Dr. KAILASH C PANDEY

Director

National Institute for Research in Environmental Health, India

Address: Head Department of Biochemistry,

National Institute for Research in Environmental Health,

Bhopal-INDIA, 462001

Phone: 91- 7552533106; 91- 7552533976

Cell; 91-11 8826712145

E-mail: kailash.pandey.nireh@gov.in

pandey.kailash70@gmail.com

http://www.researcherid.com/rid/H-5048-2011

DOB; 01.01.1970

EDUCATION

2002	Ph.D in Biotechnology, International Centre for Genetic Engineering and Biotechnology, New Delhi, affiliated with Jamia Hamdard University, INDIA
1996	M.Sc. in Biochemistry, Dr. Ram Manohar Lohia University, UP, INDIA
1994	Diploma in Chemical Processing Instrumentation & Control, Anna Malai Univ. INDIA
1991	P.G Diploma in Biotechnology, Delhi University, New Delhi, INDIA
1990	B.Sc. (Honors) in Biochemistry, Delhi University, New Delhi, INDIA

Employment

Oct.15-Present Scientist E, Head Dept. of Biochemistry, National Institute for Research in Environmental Health,

and National Institute of Malaria Research

2010-2015	Scientist (Prof. Ramalingaswami Fellow), National Institute of Malaria Research
2009-2010	Research Scholar (Wellcome Trust), University of Exeter, UK.
2006-2008	Associate Specialist III, University of California San Francisco, School of Medicine, Division of Infectious Disease, USA.
2004-2006	Associate Specialist II, University of California San Francisco, School of Medicine, Division of Infectious Disease, USA.
2002-2004	Visiting Post-Doctoral Scholar, University of California San Francisco, School of Medicine, Division of Infectious Disease, USA.
1996-1998	Research Assistant, International Centre for Genetic Engineering and Biotechnology, New Delhi
1992-1994	Research Assistance, National Institute of Immunology, New Delhi

Research Specialization: Proteases as Drug Targets and Protein Engineering (after Ph.D, 16 yrs. of experience)

Major Research Accomplishments

- Metacaspases, unusual proteases as drug target for malaria (Molecular Biochemical Parasitology. 2018).
- Allosteric inhibitor disrupting the activation of cysteine proteases of malaria parasite (Revised MS submitted in Scientific Report, 2018).
- Engineering nucleotide specificity without changing the binding site residues: the emerging role of Gatekeeper residues in drug discovery and enzyme evolution (Biochemistry, 2017).
- Identification of hot-spots based on protein-protein interactions in malarial cysteine proteases, and currently targeting them in anti-malarial chemotherapy (*PLoS One*, 2012 and PLoS One 2014).

- Discovered a new molecule named falstatin, an endogenous cysteine protease inhibitor in the human malaria parasite, which facilitates erythrocyte invasion (*PLoS Pathogen*, 2006).

- Discovered a hemoglobin binding domain in a major cysteine protease of human malaria parasite, *P. falciparum* (*PNAS,* 2005).

- Major contribution to find out structural basis for unique mechanisms of folding and hemoglobin binding by malarial cysteine protease as drug targets (*PNAS*, 2006 and *Structure* 2007).

- Discovered three independent domains for inhibition, refolding and activity of novel cysteine proteases of human malaria parasite as drug targets (*JBC*, 2004, *PLoS one* 2009).

- Characterization of erythrocyte binding proteins of malaria parasite as recombinant malaria vaccine candidates (*MBP,* 2002 and JBC, 2001).

- Developed a new technology in the field of protein folding. International patent for inventing methods for renaturation of polypeptide (European Patent Code: C07K14/445; and International Patent Code: C07K14/195).

Mentoring/ Teaching Experiences

Mentoring seven PhD students in the field of drug targets and study protein-protein interactions in malaria (2010-present).

Teaching B.Tech. Students; Techniques and fields covered in this course; Expression of recombinant protein in *E.coli,* Protein purification by Ion-exchange and affinity chromatography, analysis of antigen-antibody interactions by western blot analysis. Purification of antibody from serum. (ICMR-NIREH-SRM), 2017.

Swiss Government Excellence Fellowship to PhD student for working Rational Design of Thyroid Hormone Receptor as a Bio-recognition element; A computational approach (2017-2018).

Participated in mentors-students workshop on innovation projects, 2015-2016 (S.No. 311). Design, synthesis and Screening of silver Nano-Particles as Anti-malarial and Anti-bacterial agents, at NIMR and Srivenkeshwara College, Delhi University.

Mentoring Ph.D students and undergraduates in the field of Protein Chemistry at University of Exeter, UK, 2009-2010.

Teaching (Biochemistry) to San Francisco state high school students (4 months), and mentoring graduate students (5 months) from University of California Berkeley, USA, during 2007.

Mentoring Post–Doc fellows from University of California San Francisco in the field of protein chemistry, USA, 2004-2007.

Supervising summer trainees in the field of protein chemistry at International Center for Genetic Engineering and Biotechnology, New Delhi, INDIA, 1996-2002.

Honored as a group leader at international meeting for host-pathogen interaction organized by Tata Institute of Fundamental Research, Mumbai and green hill campus Mahabaleshwar, INDIA, 18-23 November, 2000.

Membership/Coordinator

Nominated member of American Chemical Society, 1155 Sixteenth Street, N.W, Washington, DC, 20036

Coordinator of seminar series at National Institute of Malaria Research, New Delhi (2010-2015).

Coordinator of seminar series at National Institute for Research in Environmental Health, Bhopal (2016-2018).

Member of International Society of Protistologists and the British Society for Protist Biology, 2009-2011.

Member of the Malaria Journal Club organized by University of California San Francisco, and University of California Berkeley, 2005-2008, USA.

Member of Bay Area Malaria Meeting organized by University of California San Francisco, University of California Berkeley and Stanford University, 2005-2008, USA.

Fellowships

Prof. Ramalingaswami fellowship for five year (2010-2016) by Department of Biotechnology, Govt. of India.

National eligibility fellowship for Lectureship/Assistant Professorship in Biochemistry by Agriculture Scientist Recruitment Board, New Delhi, Govt. of India, 1998.

Awards

- Traveling grant by International Society of Protistologists for joint meeting of the international society of
  Protistologists, University of KENT, Canterbury, 18-23 July, 2010, UK.
- Outstanding scientist in the field of Biochemistry by Venus International Foundation, 2015
- Bharat Excellence Award in the field of Protein Chemistry by Friendship Forum of India, 2015

Editorial responsibilities

- Review Editor; Pharmacogenetics and pharmacogenomics,
- Associate Editor; BMC Biochemistry
- Reviewer: PLoS One, Nature Scientific Report, JBC, Biochemistry, Biochemical Journal, PLoS
  Neglected Disease, Molecular Biochemical Parasitology, Malaria Journal, Parasitology today,
  BMC Biochemistry

Patents

International Patent:

- Invention of a method for polypeptide renaturation (erythrocyte binding protein of *P.vivax* and
  P.falciparum). European Patent Code: C07K14/445; and International Patent Code: C07K14/195.
  Inventors: Chetan E Chitnis., **Kailash C Pandey**., Singh S., Yazdani S., Pattnaik P., Date; 14 Feb. 2002.

Publications

1. Pant A, Kumar R, Wani NA, Verma S, Sharma S, Sharma R, Pande V, Saxena AK, Dixit R, Rai R, **Pandey KC*** (2018). Allosteric Site Inhibitor Disrupting Auto-processing of Malarial Cysteine Proteases. Revised MS submitted in **Scientific Report** (Nature Publishing group).

2. Vandana, Agam Prasad Singh, Jitendra Singh, Ruby Sharma**,** Mymoona Akhter, Ajay Saxena[4], Brijesh Rathi, Anju Katyal[5], Rajnikant Dixit, **Kailash C Pandey*** (2018). Metacaspase-2 (MCA-2): Functional characterization of potential modulator of programme cell death in *P. falciparum*, **Mol. Biochem. Parasitol,** 220, 28-41.

3. **Kailash C Pandey***, Sajal de, Praduyum K Mishra (2017) Role of proteases in chronic obstructive pulmonary disease**; Front. Pharmacol**. 8;1-9.

4. Pant A , Pasupureddy R , Pande V , Seshadri S , Dixit R , **Pandey KC** * (2017) Proteases in Mosquito Borne Diseases: New Avenues in Drug Development. **Curr Top Med Chem. 17(19):2221-2232.**

5. Verma S, Dixit R, **Pandey KC*** (2016) Cysteine Proteases; Mode of Activation and future Prospect as Pharmacological Targets. **Front. Pharmacol**. 2016 Apr 25;7:107. doi: 10.3389

6. Kapil Vashisht, Sonia Verma, Sunita Gupta, Andrew M Lynn, Rajnikant Dixit, Neelima Mishra, Neena Valecha, Karleigh A. Hamblin, Robin Maytum*, **Kailash C Pandey***, and Mark van der Giezen*

(2017). Engineering nucleotide specificity for Succinyl-CoA Synthetase of *Blastocystis*: The Emerging Role

of Gatekeeper Residues, **Biochemistry, 56, 334-542.**

6. Tanwee Das De, Punita Sharma, Tina Thomas, Deepak Singla, Sanjay Tevatiya, Seena Kumari, Charu Chauhan, Jyoti Rani, Vartika Srivastava, Ramandeep Kaur, **Kailash C. Pandey** and Rajnikant Dixit* (2018) Interorgan Molecular Communication Strategies of "Local" and "Systemic" Innate Immune Responses in Mosquito Anopheles stephensi, **Front. Immunol**. doi.org/10.3389/fimmu.2018.0014820.

7. Arpit Bhargava, Naven kumar Khare, Neha Bunkar, Koel chaudhary, **Kailash C Pandey**, Subodh kumar jain, Pradyumna Kumar mishra (2017). Cell free circulating epigenomic signatures; Non-invasive

Biomarker for cardio vascular and other age related chronic diseases. **Current Phamaceutical Design**, 2017, 23, 1-13.

8. Bhargava A, Bunkar N, Aglawe A, **Pandey KC**, Tiwari R, Chaudhury K, Goryacheva IY, Mishra PK (2017). Epigenetic biomarkers for risk assessment of particulate matter associated lung cancer. **Curr Drug Targets**. 10. doi: 10.2174/1389450118666170911114342.

9. Punita Sharma, Swati Sharma, Ashwani Mishra, Tina Thomas, Tanwee Das De, Suman Rohilla, Namita Singh, **Kailash Pandey et al., (**2015**).** Unraveling dual feeding associated molecular complexity of salivary glands in the mosquito Anopheles culicifacies. **BIOLOGY OPEN**/2015/012294.

10. Singh AK, Rajendran V, Pant A, Ghosh PC, Singh N, Latha N, Garg S, **Pandey KC** *et al* 2015. Design, synthesis and biological evaluation of functionalized phthalimides; a new class of anti-malarials and inhibitors of falcipain-2, a major hemogloninase of malaria parasite. **Bioorg. Med. Chem**. 2015,15:1817

10. Sharma P, Sharma S, Maurya RK, Das De T, Thomas T, Lata S, Singh N, **Pandey KC et al.** Hemocyte deep sequencing analysis of mosquito blood cells. **Gene** , 2016, 585, 177-90.

11. Srinivasan SUNDARARAJ, Ajay K. SAXENA, Kapil VASHISHT, Supriya SHARMA, Anup ANVIKAR, Rajnikant DIXIT, Philip J Rosenthal, **Kailash C. PANDEY* (2014).** Cross-Talk between Malarial Cysteine Proteases andFalstatin: The BC Loop as a Hot-Spot Target ***PLoS One*** 9(4), e93 008. Doi:10.1371.

12. Srinivasan Sundararaj, Deepak Singh, Ajay Saxena, Puran Sijwali, Rajnikant Dixit, **Kailash C. Pandey*** (2012). The Ionic and Hydrophobic Interactions are required for the Auto Activation of Cysteine Proteases of *Plasmodium falciparum* ***PLoS One*** **7(10): e47227. doi:10.1371.**

13 **Kailash C. Pandey*** (2011) Cysteine Proteases of Human Malaria Parasites (Invited Review Article/Centenary celebrations article, ***Journal of parasitic diseases***, 35, 94-103.

14. **Kailash C. Pandey***, Rajnikant Dixit (2012) Structure-function of Falcipains; malarial cysteine proteases. Invited review article, ***Journal of tropical Medicine,*** 345195: DOI: 10.155/2012/345195.

15.**. Pandey KC*.** Macromolecular Inhibitors of Malarial Cysteine Proteases (Invited review). ***Journal of***

Biomedical Science and Engineering2013; 6: 885-895.

16. **Kailash C. Pandey**, David T. Barkan, Andrej Sali, and Philip J. Rosenthal. Regulatory elements within the prodomain of falcipain-2, a cysteine Protease of the malaria parasite *Plasmodium falciparum*; ***PLoS One*** 2009, 27; 4 (5) e 5694.

17. **Pandey KC,** Singh N, Kapur SA, Bogyo M, Rosenthal PJ. Falstatin, a Cysteine Protease Inhibitor of *Plasmodium falciparum*, facilitates Erythrocyte Invasion. ***PLoS Pathogens***. 2006; 2: e117.

18**. Pandey KC,** Wang SX, Sijwali PS, Lau AL, Mckerrow JH, Rosenthal PJ. The *Plasmodium falciparum* cysteine protease falcipain-2 captures its substrate, hemoglobin, via a unique motif. ***PNAS***.2005; 102: 9138-9143.

19. Wang SX, **Pandey KC**, Somoza JR, Brinen LS, Sijwali PS, Kortemme T, Rosenthal PJ, Mckerrow JH. Structural basis for unique mechanisms of folding and hemoglobin binding by a malarial protease. ***PNAS***.2006; 103:11503-11508.

20. Wang SX, **Pandey KC**, Scharfstein J, Whisstock J, Huang RK et al., The structure of chagasin in complex with a cysteine protease clarifies the binding mode and evolution of an inhibitor family. **Structure**. 2007 May;15(5):535-43.

21. **Pandey KC**, Sijwali PS, Singh A, Na BK, Rosenthal PJ. Independent intramolecular mediators of folding, activity, and inhibition for the *Plasmodium falciparum* cysteine protease falcipain-2. ***J Biol Chem***. 2004; 279:348-3491

22. **Pandey KC**, Singh S, Pattnaik P, Pillai CR, Pillai U, Lynn A, Jain SK, Chitnis CE. Bacterially expressed and refolded receptor binding domain of *Plasmodium falciparum* EBA-175 elicits invasion inhibitory antibodies. ***Mol Biochem Parasitol***. 2002; 123:23-33.

23. Singh S, **Pandey KC**, Chattopadhayay R, Yazdani SS, Lynn A, Bharadwaj A, Ranjan A, Chitnis CE. Biochemical, biophysical, and functional characterization of bacterially expressed and refolded

receptor binding domain of *Plasmodium vivax* duffy-binding protein.***J Biol Chem***.2001, 6:17111-17116.

24. Dixit R, Rawat M, Kumar S, **Pandey KC**, Adak T, Sharma A. Salivary gland Transcriptome analysis in response to sugar feeding in malaria vector Anopheles stephensi; **J Insect Physiol.** 2011 Jul 20.

25 .Brijesh Rathi, Anil K. Singh , Ram Kishan, Neelu Singh, N. Latha, S. Srinivasan, **Kailash C Pandey** et al., (2013). Functionalized Hydroxyethylamine Based Peptide Nanostructures as Potential Inhibitors of Falcipain-3, an Essential Proteases of Plasmodium falciparum. ***Bioorganic & Medicinal Chemistry*.**2013; 17:5503-5509.

26. Punita Sharma, Swati Sharma, Rakesh Kumar Maurya, Tanwee Das De, Tina Thomas Suman Lata, Namita Singh, **Kailash C Pandey**et al., 2014.Salivary glands harbor more diverse microbial communities than gut in Anopheles culicifacies. ***Parasites & Vectors***, **7**:235 doi:10.1186.

27. Tina Thomas, Tanwee Das De, Punita Sharma, Sonia Verma, SumanRohilla, **Kailash C Pandey**, Rajnikant Dixit. Structural and functional prediction analysis of mosquito Ninjurin protein: Implication in the innate immune responses in *Anopheles stephensi.* ***International Journal of Mosquito Research***.2014; 1 (4): 60-65.

28. Sharma P, Sharma S, Mishra A, De TD, Thomas T, Verma S, Vandana K, Lata S, Singh N, P**andey KC**, Valecha N, Dixit R*(2014). Deep sequencing revealed plant like transcripts in mosquito A. culicifacies: an evolutionary puzzle. ***BioRvix:***http://dx.doi.org/10.1101/010009

29. ID Kerr, Lee JH, Farady CJ, Marion R, Rickert M, Sajid M, **Pandey KC**, Caffrey CR, Legac J, Hansell E, McKerrow JH, Craik CS, Rosenthal PJ, Brinen LS. Vinyl sulfones as Antiparasitic ***J Biol Chem***,2009, 38, 25697-703.

30. Kerr ID, Lee JH, **Pandey KC,** Harrision A, Sajid M, Rosenthal PJ, Brinen LS. Structure of falcipain- 2 and falcipain-3 bound to small molecule inhibitors: Implications for substrate specificity. ***J Med Chem***. 2009; (3) 852-7.

31. Naresh Singh, Puran S.Sijwali, **Kailash C Pandey** and Philip J Rosenthal. Biochemical characterization of the cysteine protease falcipain-2'. ***Experimental Parasitology***,2006; (3); 181-92.

32. Na BK, Shenai BR, Sijwali PS, Choe Y, **Pandey KC**, Singh A, Craik CS, Rosenthal PJ. Identification and biochemical characterization of vivapains, cysteine proteases of the malaria parasite *Plasmodium vivax*. ***Biochem J.*** 2004 ;378:529-538.

33.Pandey AV, Bisht H, Babberwal VK, Srivastava J, **Pandey KC**, and Chauhan VS. Mechanism of malarial haem detoxification inhibition by chloroquine. ***Biochem J.*** 2001; 355:333-338.

34. Chitnis C., Chatopadhya R., Okoyeh,J.N., **Pandey KC,** Ranjan A. and Singh S., A super family of Plasmodium proteins involved in erythrocyte invasion and cytoadherence: implications for malaria vaccine development. **The Immunologist** 1998, Suppl 1, 193.

35. C Chitnis, A Ranjan, S. Singh, **Pandey K**. Molecular interactions involved in red cell invasion by malarial parasites. **Transfusion Clinique et Biologigue** 1999, 6 (1), 60-61.

* **Corresponding author**

Invited Talks

Invited guest speaker at 11 th Symposium on Frontiers in Biomedical Research; Challenges in

Human Health; Diagnosis, Prevention and Care, Delhi Univ. 19-21 Feb. 2018

Invited talk at Molecular Parasitology meeting XIII, Marine Biological Laboratory Woods Hole, MA, USA, 2017.

Invited talk by PhD student at Molecular Parasitology meeting XIII, Marine Biological Laboratory Woods Hole, MA, USA, 2016.

Invited speaker at XI Joint Annual Conference of the Indian Society for Malaria and Other Communicable Diseases & Indian Association of Epidemiologists, Bengaluru, 10th -12th June, 2016

Invited speaker 5th Ramalingaswami Fellow's conclave at RCB, Faridabad, 18th -20th, 2015, India.

Invited speaker 2nd Ramalingaswami Fellow's Conclave at Kollam, Jan. 20-23, 2013, India

Invited speaker at National Conference-Cum- Workshop on "Search for Antimalarial: Mechanism Based Approach" organized by JNU and ICGEB, New Delhi, April, 27-30, 2012, India.

Invited speaker 1 st Ramalingaswami Fellow's conclave at Hyderabad, March 11-14, 2012, India.

Invited speaker at XI Symposium on Vectors and Vector Borne Diseases, organized by ICMR, India, Jabalpur, 15-17 Oct, 2011.

Invited speaker at International society of Protistologists and the British society for Protist Biology, University of KENT, Canterbury, 18-23 July 2010.

Guest speaker at School of Biological and Chemical Sciences, Queen Mary University of London, Mile End Road, London E1 4NS, UK, 2009

Guest speaker at School of Biosciences, Centre for Eukaryotic Evolutionary Microbiology, University of Exeter, Stocker Road, Exeter EX4 4QD, UK,2009.

Invited speaker at Malaria Research Centre, Indian Council of Medical Research, 22 Sham Nath Marg, Delhi-110054, India, 2008.

Bay area malaria meeting organized by University of California, San Francisco, University of California, Berkeley and Stanford University, 2006.

Annual meeting organized by GlaxoSmithKline, and UCSF: Malarial Cysteine Proteases as Drug Target: Olema Inn, Marine, CA, USA, 2006.

Annual meeting organized by GlaxoSmithKline and University of California San Francisco**,** Drug Discovery in Malaria, Olema Inn, Marine, CA, USA, 2005.

Molecular Parasitology meeting Marine Biological Laboratory Woods Hole, MA,USA, 2003 to 2006.

Workshop at International Conferences

1. Gordon Research Conferences for Proteolytic enzymes and their inhibitors, July 2006, New London, NH, USA.
2. Host-Pathogen Interaction Organized by Tata Institute of Fundamental Research, Mumbai and Green Hill Campus Mahabaleshwar, 18-23November, 2000, INDIA.
3. Workshop on High Performance Liquid Chromatography Organized by Sigma-Aldrich, 7-9 April, 1999 Bangalore, INDIA
4. The 10th International Congress of Immunology. 1-7 November, 1998 at New Delhi, INDIA
5. 2nd Global Meet on Parasitic Diseases. 18-22 August, 1997 at Hyderabad, INDIA

Book Chapter; Cysteine Proteases of Human Malaria Parasites by **Kailash C Pandey**; "Role of proteases in cellular dysfunction" volume 7, DOI 10.1007/978-14614-9233-7, page 121-134, edited by Dhalla N and Chakraborti S, Publisher Springer Science and Business Media New York, 2013.