



## BIOCHEMISTRY SEMINAR

### *Modulation of Eicosanoid Metabolism by Selenium and Selenoproteins: Implications for Resolution of Inflammation and Myeloid Leukemia*



Cyclopentenone prostaglandins (CyPGs) are a class of bioactive lipid molecules derived from the metabolism of arachidonic and eicosapentaenoic acids. These are polyunsaturated fatty acids that serve as a precursor for the synthesis of various signaling molecules, including prostaglandins. The alkylidene cyclopentenone structure in these prostaglandins distinguishes them from other prostaglandins, imparting unique biological activities. These CyPGs have been implicated in a range of physiological and pathological processes, such as resolution of inflammation, cell proliferation, and apoptosis. Studies in our laboratory demonstrated an intriguing role of selenoproteins, particularly selenoprotein w (Selenow) in regulating their endogenous production through “eicosanoid class switching” particularly in macrophages during inflammatory events thereby facilitating resolution of inflammation. We have explored the therapeutic potential of selenium-induced endogenous and exogenous CyPGs in various inflammatory diseases, including colonic inflammation and hematologic malignancies, given their involvement in intricate cellular signaling pathways that will be presented here. Understanding the precise mechanisms and functions of selenium and CyPGs may pave the way for novel therapeutic interventions targeting inflammatory and oxidative stress-related pathologies.

Dr. K. Sandeep Prabhu is a Professor of Immunology and Molecular Toxicology and Department Head of Veterinary & Biomedical Sciences at The Pennsylvania State University in University Park, PA, USA. He received his B.Sc., M.Sc., and Ph.D. degrees in Biochemistry from the University of Mysore, India. Dr. Prabhu conducted post-doctoral research in the Center for Molecular Toxicology, Department of Veterinary and Biomedical Sciences at The Pennsylvania State University from 1998-2002. In 2002, he joined the faculty ranks in the same department and promoted to Full Professor in 2014. From 2017-2020, he served as the Co-Leader of the Mechanisms of Carcinogenesis Program at the Penn State Cancer Institute. In 2019, he took charge as the department head. His research group comprising of undergraduate, graduate, and post-doctoral fellows is focused on the understanding of the molecular actions of trace element selenium and endogenous bioactive lipid mediators in inflammation and cancer, with an emphasis on myeloid leukemias. Key findings from his laboratory include the molecular characterization of eicosanoid class switching in immune cells and the redox control of polyunsaturated fatty acid (arachidonic and eicosapentaenoic acids) metabolism to novel bioactive cyclopentenone lipids. In addition, his group demonstrated the ability and underlying molecular mechanisms of selective targeting of cancer stem cells in myeloid leukemias. Funding for his research program has been from the National Institutes of Health as well as private entities such as American Institute of Cancer Research and Campbell Foundation. Dr. Prabhu teaches undergraduate courses in Immunotoxicology (VBSC 451) and Pharmacology (VBSC 438), and a graduate level course on Prostaglandins and Leukotrienes (VBSC 514/NUTR 514). He has mentored over 100 undergraduate research trainees and 25 PhD students. Some of his scholarly recognitions include two gold medals-Professor of Biochemistry and Professor M. Shadaksharaswamy Gold Medals at the University of Mysore for graduating top of the class in BSc and MSc courses, Elected Fellow (Biological Sciences) of the American Association for the Advancement of Science (AAAS; 2017), Young Investigator Award by the Eicosanoid Research Foundation, Invited Speaker at Center for Experimental Therapeutics and Reperfusion Injury of Harvard Medical School, Editorial Board Member of Frontiers in Nutritional Immunology, and Associate Editor of Nutrition Journal, Government of India (Ministry of Human Resources & Development) GIAN Fellowship Award (2017), Penn State Research Innovator Award (2013), memberships on grant peer-review committees of the National Institutes of Health (NIH), and General Secretary, 18th International Trace Element Conference (TEMA-18) that was held in Bengaluru (2024). Dr. Prabhu has 10 issued patents and two under review, and is a co-founder of two startup pharma/biotech companies to commercialize IP developed in his laboratory.

**Kumble Sandeep Prabhu Ph.D**  
**Pennsylvania State University**

**FRIDAY**

**April 24, 2026 @4:00**

**219 BRL**

