

# SNEHA SUDHA KOMATH

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## Education

Ph.D. (1999), University of Hyderabad (Hyderabad), India

## Awards

National Women Bioscientists' Award, 2010  
UGC-Junior Research Fellowship/ Senior Research Fellowship  
Gold Medalist in Chemistry (M.Sc. Univ. of Hyderabad, 1991)  
Ranked all-India 4<sup>th</sup> in AISSE (1984)

## Broad Areas of Research Interest

GPI anchor biosynthesis in *Candida albicans*  
Enzymology and biophysical chemistry

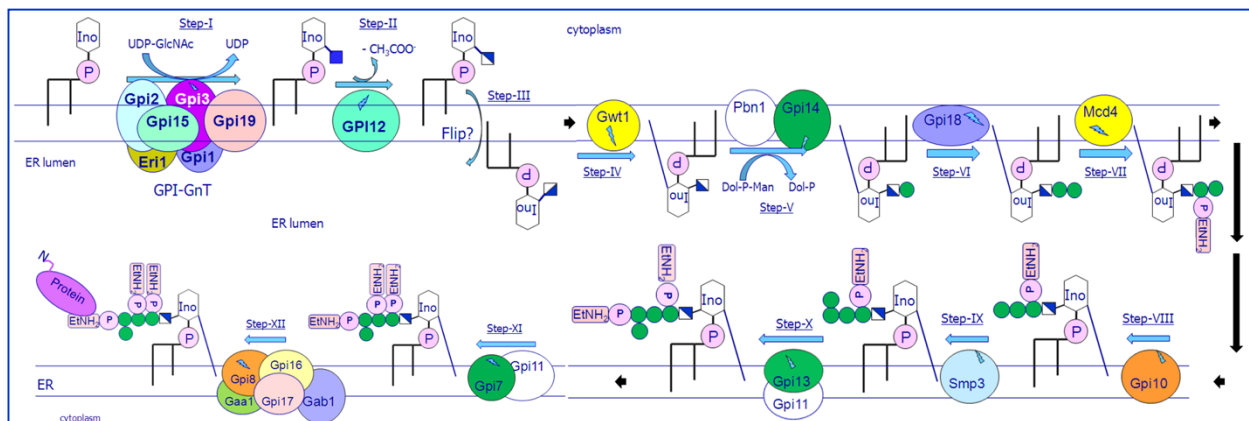
Book Chapter: 1

Publications in Peer-Reviewed Journals: 55

Ph.D students supervised (degree awarded): 17 (+1 submitted)

M. Phil: 1

## GPI Anchor Biosynthesis in Yeast and Fungi



The main focus of the lab currently is **glycosylphosphatidylinositol (GPI) anchor biosynthesis in the human pathogen, *C. albicans***. The GPI anchor is a complex glycolipid anchor that is ubiquitously present in eukaryotes. An elaborate pathway of roughly 10-12 steps works sequentially to produce the precursor GPI anchor in the endoplasmic reticulum. It is then

attached to the C-terminal ends of proteins that carry the GPI attachment signal sequence. A variety of proteins may be held by means of this anchor to the extracellular leaflet of the plasma membrane (and/ or cell wall). In lower eukaryotes the biosynthetic pathway leading to the formation of the complete GPI anchor is essential to the viability and functioning of the organism, making it an attractive drug target; in higher eukaryotes it is critical at certain stages of organismal development, such as in embryogenesis, but not at others.

My lab has been working **to understand the molecular details of this pathway**. This task is particularly challenging given that it involves mostly multi-subunit membrane-bound enzymes. There are no commercially available substrates for most steps of the pathway and assay protocols that are successful for one system do not always work for another system. Listed below are some of our major contributions to the field:

- We showed that the enzyme complex, involved in the first step of **GPI anchor biosynthesis in *C. albicans* is mutually co-regulated with ergosterol biosynthesis in the organism and is closely linked to Ras signalling/ hyphal morphogenesis and drug-response** in the organism. This has ramifications for controlling Candida infection and countering its drug-resistance. While controlling hyphal morphogenesis is seen as a key step towards controlling virulence in this pathogen, ergosterol and the sterol biosynthetic pathway are the most important targets for therapeutic intervention in controlling Candida infections. Current work in the lab is focused on better understanding the intra-subunit cross-talk as well as the mechanisms of the cross-talk of this step with ergosterol biosynthesis and Ras signaling in *C. albicans vis-à-vis S. cerevisiae*.
- We are also interested in comparing the active site of the enzyme involved in the second catalytic step of the pathway, the de-*N*-acetylation of GlcNAc-PI, between organisms. We showed that the *E. histolytica* de-*N*-acetylase is a close homologue of the yeast enzyme and exhibits a **unique metal-independent general acid-base pair catalytic mechanism**. In contrast the *C. albicans* homologue shows metal-dependent activity in cell-free systems. Current work is focused on studying the *C. albicans*, *S. cerevisiae* and mammalian enzymes.
- We have studied the first mannosyltransferase step in *C. albicans* and the role of *CaGPI14*. We showed that the gene affects growth and hyphal morphogenesis in the organism. Hyphal morphogenesis is inhibited due to an upregulation of the *HOG1* pathway in *Caipi14* mutant cells.
- A third line of enquiry in my lab is focused on understanding the GPI transamidation step and the role of signal sequences in GPI anchor attachment. We have chosen the *C. albicans* Als5 protein, an adhesin involved in host recognition, for these studies. We showed that the GPI anchor attachment signal sequence in the Als5 adhesin of *C. albicans* not only directs GPI anchor attachment but also **holds the precursor protein in a conformation that minimizes aggregation and reduces functionality**. We have gone on to provide a rationale for this alteration in conformation. This work provides a new paradigm for understanding the importance of signal sequences for GPI anchored proteins. Current work in this project is focused towards better understanding the minimal characteristics of a GPI anchor

attachment signal sequence that the transamidase can correctly process for GPI-attachment and to understand whether recognition by the transamidase involves sequence or conformational specificity.

### **Some new research tools developed:**

- The first *in vitro* assay for studying GPI biosynthetic activity in *C. albicans* microsomes.
- A protocol for expression and purification in high yields of functional de-*N*-acetylase from the GPI biosynthetic pathway.
- Protocols for purification and *in vitro* assay of the catalytic activity of GPI-de-*N*-acetylases from different organisms.
- Protocols for expression, purification and *in vitro* analyses of full-length fungal adhesins.
- Protocols for study of membrane dynamics in fungal cells using FCS.
- Protocol for the study of GPI anchored membrane proteins on the cell surface.
- Mass spectrometric analysis of GPI anchor intermediates in *C. albicans*.
- A cell free assay for the GPI transamidase in *C. albicans*.

### **Research Publications** (\* Corresponding Author)

1. Yadav U, Rai T, Sethi SC, Chandraker A, Khan M, **Komath SS\***. 2018. Characterizing *N*-acetylglucosaminylphosphatidylinositol de-*N*-acetylase (CaGpi12), the enzyme that catalyzes the second step of GPI biosynthesis in *Candida albicans*. **FEMS Yeast Res.** Manuscript accepted for publication. (<https://doi.org/10.1093/femsyr/foy067>)
2. Jain P, Sethi SC, Pratyusha VA, Garai P, Naqvi N, Singh S, Pawar K, Puri N, **Komath SS\***. 2018. Ras signaling activates glycosylphosphatidylinositol anchor biosynthesis via the GPI-*N*-acetylglucosaminyl transferase (GPI-GnT) in *Candida albicans*. **J Biol Chem.** 2018 Jun 15. pii: jbc.RA117.001225.
3. **Komath SS\***, Singh SL, Pratyusha VA, Sah SK. 2018. Generating anchors only to lose them: The unusual story of glycosylphosphatidylinositol anchor biosynthesis and remodeling in yeast and fungi. **IUBMB Life.** 2018 May;70(5):355-383. doi: 10.1002/iub.1734. Critical Review.
4. Pratyusha VA, Victoria GS, Khan MF, Haokip DT, Yadav B, Pal N, Sethi SC, Jain P, Singh SL, Sen S, **Komath SS\***. 2018. Ras hyperactivation versus overexpression: Lessons from Ras dynamics in *Candida albicans*. **Sci. Rep.** 2018 Mar 27;8(1):5248. doi: 10.1038/s41598-018-23187-8.
5. Singh SL and **Komath SS\***. 2017. Fluorescently Labelled Aerolysin (FLAER) Labelling of *Candida albicans* Cells. **Bio-protocol** 7(11): e2303. DOI: 10.21769/BioProtoc.2303.
6. Singh SL, Rai RC, Sah SK, **Komath SS\***. 2016. The catalytic subunit of the first mannosyltransferase in the GPI biosynthetic pathway affects growth, cell wall integrity and hyphal morphogenesis in *Candida albicans*. 2016. **Yeast.** Aug;33(8):365-83. doi: 10.1002/yea.3179.
7. Gupta M, Mazumder M, Dhatchinamoorthy K, Nongkhlaw M, Haokip DT, Gourinath S, **Komath SS**, Muthuswami R. 2015. Ligand-induced conformation changes drive ATP hydrolysis and function in SMARCAL1. **FEBS J.** 282(19):3841-59. doi: 10.1111/febs.13382.
8. Shah AH, Rawal MK, Dhamgaye S, **Komath SS**, Saxena AK, and Prasad R. 2015. Mutational Analysis of Intracellular Loops Identify Cross Talk with Nucleotide Binding Domains of Yeast ABC Transporter Cdr1p. **Sci. Rep.** 5:11211. doi: 10.1038/srep11211.

9. Pawar K, Yadav A, Prasher P, Mishra S, Singh B, Singh P and **Komath SS\***. 2015. Identification of an indole-triazole-amino acid conjugate as highly effective antifungal agent. *Journal Article Med. Chem. Commun.* Online Manuscript doi: 10.1039/C5MD00156K.
10. Ahmad MF, Mann PG and **Komath SS\***. 2015. A Signal with a Difference: The role of GPI anchor signal sequence in dictating conformation and function of the Als5 adhesin in *Candida albicans*. *Adv. Exp. Med. Biol.* 842:147-163. doi: 10.1007/978-3-319-11280-0\_10. (Invited article)
11. Anshuman, Singh SL, Yadav B and **Komath SS\***. 2014. *Saccharomyces cerevisiae* Gpi2, an accessory subunit of the enzyme catalyzing the first step of glycosylphosphatidylinositol (GPI) anchor biosynthesis, selectively complements some of the functions of its homolog in *Candida albicans*. *Glycoconj. J.* 31(6-7):497-507. doi: 10.1007/s10719-014-9536-8. (Invited article)
12. Yadav B, Bhatnagar S, Ahmad MF, Jain P, Pratyusha VA, Kumar P, **Komath SS\***. 2014. First step of glycosylphosphatidylinositol (GPI) biosynthesis cross-talks with ergosterol biosynthesis and Ras signaling in *Candida albicans*. *J Biol Chem.* 289(6):3365-82. doi: 10.1074/jbc.M113.528802. Epub 2013 Dec 19.
13. Pooja, Parasher P, Singh P, Panwar K, Vikramdeo KS, Mondal N, **Komath SS\***. 2014. Synthesis of amino acid appended indoles: Appreciable anti-fungal activity and inhibition of ergosterol biosynthesis as their probable mode of action. *Eur. J. Med. Chem.* 80: 325-339.
14. Ashraf M, Sreejith P, Yadav U and **Komath SS\***. 2013 Catalysis by N-acetyl-D-glucosaminylphosphatidylinositol de-N-acetylase (PIG-L) from *Entamoeba histolytica*: New roles for conserved residues. *J. Biol. Chem.* 288:7590-7595. doi: 10.1074/jbc.M112.427245. Epub 2013 Jan 22.
15. Rawal MK, Khan MF, Kapoor K, Goyal N, Sen S, Saxena AK, Lynn AM, Tyndall JDA, Monk BC, Cannon RC, **Komath SS**, and Prasad R. 2013. Insight into PDR ABC pump drug transport through mutagenesis of Cdr1p transmembrane domains. *J. Biol. Chem.* 288(34):24480-93. doi: 10.1074/jbc.M113.488353. Epub 2013 Jul 3.
16. Victoria GS, Yadav B, Hauhnaar L, Jain P, Bhatnagar S and **Komath SS\***. 2012. Mutual Co-Regulation Between GPI-N-acetylglucosaminyl Transferase and Ergosterol Biosynthesis in *Candida albicans*. *Biochem. J.* 443(3):619-25.
17. Ahmad MF, Yadav B, Kumar P, Puri A, Mazumder M, Ali A, Samudrala G, Muthuswami R, and **Komath SS\***. 2012. The GPI anchor signal sequence dictates the folding and functionality of the ALS5 adhesin from *Candida albicans*. *PLoS One* 7(4):e35305.
18. Dutta P, Tanti GK, Sharma S, Goswami SK, **Komath SS**, Mayo MW, Hockensmith JW, Muthuswami R. 2012. Global Epigenetic Changes Induced by SWI2/SNF2 Inhibitors Characterize Neomycin-Resistant Mammalian Cells. *PLoS One* 7(11):e49822.
19. Nongkhilaw M., Gupta M., **Komath S. S.** and Muthuswami R. 2012. Motifs Q and I are required for ATP hydrolysis but not for ATP binding in SWI2/SNF2 proteins. *Biochemistry* 51(18):3711-22.
20. Ashraf M, Yadav B, Sreejith, Kumar KS, Vats D, Muthuswami R and **Komath SS\***. 2011. The N-Acetyl-D-glucosaminylphosphatidylinositol de-N-acetylase from *Entamoeba histolytica*: Metal alters catalytic rates but not substrate affinity. *J. Biol. Chem.* 286: 2543-2549.
21. Singh P, Verma P, Yadav B, **Komath SS\***. 2011. Synthesis and evaluation of indole-based new scaffolds for antimicrobial activities-Identification of promising candidates. *Bioorg Med Chem Lett.* 2011 Jun 1;21(11):3367-72.
22. Victoria GS, Kumar P and **Komath SS\***. 2010. The *Candida albicans* homolog of PIG-P: Gene dosage and role in growth and filamentation. *Microbiology.* 156, 3041-3051.
23. Singh P, Kaur J, Yadav B and **Komath SS\***. 2010. Targeting efflux pumps—*In vitro* investigations with acridone derivatives and identification of a lead molecule for MDR modulation. *Bioorg. Med. Chem.* 18:4212–4223.

24. Pandey, G., Fatma, T., Cowsik, S. M. and **Komath SS**\* 2009. Specific interaction of jacalin with phycocyanin, a fluorescent phycobiliprotein. *J. Photochem. Photobiol. B. Biol.* 97(2):87-93.
25. Pandey, G., Fatma, T and **Komath SS**\* 2009. Specific interaction of the legume lectins, concanavalin A and peanut agglutinin, with phycocyanin. *Photochem. Photobiol.* 85(5):1126-33.
26. Singh P, Kaur J, Yadav B and **Komath SS**\*. 2009. Design, synthesis and evaluation of acridone derivatives using *Candida albicans*- Search for MDR modulators led to identification of an anti-candidiasis agent. *Bioorg. Med. Chem.* 17(11):3973-9. Epub 2009 Apr 18.
27. Nongkhlaw M, Jha DK, Hockensmith, JW, **Komath SS**\* and Muthuswami R.\* 2009. Elucidating the mechanism of DNA-dependent ATP hydrolysis mediated by DNA-dependent ATPase A, a member of the SWI2/SNF2 protein family. *Nucleic Acid Research* 37(10):3332-41. Epub 2009 Mar 26.
28. Oswal N, Sahni NS, Bhattacharya A, **Komath SS**\*, Muthuswami R.\* 2008. Unique motifs identify PIG-A proteins from glycosyltransferases of the GT4 family. *BMC Evol Biol.* Jun 4;8:168.
29. Rai V, Gaur M, Kumar A, Shukla S, **Komath SS** \*, Prasad R.\* 2008. A novel catalytic mechanism for ATP hydrolysis employed by the N-terminal nucleotide-binding domain of Cdr1p, a multidrug ABC transporter of *Candida albicans*. *Biochim Biophys Acta. (Biomembranes)* 1778(10):2143-53.
30. Rai V, Gaur M, Shukla S, Shukla S, Ambudkar SV, **Komath SS** and Prasad R. 2006. Conserved Asp327 of Walker B motif in the N-terminal Nucleotide Binding Domain (NBD-1) of Cdr1p of *Candida albicans* has acquired a new role in ATP hydrolysis. *Biochemistry.* 45(49):14726-39.
31. **Komath SS**\*, Kavitha M, Swamy MJ.\* 2006. Beyond carbohydrate binding: New directions in plant lectin research. *Org Biomol Chem.* 4(6):973-88. **Most downloaded paper of the month.**
32. Prasad R, Gaur NA, Gaur M and Komath SS. 2005. Efflux Pumps in Drug Resistance of *Candida*. *Infect Disord Drug Targets.* 6(2):69-83.
33. Saini P, Prasad T., Gaur NA, Shukla S., Jha S, Komath SS., Khan LA, Haq QMR and Rajendra Prasad. 2005. Alanine scanning of transmembrane helix 11 of Cdr1p ABC antifungal efflux pump of *Candida albicans*: identification of amino acid residues critical for drug efflux. *J Antimicrob Chemother.* 56:77-86.
34. Rai V, Shukla S, Jha S, **Komath SS**\* and Prasad R.\* 2005 Functional characterization of N-terminal nucleotide binding domain (NBD-1) of a major ABC drug transporter Cdr1p of *Candida albicans*: Uncommon but conserved Trp326 of Walker B is important for ATP binding. *Biochemistry.* 44: 6650-6661.
35. Kenoth R, **Komath SS** and Swamy MJ. 2003. Physicochemical and saccharide-binding studies on the galactose-specific seed lectin from *Trichosanthes cucumerina*. *Arch. Biochem. Biophys.* 413(1):131-138.
36. Manoj N, Jeyaprakash AA, Pratap JV, **Komath SS**, Kenoth R, Swamy MJ, Vijayan M. 2001. Crystallization and preliminary X-ray studies of snake gourd lectin: homology with type II ribosome-inactivating proteins. *Acta Crystallogr. D Biol. Crystallogr.* 57:912-9144.
37. **Komath SS**, Kenoth R. Swamy MJ. 2001. Thermodynamic analysis of saccharide binding to snake gourd (*Trichosanthes anguina*) seed lectin. Fluorescence and absorption spectroscopic studies. *Eur J Biochem.* 268:111-119.
38. **Komath SS**, Bhanu K, Maiya BG and Swamy MJ. 2000. Binding of porphyrins to jacalin [jack fruit (*Artocarpus integrifolia*) agglutinin]. Absorption and fluorescence spectroscopic investigations. *Biosci. Rep.* 20:265-276.
39. **Komath SS**, Kenoth R, Giribabu L, Maiya BG and Swamy MJ. 2000. Fluorescence and absorption spectroscopic studies on the interaction of porphyrins with snake gourd (*Trichosanthes anguina*) seed lectin. *J. Photochem. Photobiol. (B. Biology)* 55:49-55.

40. Chaudhary A, Vasudha S, Rajagopal K, **Komath SS**, Garg N, Yadav M, Mande SC and Sahni G. 1999. Function of the central domain of streptokinase in substrate plasminogen docking and processing as revealed by site-directed mutagenesis. *Protein Science*, 8:2791-2805.
41. Padma P, **Komath SS**, Nadimpalli SK and Swamy MJ. 1999. Purification in high yield and characterisation of a new galactose-specific lectin from the seeds of *Trichosanthes cucumerina*. *Phytochemistry*, 50: 363-371.
42. **Komath SS** and Swamy MJ. 1998. Fluorescence quenching, time resolved fluorescence and chemical modification studies on the tryptophan residues of snake gourd (*Trichosanthes anguina*) seed lectin. *J. Photochem. Photobiol.(B. Biology)* 50:108-118.
43. Padma P, **Komath SS**, Swamy MJ. 1998. Fluorescence quenching and time-resolved fluorescence studies on the *Momordica charantia* (bitter gourd) seed lectin. *Biochem. Mol. Biol. Int.* 45(5), 911-920.
44. **Komath SS**, Nadimpalli SK. and Swamy M J. 1998. Identification of histidine residues in the sugar binding site of snake gourd (*Trichosanthes anguina*) seed lectin. *Biochem. Mol. Biol. Int.* 39(2):243-252.
45. **Komath SS** and Swamy MJ. 1998. Further characterisation of the saccharide specificity of snake gourd (*Trichosanthes anguina*) seed lectin. *Current Science*, 75(6): 608-611.
46. Bhanu K, **Komath SS** and Swamy MJ. 1997. Interaction of porphyrins with concanavalin A and pea lectin. *Current Science*. 73(7):598-602.
47. Ramakrishnan M, **Komath SS**, Sheeba V and Swamy MJ. 1997. Differential scanning calorimetric studies on the thermotropic phase transitions of dry and hydrated forms of *N*-acylethanolamines of even chainlengths. *Biochim. Biophys. Acta.* 39(2):243-252.
48. **Komath SS**, Nadimpalli SK and Swamy MJ. 1996. Purification in high yield and characterisation of the galactose-specific lectin from the seeds of snake gourd (*Trichosanthes anguina*). *Biochem. Mol. Biol. Int.* 39(2):243-252.
49. Vijayadamodar GV, **Komath SS**, Roy S and Bagchi B. 1994. Dielectric relaxation in dipolar solid rotator phases. *Phase Transitions*. 50:21-45.
50. Roy S, **Komath SS** and Bagchi B. 1993. Molecular theory of ultrafast solvation in liquid acetonitrile. *J. Chem. Phys.* 99(4):3139-3058.
51. **Komath SS** and Bagchi B. 1993. Solvation dynamics in a Brownian dipolar lattice. Comparison between computer simulation and various molecular theories of solvation dynamics. *J. Chem. Phys.* 98(11):8987-8993.
52. Roy S, **Komath SS** and Bagchi B. 1993. Dielectric friction and solvation dynamics: novel results on relaxation in dipolar liquids. *Proc. Indian Acad. Sci. (Chem. Sci.)*. 105(1): 79-85.
53. Chattopadhyay A, **Komath SS** and Raman B. 1992. Aggregation of lasalocid A in membranes: a fluorescence study. *Biochim. Biophys. Acta.* 1104:147-150.

### **Book Chapter (peer-reviewed)**

54. **Komath SS\***, Ahmad FA and Mazumder M. 2013. Cloning, expression and functional characterization of Als5, an adhesin from *Candida albicans*. Protein Purification and Analysis – Methods and Applications. ISBN: 978-1477555-05-7. iConcept Press. (invited)

### **Popular Science Commentary:**

55. **Komath SS\***. 2008. Frames of science? *Current Science* 94(11): 1363-64.

## Funded Research Projects (as Principal Investigator)

### Current Projects:

1. GPI transamidase in *Candida albicans*. Department of Biotechnology (DBT), India (Dec 2017-2020).
2. Tailoring glycosylphosphatidylinositol substrates and substrate mimetics to study the GPI biosynthetic pathway and modulate host-pathogen interactions. Funded by Department of Science and Technology, India (March 2015-2018 extension by 6 months).
3. Analysis of the GPI anchor signal sequence of the Als5 adhesin in *Candida albicans*. Funded by University with Potential for Excellence grant received by JNU (2014- 2019).

Other funding support under Umbrella Projects:

1. DST-PURSE
2. UGC-RNW

Project proposals under review: Two

### Research Supervision

#### MPhil/ PhD Research

	Name	Enrolled	Degree awarded	Present Address
1.	Dr. Ramesh C. Rai	2003	2010	Project Scientist, Immunology group; International Centre for Genetic Engineering and Biotechnology, Aruna Asaf Ali Marg, New Delhi, India-110067 E mail: <a href="mailto:rairamesh@gmail.com">rairamesh@gmail.com</a>
2.	Dr. Pravin Kumar (co-supervised by Dr. Rohini Muthuswami)	2004	2010	U.G.C. Dr. D.S. Kothari Post Doctoral Fellowship Mentor: Prof. Madan Mohan Department of Plant Molecular Biology University of Delhi South Campus New Delhi-110021 E mail: <a href="mailto:csirpravin@gmail.com">csirpravin@gmail.com</a> <a href="mailto:pravin_dbt@yahoo.co.in">pravin_dbt@yahoo.co.in</a>
3.	Dr. Mohammad Ashraf Khan	2005	2013	C/o Sub-Divisional Agricultural Officer Pahalgam, Headquarter-Mattan (Near Poultry Project Office) , District-Anantnag Jammu And Kashmir -192125. e-mail: <a href="mailto:ashraf912001@yahoo.com">ashraf912001@yahoo.com</a>
4.	Dr. Guiliana Victoria Soraya	2006	2011	Post-doctoral fellow Membrane Traffic and Pathogenesis Unit Institut Pasteur 25-28 Rue du Docteur Roux,75015 Paris, France
5.	Dr. Bhawna Yadav	2007	2013	Post-doctoral Fellow, Fungal Research Group School of Medical Sciences Institute of Medical Sciences, Foresterhill University of Aberdeen Aberdeen AB25 2ZD UK

6.	Usha Yadav	2010	2016	Research Associate, Delhi University
7.	Priyanka Jain	2010	2016	NA
8.	Snehlata Singh	2011	2017	SRF, TERI, New Delhi
9.	Pratyusha Vavilala	2011	2017	Assistant Prof. (ad hoc) DU
10.	Pareeta Gajraj	2011	2017	Lecturer, Jyoti Vidyapeeth Women's University
11.	Anshuman	2012	2014 M. Phil.	Continuing research for Ph.D.
12.	Tarun K. Rai	2012	deregistered	
13.	Anshuman	2014	continuing	
14.	Shazia Parveen	2013	deregistered	
15.	Anupriya Chandarker	2013	continuing	
16.	Sudisht Sah	2013	2018 submitted	
17.	Pramitha Garai	2014	continuing	
18.	Subhash Chandra Rai	2015	continuing	
19.	Shailja Shefali	2017	continuing	

### Co-supervision of Ph. D. students registered in JNU

	Name	Degree awarded	Co-Supervisor
1.	Versha Rai	2007	Prof. Rajendra Prasad
2.	Lalremruata Haunhar	2013	Dr. Rohini Muthuswami
3.	Sudhuman Singh	2013	Prof. Biren Mallick

### Co-supervision of Ph. D. students registered outside JNU

	Name	Degree awarded	Co-supervisor	Institution at which registered
4.	Jatinder Kaur	2009	Dr. Palwinder Singh	GNDU, Amritsar
5.	Md. Faiz Ahmad	2012	Prof. Anwar Alam	Jamia Milia Islamia University
6.	Gunjan Pandey	2012	Prof. Tasneem Fatma Prof. S. M. Cowsik	Jamia Milia Islamia University
7.	Kalpana Pawar	2017	Prof. Balwinder Singh	Uttarakhand Technical University

### Masters dissertation for students registered in JNU

	Name	YEAR
1.	Lakshman	2003-04
2.	Soraya	2004-05
3.	Yukti Aggarwal	2005-06
4.	Nidhi	2005-06
5.	Sutirtha Datta	2006-07
6.	Shailesh Kumar	2008-09
7.	Aditi Verma	2010-11
8.	Pooja Sanduja	2011-12
9.	Mukesh Kumar	2011-12
10.	Anupama Yadav	2011-12
11.	Rohini Datta	2012-13
12.	Shikha Srivastava	2014-15
13.	Shafaque Zahra	2016-17
14.	Punnag Som	2018-19



**Other short-term project students/ technical assistants/project fellows\***

<b>YEAR</b>	<b>Name</b>
2008	Priyanka Kumari, Roxy Vats, Gowhar Ahmad Bhat
2009	Pooja Joshi, Kokila S Kumar, Aditi Nelly
2010	Farheen Mirza, Ankita Dasgupta, Chetna Sai, Thomas Sarah Babu,
2011	Sujeet Kumar, Sugandha Singh, Safir Ahmad, Shilpi Bhatnagar, Lavanya Nambiar, Shefali Gupta
2012	Kiran Bora, Tilak Kumar Gupta, Sudhanshu Mudgal, Md. Abdul Yaseen
2014	Suad, Deepanshi
2015	Sanjana Ailani, Jasleen Kaur, Roshni Gupta, Dr. Namita Rokana (SRF 2015-16); Dr. Dominic T. Haokip (RA 2015-16)
2016	Sonali Singh (Project Assistant 2016-2018)
2017	Rajnandan
2017	Sree Lakshmi
2017	Dr. Saquib Mahmood; Yashica Adhlakha

**\*Please bring to my notice any errors/ omissions in this list**

**Lab assistants:** Deepak Kumar; Ved Prakash