Welcome to the Laboratory of

Nuclear Receptor Biology and Gene Expression



Two PhD positions are available in the lab for 2021-22

**Dr. Vikas Yadav; PhD**

Assistant Professor

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**Qualifications**

* Ph.D (2007): School of Life Sciences, Jawaharlal Nehru University, New Delhi, India.
* M.Phil (2003): School of Life Sciences, Jawaharlal Nehru University, New Delhi, India.
* M.Sc (2001): School of Life Sciences, Jawaharlal Nehru University, New Delhi, India.

**Grants (ongoing)**

1. Ramalingaswami fellowship (until 2022)
2. UGC Start-up Grant (2022-2025)

**Area of Interest/Specialization**

* Molecular and Cellular Biochemistry
* Nuclear receptor signaling and transcriptomics of vascular diseases and diabetes
* Molecular events during host-pathogen interactions

**Research Experience/Employment**

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| Feb 2020- | Assistant Professor and Ramalingaswami Fellow | School of Life Sciences; Jawaharlal Nehru University, New Delhi, India |
| Aug 2016-Jan 2020 | Assistant Professor and Ramalingaswami Fellow | Department of Biochemistry, Central University of Haryana, Mahendergarh, Haryana, India |
| Jan 2016-July 2016 | Ramalingaswami Fellow | Center for Biomedical Sciences and Bioengineering, Indian Institute of Technology (IIT), Indore, MP, India |
| Feb 2011-April 2015 | Postdoctoral Fellow (Senior) | Center for Metabolic and Degenerative Diseases, University of Texas-Medical School, Houston, Texas, USA |
| Nov 2009-Jan 2011 | Research Fellow in Medicine | Division of Medical Oncology, Dana-Farber Cancer Institute, Harvard Medical School, Boston, MA, USA |
| May 2007-Oct 2009 | Research Associate | Department of Biomedical Engineering, Tufts University, Medford, MA, USA |

**Award/Prize/Certificate/Fellowships**

1. 2019: Visiting Scientist ; University of Texas, Houston, USA.
2. 2017: Young Scientist Award; Society of Biological Chemists (SBC), India.
3. 2015: Ramalingaswami Re-entry Fellowship: Department of Biotechnology, Govt of India.
4. 2014: Best oral presenter; University of Texas, Houston, Texas, USA.
5. 2014: Certificate in “Research Ethics and Teaching Skills”; University of Texas, Houston, Texas, USA. (two year certificate course).
6. 2001 and 2002: CSIR-NET (JRF) qualified (two times).

**PhD Guidance/Supervision**

1. Dr. Alok Singh: Identification, Isolation and Characterization of Phosphatases in Root Entophyte Fungus *Piriformospora indica.* School of Life Science, JNU. 2018. (**As a co-supervisor)**.

**Publications**

1. Puja Yadav, Nayun Kim, Monika Kumari, Shalini Verma, Tarun Sharma, **Vikas Yadav**, and Amit Kumar. (**2021**). G-Quadruplex Structures in Bacteria: Biological Relevance and Potential as Antimicrobial Target. **Journal of Bacteriology**. 233(13): e00577-20. (IF: 3.8)
2. Danesh Sopariwala, Likhite Nea, **Vikas Yadav**, Vihang Narkar. (**2021**). Estrogen-related receptor α is involved in angiogenesis and skeletal muscle revascularization in hindlimb ischemia. **The FASEB Journal**.35 (5): e21480. (IF: 5.8)
3. Pooja Sanduja, Manish Gupta, Vikas Kumar Somani, **Vikas Yadav**, Abhinay Sharma, Rakesh Bhatnagar and Atul Kumar Johri. (**2020**) Cross-serotype protection against Streptococcus pyogenes: role of SPy\_2191 as a universal vaccine candidate. **Nature Communications**. 11(1): 1- 11. (IF: 13.8)
4. Puja Yadav, Shalini Verma, Atul Kumar Johri, **Vikas Yadav**, Barbara Spellerberg. (**2020**). Deciphering Streptococcal Biofilms. **Microorganisms**. 8 (11), 1835. (IF: 4.4)
5. Neah Likhite, **Vikas Yadav**, Eric J Milliman, Danesh H Sopariwala, Sabina Lorca, Nithya P Narayana, Megha Sheth, Erin L Reineke, Vincent Giguère, Vihang Narkar. (**2019**). Loss of Estrogen-Related Receptor Alpha Facilitates Angiogenesis in Endothelial Cells. **Molecular and Cellular Biology (MCB)**. 39: e00411-18. (IF: 4.2)
6. Raksha R Bhat, Puja Yadav, Debashish Sahay, Dharmendra K Bhargava, Chad J Creighton, Sahar Yazdanfard, Ahmed Al-Rawi, **Vikas Yadav**, Lanfang Qin, Sarmistha Nanda, Vidyalakshmi Sethunath, Xiaoyong Fu, Carmine De Angelis, Vihang A Narkar, C Kent Osborne, Rachel Schiff, Meghana V Trivedi. (**2018**). GPCRs profiling and identification of GPR110 as a potential new target in HER2+ breast cancer. **Breast Cancer Research and Treatment**. 170:279–292. (IF: 3.9)
7. Danesh H Sopariwala, **Vikas Yadav**, Pierre-Marie Badin, Neah Likhite, Megha Sheth, Sabina Lorca, Isabelle K Vila, Eun Ran Kim, Qingchun Tong, Min Sup Song, George G Rodney, Vihang A Narkar. (**2017**). Long-term PGC1β over expression leads to Apoptosis, Autophagy and Muscle Wasting. **Scientific Report. 7: 10237.** (IF:4.7)
8. **Vikas Yadav**, Himanshi, Nayun Kim, Narendra Tuteja, Puja Yadav. (**2017**). G Quadruplex in Plants: A Ubiquitous Regulatory Element and Its Biological Relevance. **Frontiers in Plant Science.** 8: 1163-1168. (IF: 4.4)
9. Pierre-Marie Badin, Isabelle K Vila, Danesh H Sopariwala, **Vikas Yadav**, Sabina Lorca, Katie Louche, Eun Ran Kim, Qingchun Tong, Min Sup Song, Cedric Moro, Vihang A Narkar. (**2016**). Exercise-like effects by Estrogen-related receptor-gamma in muscle do not prevent insulin resistance in db/db mice. **Scientific Report. 6: 26442.** (IF: 4.7)
10. Atul K Johri, Ralf Oelmüller, Meenakshi Dua, **Vikas Yadav**, Manoj Kumar, Narendra Tuteja, Ajit Varma, Paola Bonfante, Bengt L Persson, Robert M Stroud. (**2015**). Fungal association and utilization of phosphate by plants: Success, limitations and future prospects.  **Frontiers in Microbiology.** 16;6:984 (IF: 4.5)
11. **Vikas Yadav**, Antonios Matsakas, Sabina Lorca, Vihang A Narkar. (2014). PGC1β activates an antiangiogenic program to repress neoangiogenesis in muscle ischemia. **Cell Reports** 2014, 8: 783–797. (IF: 9.5)
12. Meghana V Trivedi, Raksha Bhat, **Vikas Yadav**, Puja Yadav, A Al-Rawi, P Christiny, S Nanda, M Giuliano, C Creighton, CK Osborne, VA Narkar, R Schiff. (**2013**). GPR110 overexpression increases tumorigenic potential of HER2+ breast cancer cells. **Cancer Research.** 73; 24S (IF: 7.5)
13. Antonios Matsakas, **Vikas Yadav**, Sabina Lorca, Vihang Narkar. (**2013**). Muscle ERRγ mitigates Duchenne muscular dystrophy via metabolic and angiogenic reprogramming. **The FASEB** **J.** (10): 4004-16. (IF: 5.8)
14. Vikas Yadav, Lin Sun, Bruce Panilaitis, David L Kaplan. (**2013**). In vitro chondrogenesis with lysozyme susceptible bacterial cellulose as a scaffold. **Journal of Tissue Engineering and Regenerative Medicine.** (IF: 4.2)
15. Antonios Matsakas, **Vikas Yadav**, Sabina Lorca, Ronald M Evans, Vihang A Narkar. (**2012**). Revascularization of ischemic muscle by estrogen related receptor gamma**. Circulation Research.** 110(8): 1087-96. (IF: 14.8)
16. **Vikas Yadav**, Bruce Panilaitis, Hai Shi, Keiji Numuta, Kyongbum Lee, David L Kaplan. (**2011**). N-acetyl glucosamine deacetylase (NagA) requires for N-acetyl glucosamine assimilation in *Gluconacetobacter xylinus*. **PLoS ONE**. (IF: 3.4)
17. Balajikarthick Subramanian, Wei-Che Ko, **Vikas Yadav**, Teresa M DesRochers, Ronald D Perrone, Jing Zhou, David L Kaplan. (**2011**). Abnormal Matrix Interactions Regulate Cystogenesis in a Tissue Engineered Kidney Disease System. **Biomaterials.** 33(33):8383-94. (IF: 9.5)
18. Manoj Kumar, **Vikas Yadav**, Hemant Kumar, Ruby Sharma, Archana Singh, Narendra Tuteja, Atul Kumar Johri. (**2011**). *Piriformospora indica* enhances plant growth by transferring phosphate. **Plant Signalling and Behaviour.**  6(5): 723-725. (IF: 2.5)
19. **Vikas Yadav**, Bruce J Paniliatis, Hai Shi, Kyongbum Lee, Peggy Cebe, David L Kaplan. (**2010**). A novel in vivo-degradable cellulose-chitin copolymer from metabolically engineered *Gluconacetobacter xylinus*. **Applied and Environmental Microbiology.** 76(18):6257-65. (IF:4.5)
20. Manoj Kumar, **Vikas Yadav**, Narendra Tuteja, Atul Kumar Johri. (**2009**). Antioxidant enzyme activities in maize plants colonized with *Piriformospora indica*. **Microbiology**, 155:780-90. (IF:2.5)

**Chapter in Books**

1. **2005**: Prasad R, Pham GH, Kumari R, Singh A, **Yadav V**, Sachdev M, Peskan T, Hehl S, Oelmuller R and Varma A. Sebacinaceae: Culturable Mycorrhiza-like Endosymbiotic Fungi and their interaction with Non-transformed and Transformed Roots. In: In Vitro Culture of Mycorrhizas, Soil Biology. (ed Declerck S) Springer-Verlag, Germany, Volume 4, Part V, 291-312.
2. **2004: Yadav V**, Malla R, Singh A, Pham GH and Varma A. Friendly fungi abate the stress. Vistas in Palaeobotany and Plant Morphology : Evolutionary and Environmental Perspectives (Professor D.D. Pant Memorial Volume) Edited by P.C. Srivastava, U P Offset, lviii, 484.
3. **2004: Yadav V**, Verma P K and Varma A. Phosphorus Metabolism and Regulation in Symbiotic Fungi. In: Basic Research and Applications: Mycorrhiza (Eds Podila G and Varma A) IK International- India and Kluwer academic Press, Holland. pp. 111-139.
4. **2003:** Kumari R, Pham G H, Prasad R, Sachdev M, Srivastava A, **Yadav V**, Verma P K, Sharma S, Malla R, Singh A., Maurya A K , Prakash S, Pareek A., Rexer K-H, Kost G, Garg A P, Oelmueller R, Sharma M C and Varma A. Piriformospora indica: Fungus of the Millenium. In: Basic Research and Applications: Mycorrhizae (eds Podila G and Varma A) IK International- India, New York and Kluwer academic Press, Holland, pp 259-295.
5. **2002:** Malla R, Singh A, Zeyaullah M.D, **Yadav V**, Varma A and Rai, M. Piriformospora indica and plant growth promoting rhizobacteria: an appraisal. In: Rao, G.P.; Manoharchari, C.; Bhat, D.J.; Rajak, R.C. and Lakhanpal, T.N. eds. Frontiers of Fungal Diversity in India (Prof. Kamal Festscrift). International Book Distributing Co. Lucknow, India, pp. 401-419

**Invited Talks in Conferences/Symposia**

1. **Vikas Yadav:** Long Term Muscle Specific Expression of PGC1β is associated with Muscle wasting and Aging. **International Symposium titled “Emerging Areas in Biosciences and Biomedical Technologies (eBBT). Jan 6th-7th 2018;** Center for Biosciences and Biomedical Engineering (BSBE); Indian Institute of Technology, Indore, Indore, MP
2. **Vikas Yadav:** The Nuclear Receptor Co-activator PGC1β Blocks the Neo-Angiogenesis in Peripheral Vascular Disease (PVD). **86th Conference of Society of Biological Chemists, Nov 16th -19th 2017, JNU, New Delhi.**

**Membership of Scientific Organizations**

1. Association of Microbiologist of India (AMI) (Life Member): since 2019
2. Society of Biological Chemists (SBC), India (Life Member): since 2017
3. American Society for Microbiology (ASM); USA: 2009
4. Biomedical Engineering Society (BMES), USA : 2009

**Other Achievements**

1. Successfully organised a GIAN course entitled **‘Cerebral Blood Vessels in Health and Disease: Translations Insights’.** From 16th April 2018 to 20th April 2018. Central University of Haryana, Mahendergarh. Prof. Itender Singh; PhD. Assistant Professor; Department of Neurological Surgery; Washington University School of Medicine, St. Louis was expert faculty.
2. As an Instructor, Recombinant DNA Techniques Laboratory Course (BME 163-A). Department of Biomedical Engineering, Tufts University, Medford MA. This course includes lecture and laboratory exercise to familiarize the student with methods employed to produce recombinant DNA and its downstream applications.

**Research Description**

 Nuclear receptors (NRs) are a superfamily of transcription factors that induce or repress gene transcription in response to specific stimuli. Upon binding with ligand or coactivator (CoA), nuclear receptors undergo a conformational change that promotes an exchange of co-regulatory proteins that regulate the transcription rate of specific target genes. During the past two and half decades, a large number of "orphan" nuclear receptors have been identified whose cognate ligands were not initially known. The physiological and pathophysiological role of these orphan receptors is largely unknown. The Estrogen related receptors (ERR) are the orphan nuclear receptors that have been identified in early 2000. The ERR family comprise of three nuclear receptors ie, ERRα, ERRβ and ERRγ. Both ERRα and ERRγ are demonstrated to be linked to the mitochondrial biogenesis, fatty acid oxidation, angiogenesis, and slow-twitch contractile myofibers in skeletal muscles. PGC1α and PGC1β acts as co-activator (CoA) while RIP140, NCOR1 are the co-repressors (CoR) of many nuclear receptors including members of ERR family. Upon binding to metabolic signals and/or co-activators, the ERRs modulate an overlapping network of genes that control critical metabolic responses including fatty acid oxidation and synthesis, lipid transport, adipogenesis, mitochondrial biogenesis, oxidative metabolism, angiogenesis. Thus, nuclear receptors are both sensors and effectors in metabolic pathways and might be critical to the development of metabolic diseases such as diabetes and obesity. Given these biological activities and their inherent ability to respond to low-molecular weight ligands, nuclear receptors represent ideal targets for the development of novel therapies for common metabolic disorders. Our laboratory is actively engaged to explore the therapeutic/protective role of Nuclear receptor and their co-activators in metabolic diseases and neuroinflammatory diseases. The primary areas of research in the laboratory are to explore the molecular events led by nuclear receptors in following diseases:

* **Vascular complications and endothelial cell dysfunction associated with metabolic diseases i.e, diabetes.**
* **Role of nuclear receptor coactivator PGC1β in autophagy and muscle mass regulation (Sarcopenia).**
* **Role of nuclear receptors in Inflammatory diseases ie., Osteoarthritis; Atherosclerosis.**