SELF-STUDY REPORT (SSR)
OF
National Assessment & Accreditation Council (NAAC)

Department of Biochemistry

University of Delhi South Campus
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Evaluative Report of the Department

1. Name of the Department : Department of Biochemistry

2. Year of establishment : 1984

3. Is the Department part of a School/Faculty of the University?

Yes, Faculty of Interdisciplinary & Applied Sciences (FIAS)

4. Names of programmes offered (UG, PG, M.Phil., Ph.D., Integrated Masters; Integrated Ph.D., D.Sc., D.Litt., etc.)

S. No.	Name of Programme	UG/PG/Doctoral
1.	M.Sc. Biochemistry	PG Programme
2.	M.Phil. (Biotechnology); jointly with other Departments of FIAS	PG Programme
3.	Ph.D. (Biochemistry)	Doctoral Programme

5. Interdisciplinary programmes and departments involved:

i) The teachers from the department are involved in teaching the following interdisciplinary courses to M.Sc. students of other departments;

S. No.	Interdisciplinary Paper	Other Department involved
1.	Protein – Structure, folding and engineering	Department of Plant Molecular Biology & Biotechnology (PMBB)
2.	Enzyme and Techniques in Biochemistry	Department of Microbiology

ii) The teachers from the department are also involved in teaching course to Ph.D./M.Phil students of other departments

S. No.	Name of the Course	Department involved
1.	Ph.D./M.Phil.	Department of Plant Molecular Biology & Biotechnology (PMBB) Department of Genetics Department of Microbiology Department of Biophysics

6. Courses in collaboration with other Universities, industries, foreign institutions, etc. -

None

7. Details of programmes discontinued, if any, with reasons:

None

8. Examination System: Annual/Semester/Trimester/Choice Based Credit System –

S. No.	Name of the Course	Type of Examination
1.	M.Sc. Biochemistry	Semester System
2.	M.Phil. (Biotechnology)	Semester System
3.	Ph.D. (Biochemistry)	Course work – Semester system

9. Participation of the department in the courses offered by other departments:-

i) The M.Sc. students from the Department of Biochemistry take the following interdisciplinary courses offered by the other Departments:

S. No.	Name of the Paper	Name of the Dept. teaching the course
1.	Microbial Pathogenicity	Department of Microbiology
2.	Introduction to Bioinformatics	Department of Plant Molecular Biology & Biotechnology (PMBB).

ii) The Ph.D./M.Phil students from the Department of Biochemistry take up courses in other Departments *viz*. PMBB, Microbiology and Biophysics

S. No.	Name of the Paper	Name of the Dept. teaching the course
1.	Microbial Pathogenicity	Department of Microbiology
2.	Introduction to Bioinformatics	Department of Plant Molecular Biology & Biotechnology (PMBB)
3.	Immunology	Department of Microbiology
4.	Computer Applications in Biology	Department of Biophysics

10. Number of teaching posts sanctioned, filled and actual (Professors/ Associate Professors/Asst. Professors/others)

	Sanctioned	Filled	Actual (including CAS & MPS)
Professor	03	03	04
Associate Professors	04	02	02
Asst. Professors	03	01	01
Others	Nil	Nil	Nil

11. Faculty profile with name, qualification, designation, area of specialization, experience and research under guidance

Name	Qualification	Designation	Specialization	No. of Years of Experience	No. of Ph.D./M.Phil. students guided for the last 4 years
Prof. Anil K. Tyagi	M.Sc., Ph.D.	Professor	Tuberculosis with special reference to the development of new TB vaccines and drug discovery against TB	33 Years	3 awarded 8 continuing
Prof. Vijay K. Chaudhary	M.Sc., Ph.D.	Professor	Development of novel reagents for diagnostic test for infectious diseases using state-of-the-art protein engineering technologies including human antibodies.	27 Years	2 awarded 6 continuing
Prof. Prahlad C. Ghosh	M.Sc., Ph.D.	Professor	Drug Delivery using Liposomes and Nanoparticles as Carriers.	27 Years	4 awarded 6 continuing
Prof. Debi P. Sarkar	M.Sc., Ph.D.	Professor	HOST-VIRUS Interactions/Molecular Cell Biology/Virology	25 Years	4 awarded 3 continuing
Dr. Suman Kundu	M.Sc., Ph.D.	Associate Professor	Structure-Function Relationship and Protein Engineering in Hemoglobins and Artificial Blood Substitutes; Diagnosis of Hemoglobinopathies ; Rational Drug Design (Cardiovascular Diseases, Cancer)	8 Years	1 awarded 6 continuing (1 submitted)
Dr. Alo Nag	M.Sc., Ph.D.	Associate Professor	Molecular mechanisms of cellular transformation during oncogenesis and discovery of novel therapeutic targets against cancer.	6.5 Years	4 continuing
Dr. Suneel Kateriya	M.Sc., Ph.D.	Assistant Professor	Molecular basis of the rhodopsin mediated signaling, Optogenetics, Channelopathy and Ciliopathy	8 Years	4 continuing

12. List of Senior Visiting Fellows, adjunct faculty, emeritus professors

None

13. Percentage of classes taken by temporary faculty – programme-wise information

None

14. Programme-wise Student Teacher Ratio:

S.No.	Programme	Student Teacher Ratio
1.	M.Sc. Biochemistry	3 : 1
2.	Ph.D. Biochemistry	5 : 1

15. Number of academic support staff (technical) and administrative staff: sanctioned, filled and actual

Name of the Post	Sanctioned	Filled	Actual
Technical Assistant	1*	1*	1
Laboratory Attendant	2*	1*	1
Senior Assistant	-	-	1 (Provided by the University)
Technical Assistant (Computer)	-	-	1 (Provided by the University)

**These posts have been sanctioned faculty-wise and not department-wise*

16. Research thrust areas as recognized by major funding agencies:

(i) Diagnostics, prophylactics and therapeutics for infectious diseases with emphasis on Tuberculosis

(ii) Drug delivery using virosomes, liposomes and nanoparticles as carrier for the treatment of infectious diseases.

(iii) Basic understanding of the molecular mechanisms of oncogenesis and discovery of novel anti-cancer targets.

(iv) Photosignalling, optogenetics, channelopathies and ciliopthies

(v) Mechanistic understanding of novel hemoglobins, diagnostics for hemoglobinopathies and rational drug design for cardiovascular diseases and cancer

17. Number of faculty with ongoing projects from a) national b) international funding agencies and c) Total grants received. Give the names of the funding agencies, project title and grants received project-wise.

a) National

Name of the funding Agencies:
Department of Biotechnology (DBT), Government of India
Department of Science and Technology (DST), Government of India
University Grant Commission (UGC)
Council of Scientific and Industrial Research (CSIR)
Indian Council of Medical Research (ICMR)

Prof. Anil K. Tyagi

Title	Funding Agency	Ongoing/ Sanction	Grant (in Lacs)
rBCG85C – a candidate TB vaccine: Removal of antibiotic resistance marker, modifications for stabilization of antigen expression and efficacy studies (Sept. 2009 to August 2013)	DBT	Ongoing	Rs.193.90 lacs
A Virtual Centre of Excellence for Co-ordinated Research on Tuberculosis :Development of Alternate Strategies (September 2011 to September 2016)	DBT	Ongoing	Rs.484.77 lacs
Development and evaluation of an α–crystallin based prime boost vaccination strategy against TB by employing MVA (May 2012 to November 2014)	DBT	Ongoing	Rs.80.89 lacs

Prof. Vijay K. Chaudhary

NMITLI Project "Development and production of a therapeutic monoclonal antibody against eNAMPT, a novel inflammatory target" (March, 2011-2016)	CSIR NMITLI	Ongoing	Rs. 275 lacs
Ready-to-use Microfluidic Cartridges for Affordable Point-of-care Diagnostics "ReDia", DBT under Indo-Finland programme. (Jan 2012- September 2014)	DBT	Ongoing	Rs.74.23 lacs
DNA Sequencing facility at UDSC (Phase IV) (October 2010- March 2014)	DBT	Ongoing	Rs.173.94 lacs
Indo-Finnish collaborative project "High performing lateral-flow type assay concepts for cardiac and infectious disease testing" DBT under Indo-Finland programme. (March 2010- March 2013)	DBT	Ongoing	Rs.89 lacs

"Development of reagents for simple and rapid immunochemical test for culture confirmation of *Mycobacterium tuberculosis* complex" & Multi Centre Evaluation of TBConfirm test (A rapid Immunochromatorgraphy test) for culture confirmation of *M. tuberculosis*. (September 2006- March 2014)	` DBT	Ongoing	Rs.268.94 lacs

Prof. Prahlad C. Ghosh

Evaluation of Soya Phosphatidylcholine-Stearylamine Liposome as Anti-Malarial Agent. 2012 for three years.	ICMR	Ongoing	Rs.25 lakhs
Biodegradable nanoparticles mediated delivery of antimalarial drugs for the treatment of malaria. 2008-2012	DBT	Ongoing	Rs.93 lakhs

Prof Debi P. Sarkar

Inhibition of HCV RNA translational and replication using small RNAs wef November, 2008 in collaboration with Dr. Saumitra Das, Dept. of Microbiology and Cell Biology, Indian Institute of Science, Bangalore-560012	DBT	Ongoing	Rs.64 Lakhs
Utilization of siRNA tools to study stress-induced liver cells response using hepatocyte specific fusogenic nanoparticle derived from Sendai virus wef 2008, with Dr. Sandeep Saxena, NII, New Delhi.	DBT	Ongoing	Rs.97.36 Lakhs
Novel nanoscale materials-----antimicrobial and anticancer activities wef April 2011, with Prof. SS Ghosh, IIT, Guwahati, NE/DBT programme.	DBT	Ongoing	Rs. 75 Lakhs

Dr. Suman Kundu

Structure-function relationship in Dopamine Beta hydroxylase and neuroglobin. 2008-2014	DBT	Ongoing	Rs.32.50 Lakhs
Characterizing Novel Globins Across Species and Deciphering their Stress Response and Interacting Partners: An Integrated, Holistic Approach for Function Elucidation. 2009-2013	DU-DST Purse	Ongoing	Rs. 49 Lakhs

Dr. Alo Nag

Role of ADA3 in damaged DNA pathways. 2010-2013.	DST-SERC Fast Track project for Young Scientist	Ongoing	Rs. 17.48 lakhs
Characterizing Novel Globins Across Species and Deciphering their Stress Response and Interacting Partners: An Integrated, Holistic Approach for Function Elucidation. 2009-2013	DU-DST Purse	Ongoing	Rs. 52 Lakhs

Dr. Suneel Kateriya

Photo-dynamic, biochemical and optogenetic characterization of the novel bacterial photoactivatedAdenylatecyclase. (2013-16)	Funded by SERB-DST, Govt. of India	Ongoing	Rs.45 lacs
Engineering of photoactivated adenylatecyclase (PAC) for the development of optogenetic tools for neuroscience Applications. (2013-2016)	Funded by DBT, Govt. of India	Ongoing	Rs.46 lacs
Development of new light-sensitive protein tools for neuroscience applications (2009-2013)	Funded by DBT, under "Joint collaborative project Indo-German collaboration in biotechnology scheme"	Ongoing	Rs.40 lacs
Biochemical and biophysical characterization of small GTPase from C. *reinhardti* (2010-2013)	Funded by DST, under SERC Fast Track Project for Young Scientist	Ongoing	Rs.20 lacs
Characterizing novel globins across species and deciphering their stress response and interacting Partners: An Integrated, holistic approach for function elucidation (2009-2013)	Funded by DST-DU, Purse Grant	Ongoing	Rs.27 lacs
Development of pre-treatment strategies and bioprocess for improved production of cellulolytic enzymes and ethanol from crop byproduct for demonstration at pilot plant- (2012-15)	Funded by Ministry of New and Renewable Energy, Govt. of India	Ongoing	Rs.10 lacs

b) **International** None

c) **Total Grant Received**: 2475.95 lacs (Ongoing Projects)

18. Inter-institutional collaborative projects and associated grants received

(a) National collaboration

Name of the Faculty	Collaborated Agency
Prof. Vijay K. Chaudhary	Development of rapid test for infectious diseases with M/s SPAN Diagnostics Limited, Surat
	Development and evaluation for the development of rapid test for culture confirmation of *M. tuberculosis* with AIIMS (New Delhi), PGI (Chandigarh), P.D. Hinduja Hospital (Mumbai), Nizam Institute of Medical Sciences (Hyderabad), NJIL&OMD (Agra)
Prof. Debi P. Sarkar	Inhibition of HCV RNA translational and replication using small RNAs" in collaboration with Dr. Saumitra Das, Dept. of Microbiology and Cell Biology, Indian Institute of Science, Bangalore-560012
	Role of Nonmescle Myosin II in virus-cell fusion" with Dr. SS Jana, IACS, Kolkata.
	Novel nanoscale materials-----antimicrobial and anticancer activities" with Prof. SS Ghosh, IIT, Guwahati.
Dr. Suneel Kateriya	Engineering of photoactivated adenylatecyclase (PAC) for the development of optogenetic tools for neuroscience Applications. Collaborative project with Dr. Surjit Sarkar, Department of Genetics, UDSC, New Delhi

(b) International Collaboration

Name of the Faculty	Collaborated Agency
Prof. Vijay K. Chaudhary	High Performing Lateral Flow ……. For Cardiac and Infectious diseases")with University of Turku, Finland under Indo-Finland programme supported by DBT
	Ready-to-use Microfluidic Cartridges for Affordable Point-of-care Diagnostics "ReDia"" by Prof. Vijay. K. Chaudhary, Prof. PasiKallio, Tampere University of Technology and Department of Biotechnology, University of Turku, BioCity, Finland under Indo-Finnish collaboration in diagnostics" by Finnish Funding Agency for Technology and Innovation (TEKES), and the Indian Department of Biotechnology (DBT).
Dr. Suman Kundu	Mossbauer Spectroscopy of Mammalian and other Novel Hemoglobins. Boehringer Ingelheim Fonds Fellowship for student and Research Collaboration with Ural State Technical University-UPI, Ekaterinburg, Russia, 2010-2015
Dr. Suneel Kateriya	Development of novel optogenetics tools, collaborative project with Prof. Peter Hegeman, Humboldt University, Berlin, Germany
	Engineering and characterization of LOV domain proteins, Max-Planck Institute, Muelheim, Germany

19. Departmental projects funded by DST-FIST; UGC-SAP/CAS, DPE; DBT, ICSSR, AICTE, etc.; total grants received.

S. No.	Projects Funding Agency	Grant Received
1.	DST-FIST	Rs.56.92 lacs
2.	UGC-SAP	Rs.42.63 lacs

20. Research facility / centre with

S. No.	Research Facility	Centre with
1.	State recognition	None
2.	National recognition	DBT supported DNA Sequencing Facility DBT supported Distributed Information Sub-Centre
3.	International recognition	None

21. Special research laboratories sponsored by / created by industry or corporate Bodies:

The department has a **BSL3 facility** located at the campus dedicated to work related to tuberculosis. The facility has P3 level containment to work with *Mycobacterium tuberculosis* and has facilities for animal work and infection of animals with aerosol challenge. The facility was created by the Department of Biotechnology, Government of India in 2009.

22. Publications

* Number of papers published in peer reviewed journals (national/international)

  : 96 (Last 5 years: 2008-2013)

* Monographs : None

* Chapters in Books : 01 (Last 5 years: 2008-2013)

* Edited Books : None

* Books with ISBN with details of publishers : None

* Number listed in International Database (For e.g. Web of Science, Scopus, Humanities International Complete, Dare Database - International Social Sciences Directory, EBSCO host, Google Scholar etc.)

  : 96 (Last 5 years: 2008-2013)

* Citation Index – range / average: Range : 717 – 2308

Average : 1236 (per faculty)

* SNIP : 1.177 (70 articles)

* SJR : 1.817 (70 articles)

* Impact Factor – range / average : Range : 0.21 – 12.948
Average: ~ 3.6 (per journal)

* h-index : Range : 8- 26
Average: 16 (per faculty)

Details of Publications (2008-2013)

S.No.	Title of the Research Papers along with references	Name of Journals & their Impact Factor
1.	Garima Khare, Praveen Kumar, **Anil K Tyagi**. (2013). Whole-Cell Screening-Based Identification of Inhibitors against the Intraphagosomal Survival of *Mycobacterium tuberculosis.* Antimicrobial Agents and Chemotherapy. doi:10.1128/AAC.01444-13.	Antimicrobial Agents and Chemotherapy Impact factor : 4.56
2.	Priyanka Chauhan, P. Vineel Reddy, Ramandeep Singh, Neetika Jaisinghani, Sheetal Gandotra and **Anil K. Tyagi**. (2013). Secretory phosphatases deficient mutant of *Mycobacterium tuberculosis* imparts protection at the primary site of infection in guinea pigs. PloS ONE. 8(10): e77930. doi:10.1371.	PLoS ONE Impact factor : 3.730
3.	Rupangi Verma Puri, Nisha Singh, Rakesh K. Gupta¤, **Anil K. Tyagi**. (2013). Endonuclease IV Is the Major Apurinic/Apyrimidinic Endonuclease in Mycobacterium tuberculosis and Is Important for Protection against Oxidative Damage. PLoS ONE 8(8): e71535. doi:10.1371/ journal.pone.0071535.	PLoS One Impact factor : 3.730
4.	Rupangi Verma Puri, P. Vineel Reddy, **Anil K. Tyagi**. (2013). Secreted Acid Phosphatase (SapM) of Mycobacterium tuberculosis Is Indispensable for Arresting Phagosomal Maturation and Growth of the Pathogen in Guinea Pig Tissues. PLoS ONE 8(7): e70514. doi:10.1371/journal.pone.0070514.	PLoS One Impact factor : 3.730
5.	P. Vineel Reddy, Rupangi Verma Puri, Priyanka Chauhan, Ritika Kar, Akshay Rohilla, Aparna Khera and **Anil K. Tyagi**. (2013). Disruption of mycobactin biosynthesis leads to attenuation of *Mycobacterium tuberculosis* for growth and virulence. Journal of Infectious Diseases. DOI: 10.1093/infdis/jit250.	Journal of Infectious Diseases Impact factor : 5.848

6.	Priyanka Chauhan, Ruchi Jain, Bappaditya Dey and **Anil K. Tyagi.** (2013). Adjunctive immunotherapy with □–crystallin based DNA vaccination reduces tuberculosis chemotherapy period in chronically infected mice. Scientific Reports. 3: 1821, DOI: 10.1038.	Scientific Reports Impact factor : 2.927
7.	Garima Khare, Prachi Nangpal and **Anil K. Tyagi**. (2013). Unique residues at the 3-fold and 4-fold axis of mycobacterial ferritin are involved in oligomer switching. Biochemistry**,** 52(10) : 1694-1704.	Biochemistry Impact factor : 3.377
8.	Ruchi Jain, Bappaditya Dey and **Anil K. Tyagi**. (2012). Development of the first oligonucleotide microarray for global gene expression profiling in guinea pigs: defining the transcription signature of infectious diseases. BMC Genomics, 13: 520-530.	BMC Genomics Impact factor : 4.40
9.	Vikram Saini, Saurabh Raghuvanshi, Jitendra P. Khurana, Niyaz Ahmed, Seyed E. Hasnain, Akhilesh K. Tyagi and **Anil K. Tyagi**. (2012). Massive gene acquisitions in *Mycobacterium indicus pranii* provide a perspective on mycobacterial evolution. Nucleic Acids Research. 1-19, doi:10.1093/nar/gks793.	Nucleic Acid Research Impact factor : 8.055
10.	P. Vineel Reddy, Rupangi Verma Puri, Aparna Khera and **Anil K. Tyagi**. (2012). Iron Storage Proteins Are Essential for the Survival and Pathogenesis of *Mycobacterium tuberculosis* in THP-1 Macrophages and the Guinea Pig Model of Infection. *J. Bacteriol.* 194(3):567. DOI: 10.1128/JB.05553-11.	Journal of Bacteriology Impact factor : 3.194
11.	Ruchi Jain, Bappaditya Dey, Aparna Khera, Priyadarshani Srivastava, Umesh D. Gupta, V.M. Katoch, V.D. Ramanathan, **Anil K. Tyagi.** (2011). Over-expression of superoxide dismutase obliterates the protective effect of BCG against tuberculosis by modulating innate and adaptive immune responses. Vaccine. 29: 8118– 8125	Vaccine Impact factor : 3.458
12.	Bappaditya Dey, Ruchi Jain, Umesh D. Gupta, V. M. Katoch, V. D. Ramanathan, **Anil K. Tyagi.** (2011). A Booster Vaccine Expressing a Latency-Associated Antigen Augments BCG Induced Immunity and Confers Enhanced Protection against Tuberculosis. PLoS ONE 6(8): e23360.	PLoS One Impact factor : 3.730
13.	Garima Khare, Ritika Kar, **Anil K. Tyagi.** (2011). Identification of Inhibitors against Mycobacterium tuberculosis Thiamin Phosphate Synthase, an Important Target for the Development of Anti-TB Drugs. PLoS ONE 6(7): e22441.	PLoS One Impact factor : 3.730
14.	Bappaditya Dey, Ruchi Jain, Aparna Khera, Umesh D. Gupta, V.M. Katoch, V.D. Ramanathan and **Anil K. Tyagi**. (2011). Latency antigen α–crystalin based vaccination imparts a robust protection against TB by modulating the dynamics of pulmonary cytokines. PLoSONE 6(4): e18773.	PLoS One Impact factor : 3.730
15.	Garima Khare, Vibha Gupta, Prachi Nangpal, Rakesh K. Gupta, Nicholas K. Sauter and **Anil K. Tyagi**. (2011). Ferritin Structure from Mycobacterium tuberculosis: Comparative	PLoS One Impact factor : 3.730

	Study with Homologues identifies Extended C-terminus involved in Ferroxidase Activity. PLoSONE 6(4): e18570.	
16.	Purushothaman S, Annamalai K, **Tyagi AK**, Surolia A (2011). Diversity in Functional Organization of Class I and Class II Biotin Protein Ligase. PLoS ONE 6(3):e16850.	PLoS One Impact factor : 3.730
17.	Ashish Arora, Nagasuma R. Chandra, Amit Das, Balasubramanian Gopal, Shekhar C. Mande, Balaji Prakash, Ravishankar Ramachandran, Rajan Sankaranarayanan, K. Sekar, Kaza Suguna, **Anil K. Tyagi**, Mamannamana Vijayan. (2011). Structural biology of *Mycobacterium tuberculosis* proteins: The Indian efforts, Tuberculosis, doi:10.1016/j.tube.2011.03.004	Tuberculosis Impact factor : 3.036
18.	**Anil K. Tyagi**, Prachi Nangpal, Vijaya Satchidanandam. (2011). Development of vaccines against tuberculosis. Tuberculosis. Doi:10.1016/j.tube.2011.01.003.	Tuberculosis Impact factor : 3.036
19.	Vibha Gupta, Rakesh K. Gupta, Garima Khare, Dinakar M. Salunke, Avadhesha Surolia and **Anil K. Tyagi**. (2010). Structural ordering of disordered ligand-binding loops of biotin protein ligase into active conformations as a consequence of dehydration. PloS ONE 5(2): e9222.	PLoS One Impact factor : 3.730
20.	Bappaditya Dey, Ruchi Jain, Aparna Khera, Vivek Rao, Neeraj Dhar, Umesh D. Gupta, V.M. Katoch, V.D. Ramanathan and **Anil K. Tyagi**. (2010). Boosting with a DNA vaccine expressing ESAT-6 (DNAE6) obliterates the protection imparted by recombinant BCG (rBCGE6) against aerosol *M.tuberculosis* infection in guinea pigs. Vaccine. 28: 63-70.	Vaccine Impact factor : 3.458
21.	Khare, G., Gupta, V., Gupta, R.K., Gupta, R, Bhat, R. and **Anil K. Tyagi**. (2009). Dissecting the role of critical residues and substrate preferene of a fatty Acyl-CoA synthetase (FadD13) of *Mycobacterium tuberculosis*. PLoS ONE 4(12): e8387.	PLoS One Impact factor : 3.730
22.	Vibha Gupta, Rakesh K. Gupta, Garima Khare, Dinakar M. Salunke and **Anil K. Tyagi**. (2009). Crystal structure of Bfr A from *Mycobacterium tuberculosis:* Incorporation of selenomethionine results in cleavage and demetallation of Haem. PLoS One. 4(11): e8028.	PLoS One Impact factor : 3.730
23.	Preeti Sachdeva, Richa Misra, **Anil K. Tyagi** and Yogendra Singh. 2009. The sigma factors of *Mycobacterium tuberculosis:* regulation of the regulators. FEBS Journal. Doi:10.1111/j.1742-4658.2009.07479.x.	FEBS Journal Impact factor : 4.25
24.	C.M. Santosh Kumar, Garima Khare, C.V. Srikanth, **Anil K. Tyagi**, Abhijit A. Sardesai and Shekhar C. Mande. (2009). Facilitated oligomericzation of mycobacterial GroEL: Evidence for phosphorylation-mediated oligomerization. J. Bacteriol. 191: 6525-6538.	Journal of Bacteriology Impact factor : 3.194
25.	Vikram Saini, S. Raghuvanshi, G.P. Talwar, N. Ahmed, J.P. Khurana, S.E. Hasnain, Akhilesh K. Tyagi, and **Anil K. Tyagi.** (2009). Polyphasic Taxonomic Analysis Establishes	PLoS One Impact factor : 3.730

	Mycobacterium indicus pranii as a Distinct Species. PLoS ONE 4(7): e6263.	
26.	D. Basu, Garima Khare, S. Singh, **Anil K. Tyagi,** S. Khosla, S.C. Mande. (2009). A novel nucleoid-associated protein of *Mycobacterium tuberculosis* is a sequence homolog of GrotL. Nucleic Acids Res. Doi:10.1093/nar/gkp502.	Nucleic Acid Research Impact factor : 8.055
27.	Pooja Arora, Aneesh Goyal, Vivek T. Natarajan, Eerappa Rajakumara, Priyanka Verma, Radhika Gupta, Malikmohamed Yousuf, Omkita A. Trivedi, Debasisa Mohanty, **Anil Tyagi**, Rajan Sankaranarayanan and Rajesh S. Gokhale. (2009). Mechanistic and functional insights into fatty acid activation in *Mycobacterium tuberculosis*. Nature Chemical Biology. 5, 166-173.	Nature Chemical Biology Impact factor : 12.948
28.	Ruchi Jain, Bappaditya Dey, Neeraj Dhar, Vivek Rao, Ramandeep Singh, Umesh D. Gupta, V.M. Katoch, V.D. Ramanathan and **Anil K. Tyagi**. (2008). Enhanced and Enduring Protection against Tuberculosis by Recombinant BCG-Ag85C and its Association with Modulation of Cytokine Profile in Lung. PLoS ONE. 3(12): 3869.	PLoS One Impact factor : 3.730
29.	Mohd Akif, Garima Khare, **Anil K. Tyagi,** Shekhar C. Mande, and Abhijit A. Sardesai (2008). Functional Studies on Multiple Thioredoxins from *Mycobacterium tuberculosis.* J. Bacteriol. 190: 7087-7095.	Journal of Bacteriology Impact factor : 3.194
30.	Shruti Jain, Garima Khare, Pushplata Tripathi and **Anil K. Tyagi.** (2008). An inducible system for the identification of target genes for a regulator in mycobacteria. American Journal of Biochemistry and Biotechnology 4(3): 226-230.	American Journal of Biochemistry and Biotechnology Impact factor: 1.62
31.	Expression of recombinant antibody (single chain antibody fragment) in transgenic plant Nicotiana tabacum cv. Xanthi. Dobhal S, **Chaudhary VK**, Singh A, Pandey D, Kumar A, Agrawal S. Mol Biol Rep. 2013 Dec;40(12):7027-37. doi: 10.1007/s11033-013-2822-x. Epub 2013 Nov 12.	Mol Biol Rep. Impact factor : 2.506
32.	A novel helper phage enabling construction of genome-scale ORF-enriched phage display libraries. Gupta A, Shrivastava N, Grover P, Singh A, Mathur K, Verma V, Kaur C, **Chaudhary VK**. PLoS One. 2013 Sep 27;8(9):e75212. doi: 10.1371/journal.pone.0075212.	PLoS One Impact factor: 3.730
33.	Mapping interactions of Chikungunya virus nonstructural proteins. Sreejith R, Rana J, Dudha N, Kumar K, Gabrani R, Sharma SK, Gupta A, Vrati S, **Chaudhary VK**, Gupta S. Virus Res. 2012 Oct;169(1):231-6. doi: 10.1016/j.virusres.2012.08.006. Epub 2012 Aug 19.	Virus Res. Impact factor: 2.665
34.	Intraviral protein interactions of Chandipura virus. Kumar K, Rana J, Sreejith R, Gabrani R, Sharma SK, Gupta A, **Chaudhary VK**, Gupta S. Arch Virol. 2012 Oct;157(10):1949-57. Epub 2012 Jul 5.	Arch Virol. Impact factor: 2.03
35.	Gupta, A., **V.K. Chaudhary** and Rajiv Bhat. (2009). Directed evolution of an anti-human red blood cell antibody. MAbs. Vol 1: issue 3	MAbs Impact factor: 5.275
36.	Surolia, Ranu. and **Ghosh, P.C.** (2012). Preparation and characterization of monensin loaded PLGA nanoparticles: in	J. Biomedical Nanotechnology

	vitro anti-malarial activity against Plasmodium falciparum. J. Biomedical Nanotechnology. 8, 1-10.	Impact factor : 5.26
37.	Tyagi, N. and **Ghosh P.C**. (2011). Folate receptor mediated targeted delivery of ricin entrapped into stearically stabilized liposomes to human epidermoid carcinoma (KB) cells: effect of monensin intercalated into folate-tagged liposomes. Eur J. Phar. Sci. 43, 343-353.	Eur J. Phar. Sci. Impact factor : 2.98
38.	Tyagi, N., Rathore, S. S. and **Ghosh P.C**. (2011). Enhanced killing of human epidermoid carcinoma (KB) cells by ricin encapsulated into stearically stabilized liposomes in combination with monensin. Drug Delivery. 18(6), 394-404.	Drug Delivery Impact factor : 2.01
39.	G.M. Hasan, N. Garg, Enna, Surolia, R. and **Ghosh P.C.** (2011). Inhibition of the growth of Plasmodium falciparum in culture by stearylamine-phosphatidylcholine liposomes. J Parasitol. Res. 2011;2011:120462. Epub 2011 Published online 2011 June14, doi: 10.1155/2011/120462.	J Parasitol. Res. Impact factor : under evaluation
40..	Farhana, A., Kumar, S., Rathore, S. S., **Ghosh, P.C**., Ehtesham, N. Z., Tyagi, A.K. and Hasnanin, S.E. (2008) Mechanistic insights into a Novel Export-Import System of Mycobacterium tuberculosis unravel its role in trafficking of iron. PLoSOne. 3, e2087.	PLoSOne Impact factor : 3.73
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95.	Penzkofer, A., Stierl, M., Hegemann, P., **Kateriya, S.** Absorption and fluorescence characteristics of photo-activated adenylate cyclase nano-clusters from the amoeboflagellate Naegleria gruberi NEG-M strain. **Chem. Phys**. **392**, 46-54 (2012).	Chem. Phys. Impact Factor:1.8

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Books Chapters (2008-2013)

1. Kumar, A., Uppal, S., and **Kundu*, S.** (2009) "The Red Goldmine: Promises of Biotechnological Riches" *Invited Book Chapter*. ***Biotechnological Applications***, eds. C.S.K. Mishra, India and Dr. Pascale Champagne, Canada. IK Publishing House, Delhi.

23. Details of patents and income generated

Income Generated

- **Rs. 30 lacs** were received from M/s Cadila Pharmaceuticals limited Ahmedabad in lieu of licensing the technology for NEVAHIV, a rapid test for HIV (AIDS), 2004 (Prof. Vijay K. Chaudhary)
- **Rs. 6 lacs** out of a total 20 lacs were received from M/s Span Diagnostics, Surat in lieu of licensing the technology for TBConfirm, a rapid test for confirming the presence of Mycobacterium tuberculosis in growing cultures. 2011 (Prof. Vijay K. Chaudhary)
- The Virosome technology (Sarkar, Debi P. Ramani, Komal, Bora, Roop S., Kumar, Mukesh, and Tyagi, Sandeep K. Process for Producing A Targeted Gene. US Patent Application Granted. Patent No. 5,683,866; Date. 4th Nov, 1997) has been licensed to the Panacea Biotech Ltd., New Delhi, through NRDC, NEW DELHI, MOU signed, March, 2002. Technology transfer process has been completed and Royalty (**Rs. 25.00 Lakh**) received by University of Delhi. As of now, commercialization is awaited (Prof. Debi P. Sarkar).

Details of Patents

Prof. Anil K. Tyagi

i. **Title:** Mutants of mycobacteria and process thereof.
Indian Patent Application No. 882/DEL/2003 dated 09.07.2003
Investigators: Anil Tyagi*et al.*

ii. **Title:** Mutants of mycobacteria and process thereof.
PCT Application No. PCT/IN04/002003
Investigators: Anil Tyagi*et al.*
(*Patent granted by Singapore Patent Office, application pending in USA, Brazil and Japan*)

iii. **Title:** Recombinant BCG-Ag85C based immunization against tuberculosis.
Indian Patent Application No. 2639/DEL/2008 dated November 21, 2008
Investigators: Anil Tyagi et al.

iv. **Title:** Alpha-crystallin based immunization against *Mycobacterium* and methods thereof.
Indian Patent Application No.473/DEL/2009 dated March 9, 2009
Investigators: Anil Tyagi et al.

v. **Title:** A simple and fast process for evaluating promoter activity of persistent *M. tuberculosis* in hypoxic conditions using *M. smegmatis* as a surrogate host
Indian Patent Application No. 981/DEL/2003
Investigators: Jaya Tyagi*et al.*

Prof. Vijay K. Chaudhary

i. Recombinant antibody-toxin fusion protein, David FitzGerald, Vijay Kumar Chaudhary, Ira Harry Pastan, Thomas Alexander Waldmann, Cary L. Queen. US Patent No.5,696,237, December, 9, 1997.

ii. Pseudomonas Exotoxins of Low Animal Toxicity and High Cytocidal Activity, Ira Pastan, David Fitzgerald, Vijay K. Chaudhary, US Patent No. 5,705,156, January 6, 1998.

iii. Target-specific, Cytotoxic, Recombinant Pseudomonas Exotoxin, Ira Pastan, Vijay K. Chaudhary, David Fitzgerald, US Patent No.5,705,163, January 6, 1998.

iv. Monoclonal Antibodies(MAbs) against two coat proteins gIIIp and gVIIIp of filamentous phage M13 and a process for their preparation. Patent No.764/Del/94, dated 20 October, 1997. (This technology was licensed to Pharmacia Biotech. Inc., USA.)

v. Cytotoxic agent against specific virus infection, Patent No.5,587,455

vi. Pseudomonas exotoxins (PE) and conjugates there of having lower animal toxicity with high cytocidal activity through substitution of positively charged amino acids. US Patent No.5,512,658

vii. Pseudomonas exotoxin fusion proteins have COOHG220101 al alterations, which increase cytotoxicity. US Patent No.5,458,143.

viii. Cytotoxic agent against specific virus infection. US Patent No.5,428,143

ix. CD-4/cytotoxic gene fusions. US Patent No.5,206,353.

x. A process for the isolation and purification of protein p17 of HIV-1 subtype B and C. (application no.1476/Del/99) (M/s SPAN has shown interest to licence the technology)

xi. A process for the isolation and purification of protein p24 of HIV-1 subtype B. (application no.1477/Del/99) (M/s SPAN has shown interest to licence the technology)

xii. A process for the isolation and purification of protein p24 of HIV-1 subtype C. (application no.1478/Del/99) (M/s SPAN has shown interest to licence the technology)

xiii. Recombinant fusion proteins, a process for preparing the same an their use in an agglutination based assay for the detection of anti-HIV antibodies (application no.659/Del/2001). (This technology was licensed to Cadila Pharmaceuticals, India who commercialised it as NEVA HIV.)

xiv. A non-aggregating derivative of HIV-1 p24 for haemagglutination based rapid detection of antibodies to HIV in whole blood (application no.1149/Del/2001).

xv. A process of displaying functional proteins on Bacteriophage Lambda. (No. 566/Del/2002)

xvi. A process for the isolation and purification of protein p17 of HIV–1 subtype C. (No.808/Del/2003) (M/s SPAN has shown interest to licence the technology)

xvii. A process of obtaining recombinant lamboid bacteriophage and the resultant novel phage display system (No: PCT/IN03/00193; 18th Nov 2004, WO03/096969)

xviii. A process for preparation of an agglutination reagent for rapid detection of typhoid. GP Rai, GS Agarwal, SK Sharma, DK Jaiswal, K Shekhar, K Arora, & Chaudhary, Vijay Kumar WO Patent 2,004,047,721.

xix. Process for preparation of an agglutination reagent for rapid detection of typhoid. GP Rai, GS Agarwal, SK Sharma, DK Jaiswal, K Shekhar, K Arora, & Chaudhary, Vijay Kumar US20060127960 (2006)

xx. A process for preparation of an agglutination reagent for rapid detection of typhoid. GP Rai, GS Agarwal, SK Sharma, DK Jaiswal, K Shekhar, K Arora, & Chaudhary, Vijay Kumar EP Patent 1,575,520. (2007)

xxi. Lambda Phage display system and the process (US patent No. 7,410,801 August 2008)

xxii. Improved process for expression, purification and enhanced recovery of mycobacterial recombinant proteins. (Application no. 2077/Del/2004)

xxiii. A process of producing ORF-enriched phage display library and uses thereof. (Application no. 2346/Del/2013)

Prof. Debi P. Sarkar

i. Sarkar, Debi P. **Ramani, Komal, Bora, Roop S., Kumar, Mukesh, and Tyagi, Sandeep K. Process for Producing A Targeted Gene.** *US Patent Application Granted*. Patent No. 5,683,866; Date. 4th Nov, 1997.

ii. Debi P. Sarkar *et. al***.**(2005) **"Process for producing modified reconstituted Sendai viral envelope specific for drug and/or gene delivery to liver cells"** Indian Patent Applications Filed. #1003/Del/2005 dated 21/4/2005.PCT application filed, October 2005 (PCT No. PCT/IN2006/000061 dated 6th Nov., 2009). USA Patent Application Published, Pub. No. US 2010/0047897 A1, dated 25th Feb., 2010, Accepted/Published other countries March, 2011.

Dr. Suman Kundu

i. Isolated Polynucleotide Molecules Corresponding to Mutant and Wild-type Alleles of the Maize D9 Gene and Methods of Use. (2007) Lawit, Shai J.; **Kundu, Suman**; Rao, Aragula, G.; Tomes, Dwight T. Affiliation: Pioneer Hi-Bred International, Inc., Johnston, Iowa, USA. (US Patent 7,557,266; EP Patent 2,251,349; WO Patent 2,007,124, 312)

24. Areas of consultancy and income generated

Professor Vijay K Chaudhary served as consultant to M/s Cadila Pharmaceuticals Limited, Ahmedabad from September, 2007 to October, 2010, and the University received a sum of **Rs. 32 lacs**, which was distributed to Professor Chaudhary as per rules.

25. Faculty selected nationally / internationally to visit other laboratories /institutions / industries in India and abroad

Prof. Debi P. Sarkar

(a) Invited as resource person & invited speaker in Biotech 2012, 24-25th Feb. 2012 at ILBS, Vasant Kunj, New Delhi

(b) Resource person & invited speaker in Seminar on Molecular Biology, 31st March, at Agartala Gov. Medical College

(c) As organizer of Trends in Translational Proteomics, The Indian Proteomics Conference, 3rd to 5th April, 2011, JNU

(d) Taught many classes in Academic Staff College, JNU from 2005 till 2011

(e) Taken workshop classes as a visiting scientist at Albert Einstein College of Medicine, New York, USA, May, 2008 and 2011

Dr. Suman Kundu

(a) Selected as Indo-US Fellow to visit Iowa State University, USA for three months in 2010.

Dr. Alo Nag

(a) Invited as Research Scientist Fellow in University of Illinois at Chicago, USA, 2012

Dr. Suneel Kateriya

(a) Max-Planck Institute of Chemical Energy Conversion, Muelheim, Germany

(b) Institute of Biology, Humboldt University, Berlin, Germany

26. Faculty serving in

a) National committees

Prof. Anil K. Tyagi

- Member, Scientific Advisory Group, Translational Health Science and Technology Institute (THSTI), Udyog Vihar, Gurgaon from 2010 onwards.
- Member, APEX Committee, Vaccine Grant Challenge Programme, Department of Biotechnology, Government of India, New Delhi from 2011 onwards.
- Member of Scientific Advisory Committee, National Centre for Cell Sciences (NCCS), Pune, 2003 -2010.
- Member of Expert Committee for North Eastern Region Biotechnology Programmes, Department of Biotechnology, Government of India, 2009 onwards.
- Member, Technical Advisory Committee (TAC) for advising, evaluating, reviewing and monitoring activities of National Research Development Corporation (NRDC), New Delhi for activities funded by DSIR, 2007-09.
- Member, Task Force for Vaccines and Diagnostics in the areas of health care, Department of Biotechnology, Government of India, New Delhi, 2005-08.

- Member, Task Force for Infectious Disease Biology, Department of Biotechnology, Government of India, New Delhi, 2005-08.
- Member, Research Area Panels and Scientific Advisory Committee, National Institute of Immunology, New Delhi, 1996-2008.
- Member of the Research Area Panels and Scientific Advisory Committee, Centre for DNA Finger Printing and Diagnosis (CDFD), Hyderabad, 1999-2011.
- Member, Academic Committee, Translational Health Science and Technology Institute, Gurgaon from August 2013 onwards.
- Member, Academic Committee, National Institute of Immunology, New Delhi from 2013 onwards.
- Member, Academic Committee, International Centre for Genetic Engineering and Biotechnology, New Delhi, January 2008-10.
- Member, Advisory Committee of DRS Programme, Interdisciplinary Biotechnology Unit, Aligarh Muslim University, Aligarh, May 2007 to March 2012.

Prof. Vijay K. Chaudhary

- Member, Expert Committee on Tuberculosis, Department of Biotechnology, Government of India, New Delhi, 2006 onwards.
- Member, Task Force on DBT-Boost to University Interdisciplinary Life Sciences for Education and Research (DBT-BUILDER) Department of Biotechnology, Government of India, New Delhi, 2009 onwards.
- Member, Committee for Innovative Young Biotechnologists Award, Department of Biotechnology, Government of India, New Delhi, 2005 onwards.
- Member, Expert Committee(DBT-ICMR) on HIV, AIDS and Microbicides, Department of Biotechnology, Government of India, New Delhi, 2010 onwards.

Prof. Debi P. Sarkar

- Member of the Special Committee of Center for Biotechnology, JNU, New Delhi.
- Member of the Academic Committee of ICGEB, New Delhi.
- Member of the Special Committee of SLS, JNU, New Delhi.
- Member of the Task Force on Fast Track Project, DST, New Delhi.
- Member, Academic Council, Delhi University, Delhi
- Member, Task Force, RCGM, DBT, New Delhi
- Member, Task Force, Biotech Facilities and Infrastructure, DBT, New Delhi
- Member, Task Force, Basic Research in Modern Biology, DBT, New Delhi
- Member, Thematic-Group on "National S&T Human Resource Development", CSIR, for the formulation of Eleventh Five Year Plan.
- Member, of the Academic Committee of CCMB (CSIR), Hyderabad
- Member, of the Academic Committee of IMTECH (CSIR), Chandigarh
- Member, of the RC of CIMAP (CSIR), Lucknow
- Member, Planning and Monitoring Board of National Brain Research Centre (NBRC, DBT), Manesar, Gurgaon
- Expert Member, RAB/CSIR
- Member, Standing Committee on Recognized Research Institute, JNU
- Member, Course committee, IISER, Mohali, Chandigarh
- Member of the expert committee of CSIR Eng-42 RA/SRF selection

- Co-Convenor CSIR/UGC NET Examination Board
- Expert Member of the task force of "Animal Science Committee", CSIR
- Elected Member, NII Finance Committee
- Member Task Force of DBT, Bio-Care

Dr. Suman Kundu

- Special Academic Committee Member, Special Center of Molecular Medicine, JNU, 2013-2016

b) International committees

None

c) Editorial Boards

Prof. Anil K. Tyagi

- Academic Editor, PLoS ONE from 2009 onwards, published by Public Library of Science.
- Member of Editorial Advisory Board for the journal Tuberculosis from 2012 onwards published by Elsevier Press.
- Member of the Editorial Board for the Journal "Indian Journal of Medical Research" published by ICMR, New Delhi, 2003 onwards.

Prof. Debi P. Sarkar

- Elected member of the editorial board of Indian Journal of Biochemistry and Biophysics.
- Member, Editorial Board of "Human Gene Therapy", MaryAnn Liebert Inc. Publishers, A Journal of European Society for Gene and Cell Therapy w.e.f. August 2009

Dr. Suman Kundu

- Editor-in-Chief, Journal of Proteins and Proteomics, India

Dr. Alo Nag

- Member of the Editorial Board for the Journal "Current Trends in Biotechnological and Chemical Research" India.

Dr. Suneel Kateriya

- Editorial Board Member, Advances in Applied Research Journal

d) Any other (please specify)

Prof. Anil K. Tyagi

- Reviewer of research grant proposals for Wellcome Trust, CSIR, DBT and DST, Govt. of India.
- Regular reviewer for papers from the journals such as PLoS ONE, Indian Journal of Medical Research, Vaccine.

Prof. Debi P. Sarkar

- Reviewer of research grant proposals for CSIR, DBT and DST, Govt. of India.
- Reviewer of research papers from FEBS Letters, Molecular Pharmaceutics (USA), Molecular Membrane Biology (USA), BioTechniques (USA), Antiviral Research (Belgium), Archaea (Canada), PDA Journal of Pharmaceutical Science and Technology (USA), International Medical Journal for Experimental and Clinical Research, Poland (USA), BBA-Biomembrane, Journal of Infectious Diseases, Nanotechnology and Langmuir.

Dr. Suman Kundu

- Reviewer of research grant proposals for CSIR, DBT and DST, Govt. of India.
- Reviewer of research papers for PLoS One, Indian Journal of Microbiology, FEBS Letters, Indian Journal of Biotechnology, Cell and Developmental Biology, Journal of Agriculture and Food Chemistry.

Dr. Alo Nag

- Reviewer of research grant proposals for CSIR, DBT and DST, Govt. of India.
- Reviewer of research papers from PLoS One, PLASMID (USA), Current Cancer Drug Targets (USA), Genetics Research International (USA) and Molecular Cancer Biology (USA).

Dr. Suneel Kateriya

- Reviewer of research papers from New Phytologist, PloS One, Indian Journal of Microbiology, Journal of Applied Phycology, International Journal of Photoenergy.

27. Faculty recharging strategies (UGC, ASC, Refresher / orientation programs, workshops, training programs and similar programs).

S. No.	Type of Course	Details
1.	Refresher course	Refresher course in biochemistry sponsored by the University Grants Commission, 28th June – 17th July 1993.
		Refresher course in Immunology sponsored by the University Grants Commission, 28th September - 17th October 1992.
		Refresher course in Biochemistry sponsored by the University Grants Commission, 31st March – 19th April 1991.

2.	Workshop	Workshop entitled, "Machine Learning Techniques in Bioinformatics" held at the Department of Biochemistry, University of Delhi South Campus and JNU, New Delhi, 28th - 29th March 2005.
		Workshop entitled, "Biological databases – Mining of Information" held at the Department of Biochemistry, University of Delhi South Campus and JNU, New Delhi, 28th - 29th March 2003.
		Workshop entitled, "Applications of Genomics and Proteomics" held at the Department of Biochemistry, University of Delhi South Campus and JNU, New Delhi, 1st - 3rd February 2002.
		Workshop entitled, "Bioinformatics and its Application to Biology" held at the Department of Biochemistry, University of Delhi South Campus, New Delhi, 22nd - 23rd March 2000.

28. Student projects

- Percentage of students who have done in-house projects including inter-departmental projects: 100%

- Percentage of students doing projects in collaboration with other universities / industry / institute: None

29. Awards / recognitions received at the national and international level by

- **Faculty**

Prof. Anil K. Tyagi

- J.C. Bose National Fellow, Department of Science and Technology, GOI (2010).
- Vigyan Gaurav Samman Award by UP Government. (2010).
- Vice President, Society of Biological Chemists (India) from 2004-2006.
- Ranbaxy Research Award by Ranbaxy Science Foundation (1999).
- Dr. Nitya Anand Endowment Lecture Award by INSA (1999).
- Shanti Swarup Bhatnagar Prize by CSIR (1995).
- P.S. Sarma memorial award by the Society of Biological Chemists (India) (1993).
- C.R. Krishnamurthy Memorial Oration Award by CDRI, Lucknow
- Prof. S.H. Zaidi Oration Award by ITRC, Lucknow,
- Dr. Kona Sampath Kumar prize by the University of Delhi (1983).
- Fellow of the National Academy of Sciences, India
- Fellow of the Indian Academy of Sciences, India
- Fellow of the Indian National Science Academy, India
- Fellow of the Society for Immunology and Immunopathology, India

Prof. Vijay K. Chaudhary

- Bachhawat Memorial Lecture award by National Academy of Sciences India (2009).
- WIPO (World Intellectual Property Organization, Geneva) Gold Medal for "Best Invention of the Year 2004" for inventing "On-site Detection of HIV (AIDS) (2005).

- National Research Development Corporation (NRDC, DSIR, Ministry of Science & Technology, Government of India) award of Rs. 1,50,000/- for inventing "On-site Detection of HIV (AIDS)" (2004).
- Biotech Product and Process Development and Commercialization Award, Department of Biotechnology, Government of India (2002).
- All India Biotech Association (AIBA) Award (1999).
- VASVIK Award for Biological Science and Technology (1997).
- The National Institutes of Health, USA (NIH) Director's Award (1991).
- Fellow of the National Academy of Sciences

Prof. Prahlad C. Ghosh

- Fellow of National Academy of Sciences, India

Prof. D.P. Sarkar

- Awarded a Gold Medal from the Banaras Hindu University for standing first in the M.Sc. (Biochemistry) examination in 1980.
- Awarded a Travel Fellowship by the International Union of Biochemistry to attend the 13th International Congress of Biochemistry, Amsterdam, The Netherlands, August 25th-30th, 1985.
- Awarded an ICRETT Fellowship by the "International Union Against Cancer" to work in NCI/NIH, USA from May 16th to August 1st, 1989.
- Awarded Shanti Swarup Bhatnagar Prize in *Biological Sciences*, 1998.
- Conferred M. Sreenivasaya Memorial Award, by SBC, India, 2005
- Recipient of J.C. BOSE National Fellowship (DST) Award, September, 2010
- Conferred Prof. B.K. Bachhawat Memorial Lecture Award 2011 by NASI, Allahabad
- Elected, Fellow of The National Academy of Sciences, India (1996).
- Elected, Fellow of The Indian Academy of Sciences (2007).
- Elected Fellow of the Indian National Science Academy (INSA), New Delhi, 2010.
- Elected Fellow of the West Bengal Academy of Science & Technology (WAST), December 2011

Dr. Suman Kundu

- Indo-US Research Fellow from Indo-US Science and Technology Forum and DST, Government of India (2010) (International).
- Citation in Marquis Who's Who in Medicine and Healthcare 2011-2012 (8th Edition) (International)
- DST (Government of India) Travel Award for Attending International Conference Abroad, (2008).

Dr. Alo Nag

- Invited as Research Scientist Fellow in University of Illinois at Chicago, USA, from May to July (2012)
- Young Scientist travel grant awarded by Council of Scientific and Industrial Research (CSIR, India) to attend the17th International Congress of Biochemistry and Molecular Biology Conference, 1997, San Francisco, California.

- Young Scientist award in the 4th International Symposium on Biochemical Roles of Eukaryotic Cell Surface Macromolecules, 1996, New Delhi, India.

Dr. Suneel Kateriya

- Indian Science Congress Young Scientist Award in New Biology Section (2009-2010)
- Indian Biophysical Society Ratna Phadke Young Scientist Award (2010)
- Association of Microbiologist of India Young Scientist Award (2011)
- Elected member of National Academy of Sciences, India
- Head of a Max Planck India Fellowship from Department of Science and Technology, India and Max Planck Group-Germany (2012-2016) (International)

- **Doctoral / post doctoral fellows**

- **Garima Khare**. Determination of the structure of Thiamin Phosphate Synthase (MtTPS) of *Mycobacterium tuberculosis* by homology modeling and identification of inhibitors by using virtual screening. Young Scientist Oral presentation at Symposium on "Microbes in Health and Agriculture", 2012, held at Jawarharlal Nehru University, Delhi. ***The first author was selected for Best Oral Presentation Award***.
- **Priyanka Chauhan**. Mycobactin biosynthesis is essential for the growth and virulence of *Mycobacterium tuberculosis*: An attractive target for therapeutic interventions. Presented at National Science Day Symposium 2013, held at University of Delhi South Campus. ***The first author was selected for Best Oral Presentation Award.***
- **Garima Khare,** Vibha Gupta, Rakesh K. Gupta, Radhika Gupta, Rajiv Bhat and Anil K. Tyagi. Dissecting the role of critical residues and substrate preference of a Fatty Acyl-CoA Synthetase (FadD13) belonging to a virulence associated operon of *Mycobacterium tuberculosis*. Presented at International Symposium "Understanding and Managing Pathogenic Microbes (UMPM 2010)**"** organized by Institute of Microbial Technology, Chandigarh**.** ***The first author was selected for Best Poster Award***.
- **Garima Khare,** Prachi Nangpal, Anil K. Tyagi. Mycobacterium tuberculosis bacterioferritins- Structural and biochemical characterization to facilitate rational drug design. Presented at National Symposium on "Innovation in TB Diagnostics, Drug Targets and Biomarkers", 2014, held at Mahatma Gandhi Institute of Medical Sciences, Sevagram. ***The first author was selected for Best Poster Award***.
- **Ritika Kar**,_ Priyanka Chauhan, Garima Khare, Prachi Nangpal, Anil K. Tyagi. rBCG85C – A Superior Vaccine than BCG : Modifications for Human Clinical Trials. Presented at National Science Day Symposium (2013), held at University of Delhi South Campus. ***The first author was selected for Best Poster Award***.
- **Manendra Pachauri** and Prahlad C. Ghosh. Combination of Curcumin and Monensin Loaded Poly(lactic-co-glycolic acid) Nanoparticles for Cancer Therapy. Poster presented at 3rd International Conference of Carcinogenesis Foundation-Frontiers in Carcinogenesis and Preventive Oncology Molecular Mechanisms to Therapeutics, New Delhi, India, 19-21 November, **2012**. ***The first author was selected for Award of Excellence.***
- **Sanjay Kumar Dey**, B.K. Thelma and Suman Kundu. Dopamine-β-hydroxylase as a novel drug target for cardiovascular diseases: *In silico* identification and *in vitro* validation of novel inhibitors. Poster presented at Conference on Recent Advances in Computational Drug Design, Indian Institute of Science, Bangalore, 16-17 September, 2013. ***The first author was selected for 3rd Best Poster award***.

- **Sanjay Kumar Dey**, Abhishika Srivastava, Rachana Muley, B.K. Thelma and Suman Kundu. *In silico* identification and *in vitro* validation of novel inhibitors to combat cardiovascular diseases exploiting dopamine-β-hydroxylase as the drug target. Poster presented at SYSCON-2013 on Interfacing Basic and Translational Research, All India Institute of Medical Sciences, New Delhi, India, 23 August, 2013. ***The first author was selected for Best Poster Award***.

- **Sanjay Kumar Dey** and Suman Kundu. Identification of Novel Inhibitors against Human Dopamine-β-Hydroxylase, a Drug Target for Cardiovascular Diseases. Oral presentation at National Symposium on Frontiers of Biophysics, Biotechnology and Bioinformatics and 37th Annual Meeting of Indian Biophysical Society (IBS), University of Mumbai, Kalina Campus, Mumbai, India, 13-16 January, 2013. ***The first author was awarded Ratna Phadke Young Scientist Award.***

- **Amit Kumar** and Suman Kundu. **Boehringer Ingelheim Fonds Travel Fellowship** for visit to Russia (2012) **(International)**
- **Amit Kumar** and Suman Kundu. Regulation of ligand binding in classical plant hemoglobins: Structural aspects of heme pocket. Poster presented at Indo-US Workshop / Symposium on Modern Trends in Macromolecular Structures, Indian Institute of Technology Bombay, Mumbai, India, 21-24 February, 2011. ***The first author was selected for Travel Award.***

- **Amit Kumar**, Sheetal Uppal, Komal Choudhary and Suman Kundu. Regulation of Ligand Binding and Stability in Leghemoglobins. Poster presented at First DU-SDU Seminar on Emerging Trends in Interfacial Areas of Chemical, Biological and Environmental Sciences, University of Delhi and University of Southern Denmark, New Delhi, India, 17-18 March, 2008. ***The first author was selected for 2nd Best Poster award***.

- **Vaibhav Chand,** Rince John, Neha Jaiswal, Vandana Kumari and **Alo Nag** (2012). "Downregulation of hADA3 Promotes Epithelial to Mesenchymal Transition in Cervical Cancer", 3rd International Conference of Carcinogenesis Foundation- Frontiers in Carcinogenesis and Preventive Oncology Molecular Mechanisms to Therapeutics, RML Hospital, New Delhi India, 19-21 November, 2012. ***The first author of the poster was selected for oral presentation and received Excellence Award.***

- **Neha Jaiswal**, Rince John, Vaibhav chand and **Alo Nag** (2012). " FoxM1: A Key Player in HPV-Mediated Oncogenesis", Carcinogenesis 2012, 3rd International Conference of the Carcinogenesis Foundation - Frontiers in Carcinogenesis and Preventive Oncology : Molecular Mechanisms to Therapeutics, RML hospital, New-Delhi, India, 19-21 November, 2012. ***The first author of the poster was selected for a podium presentation and received an Excellence Award.***

- **Vaibhav Chand**, Rince John, Neha Jaiswal and **Alo Nag** (2011). "Unraveling the Role of hADA3 in HPV mediated Oncogenesis", International Symposium on Cancer Biology, National Institute of Immunology, New Delhi, India, November 14-16, 2011. ***The Poster was selected for an Excellence Award.***

- **Neha Jaiswal** and Alo Nag **(2011).** " SUMOylation of FOXM1: A Therapeutic Approach against HPV Mediated Oncogenesis", UGC-SAP, Department of Biochemistry, University of Delhi South Campus. ***The Poster was selected for 2nd Best Poster Award.***

- **Neha Jaiswal** and Alo Nag **(2012).** "FOXM1 Biology: In Cellular Physiology and Pathology", UGC-SAP, Department of Biochemistry, University of Delhi South Campus. ***The Poster was selected for 3nd Best Poster Award.***

- **Peeyush Ranjan**, Mayanka Awasthi, Sindhu Kandoth Veetil and Suneel kateriya. Cellular trafficking of phototropin and novel modular rhodopsin is mediated by animal like IFT machinery in *Chlamydomonas reinhardtii*, 7th Annual Convention of ABAP &

International Conference on Plant Biotechnology, Molecular Medicine & Human Health, New Delhi, **India.** October 18th-20th, **2013**. ***The first author was selected for Junior Scientist Award.***

- **Peeyush Ranjan**, Mayanka Awasthi, Rudra Shankar, Peter Hegemann and Suneel Kateriya. Distribution of Modular Enzymerhodopsins in Microalgae, 15th International Conference on the Cell and Molecular Biology of *Chlamydomonas*, June 5-10, 2012, Potsdam, **Germany**. ***The first author was selected for International Travel Award from organizing committee of the German funding agency and Young Scientist Travel Award from DST, Govt. of India.***
- **Mayanka Awasthi**, Jyoti Batra and Suneel Kateriya, Disulfide Bridge Mediates the Apparent Lipid Specificity and Dimer Stability of Membrane Bound Phospholipase C in *C. reinhardtii*, 15th International Conference on the Cell and Molecular Biology of *Chlamydomonas*, June 5-10, 2012, Potsdam, Germany. **First author was awarded for the International travel grant from DBT, Govt of India.**
- **Peeyush Ranjan†**, Mayanka Awasthi† and Suneel Kateriya, Microalga: "mimicking the mammalian like IFT mediated trafficking of rhodopsin", National Science Day Symposium, UDSC, 28th February, 2013. India. (†equally contributed). ***The poster was selected for 3rd Best Poster Award.***
- Mayanka Awasthi*, **Peeyush Ranjan***, Meenakshi Tanwar* and Suneel Kateriya, Cellular and biochemical characterization of optozymes from lower eukaryotes, National Science Day Symposium, UDSC, 28th February, 2011. India (*equally contributed). ***The poster was selected for Best Poster Award.***

- **Students**

30. Seminars/ Conferences/Workshops organized and the source of funding (national/international) with details of outstanding participants, if any:

1. National Symposium on "Ramachandran Manifestation: Peptide to Proteome", Commemorating 50 years of Ramachandran Map, 14th-15th March 2013**,** UGC-SAP Programme, Department of Biochemistry, Distributed Information Sub-Centre, UDSC and Department of Biochemistry, Sri Venkateswara College (outstanding participants – Prof. D. Balasubramanian, Research Director, L.V. Prasad Eye Institute and Prof. A.G. Rao, Chair, Department of Biochemistry, Biophysics and Molecular Biology, Iowa State University, USA).
2. Symposium on "Systems Biology" held at the Department of Biochemistry, University of Delhi South Campus, New Delhi, March 26, 2012 (Rs.1.5 lakhs, national).
3. UGC-SAP Symposium on "Development of Molecular Strategies to Combat Various Human Diseases" held on March 23 2012, Biotech Centre Auditorium, University of Delhi South Campus, New Delhi (Rs.2.0 lakhs, national).
4. "Frontiers in Biological Sciences", March 16, 2012, DST-PURSE and Delhi University sponsored symposium, S.P. Jain Auditorium, University of Delhi South Campus, New Delhi (Rs. 1 lakh, national).
5. UGC-SAP Symposium on "Development of Molecular Strategies to Combat Various Human diseases" held on 17-18th March 2011, Biotech Centre Auditorium, University of Delhi South Campus, New Delhi (Rs.1.5 lakhs, national).

6. Symposium-cum-workshop on "Next Generation Sequencing Data Analysis" jointly organized by the Department of Biochemistry, University of Delhi South Campus and JNU, New Delhi, 28th – 29th January 2011 (Rs.1 lakhs, national).
7. UGC-SAP Symposium on "Development of Molecular Strategies to Combat Various Human diseases" held on 17-18th March 2010, Biotech Centre Auditorium, University of Delhi South Campus, New Delhi.
8. "Emerging Trends in Globin Research: Need to Imbibe New Approaches and Technologies" February 6, 2010, Biotech Centre Auditorium, University of Delhi South Campus, New Delhi (Rs.1.5 lakh, national).
9. National conference on "Drug Discovery and Development" organized by Bioinformatics Centre, Sri Venkateswara College in association with Bioinformatics Centre, DISC, Department of Biochemistry, University of Delhi South Campus, 21st – 23rd January 2009 (Rs.1 lakh, national).
10. Special seminar on "Chemical Diversity in Biology" at S.P. Jain Auditorium, University of Delhi South Campus on September 18, 2013 (outstanding participant - Prof. P. Balaram, Director, IISc. Bangalore)

31. Code of ethics for research followed by the departments:

1. The students and faculty members observe very high standards in respect of ethics for publication, use of animals for research, biosafety etc. Any project involving **radioactivity is monitored by departmental radiation safety officer**. Every departmental member is regularly exposed to procedures to safeguard any type of malpractices.
2. All the laboratory supervisors ensure that the research work undertaken under their guidance and supervision is original. They also ensure that the work is carried out by the student(s) themselves. For writing the thesis/reports/scientific manuscripts the supervisors ensure that these are original writings. **Plagiarism** is avoided at all costs using appropriate softwares and alertness by supervisors.
3. It is also ensured that all research projects are routed through appropriate committees like Institutional Bio-safety Committee (IBSC) & Animal ethics committee and Institutional Ethics Committee.
4. The supervisors ensure that Good Microbiological Practices (GMP) and Good Laboratory Practices(GLP) are followed during research including the P3 level containment practices as and when appropriate.

32. Student profile programme-wise:

Name of the Programme (refer to question no. 4)	Applications received	Selected		Pass percentage	
		Male	Female	Male	Female
M.Sc. Biochemistry	260	02	20	100%	100%
M.Phil. Biotechnology*	160	Nil	06	N/A	N/A
Ph.D. Biochemistry	N/A[&]	11[$]	27[$]	N/A	N/A

** In collaboration with other departments of FIAS,* [$] Currently enrolled, [&] Currently there is no annual or biannual system. As per the existing ordinance VIB, students with fellowship are enrolled directly, and those with fellowship in the project are interviewed before enrollment.

33. Diversity of students:

Name of the Programme (refer to question no. 4)	% of students from the same university	% of students from other universities within the State	% of students from universities outside the State	% of students from other countries
M.Sc. Biochemistry	100%	0%	0%	0%
M.Phil. Biotechnology	0%	0%	100%	0%
Ph.D. Biochemistry	21% (8/38)	0%	79% (30/38)	0%

34. How many students have cleared Civil Services and Defence Services examinations, NET, SLET, GATE and other competitive examinations? Give details category-wise.

NET	:	28
GATE/NET (LS)	:	None
SLET	:	None
GATE	:	None

Other competitive examinations:

MNRE	:	None
CSIR	:	13
ICMR	:	02
DBT	:	03
UGC	:	09
DST	:	01

35. Student progression:

Student progression	Percentage against enrolled
UG to PG	8% join DU; remaining go to other Universities
PG to M.Phil.	Not Applicable
PG to Ph.D.	20% join DU; remaining go to other National & International Institutions
Ph.D. to Post-Doctoral	20-25%
Employed • Campus selection • Other than campus recruitment.	 Not Applicable 100%
Entrepreneurs	5%

36. Diversity of staff:

Percentage of faculty who are graduates	
of the same university	40%
from other universities within the State	Nil
from universities from other States	60%
from universities outside the country	Nil

37. Number of faculty who were awarded M.Phil., Ph.D., D.Sc. and D.Litt. during the assessment Period

None

38. Present details of departmental infrastructural facilities with regard to

a) **Library** **:** Departmental library receives 10 journals and has a collection about 200 books which are primarily used by M.Sc. students

b) Internet facilities for staff and students **:** All research laboratories, M.Sc. laboratories and classrooms and office are equipped with Internet Facilities

c) Total number of class rooms **:** Two

d) Class rooms with ICT facility **:** The classrooms are equipped with Desktop Computers, Internet Facilities and LCD Projectors

e) Students' laboratories **:** M.Sc. laboratories are equipped with modern instruments, Desktop Computer, overhead Projectors and Internet Facilities and have work benches to carry out experiments

f) Research laboratories **:** Research laboratories are equipped with various instruments related to specialization of the laboratories. All laboratories have state-of-art research facilities

39. List of doctoral, post-doctoral students and Research Associates (current)

a) from the host institution/university : 09

b) from other institutions/universities : 31

Prof. Anil K. Tyagi

Doctoral

1. Akshay Rohilla
2. Priyanka Chauhan
3. Rupangi Verma
4. Prachi Nangpal
5. Ritika Kar
6. Shingar Sharma
7. Swati Singh
8. Shubhita Mathur

Post-doctoral

1. Dr. Garima Khare (Research Scientist)

Prof. Vijay K. Chaudhary

Doctoral

1. Vaishali Verma
2. Shruti Bakshi
3. Shikha Singh
4. Charanpreet Kaur
5. Payal Grover
6. Kapil Mathur

Post-doctoral

1. Dr. Nimisha Shrivastava

Prof. Debi P. Sarkar

Doctoral

1. Sunandini Chandra
2. Mumtaz Khan
3. Nirmalya Ganguli

Prof. Prahlad C. Ghosh

Doctoral

1. Manendra Pachauri
2. Pooja Tiwari
3. Enna
4. Deepa Jha
5. Vandana
6. Vinoth Rajendran
7. Mohsin Raza

Dr. Suman Kundu

Doctoral

1. Amit Kumar
2. Sheetal Uppal
3. Manish Shandilya
4. Richa Arya
5. Sanjay Kumar Dey
6. Suneeta Basireddy
7. Pushpanjali Dasauni

Dr. Alo Nag

Doctoral

1. Rince John
2. Vaibhav Chand
3. Neha Jaiswal
4. Pallavi Singhal

Dr. Suneel Kateriya

Doctoral

1. Peeyush Ranjan
2. Mayanka Awasthi,
3. Meenakshi Tanwar

40. Number of postgraduate students getting financial assistance from the university

14

41. Was any need assessment exercise undertaken before the development of new programme(s)? If so, highlight the methodology

In the XIIth Plan, the Department has proposed to start a new M.Sc. course "Master of Science in "Translational Biochemistry"

42. Does the department obtain feedback from

a. faculty on curriculum as well as teaching-learning-evaluation? If yes, how does the department utilize the feedback?

The feedback of the faculty on curriculum is sought during the departmental meetings which are held almost every month. This is taken into account while the course revision is undertaken.

b. students on staff, curriculum and teaching-learning-evaluation and how does the department utilize the feedback?

The feedback of the students on curriculum is undertaken during discussions with the students especially during the project presentation by the final year students which are more mature and are ready to give good advice based on their experience to improve the syllabus and teaching methodology. This is taken into consideration during the curriculum revision.

c. alumni and employers on the programmes offered and how does the department utilize the feedback?

The alumni who are employed to teach Biochemistry course at undergraduate level in the Delhi University colleges regularly give feedback for improvement/revision of the curriculum.

43. List the distinguished alumni of the department (maximum 10)

Name	Designation	Address
Dr. Deepak Kaushal	Professor	Professor of Microbiology & Immunology, Tulane National Primate Research Center, 18703 Three Rivers Rd, Covington LA 70433
Dr. Alo Nag	Assoc. Professor	Dept. of Biochemistry, UDSC, New Delhi
Dr. Sanjay Gupta	Assoc. Professor	Jaypee Institute of Information Technology, NOIDA, UP
Dr. Siddhartha Jana	Assoc. Professor	Dept. of Biological Sciences, Indian Association of Cultivation of Science, Kolkata
Dr. Amita Gupta	Asstt. Professor	Dept. of Microbiology, UDSC, New Delhi
Dr. Ramandeep Singh	Asstt. Professor	THSTI, Gurgaon
Dr. Nisheeth Agrawal	Asstt. Professor	THSTI, Gurgaon
Dr. Ashima Kushwaha	Asstt. Professor	Indian Institute of Scientific Research, Gandhinagar
Dr. Vivek Rao	Scientist	Institute of Genomics and Integrative Biology, Mall Road, Delhi
Dr. Sandeep Saxena	Scientist	NII, New Delhi

44. Give details of student enrichment programmes (special lectures / workshops /seminar) involving external experts.

Name of External Experts	Designation& Address	Subject of Lecture
Dr. Sanjay Gupta	Assoc. Professor, Jaypee Institute of Information Technology, NOIDA, UP	Protein-interaction technologies
Dr. G. Balakrish Nair	Executive Director, THSTI, Gurgaon	From Genomes to Public Health : The cholera example
Dr. Purnananda Guptasharma	Professor, IISER Mohali	Protein Engineering
Dr. Satyajit Rath	Senior Scientist, NII, New Delhi	Cellular immunology
Dr. Anna George	Senior Scientist, NII, New Delhi	Cellular immunology
Dr. Vinita Bal	Senior Scientist, NII, N.Delhi	Molecular immunology

45. List the teaching methods adopted by the faculty for different programmes.

Teaching is carried out by a combination of the following:

a) PowerPoint lectures by teachers
b) Interactive discussion with students during the lectures
c) Periodic question-answer sessions during the classrooms teaching
d) Writing assignments given to students
e) Seminars by the students

46. How does the department ensure that programme objectives are constantly met and learning outcomes are monitored?

That the programme objectives are met is ensured by:

a) Taking feedback from the students
b) Periodic evaluation of the students
c) Monitoring the performance of the students during examinations
d) Departmental meetings

47. Highlight the participation of students and faculty in extension activities:

The faculty members regularly visit colleges of the University for interacting with undergraduate students, deliver lectures and seminars and teach specialized courses. The faculty members also deliver lectures in different institutions across the country. They also participate in workshops and share their research work in symposium and conferences.

The students of the department present posters and oral presentations in various national and international conferences. Senior students enrolled in post-graduate programme of University department visit their respective colleges to interact with their juniors.

48. Give details of "beyond syllabus scholarly activities" of the department.

1. Participation of the students in lectures/ seminars delivered by external experts in the department as well as in other departments.
2. Mandatory participation of the students in all Pre-Ph.D. seminars and Ph.D. *viva-voce* examinations in the department.
3. Participation of the students in activities like poster presentations, quiz, collage etc. during the science day function.
4. Participation of the students in seminars/workshops conferences being organized in the department.

49. State whether the programme/ department is accredited/ graded by other agencies? If yes, give details

No

50. Briefly highlight the contributions of the department in generating new knowledge, basic or applied.

One of the commendable contributions of the department has been the creation and sustenance of a rigorous, dynamic and vibrant master's programme in biochemistry that imparts conventional and new knowledge in an innovative way, which ensures that fresh, young minds are

trained and oriented to create newer knowledge in turn. The two-year full time programme is considered one of the best in the country as evidenced by the quality of students who complete this course and their achievements. They qualify national level examinations with ease and get absorbed into Ph.D. programmes in the best institutions worldwide.

The department has a rich tradition of an equally vibrant research programme in both basic and innovative applied research. While basic research has resulted in large number of publications in high impact journals, applied research has resulted in patents (both national and international) and also successful transfer of developed technologies to Indian industry, which converted the leads from the department into commercialized products. Notable examples of technologies transferred and commercialized are: (1) Liposomal Amphotericin B - commercialized by Life Care Innovations, Gurgaon.(2) Monoclonal antibodies to M13 phage protein - commercialized by M/s GE HealthCare (multinational). (3) Rapid test for HIV (AIDS) - commercialized by M/s Cadilla Pharmaceuticals Limited, Ahmedabad (4) Detection of *M. tuberculosis* in culture - transferred to M/s SPAN Diagnostics Limited, Surat and is likely to be available in the market shortly as the product has received approval from Drug Controller General of India. (5) Virosome Technology for targeted delivery – transferred to Pancea Biotech. India, New Delhi. Additionally, there are many leads in the area of vaccine and drug development, gene and drug delivery and diagnostics especially in relation to diseases like tuberculosis, malaria and jaundice/hepatisis, some of which are in clinical trials as well. Many of the faculty members are working in close collaboration with industry or institutions, which are responsible for taking leads to the next level in the process of products development.

The department is equally at ease in basic research for newer knowledge creation with potential for translation. Several research initiatives in mechanistic understanding of pathogenesis, host virus membrane fusion, liposomal and nanomaterial formulation, oncogenesis, photosignalling, amyloidosis, stability and structure-function relationship of proteins and others are ongoing. The department has also taken lead in whole genome sequencing of indigenous pathogens like *Mycobacterium indicus pranii*, which has opened up new horizon in understanding the evolution of pathogenesis in mycobacterial species and leprosy. It represented the first completed genome of a new species of bacteria published from India.

51. Detail five major Strengths, Weaknesses, Opportunities and Challenges (SWOC) of the department.

Strength:

1. Highly active research in the areas of frontiers of modern biology with special emphasis on human diseases. The emphasis is also laid on the translational aspect of the research work through interaction and participation of industry.
2. The M.Sc. programme in addition to theoretical knowledge provides considerable emphasis on the hand on experience in the fore-front areas of biochemistry through a dissertation based on research work and thesis writing.
3. Special emphasis on critical review of literature and presentation by way of training in seminars.
4. Very well equipped international standard laboratories
5. Financial support from FIST and UGC-SAP programme. Also, high level funding for research from funding agencies such as DBT, DST, UGC, ICMR and CSIR.

Weaknesses:

1. Space constraints to further expansion.
2. Shortage of grant for post-graduate teaching and departmental infrastructures.

Opportunities:

1. Emerging areas of translational biotechnology such as diagnostics strategies and development of kits for commercialization. Development of TB vaccines to channel into clinical trials, Gene delivery strategies for humans through virosomes and liposomes, development of new analogs of hemoglobins, Industrial interaction
2. Attracting industry for R&D collaborations.

Challenges:

1. Streamlining of commercialization of processes and products.

52. Future plans of the department.

Future plans of the department include elevation of its teaching and research performance to an even higher stratum that suits the dynamics of the changing times and caters to the emerging needs of the country. The department envisions the need to convert the classical knowledge of biochemistry into more meaningful deliverables required to alleviate human suffering in general. With the tremendous progress both academically as well as technically, the need to translate conventional knowledge into innovations for management as well as amelioration of human diseases will be emphasized. Hence, the department will expand its ongoing programme in the areas of diagnostics, prophylactics and therapeutics for diverse human diseases. While the existing tuberculosis, malaria and hepatisis research will continue, the department will venture into several other areas like cardiovascular diseases, cervical and breast cancer, ciliopathies, channelopathies, optogenetics, hemoglobinopathies and neurodegenerative diseases with research programme on innovations in mechanistic understanding, target identification and validation, small molecule and peptide screening and newer tools for diagnostics and prophylactics. The department will be committed to creation of manpower for both basic mechanistic investigations as well as applied translational aspects of human diseases. It will expand its scope through initiation of research projects in relevant areas, like hard-core immunology and systems biology, via newly appointed faculties to complement the existing strengths. The teaching curriculum will witness constant innovations and further hands-on knowledge.

Declaration by the Head of the Institution

I certify that that the data included in this Self-Study Report (SSR) are true to the best of my knowledge.

This SSR is prepared by the institution after internal discussions, and no part thereof has been outsourced.

I am aware that the Peer team will validate the information provided in this SSR during the peer team visit.

Signature of the Head of the Department

Place: New Delhi

Date: