma and Applied Immunology (ICAAICON) 2013 Jaipur December 13-15, 2013

Sl No.	Faculty Member	Title of Lecture	Organiser(s)	Conference, Place and Date
22.	Prof. S.N. Gaur	Anaphylaxis: prevention with immunotherapy	American Association of Physicians of Indian Origin (AAPI)	Global Healthcare Summit Ahmadabad January 2-3, 2014
23.	Prof. S.N. Gaur	Immunotherapy for asthma: does it really work?	Tuberculosis Association of India and National Institute of Tuberculosis and Respiratory Diseases (NITRD)	66th National Conference on Tuberculosis and Chest Diseases (NATCON-2013) New Delhi February 23-26, 2014
24.	Prof. S.N. Gaur	Pulmonary rehabilitation	Department of TB and Chest Diseases Dr S.N. Medical College	NCCP-RAJ PULMOCON-2014 Jodhpur March 29, 2014
25.	Prof. A. Ray	Complimentary roles of clinical and pre-clinical studies in herbal drug development in respiratory disease: an experience with bronchial asthma	Bhagwan Mahavir Medical Research Centre (BMMRC)	National Seminar on Emerging Trends, Challenges and Innovative Approaches in Clinical Research in India Hyderabad April 27-28, 2013
26.	Prof. A. Ray	Pre-clinical toxicity studies	Select Bio	International Symposium on ADME and Toxicology New Delhi May 31, 2013
27.	Prof. A. Ray	The pharmacology of CNS-immune interactions during stress	International Forum on Immunology	International Forum on Immunology Montreal, Canada October 19-20, 2013
28.	Prof. A. Ray	Methylxanthine induced cardiotoxicity and its mechanisms	University of Manitoba Medical School	Institute of Cardiovascular Sciences, University of Manitoba Medical School Winnipeg, Canada, October 22-24, 2013

Sl No.	Faculty Member	Title of Lecture	Organiser(s)	Conference, Place and Date
29.	Prof. A. Ray	Sexual dimorphism in stress responsiveness and its regulation by nitric oxide	Rajiv Gandhi Centre for Biotechnology (RGCB), Department of Biotechnology (DBT) *and* Srinivasa Ramanujan Institute for Basic Sciences (SRIBS), Kerala State Council for Science, Technology and Environment (KSCSTE)	International Symposium on Legacy of Nitric Oxide Discovery – Impact on Disease Biology Thiruvanthapuram November 5-6, 2013
30.	Prof. A. Ray	CNS-immune interactions during stress: role of NO	Indian Pharmacological Society	International Conference on Translational Pharmacology and 46th Annual Conference of Indian Pharmacological Society (IPS) Bangalore December 16-18, 2013
31.	Prof. A. Ray	Experimental studies on methylxanthine induced cardiotoxicity	International Academy of Cardiovascular Sciences (IACS) – India Section and Delhi Institute of Pharmaceutical Sciences and Research (DIPSAR) New Delhi	6th International Conference on Recent Advances in Cardiovascular Sciences (RACS) New Delhi January 31-February 1, 2014
32.	Prof. A. Ray	Translational research and drug safety	Jamia Hamdard	National Symposium on Contemporary Regulatory Scenario in Pharmacovigilance New Delhi March 5, 2014

Sl No.	Faculty Member	Title of Lecture	Organiser(s)	Conference, Place and Date
33.	Prof. A. Ray	Basic concepts and introduction to pharmacovigilance	Indian Pharmacopoeia Commission	National Induction cum Training Programmee of the IPC/CDSCO Pharmacovigilance Programme of India (PVPI) New Delhi February 10-11, 2014
34.	Prof. Ashok Shah	Respiratory allergic disorders in India: an overview	Max Superspeciality Hospital, Saket	Symposium on Current Trends and Challenges in Treatment of Allergies New Delhi April 11, 2013
35.	Prof. Ashok Shah	Upper airways allergic inflammatory disorders	Society of Otolaryngologist of India, Delhi State	36th Annual Conference of the Otolaryngologist of India, Delhi State New Delhi April 27-28, 2013
36.	Prof. Ashok Shah	Sarcoidosis in India	World Association of Sarcoidosis and Other Granulomatous Disorders (The WASOG)	Sarcoidosis and ILD Update – Panel Meet Bali, Indonesia July 5, 2013
37.	Prof. Ashok Shah	Human seminal plasma allergy	Asia Pacific Association of Allergy, Asthma and Clinical Immunology	Asia Pacific Congress of Allergy, Asthma and Clinical Immunology (APCAACI) 2013 Taipei, Taiwan November 14-17, 2013
38.	Prof. Ashok Shah	Role of long term antibiotics in bronchiactasis	National College of Chest Physicians (India) and Indian Chest Society, and Dept. of Pulmonary Medicine, SRMC and IT, Sri Ramachandra University	15th National Conference on Pulmonary Diseases (NAPCON-2013) Chennai November 27-30, 2013

Sl No.	Faculty Member	Title of Lecture	Organiser(s)	Conference, Place and Date
39.	Prof. Ashok Shah	Human seminal plasma allergy	Indian College of Allergy, Asthma and Applied Immunology and Mahatma Gandhi Medical College and Hospital	47th Annual Convention of the Indian College of Allergy, Asthma and Applied Immunology (ICAAICON) 2013 Jaipur December 13-15, 2013
40.	Prof. Ashok Shah	Bronchial anthracofibrosis: a bronchoscopic diagnosis	Indian Association for Bronchology and Jaipur Golden Hospital	19th Annual Conference on Bronchology and Interventional Pulmonology (BRONCHON-2014) New Delhi February 21-23, 2014
41.	Prof. Ashok Shah	Sarcoidosis: TB's enigmatic twin	Tuberculosis Association of India and National Institute of Tuberculosis and Respiratory Diseases (NITRD)	66th National Conference on Tuberculosis and Chest Diseases (NATCON 2013) New Delhi February 23-26, 2014
42.	Prof. S.K. Chhabra	· Diagnostic dilemma in obstructive airways diseases · Non-resolving pneumonia: approach to diagnosis	Department of Pulmonary Medicine, Guwahati Medical College	Respiratory Update 2013 Guwahati May 5, 2013
43.	Prof. S.K. Chhabra	Bronchial asthma	Post Graduate Institute of Medical Education and Research	27th Annual Update on Pulmonary and Critical Care Medicine Chandigarh October 20, 2013
44.	Prof. S.K. Chhabra	Health effects of air pollution	The Energy and Research Institute (TERI) and West Bengal Pollution Control Board	Civic Forum on Improved Vehicles and Clean for Better Air Quality Bengaluru January 21, 2014
45.	Prof. Raj Kumar	Smoking cessation and health hazards	V.P.C.I., University of Delhi and Society for Tobacco Control	On the eve of World No Tobacco Day, "Smoking and Lung Health Public Awareness Programme" Delhi May 30, 2013

Sl No.	Faculty Member	Title of Lecture	Organiser(s)	Conference, Place and Date
46.	Prof. Raj Kumar	Allergy situation in India	Allergy Expert Foroum	Venus Pulmonary Centre Delhi July 26, 2013
47.	Prof. Raj Kumar	Smoking cessation	V.P.C.I., University of Delhi	Update on COPD Delhi September 8, 2013
48.	Prof. Raj Kumar	Smoking cessation	Department of Pulmonary Medicine, Grant Govt. Medical College	Respiratory Update-2013 Mumbai September 28, 2013
49.	Prof. Raj Kumar	Allergy situation in India	American College of Allergy, Asthma and Immunology (ACAAI)	Annual Meeting of the American College of Allergy, Asthma and Immunology (ACAAI) Baltimore, USA November 7-11, 2013
50.	Prof. Raj Kumar	Evolving concepts of allergy	National College of Chest Physicians (India) and Indian Chest Society, and Dept. of Pulmonary Medicine, SRMC and IT, Sri Ramachandra University	15th National Conference on Pulmonary Diseases (NAPCON-2013) Chennai November 27-30, 2013
51.	Prof. Raj Kumar	Prevalence of food allergy in bronchial asthma	CSIR-Indian Institute of Toxicology Research	Brain Storming Session on Food Allergy (BSS-FA) Lucknow December 9, 2013
52.	Prof. Raj Kumar	Bronchoscopy our experience	V.P.C.I., University of Delhi	Symposium on New Trends on Interventional Bronchoscopy Delhi December 24, 2013
53.	Prof. Raj Kumar	Allergy situation in india	Management Association and American Association of Physicians of Indian Origin	8th AAPI Global Health Care Summit Ahemadabad January 2-5, 2014

Sl No.	Faculty Member	Title of Lecture	Organiser(s)	Conference, Place and Date
54.	Dr Balakrishnan Menon	HRCT in interstial lung disease	Indian Medical Association	RESPICON 2014 Saharanpur February 16, 2014
55.	Dr Mandira Varma-Basil	Drug resistance in tuberculosis	Dept. of Transplant Immunology, AIIMS	Meeting of the Tuberculosis Consortium of India New Delhi January 12-13, 2014
56.	Dr Mandira Varma-Basil	Drug resistance tuberculosis: a global threat	Dept. of Biomedical Sciences, Acharya Narendra Dev College	Cathexis 2014 Delhi February 20, 2014
57.	Dr Anuradha Chowdhary	Azole resistance in *Aspergillus fumigatus*: an emerging problem in India	Society for Indian Human and Animal Mycologists	10th National Conference of the Society for Indian Human and Animal Mycologists (SIHAM) Coimbatore January 10-12, 2014
58.	Dr Anuradha Chowdhary	Voriconazole resistant *Aspergillus fumigatus* carrying TR_{46} / Y121F / T289A mutation from the Indian environment	European Society of Clinical Microbiology and Infectious Diseases	6th Advances Against Aspergillosis Madrid, Spain February 27-March 1, 2014
59.	Dr Madhu Khanna	A novel siRNA-chimeric-ribozyme construct against the matrix (M1) gene significantly down-regulate the influenza A virus replication	Amity University	Women Power in Cutting Edge Biotechnology Lucknow October 17, 2013
60.	Dr Anita Kotwani	Where are we now: assessing the access to essential medicines as India plans free medicines for all	Foundation of Research in Community Health	Disseminating Meeting on Accessing Medicines in Africa and South Asia (AMASA) New Delhi July 5, 2013
61.	Dr Anita Kotwani	Antibiotic dispensing in urban New Delhi and rural Karnataka State, India	Vietnam Society for Infectious Diseases and National Hospital of Tropical Diseases (NHTD)	VINARES Meeting on Antibiotic Stewardship in Vietnam and Asia Hanoi, Vietnam October 24-25, 2013

Sl No.	Faculty Member	Title of Lecture	Organiser(s)	Conference, Place and Date
62.	Dr Anita Kotwani	Access to affordable generics	FICCI	India Pharma Summit´ New Delhi November 29, 2011
63.	Dr Kavita Gulati	Translational research and drug safety: an experience in respiratory medicine	Bhagwan Mahavir Medical Research Centre (BMMRC)	National Seminar on Emerging Trends, Challenges and Innovative Approaches in Clinical Research in India Hyderabad April 27-28, 2013
64.	Dr Kavita Gulati	Newer strategies in drug safety research: a translational approach	Select Bio	International Symposium on ADME and Toxicology New Delhi May 30-31, 2013
65.	Dr Kavita Gulati	Immunomodulation by herbal drugs: impact on health and disease	International Forum on Immunology	International Forum on Immunology Montreal, Canada October 19-20, 2013
66.	Dr Kavita Gulati	Role of nitrc oxide during stress	University of Manitoba Medical School	Institute of Cardiovascular Sciences, University of Manitoba Medical School Winnipeg, Canada, October 22-24, 2013
67.	Dr Kavita Gulati	Dual neuromodulatory role of nitrc oxide in the brain	Rajiv Gandhi Centre for Biotechnology (RGCB), Department of Biotechnology (DBT) *and* Srinivasa Ramanujan Institute for Basic Sciences (SRIBS), Kerala State Council for Science, Technology and Environment (KSCSTE)	International Symposium on Legacy of Nitric Oxide Discovery – Impact on Disease Biology Thiruvanthapuram November 5-6, 2013

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68.	Dr Kavita Gulati	Differential neuromodulatory role of NO in anxiety and seizures	Indian Pharmacological Society	International Conference on Translational Pharmacology and 46th Annual Conference of Indian Pharmacological Society (IPS) Bangalore December 16-18, 2013
69.	Dr Kavita Gulati	Pharmacovigilance: concepts and applications	LM College of Pharmacy	Gujarat Technological University Ahmedabad February 20-March 7, 2014
70.	Dr Vishal Bansal	Pulmonary rehabilitation in COPD	Allergy and Asthma Research Centre, Kolkata	3rd National Conference on Respiratory Allergy and Immunology Kolkata October 27, 2013
71.	Dr Vishal Bansal	Exercise training: an aspect in management of chronic respiratory disease	Department of Physiology, Kamineni Institute of Medical Sciences	XXV Annual National Conference of Physiological Society of India: (Physicon-2013) Nalgonda December 9-11, 2013
72.	Dr Vishal Bansal	Pulmonary rehabilitation—how I do it: tools and methods	Tuberculosis Association of India (TAI) and National Institute of Tuberculosis and Respiratory Diseases (NITRD)	68th National Conference on Tuberculosis and Chest Diseases (NATCON 2013) New Delhi February 23-26, 2014
73.	Dr Vishal Bansal	Pulmonary rehabilitation in COPD	Department of Medicine, PGIMER, Dr RML Hospital	PGIMER, Dr RML Hospital New Delhi March 14, 2014
74.	Dr Ritu Kulshrestha	Pathological and molecular diagnosis of lung cancer	V.P.C.I., University of Delhi	Update on Lung Cancer Delhi July 26, 2013

Conferences/Symposia/Seminars/Workshops/CMEs

Sl No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
1.	Prof. Rajendra Prasad	Tuberculosis	V.P.C.I., University of Delhi	Public Awareness Lecture Delhi July 31, 2013
2.	Prof. Rajendra Prasad	Chaired a session on Medical thoracoscopy	Batra Hospital	Workshop on Medical Thoracoscopy New Delhi August 11, 2013
3.	Prof. Rajendra Prasad	Lecture on: Approach to diffuse lung diseases	Indian Medical Association (Faizabad Branch)	CME on Respiratory Update Faizabad August 17, 2013
4.	Prof. Rajendra Prasad	Participated in a panel discussion on Tuberculosis	Association of Physicians of India	CME on Tuberculosis Delhi August 25, 2013
5.	Prof. Rajendra Prasad	Lecture on: Thrust area in operational research in RNTCP	Sher-e-Kashmir Institute of Medical Sciences	North Zone OR Workshop Srinagar September 13-14, 2013
6.	Prof. Rajendra Prasad	Lecture on: Approach to normal looking chest x-rays	Association of Physicians of India (Bikaner Branch)	API Meeting Bikaner September 15, 2013
7.	Prof. Rajendra Prasad	Lecture on: Tuberculosis: current issues and management	Indian Medical Association (Lucknow Branch)	CME on Tuberculosis Lucknow November 23, 2013
8.	Prof. Rajendra Prasad	Participated in a panel discussion on Asthma, COPD and ILD	American College of Chest Physicians (Indian Chapter)	ACCP Respiratory Update 2013 Delhi October 11, 2013
9.	Prof. Rajendra Prasad	Lecture on: Magnitude and management of drug resistant tuberculosis in children	National Academy of Medical Sciences	CME on Tuberculosis Agra November 28, 2013

Sl No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
10.	Prof. Rajendra Prasad	Lecture on: Role of history and physical examination	Indian College of Allergy, Asthma and Applied Immunology and Mahatma Gandhi Medical College and Hospital	47th Annual Convention of the Indian College of Allergy, Asthma and Applied Immunology (ICAAICON) 2013 Jaipur December 13-15, 2013
11.	Prof. Rajendra Prasad	Lectures on: · Basics of fiberoptic bronchoscopy · Interesting cases of bronchoscopy	Indian Chest Society	CME on Bronchoscopy Allahabad December 29, 2013
12.	Prof. S.N. Gaur	Presented a poster on Antibiotic prescribing patterns for community acquired pneumonia in hospitalized patients: a retrospective pilot study from Delhi, India	International Society for Pharmacoeconomics and Outcome Research (ISPOR)	International Society for Pharmacoeconomics and Outcome Research (ISPOR) New Orleans, USA May 18-22, 2013
13.	Prof. S.N. Gaur	Participated in a panel discussion on Obstructive airway diseases	East Delhi Physicians' Association	MIDCON 2013 New Delhi August 25, 2013
14.	Prof. S.N. Gaur	Participated in a panel discussion on COPD Chaired a session on COPD	V.P.C.I., University of Delhi and Society for Tobacco Control	Update on COPD Delhi September 8, 2013
15.	Prof. S.N. Gaur	Chaired a session on COPD: Indian perspective	Santosh University	International Pulmonary Update Ghaziabad October 5, 2013
16.	Prof. S.N. Gaur	Participated in a panel discussion on COPD	American College of Chest Physicians (Indian Chapter)	ACCP Respiratory Update 2013 Delhi October 11, 2013
17.	Prof. S.N. Gaur	Presented a poster on Indoor air pollution and asthma in children at Delhi, India	American College of Allergy, Asthma and Immunology (ACAAI)	Annual Meeting of the American College of Allergy, Asthma and Immunology (ACAAI) Baltimore, USA November 7-11, 2013

Sl No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
16.	Prof. Ashok Shah	Chaired the D.N. Shivpuri Oration	MGM University of Health Sciences, Navi Mumbai, Mahatma Gandhi Mission's Medical College and Hospital, Aurangabad and Aurangabad Chest Society and Physicians´ Association	45th Annual Convention of the Indian College of Allergy, Asthma and Applied Immunology (ICAACON 2011) Aurangabad December 16-18, 2011
18.	Prof. S.N. Gaur	Moderator Represented Indian College of Allergy, Asthma and Applied Immunology	Asia Pacific Association of Allergy, Asthma and Clinical Immunology	Asia Pacific Congress of Allergy, Asthma and Clinical Immunology (APCAACI) 2013 Taipei, Taiwan November 14-17, 2013
19.	Prof. S.N. Gaur	Lecture on: Immunotherapy Modretor of the sessions · Immunothrapy · Immunotherapy in clinical practice Chaired a session on Occupational allergies and asthma	Indian College of Allergy, Asthma and Applied Immunology and Mahatma Gandhi Medical College and Hospital	47th Annual Convention of the Indian College of Allergy, Asthma and Applied Immunology (ICAAICON) 2013 Jaipur December 13-15, 2013
20.	Prof. S.N. Gaur	Chaired a session on Pathophysiology of COPD	Chest Research Foundation, Pune and Johns Hopkins Bloomberg School of Public Health	International Conference Conference on Insights and Management of COPD (ICONIC) Pune February 1-2, 2014
21.	Prof. S.N. Gaur	Lecture on: Subcutaneous immunotherapy	V.P.C.I., University of Delhi and Institute of Genomics and Integrative Biology	39th Workshop on Respiratory Allergy: Diagnosis and Management Delhi February 10-14, 2014
22.	Prof. S.N. Gaur	Chaired a session on Endobronchial valves	Indian Association for Bronchology and Jaipur Golden Hospital	19th Annual Conference on Bronchology and Interventional Pulmonology (BRONCHON-2014) New Delhi February 21-23, 2014

Sl No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
23.	Prof. S.N. Gaur	Chaied a session on Anatomy of tracheabronchial tree, preparation and anesthesia for bronchoscopy	V.P.C.I., University of Delhi	Bronchoscopy Training Course Delhi February 28, 2014
24.	Prof. A. Ray	Convenor	V.P.C.I., University of Delhi	CME Programme on Evaluation of Drug Safety Delhi April 5, 2013
25.	Prof. A. Ray	Member, National Advisory Committee	Indian Pharmacological Society	International Conference on Translational Pharmacology and 46th Annual Conference of Indian Pharmacological Society (IPS) Bangalore December 16-18, 2013
26.	Prof. A. Ray	Convenor	V.P.C.I., University of Delhi	Workshop on Methods in Cardiorespiratory Pharmacology Delhi February 3-4, 2014
27.	Prof. Ashok Shah	Lectue on: Diagnosis and communications in bronchial asthma	Max Superspeciality Hospital Shalimar Bagh	CME organised on World Asthma Day New Delhi May 5, 2013
28.	Prof. Ashok Shah	Chaired the Poster Discussion and Award session on Unravelling the mechanisms underlying asthma exacerbation and fungal asthma	European Academy Allergology and Clinical Immunology	XXXII Congress of the European Academy Allergology and Clinical Immunology (EAACI 2013) Milan, Italy June 22-26, 2013
29.	Prof. Ashok Shah	Moderator of a session on Allergy overview	Allergy Expert Forum	Allergy Expert Forum New Delh July 26, 2013
30.	Prof. Ashok Shah	Participated as a panelist on Obstructive airway diseases	East Delhi Physicians' Association	MIDCON 2013 New Delhi August 25, 2013

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31.	Prof. Ashok Shah	Panelist on Discussion on COPD Chaired a session on Epidemiology of COPD	V.P.C.I., University of Delhi and Society for Tobacco Control	Update on COPD Delhi September 8, 2013
32.	Prof. Ashok Shah	Panelist on Forum on regional guidelines for food and milk allergy	Asia Pacific Association of Allergy, Asthma and Clinical Immunology	Asia Pacific Congress of Allergy, Asthma and Clinical Immunology (APCAACI) 2013 Taipei, Taiwan November 14-17, 2013
33.	Prof. Ashok Shah	Chaired a session on Diseases of airway obstruction	National College of Chest Physicians (India) and Indian Chest Society, and Dept. of Pulmonary Medicine, SRMC and IT, Sri Ramachandra University	15th National Conference on Pulmonary Diseases (NAPCON-2013) Chennai November 27-30, 2013
34.	Prof. Ashok Shah	Chaired a session on Asthma and allergic rhinitis	Indian College of Allergy, Asthma and Applied Immunology and Mahatma Gandhi Medical College and Hospital	47th Annual Convention of the Indian College of Allergy, Asthma and Applied Immunology (ICAAICON) 2013 Jaipur December 13-15, 2013
35.	Prof. Ashok Shah	Chaired a session on Current therapies for the management of COPD and its comparative effectiveness	Chest Research Foundation, Pune and Johns Hopkins Bloomberg School of Public Health	International Conference on Insights and Management of COPD (ICONIC) Pune February 1-2, 2014
36.	Prof. Ashok Shah	Lecture on: Allergic bronchopulmonary aspergillosis	V.P.C.I., University of Delhi and Institute of Genomics and Integrative Biology	39th Workshop on Respiratory Allergy: Diagnosis and Management Delhi February 10-14, 2014

Sl No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
37.	Prof. Ashok Shah	Chaired a session on Asthma-COPD (Symposium-I)	Tuberculosis Association of India and National Institute of Tuberculosis and Respiratory Diseases	66th National Conference on Tuberculosis and Chest Diseases (NATCON-2013) New Delhi February 23-26, 2014
38.	Prof. Ashok Shah	Lecture on: Anatomy of tracheobronchial tree, preparation and anaesthesia for bronchoscopy	V.P.C.I., University of Delhi	Bronchoscopy Training Course Delhi February 28, 2014
39.	Prof. Ashok Shah	Chaired a session on Sleep	Delhi Medical Association	56th Annual Delhi State Medical Conference of the Delhi Medical Association New Delhi March 16, 2014
40.	Prof. S.K. Chhabra	Lecture on: Health effects of air pollution	The Energy and Resources Institute (TERI) and Gujarat Pollution Control Board	Workshop on Improving Vehicular Technologies and Fuel Quality for Air Pollution Control Ahemedabad April 11, 2013
41.	Prof. S.K. Chhabra	Chaired a session on Acute exacerbations and smoking cessation	V.P.C.I., University of Delhi and Society for Tobacco Control	Update on COPD Delhi September 8, 2013
42.	Prof. S.K. Bansal	Chaired a session on Tissue engineering	KIIT University	6th World Congress on Preventive and Regenerative Medicine Bhubaneswar November 14-16, 2013
43.	Prof. S.K. Bansal	Member, Core Committee Chaired a session on Pharmacogenomics clinical testing for personalized medicine – personalized laboratory medicine	Vardhamaan Mahavir Medical College and Safdarjung Hospital and Association of Clinical Biochemists of India (Delhi Chapter)	40th National Conference of Association of Clinical Biochemists of India (ACBICON 2013) New Delhi December 3-6, 2013

Sl No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
44.	Prof. S.K. Bansal	· Chaired sessions on Pharmaceutical biotechnology · Evidence based herbal medicine · Member, Advisory Committee and Award for popularisation of science	University Centre of Excellence in Research, Faridkot	7th Conference of Biotechnology Society of India (BIOTECHON-2014) on Biotechnology in Medicine and Herbal Drug Development) Faridkot, Punjab January 23-24, 2014
45.	Prof. S.K. Bansal	Participated as a delegate	UGC-ASC andJamia Millia Islamia	Principal's Workshop: Prospects and Challenges of Higher Education in India New Delhi March 4, 2014
46.	Prof. Raj Kumar	Organising Secretary	V.P.C.I., University of Delhi	Quiz Programme Delhi April 16, 2013
47.	Prof. Raj Kumar	Lecture on Smoking cessation	V.P.C.I., University of Delhi, Indian Co-operative Oncology Network (ICON) and Promote INDIA	Advance CME-Workshop on Thoracic Oncology Delhi May 24, 2013
48.	Prof. Raj Kumar	Organising Secretary Chaired a session on COPD	V.P.C.I., University of Delhi and Society for Tobacco Control	Update on COPD Delhi September 8, 2013
49.	Prof. Raj Kumar	Chaired a session on Tobacco cessation	Department of Pulmonary Medicine, Grant Govt. Medical College	Respiratory Update-2013 Mumbai September 28, 2013
50.	Prof. Raj Kumar	Chaired a session on Allergy	Santosh University	International Pulmonary Update Ghaziabad October 5, 2013
51.	Prof. Raj Kumar	Presented a poster on Indoor air pollution and asthma in children at Delhi, India	American College of Allergy, Asthma and Immunology (ACAAI)	Annual Meeting of the American College of Allergy, Asthma and Immunology (ACAAI) Baltimore, USA November 7-11, 2013

Sl No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
52.	Prof. Raj Kumar	Lectures on: · Pharmacological principles of tobacco cessation · Practical tips of starting tobacco cessationOpen house discussion	Deptt. of Community Medicine, Maulana Azad Medical College, V.P.C.I., University of Delhi and Society for Tobacco Control	Tobacco Cessation Training Programme New Delhi Novemver 18, 2013
53.	Prof. Raj Kumar	Lecture on: Smoking cessation	Dept. of Medicine, All India Institute of Medical Sciences	Training Programme on Smoking Cessation New Delhi December 30, 2013
54.	Prof. Raj Kumar	Organising Secretary Lecture on: Food allergy in bronchial asthma Hands on practical training on skin prick testing	V.P.C.I., University of Delhi and Institute of Genomics and Integrative Biology	39th Workshop on Respiratory Allergy: Diagnosis and Management Delhi February 10-14, 2014
55.	Prof. Raj Kumar	Lecture on: Role of TBNA in sarcodosis: Indian perspective	Indian Association for Bronchology and Jaipur Golden Hospital	19th Annual Conference on Bronchology and Interventional Pulmonology (BRONCHON-2014) New Delhi February 21-23, 2014
56.	Prof. Raj Kumar	Member, Award Committee	Tuberculosis Association of India and National Institute of Tuberculosis and Respiratory Diseases	66th National Conference Tuberculosis and Chest Diseases (NATCON-2013) New Delhi February 23-26, 2014
57.	Prof. Raj Kumar	Organising Secretary Lecture on: Transbronchial needle aspiration (Conventional method)	V.P.C.I., University of Delhi	Bronchoscopy Training Course Delhi February 28, 2014
58.	Prof. Raj Kumar	Participated as an Expert member	P.G.I.M.E.R.	National Workshop to Formulate Guidelines for Diagnosis and Management of Bronchial Asthma in India Chandigarh March 8-9, 2014

Sl No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
59.	Dr Balakrishnan Menon	Lecture on: Diagnosis of lung cancer	V.P.C.I., University of Delhi, Indian Co-operative Oncology Network (ICON) and Promote INDIA	Advance CME-Workshop on Thoracic Oncology Delhi May 24, 2013
60.	Dr Balakrishnan Menon	Presented a paper on Evaluation of real-time polymerase chain reaction, adenosine deaminase and interferon gamma in tubercular pleural effusions	European Respiratory Society	23nd European Respiratory Society Annual Congress (ERS - 2013) Barcelona, Spain September 7-11, 2013
61.	Dr Balakrishnan Menon	Participated in a panel discussion on MDR-TB: scenario in India	National College of Chest Physicians (India) and Indian Chest Society, and Dept. of Pulmonary Medicine, SRMC and IT, Sri Ramachandra University	15th National Conference on Pulmonary Diseases (NAPCON-2013) Chennai November 27-30, 2013
62.	Dr Balakrishnan Menon	Lecture on: Pharmacology of asthma	V.P.C.I., University of Delhi and Institute of Genomics and Integrative Biology	39th Workshop on Respiratory Allergy: Diagnosis and Management Delhi February 10-14, 2014
63.	Dr Mandira Varma-Basil	Lecture on: Molecular diagnostic techniques	Miranda House, University of Delhi	Workshop on Biotechnology Delhi September 15, 2013
64.	Dr Anuradha Chowdhary	Presented a paper on Comparison of CLSI and EUCAST antifungal susceptibility profile with therapeutic outcome in HIV-positive cryptococcosis patients due to *Cryptococcus neoformans* var. *grubii* in India	American Society of Microbiology	53rd ICAAC 2013 Denver, Colorado September 10-14, 2013

Sl No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
65.	Dr Anuradha Chowdhary	Expert member for upcoming ESCMID and ECMM Joint Clinical Guidelines for Phaeohyphomycosis Presented papers on · Emergence of multi triazole-resistant *Aspergillus fumigatus* carrying the TR_{46}/Y121F/T289A mutations in *cyp51A* gene from Indian environment · Molecular characterisation and antifungal susceptibility profile of *Candida* species isolated from vulvovaginal candidiasis patients in a STD Centre, New Delhi, India	European Society of Clinical Microbiology and Infectious Diseases and European Confederation of Medical Mycology	6th Trends in Medical Mycology Copenhagen, Denmark October 11-14, 2013
66.	Dr Anuradha Chowdhary	Lecture on Recent advances in medical mycology	HIMSR and HAH Centenary Hospital, Jamia Hamdard	CME on Diagnostic Microbiology: Newer Trends and Advances Delhi December 21, 2013
67.	Dr Anuradha Chowdhary	Presented papers / posters on · Isolation of multiple-triazole-resistant *Aspergillus fumigatus* strains carrying TR_{34}/L98H and TR_{46}/Y121F/T289A mutations in *cyp51A* gene from clinical and environmental sources in India · *Wangiella (Exophiala) dermatitis* as a cause of catheter-associated fungemia: First report from India · Microsatellite typing and antifungal susceptibility profiling of clinical and environmental *Cryptococcus neoformans* var *grubii* isolates from India · *Blastobotrys serpentines:* a cause of human disease (Poster)	Society for Indian Human and Animal Mycologists	10th National Conference of the Society for Indian Human and Animal Mycologists (SIHAM) Coimbatore January 10-12, 2014

Sl No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
68.	Dr Anuradha Chowdhary	Presented a papers on · AFLP genotyping, *in vitro* antifungal susceptibility and evaluation of antifungal combination of amphotericin B, voriconazole and anidulafungin against 126 clinical *Aspergillus terreus* species complex isolate, from a tertiary care chest hospital, Delhi, India · Multi-azole resistant aspergillosis due to TR_{34}/L98H *Aspergillus fumigatus* in a tertiary care hospital in Delhi, India, 2009-2012	European Society of Clinical Microbiology and Infectious Diseases and European Confederation of Medical Mycology	6th Advances Against Aspergillosis Madrid, Spain February 27-March 1, 2014
69.	Dr Madhu Khanna	Presented a poster on Generation and characterisation of recombinant scFv antibodies against haemagglutin in antigen of pandemic influenza 2009 (H1N1) virus	International Society for Influenza and Other Respiratory Virus Diseases (ISIRV)	Options for Control of Influenza VIII Cape Town, South Africa September 5-10, 2013
70.	Dr Madhu Khanna	Lecture on:Laboratory diagnosis of influenza	Amity Institute of Virology and Immunology	Influenza National Symposium-cum-Workshop Noida September 12, 2013
71.	Dr Madhu Khanna	Presented a poster on DNA vaccine expressing conserved matrix epitope of influenza A virus protects mice against lethal H1N1 challenge	Bali Pulendran, Chris Wilson and Rino Rappuoli	Keystone Symposium, International Meeting Rio de Janeiro, Brazil October 31-November 4, 2013
72.	Dr Madhu Khanna	Organising Secretary	V.P.C.I., University of Delhi and Biotechnology Society of India	Workshop on Hands-on-Training in Molecular Techniques in Biotechnology Delhi December 23-24, 2013

Sl No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
74.	Dr Anita Kotwani	· Presented a paper on Assessment of adherence to inhaled corticosteroid treatment for asthma: a cross-sectional study from Delhi, India · Judge for one of the podium presentations on Infectious Disease Outcome Research Studies · Invited by ISPOR-Asia Consortium to discuss the scientific activities for the upcoming ISPOR-AP conference scheduled for 2014 at Beijing, China	International Society for Pharmacoeconomics and Outcome Research (ISPOR)	International Society for Pharmacoeconomics and Outcome Research (ISPOR) New Orleans, USA May 18-22, 2013
75.	Dr Anita Kotwani	Participated in the discussion	Apollo Hospitals Educational Research Foundation	Evolving Roles of Ethics Committees in India New Delhi May 31-June 1, 2013
76.	Dr Anita Kotwani	Invited as an expert member from India	Global Respiratory Infection Partnership	Global Respiratory Infection Partnership (GRIP) Summit Berkshire, UK July 7-8, 2013
77.	Dr Anita Kotwani	· Resource person for conducting one-day training and finalizing the data collection forms · Field work at facilities to collect data and interaction with data collectors after the field work	Institute of Public Health	Training workshop on WHO-Alliance study on Access to Medicines Bangalore September 5-6, 2013
78.	Dr Anita Kotwani	Lecture on: Surveillance of antibiotic consumption and prescribing in outpatient and inpatient at various levels of healthcare facilities in India	Indo-Norway Working Group on Antimicrobial Stewardship Programme	Indo-Norway Workshop Workshop on Antimicrobial Resistance: Understanding Challenges and Identifying Future Approaches Tromso, Norway September 26, 2013

Sl No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
79.	Dr Anita Kotwani	Organising Secretary Lecture on Scenario of price and availability of essential medicines before implementation of NPPP 2012	V.P.C.I., University of Delhi	Workshop on Essential Medicines Concept, Price and Availability of Essential Medicines before implementation of NPPP 2012 Delhi December 6, 2013
80.	Dr Anita Kotwani	Facilitator for the Symposia: Access to medicine for group work on affordability	Public Health Foundation of India (PHFI) and the Institute for Studies in Industrial Development (ISID)	National Workshop on Pharmaceutical Policies in India: Balancing Industrial and Public Health Interests, PHFI and ISID New Delhi March 3-5, 2014
81.	Dr Kavita Gulati	Participated as deligate	Indian Pharmacopoeia Commission IPC / CDSCO Programme of India	National Induction cum Training Programme of the Pharmacovigilance (PVPI) New Delhi February 10-11, 2014
82.	Dr Vishwajeet Rohil	Chaired a session on Free oral paper Presented a poster on Effect of ellagic acid on the expression of p21 in lung cancer	Vardhamaan Mahavir Medical College and Safdarjung Hospital and Association of Clinical Biochemists of India (Delhi Chapter)	40th National Conference of Association of Clinical Biochemists of India (ACBICON-2013) New Delhi December 3-6, 2013
83.	Dr Vishwajeet Rohil	Co-chairperson of Technical session and Judge of the poster session	Baba Farid University of Health Sciences	7th Conference of Biotechnology Society of India (BIOTECHON-2014) on Role of Biotechnology in Medicine and Herbal Drug Development Faridkot January 23-24, 2014
84.	Dr Vishal Bansal	Lecture on Role of oxygen therapy in pulmonary rehabilitation	Metro Multi Specialty Hospital, Noida	Workshop on Prescription to Pulmonary Rehabilitation NoidaJune 2, 2013

Sl No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
85.	Dr Vishal Bansal	Presented a poster on Effect of pulmonary rehabilitation on quality of life and functional status in post-tubercular sequelae	American College of Chest Physician (ACCP)	Annual Congress of American College of Chest Physicians (Chest-2013) Chicago, USA October 26-31, 2013
86.	Dr Vishal Bansal	Panelist in a panel discussion on Approach to end stage COPD	Department of Pulmonary Medicine and Sleep Disorders, AIIMS, New Delhi in collaboration with American College of Chest Physicians (ACCP), USA	Update in Pulmonary, Critical Care and Sleep Medicine (AIIMS PULMOCRIT- 2014) New Delhi February 1-2, 2014
87.	Dr Ritu Kulshrestha	Presented a paper on Regulation of TNF-α expression and attenuation of lung fibrosis by N-acetylcysteine (NAC)	Indian Immunology Society	40th Annual Conference of Indian Immunology Society (IMMUNOCON 2013) Delhi November 15-17, 2013
88.	Dr Ritu Kulshrestha	Presented a paper on Effects of oral N-acetylcysteine on (BARC) oxidant-antioxidant imbalance in pulmonary fibrosis	Bhabha Atomic Research Centre	IX DAE-BRNS Life Science Symposium - 2013 on Current Advances in Immunobiology and Cancer Mumbai November 28-30, 2013
89.	Dr Ritu Kulshrestha	Presented papers on · Vascular remodelling in bleomycin induced lung fibrosis: a morphometric analysis · Differential diagnosis of primary poorly differentiated non small cell lung carcinoma from metastatic urothelial carcinoma using panel of immunohistochemical markers	Indian Association for Bronchology and Jaipur Golden Hospital	19th Annual Conference on Bronchology and Interventional Pulmonology (BRONCHON-2014) New Delhi February 21-23, 2014
90.	Mrs Uma Tyagi (Librarian)	Participated in discussion on Information sources and services (Live telecast)	IGNOU Gyandarshan National Television Channel	IGNOU Gyandarshan National Television Channel New Delhi August 16, 2013

Sl No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
91.	Dr Anshu Mittal[1] (MD Student) Ms Pooja Singh[2] (PhD Student) Ms Shradha Porwal[3] (PhD Student) *(Guide: Dr Mandira Varma-Basil)*	Presented papers on [1]Identification, drug susceptibility profile and molecular typing of *M. tuberculosis* isolates in patients of tuberculosis lymphadenitis in Delhi, India [2]Host cholesterol utilization by *Mycobacterium tuberculosis*: role of *mce4*A protein [3] Drug resistance profiling of *Mycobacterium tuberculosis* isolates from a DOTS centre, a non DOTS centre and private centre in North Delhi	Indian Association of Medical Microbiologists (Delhi and NCR Chapter)	Vth Annual Conference (Micro-D-Con 2013) on Human Microbiome in Health and Diseases Delhi October 26, 2013
92.	Ms Anshika Narang[1] (PhD Student) Ms Nisha Rathore[2] (PhD Student) *(Guide: Dr Mandira Varma-Basil)*	Presented papers / posters on [1] Genetic diversity of *M. tuberculosis* isolates obtained from patients of pulmonary tuberculosis in Delhi [2] Characterization of regulation of mammalian cell entry locus 4 (*mce4*) operon of *M. tuberculosis* (Poster)	Department of Biochemistry, University College of Medical Sciences	40th Annual Conference of the Indian Immunology Society Delhi November 15-17, 2013
93.	Ms Anshika Narang (PhD Student) *(Guide: Dr Mandira Varma-Basil)*	Presented a paper on Use of MIRU-VNTR in discriminating high IS*6110* copy isolates of *M. tuberculosis* obtained from patients of pulmonary tuberculosis in Delhi	Indian Association of Medical Microbiologists (Delhi Chapter)	First Chapter Meeting of Indian Association of Medical Microbiologists (Delhi Chapter) Delhi March 29, 2014
94.	Ms Latika Sharma[1] (PhD Student) Ms Roopali Rajput[2] (PhD Student) *(Guide: Dr Madhu Khanna)*	Presented posters on [1]Inhibitory potential of *Azadirachta indica Juss* (neem) leaves on influenza A virus replication [2] Distinct inhibition of non-structural gene expression potently reduces the propagation of influenza A virus *in vivo*	International Society of Antiviral Research (ISAR)	26th International Conference on Antiviral Research California, USA May 11-15, 2013

Sl No.	Faculty Member	Role/Topic	Organiser(s)	Conference, Place and Date
95.	Mr Binod Kumar (PhD Student) *(Guide: Dr Madhu Khanna)*	Presented a poster on Sequence specific cleavage of influenza A virus M2 gene transcript by circular DNzymes: prolonged inhibition of viral RNA translation and replication	International Society for Influenza and Other Respiratory Virus Diseases (ISIRV)	Options for Control of Influenza VIII Cape Town, South Africa September 5-10, 2013
96.	Mr Dibya Ranjan Pati[1] (PhD Student) Ms Renu Sharma[2] (Junior Research Fellow) Ms Roopali Rajput[3] (PhD Student) *(Guide: Dr Madhu Khanna)*	Presented papers / posters on [1] Evaluation of respiratory viral pathogens from influenza–like-illness cases from hospitals in Delhi, India (Poster) [2] A comparative indexing of influenza A virus infection in paediatric cases from Military Hospital *vs* Civil Hospital in Delhi, India (Poster) [3] Construction and characterisation of recombinant scFv antibodies against nucleocapsid and non-structural proteins of pandemic influenza 2009 (H1N1) virus (Oral Paper)	Amity Institute of Virology and Immunology, Amity University and Indian Virology Society	Asia Pacific Congress of Virology Noida December 17-20, 2013
97.	Mr Dibya Ranjan Pati (PhD Student) *(Guide: Dr Madhu Khanna)*	Participated in a training programme on Novel influenza diagnostics	National Institute of Cholera and Enteric Diseases	National Institute of Cholera and Enteric Diseases Kolkata January 3-8, 2014
98.	Mr Sanjesh Saini (Senir Research Fellow) *(Guide: Dr Madhu Khanna)*	Participated in a training programme on Hands on workshop on flow cytometry	Institute of Liver and Biliary Sciences (ILBS) and Flowcytometry Solutions Pvt Ltd	Hands on Workshop on Flow Cytometry New Delhi February 26-28, 2014

Participation in Advanced and Specialised Training Programme by Faculty Members

Sl No.	Participant (Department)	Course Title/ Topic	Training Duration	Host
1.	Dr Mandira Varma-Basil (Microbiology)	Workshop on Gel ComparII (Hands on training)	June 10-11, 2013	Applied Maths Ghent, Belgium
2.	Prof. A. Ray (Pharmacology)	Pharmacovigilance, Causality Assessment of Drugs and Vaccines (AEFI- adverse effects following immunization) to Coordinators, Deputy Coordinators and staff of NCC-PvPI (National Coordination Centre-Pharmacovigilance Programme of India)	May 10, 2013	Indian Pharmacopeia Commission Ministry of Health and Family Welfare, GOI) New Delhi
3.	Dr Anita Kotwani (Pharmacology)	Surveillance Workshop	October 26, 2013	National Hospital for Tropical Diseases, Hanoi, Vietnam
4.	Dr Kavita Gulati (Pharmacology)	Pharmacovigilance, Causality Assessment of Drugs and Vaccines (AEFI- adverse effects following immunization) to Coordinators, Deputy Coordinators and staff of NCC-PvPI (National Coordination Centre-Pharmacovigilance Programme of India)	May 10, 2013	Indian Pharmacopeia Commission Ministry of Health and Family Welfare, GOI) New Delhi
5.	Dr Kavita Gulati (Pharmacology)	National level Coordination Workshop of Key Stakeholders Involved in Vaccine Pharmacovigilnce	July 22-23, 2013	ITSU- Ministry of Health and Family Welfare, GOI) and W.H.O. New Delhi

Short Term Specialised Trainings Imparted by Faculty Members

Sl No.	Name, Subject and Organisation	Course Title/Topic	Faculty Member (Department)	Period
1.	Ms Pratibha Sahni BTech (Biotechnology) Amity Institute of Biotechnology Amity University Noida (Uttar Pradesh)	Techniques in biochemistry	Prof. S.K. Bansal (Biochemistry)	May 20 - June 30, 2013
2.	Ms Reena and Ms Nisha Nagar BSc (H) (Biomedical Sciences) Saheed Rajguru College of Applied Sciences University of Delhi Delhi	Techniques in biochemistry	Prof. S.K. Bansal (Biochemistry)	June 10 - July 20, 2013
3.	Ms Latika Grover BSc (H) (Biomedical Sciences) Sri Venkateswara College University of Delhi Dhaula Kuan, New Delhi	Techniques in biochemistry	Prof. S.K. Bansal (Biochemistry)	June 12 - July 20, 2013
4.	Mr Abhijeet Saxena BTech (Biotechnology) University School of Biotechnology Guru Gobind Singh Indraprastha University Dwarka, New Delhi	Techniques in biochemistry	Prof. S.K. Bansal (Biochemistry)	June 12 - July 31, 2013
5.	Mr Navneet Shukla and Mr Dhanaraj Singh Patel MSc (Biotechnology) A.P.S. University Rewa (Madhy Pradesh)	Clinical biochemistry and biotechnology	Dr Vishwajeet Rohil (Clinical Biochemistry)	March 11 - June 30, 2013
6.	Ms Shalu Singh Chauhan and Ms Urvashi Sharma MSc (Forensic Science) Galgotias University Greater Noida (Uttar Pradesh)	Clinical biochemistry and biotechnology	Dr Vishwajeet Rohil (Clinical Biochemistry)	July 9 - August 5, 2013

Sl No.	Name, Subject and Organisation	Course Title/Topic	Faculty Member (Department)	Period
7.	Ms Moumita Ganguly MSc (Biomedical Science) Dr BR Ambedkar Centre for Biomedical Research (ACBR) University of Delhi, Delhi	Clinical biochemistry and biotechnology	Dr Vishwajeet Rohil (Clinical Biochemistry)	January 14, 2014
8.	20 Partcipants	2nd Spirometry Technicians Training Workshop	Prof. Rajendra Prasad (Respiratory Medicine) and Prof. S.K. Chhabra (Cardio-respiratory Physiology)	March 26 - 27, 2014
9.	17 Participants	CME on Health Care Associated Infections	Dr Malini Shariff (Microbiology)	September 23, 2013
10.	Ms Setu MSc (Biomedical Science) Dr B.R. Ambedkar Centre for Biomedical Research (ACBR) University of Delhi Delhi	Cloning of a putative efflux gene of *M. tuberculosis*	Dr Mandira Varma-Basil (Microbiology)	January 1 - May 19, 2013
11.	Ms Shifu Agarwal MSc (Biotechnology) Amity Institute of Biotechnology Amity University Noida (Uttar Pradesh)	Cloning of two putative efflux genes of *M. tuberculosis* in *E. coli* DH5α cells	Dr Mandira Varma-Basil (Microbiology)	January 6 - May 12, 2014
12.	Ms Shivani Datta MSc (Biotechnology) Amity Institute of Biotechnology Amity University Noida (Uttar Pradesh)	Comparison between two in-house developed PCR based methods to differentiate between *M. tuberculosis* complex and non-tuberculous mycobacteria	Dr Mandira Varma-Basil (Microbiology)	January 18 - May 12, 2014
13.	Ms Archana Sharma MSc (Biotechnology) Department of Biotechnology Rewa University Rewa (Madhya Pradesh)	Training on pathology techniques	Dr Ritu Kulshrestha (Pathology)	January 1 - June 30, 2014

Sl No.	Name, Subject and Organisation	Course Title/Topic	Faculty Member (Department)	Period
14.	Ms Ruchi Ravi and Ms Tenzin Dolma B.Sc (Biomedical Science) Shaheed Rajguru College of Applied Science for Women University of Delhi Delhi	Research methods in pharmacology	Prof. A Ray, Dr Kavita Gulati (Pharmacology)	May 1 to July 31, 2013
15.	Ms Gunjan Dagar and Ms Manisha Dagar MSc (Biotechnology) Amity Institute of Biotechnology Amity University Noida (Uttar Pradesh)	Research methods in pharmacology	Prof. A Ray, Dr Kavita Gulati (Pharmacology)	April 1 to July 31, 2013
16.	Dr P.C. Kaushik (Senior Consultant Chest Physician) Chest Speciality Clinic, Pitampura, New Delhi	Cardio-pulmonary rehabilitation	Dr Vishal Bansal (Physiology)	September 11, 2013
17.	Ms Shaheen Alam, Ms Rajshree Rajput and Ms Monica Chaudhary BSc (Physiotherapy) Pt. Deendayal Upadhyaya Institute for the Physically Handicapped, New Delhi	Cardio-pulmonary rehabilitation	Dr Vishal Bansal (Physiology)	January 21- March 5, 2014
18.	Dr Soumya Santa Pan MD (Physical Medicine and Rehabilitation) Patna Medical College Patna (Bihar)	Cardio-pulmonary rehabilitation	Dr Vishal Bansal (Physiology)	March 3-14, 2014
19.	Mr Naman Mehrotra Pre Medical Course 1315 Stelton Road Piscataway, NJ 08854 USA	Asthma	Prof. Raj Kumar (Head, NCRAAI and Respiratory Allergy and Applied Immunology)	May 1- 31, 2013

Sl No.	Name, Subject and Organisation	Course Title/Topic	Faculty Member (Department)	Period
21.	Ms Sugandha Sharma BTech (Biotechnology) Maharishi Markandeshwar University Ambala (Punjab)	Research methodology and training	Dr Kavita Gulati (Pharmacology)	March - May 2011
20.	Dr Achla Prasad (Scientist II) and Dr Sanjay Mendiratta (Jr. Scientist) National Institute of Biologicals, Ministry of Health and Family Welfare Noida (Uttar Pradesh)	Allergy and immunology	Prof. Raj Kumar (Head, NCRAAI and Respiratory Allergy and Applied Immunology)	December 6, 2013
21.	Dr Barkat Ullah (Physician) National institute of the Disease of the Chest and Hospital Dhaka, Bangladesh	Allergy and immunology	Prof. Raj Kumar (Head, NCRAAI and Respiratory Allergy and Applied Immunology)	April 16-23, 2013
22.	50 Medical Professionals	Bronchoscopy training course	Prof. Rajendra Prasad, Prof. S.N. Gaur, Prof. Ashok Shah, Prof. S.K. Chhabra, Prof. Raj Kumar, Dr Nitin Goel and Dr Sweta Bansal (Viswanathan Chest Hospital)	February 28, 2014
23.	Ms Preeti Mehndiratta MSc (Biotechnology) Amity University Gurgaon (Haryana)	Evaluation of antiviral activity of *Azadirachta indica* leaf extract against influenza A virus	Dr Madhu Khanna (Respiratory Virology)	January-June 2013
24.	Ms Maria MSc (Virology) Amity Institute of Virology and Immunology, Amity University, Noida (Uttar Pradesh)	To study the genetic evolution of haemagglutinin (HA) of pandemic influenza A 2009 (H1N1) virus	Dr Madhu Khanna (Respiratory Virology)	January-June 2013

Cultural and Sports Activities

The Institute has started the construction work for establishing a Gymnasium and Badminton Court to improve the recreation facility as well as the quality of life of the Faculty, Staff and students of the Institute.

The staff members of the Institute had participated in various events of the Annual Tournament of Delhi University Staff Club. The details of awards won were as follows:

Cricket: The Institute's cricket team got Third position in the Annual Cricket Tournament event.

Table Tennis:

- Shri Tara Chand, Library, got the First prize in the Lucky Doubles category.
- Shri R.K. Gupta, Publication Division, got Second prize in the Lucky Doubles category and Third prize in Doubles category.
- Shri D.K. Sahu, Publication Division, got Second prize in Doubles category, Third prize in Singles category and Third prize in the Lucky Doubles category.

Badminton:

- Shri Vipin Gupta, Accounts Section, got Third prize in the Singles category.
- Shri Vipin Gupta, Accounts Section, and Shri Tara Chand, Library, got the Third prize in the Doubles category.

Hindi is one of the official languages of India and to promote the use of Hindi language and encourage officials working in University of Delhi, to use Hindi in daily official working, Hindi *Saptah* / Hindi *Diwas* was organized every year by the University of Delhi, as per guidelines of the Government of India. Various events like Hindi *Nibhandh*, Hindi *Smriti Parikshan*, Hindi *Kavita Path*, *Prashan Manch* Competition, etc were organized by the *Rajbhasha Anubhage* of University of Delhi during the Hindi *Saptah* / Hindi *Diwas*.

Staff members of the Institute were participating in various events of this programme regularly and won prizes and appreciation. Details of prizes / appreciation won this year are given below:

- Shri Kapil Dev, Library, got consolation / appreciation prizes in Hindi *Nibhandh* writing, Hindi *Smriti Parikshan* and *Prashan Manch* competitions.
- Shri Tara Chand Sharma, Library, got consolation / appreciation prizes in Hindi *Smriti Parikshan* and *Prashan Manch* competitions.

List of Publications

Journals

1. Abhimanyu, Bose M, Komal, Varma-Basil M. Lack of association between IL17A and IL17F polymorphisms and related serum levels in north Indians with tuberculosis. *Gene* 2013; 529:195-8.
2. Agarwal K, Kathuria S, Sundar G, Singh P, Khanna G, Chowdhary A. A case of allergic fungal rhinosinusitis due to *Ceratocystis adiposa. Diagn Microbiol Infect Dis* 2014;78:196-8.
3. Agarwal K, Sharma L, Menon B, Gaur SN. Comparison of nutritional status in chronic obstructive pulmonary disease and asthma. *Indian J Allergy Asthma Immunol* 2013;27;115- 20.
4. Agarwal R, Chakrabarti A, Shah A, Gupta D, Meis JF, Guleria R, Moss R, Denning DW. Allergic bronchopulmonary aspergillosis: review of literature and proposal of new diagnostic and classification criteria. *Clin Exp Allergy* 2013;43:850-73.
5. Agrawal A, Agrawal A, Bansal V, Pandit M. A systematic approach to interpretation of heterogeneous lung attenuation on computed tomography of the chest. *Lung India* 2013;30:327-34.
6. Badali H, Vaezi A, Haghani I, Yazdanparast SA, Hedayati MT, Mousavi B, Ansari S, Hagen F, Meis JF, Chowdhary A. Environmental study of azole-resistant *Aspergillus fumigatus* with TR34 / L98H mutations in the *cyp51A* gene in Iran. *Mycoses* 2013;56:659-63.
7. Chowdhary A, Agarwal K, Kathuria S, Gaur SN, Randhawa HS, Meis JF. Allergic bronchopulmonary mycosis due to fungi other than *Aspergillus*: a global overview. *Crit Rev Microbiol* 2014;40:30-48.
8. Chowdhary A, Kathuria S, Singh PK, *et al*. Molecular characterization and *in vitro* antifungal susceptibility profile of *Schizophyllum* commune, an emerging basidiomycete in bronchopulmonary mycoses. *Antimicrob Agents Chemother* 2013;57:2845-8.
9. Chowdhary A, Anil Kumar V, Sharma C, Prakash A, Agarwal K, Babu R, Dinesh KR, Karim S, Singh SK, Hagen F, Meis JF. Multidrug resistant endemic clonal strain of *Candida auris* in India. *Eur J Clin Microbiol Infect* 2013;33:919-26.
10. Chowdhary A, Kathuria S, Agarwal K, Meis JF. Reply to "Implications of high antifungal susceptibility on *Schizophylum commune*-associated allergy in clinical practice. *Antimicrob Agents Chemother* 2013;57:5784-5.
11. Chowdhary A, Kathuria S, Xu J, Meis JF. Emergence of azole resistant *Aspergillus fumigatus* strains due to agricultural azole use creates an increasing threat to human health. *PLoS Pathog* 2013;9:10e1003633.
12. Chowdhary A, Sharma C, Duggal S, Agarwal K, Prakash A, Singh PK, Jain S, Kathuria S, Randhawa HS, Hagen F, Meis JF. New clonal strain of *Candida auris*, Delhi, India. *Emerg Infect Dis* 2013;10:1670-3.
13. Chowdhary A, Sharma C, Kathuria S, Hagen F, Meis JF. Azole resistant *Aspergillus fumigatus* with the environmental TR_{46} / Y121F / T289A mutation in India. *J Antimicrob Chemother* 2014;69: 555-7.
14. Dabet R, Shariff M, Deb M. Multi-locus sequence types of *Acinetobacter baumanii* clinical isolates from India. *J Infect Dev Ctries* 2013; 7:358-60.
15. Cornely OA, Arikan-Akdagli S, Dannaoui E, Groll AH, Lagrou K, Chakrabarti A, Lanternier F, Pagano L, Skiada A, Akova M, Arendrup MC, Boekhout T, Chowdhary A, Cuenca-Estrella MC, Tomas F, Guinea J, Guarro J, de Hoog GS, Hope W, Johnson E, Kathuria S, Lackner M, Lass-Florl C, Lortholary O, Meis JF, Meletiadis J, Munoz P, Richardson M, Roilides E, Tortorano AM, Ullmann AJ, van Diepeningen A, Verweij P, Petrikkos G. ESCMID (European Society of Microbiology and Infectious Diseases) and ECMM (European Confederation of Medical Mycology) Joint Clinical Guidelines for the Diagnosis and Management of Mucormycosis 2013. *Clin Microbiol Infect* 2014;20(Suppl. 3):5-26.

16. Tortorano AM, Richardson MD, Roilides E, van Diepeningen A, Caira M, Munoz P, Johnson E, Meletiadis J, Pana ZD, Lackner M, PE, Freiberger T, Cornely OA, Arikan-Akdagli S, Dannaoui E, Groll AH, Lagrou K, Chakrabarti A, Lanternier F, Pagano L, Skiada A, Akova M, Arendrup MC, Boekhout T, Chowdhary A, Cuenca-Estrella M, Guinea J, Guarro J, de Hoog GS, Hope WH, Kathuria S, Lortholary O, Meis JF, Ullmann AJ, Petrikkos G, Lass-Flörl C. *Cli.* ESCMID and ECMM Joint Guidelines on Diagnosis and Management of Hyalohyphomycosis: *Fusarium* spp, *Scedosporium* spp, and others *Microbiol Infect* 2014;20(Suppl. 3):27-46.

17. Chowdhary A, Meis JF, Guarro J, de Hoog SG, Kathuria S, Arendrup MC, Arikan-Akdagli S, Akova M, Boekhout T, Caira M, Guinea J, Chakrabati A, Dannaoui E, Diepeningen A, Freiberger T, Groll AH, Hope WH, Johnson E, Lackner M, Lagrou K, Lanternier F, Lass-Flörl C, Lortholary O, Meletiadis J, Muñoz P, Pagano L, Petrikkos G, Richardson M.D, Roilides E, Skiada A, Tortorano AM, Ullmann AJ, Verweij PE, Cornely OA, Cuenca-Estrella M. ESCMID and ECMM Joint Guidelines on Diagnosis and Management of Systemic Phaeohyphomycosis: Diseases Caused by Black Fungi. *Clin Microbiol Infect* 2014;20(Suppl. 3):47-75.

18. Gaur SN. Immunological and clinical insight in asthma and other respiratory diseases (Editorial). *Indian J Allergy Asthma Immunol* 2013;27:1-2.

19. Gaur SN, Kumar R. Food allergy or food intolerance....?. (Editorial). *Indian J Allergy Asthma Immunol* 2013;27:93-4.

20. Gupta D, Agarwal R, Aggarwal AN, Maturu VN, Dhooria S, Prasad KT, Sehgal IS, Yenge LB, Jindal A, Singh N, Ghoshal AG, Khilnani GC, Samaria JK, Gaur SN, Behera D, Jindal SK for the COPD Guidelines Working Group. Guidelines for diagnosis and management of chronic obstructive pulmonary disease: Joint ICS / NCCP (I) recommendations. *Lung India* 2013;30:228-67.

21. Gupta M, Bansal V, Chhabra SK. Abnormal heart rate recovery and chronotropic incompetence on exercise in chronic obstructive pulmonary disease. *Chron Respir Dis* 2013;10:117-26.

22. Hagen F, Chowdhary A, Prakash A, Meis JF. Molecular characterization of *Cryptococcus gattii* genotype AFLP6 / VGII isolated from woody debris of divi-divi (*Caesalpinia coriaria*), Bonaire, Dutch Caribbean. *Revista Iberoamericana de Micología* 2014;7:S1130-1406.

23. Joshi J, Ray A, Gulati K. Differential modulatory effects of morphine on acute and chronic stress induced neurobehavioral and cellular markers in rats. *Eur J Pharmacol* 2014;729:17-21.

24. Khayhan K, Hagen F, Pan W, Simwami S, Fisher MC, Wahyuningsih R, Chakrabarti A, Chowdhary A, Reiko Ikeda R, Taj-Aldeen SJ, Khan Z, Margaret Ip, Imran D, Sjam R, Sriburee P, Liao W, Chaicumpar K, Vuddhakul V, Meyer W, Trilles L, van Ierse LJJ, Meis JF, Klaassen CHW, Boekhou T. Geographically structured populations of *Cryptococcus neoformans* var *grubii* in Asia correlate with HIV status and show a clonal population structure. *PLoS One* 2013;8:e72222.

25. Kotwani A, Holloway K. Access to antibiotics in New Delhi, India: implications for antibiotic policy. *J Pharmaceutical Policy Practice*.2013;6:6.

26. Kotwani A. Tracking medicine prices in the supply chain. Who benefits from the free market in India? *Economic and Political Weekly* 2013;XLVIII No 52:104-12.

27. Kotwani A. Where are we now: assessing the price, availability and affordability of essential medicines in Delhi as India plans free medicine for all. *BMC Health Services Research* 2013;13:285.

28. Kumar B, Kumar P, Rajput R, Saxena L, Daga MK, Khanna M. Sequence-specific cleavage of BM2 gene transcript of influenza B virus by 10-23 catalytic motif containing DNA enzymes significantly inhibits viral RNA translation and replication. *Nucleic Acid Ther* 2013;23:355-62.

29. Kumar P, Kumar B, Rajput R, Saxena L, Banerjea AC, Khanna M. Cross-protective effect of antisense oligonucleotide developed against the common 3' NCR of influenza A virus genome. *Mol Biotechnol* 2013;55:203-11.

30. Kumar R. Food allergy in bronchial asthma: diagnostic modalities. *Indian J Allergy Asthma Immunol* 2013;27:108-14.

31. Kumar R, Goel N. Allergic bronchopulmonary aspergillosis: a clinico-serological correlation with radiologic profile. *J Asthma* 2013;50:759-63.

32. Kumar R, Gupta N. A case of bronchial asthma and allergic rhinitis exacerbated during Cannabis pollination and subsequently controlled by subcutaneous immunotherapy. *Indian J Allergy Asthma Immunol* 2013;2:143-6.

33. Kumar R, Gupta N, Goel N. Correlation between nasal nitric oxide, nasal airway resistance and atopy in patients of allergic rhinitis. *Indian J Allergy Asthma Immunol* 2013;27:134-7.

34. Kumar R, Gupta N, Goel N. Correlation of atopy and FeNO in allergic rhinitis: an Indian study. *Indian J Chest Dis Allied Sci* 2013;55:79-83.

35. Kumar R, Nagar D, Mallick A, Kumar M, Tarke CR. The prevalence of obstructive sleep apnoea amongst middle aged chronic obstructive airway disease and asthma patients by a home based sleep study and its relation to atopy. *J Assoc Physicians India* 2013;61:615-8.

36. Kumar R, Singh M, Gupta N, Kumar R, Bisht I. Prevalence of food intolerance in bronchial asthma in India. *Indian J Allergy Asthma Immunol* 2013; 27:121-8.

37. Menon B, Nima G, Dogra V, Kaur C. C-reactive protein as a marker of asthma control. *Int J Basic Applied Med Sci* 2013;3:114-9.

38. Mishra M, Chakarwati A, Kumar R. Skin sensitivity to aeroallergens in allergic rhinitis. *Clinical Rhinology: An International Journal* 2013;6:64-6.

39. Mishra RK, Kulshrestha Ritu, Chhabra SK, Srivastav SK, Bansal SK. Critical role of protein kinase C (PKC) in the onset of airway hypersensitivity in ova-sensitized guinea pig model of asthma. *Open J Respir Dis* 2014;4:1-11.

40. Omanwar S, Saidullah B, Ravi K, Fahim M. Modulation of vasodilator response via the nitric oxide pathway after acute methyl mercury chloride exposure in rats. *Biomed Res Int* 2013.

41. Omanwar S, Saidullah B, Ravi K, Fahim M. Vasorelaxant effects of mercury on rat thoracic aorta: the nitric oxide signaling mechanism. *Hum Exp Toxicol* 2013;33:904-10.

42. Prakash A, Wankhede S, Singh PK, Agarwal K, Kathuria S, Sengupta S, Barman P, Meis JF, Chowdhary A. First neonatal case of fungemia due to *Pseudozyma aphidis* and a global literature review. *Mycoses* 2014; 57: 64-8.

43. Prasad R, Gupta P, Gupta N. Drug induced pulmonary diseases. *World Clin Pulm Crit Care Med* 2013;2:255-68.

44. Prasad R, Srivastava DK. Multidrug and Extensively drug resistant TB (M / XDR TB) management: Current issues. *Clin Epidemiol Global Health* 2013;1:124-8.

45. Rai N, Banerji BD, Jamil SS, Ray A. An experimental study to evaluate the anti-inflammatory and immunmodulatory effects of UNIM-352, a polyherbal preparation for bronchial asthma. *Med Plant Res* 2013;3:3-12.

46. Rathor N, Chandolia A, Saini NK, Sinha R, Pathak R, Garima K, Singh S, Varma-Basil M, Bose M. An insight into the regulation of *mce4* operon of *Mycobacterium tuberculosis*. *Tuberculosis* (Edinburgh). 2013;93:389-97.

47. Shah A, Panjabi C. Allergic aspergillosis of the respiratory tract. *Eur Respir Rev* 2014;23:8-29.

48. Sharma C, Muralidhar S, Xu J, Meis JF, Chowdhary A. Multilocus sequence typing of *Candida africana* from patients with vulvovaginal candidiasis in New Delhi, India. *Mycoses.* 2014.

49. Sharma P, Gaur SN, Arora N. *In silico* identification of IgE-binding epitopes of osmotin protein. *PLoS One* 2013;8(1):e54755.

50. Singh PK, Kathuria S, Agarwal K, Gaur SN, Meis JF, Chowdhary A. Clinical significance and molecular characterization of non-sporulating moulds isolated from the respiratory tract of bronchopulmonary mycoses patients with special reference to basidiomycetes. *J Clin Microbiol* 2013;10:3331-7.

51. Sodhi R, Prasad R, Kushwaha RAS, Kant S, Verma SK, Garg R, Kumar S, Verma AK, Prakash V. A study to know the knowledge, attitude and practices of patients of bronchial asthma. *Int J Med Public Health* 2013;3:159-62.

52. Tripathi P, Awasthi S, Hussain N, Prasad R, Mishra V. Increased expression of ADAM33 protein in asthmatic patients as compared to non-asthmatic controls. *Indian J Med Res* 2013;137:507-14.

53. Varma-Basil M, Garima K, Pathaka R, Dhar Dwivedia SK, Naranga A, Bhatnagar A, Bose M. Development of a novel PCR restriction analysis of *hsp65* gene as a rapid method to screen for *M. tuberculosis* complex and non-tuberculous mycobacteria in high burden countries. *J Clin Microbiol* 2013;51:1165-70.

54. Verma SK, Saheer S, Kumar P, Kumar M, Das SK, Prasad R, Hassan G. Respiratory manifestations among patients with connective tissue disorders. *JIACM* 2013;14:28-32.

Books

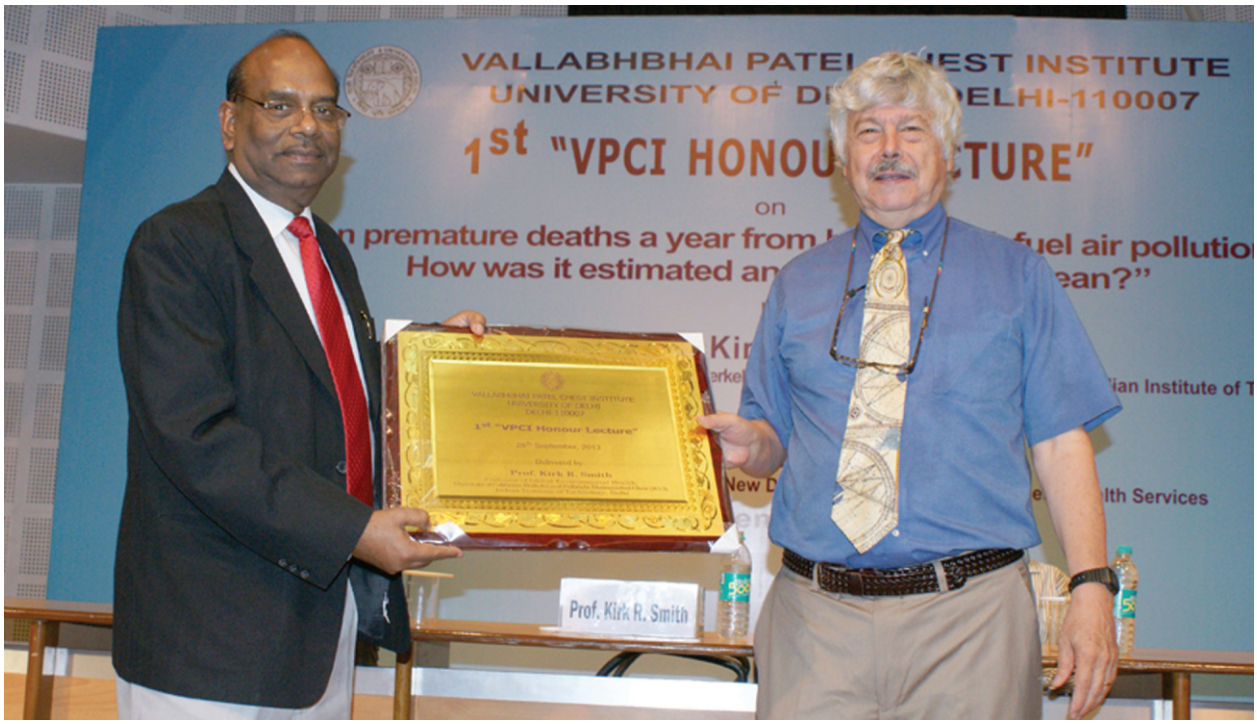
1. Prasad R. *Atlas of Fiberoptic Bronchoscopy*. New Delhi: Jaypee Brothers Medical Publishers (P) Ltd; 2014.

Honourable Dr APJ Abdul Kalam, Former President of Republic of India, releasing the book "Atlas of Bronchoscopy" written and edited by Prof. Rajendra Prasad, Director, VPCI.

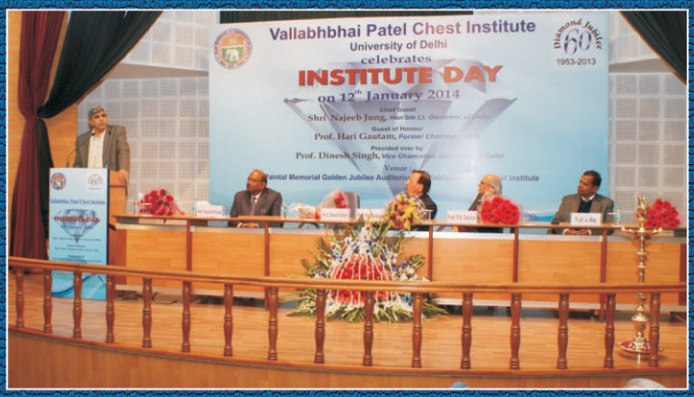
Chapters in Books

1. Khanna M, Saxena L. RNA interference and its applications in human health. In: Gill SS, Singh Z, Bansal P, editors. *Recent Advances in Assisted Reproductive Technology*. Sangur, India: Gulab Publishers; 2013:pp161-70.
2. Khanna M, Saxena L, Rajput R, Sharma S, Kumar B. Biotechnology in development of viral markers. In: Gill SS, Singh Z, Bansal P, editors. *Biotechnology in Medicine and Herbal Drug Development*. Germany: Basera Verlag; 2013:pp532-50.
3. Kumar V, Tyagi U. Metadata-revaluation in current scenario. In: Kumar R, Sharma J, Sharma C, editors. *Dynamics of Librarianship in India.* New Delhi: SSDN Publishers and Distributors; 2013:pp130-8.
4. Prasad R, Garg R. Biomass fuel and lung diseases: an Indian perspective. In: Pinkerton KE, Rom WN, editors. *Global Climate Change and Public Health*. New York: Springer Science; 2014:pp 257-71.

On "World No Tobacco Day" on 30th May 2013, a symposium on "Smoking and Lung Health: Public Awareness Programme" was organized. Shri G. Balakrishnan, Chairman, National Human Rights Commission, inaugurated the function and addressed the audience.



The Institute started "VPCI-Honour Lecture" series. Prof. Kirk R. Smith gave the first lecture on "One million premature deaths a year from household fuel air pollution in India: How was it estimated and what does it mean" (26th September 2013).



Vallabhbhai Patel Chest Institute

University of Delhi, Delhi-110 007, India