

We propose Professor Muthu Periasamy as a candidate to receive the Poulsson prize in basic pharmacology 2019.

Muthu Periasamy received his Master's degree in Zoology with distinction from the University of Madras in India and an M.Phil. degree in Life Sciences from Jawaharlal Nehru University in New Delhi. With a fellowship from the Government of France he obtained his PhD in Biochemistry at the Université de Montpellier, France. Thereafter he pursued his extensive post-doctoral research training: molecular biology of muscle at Albert Einstein's college of Medicine and molecular cardiology at Boston children's Hospital/Harvard Medical School. He completed faculty appointments including Assistant and Associate Professor in the Department of Molecular Physiology and Biophysics at the University of Vermont, before becoming Professor and Director of Molecular Cardiology at the University of Cincinnati. In 2001 he was appointed Professor and Chair for the Department of Physiology & Cell Biology at Ohio State University, where he played a prominent role in building a thematic research program in Cardiac Muscle Physiology. As of 2018, he works as a Professor at Department of Internal Medicine, College of Medicine, University of Central Florida/Sanford Burnham Prebys Medical Discovery Institute at Lake Nona.

Over the years, Professor Periasamy has served on a number of university and advisory committees, including the role of President of the Associate of Chairs of Physiology Departments and Chair of National Institutes of Health (NIH)/American Heart Association (AHA) study committees. Furthermore, he has been awarded numerous competitive grants for his research endeavors, exceeding a total of \$17,000,000. He has also been awarded the AHA Established Investigator Award and been recipient of a number of honors and fellowships.

Professor Periasamy's research interests are ageing, sarcopenia, diabetes, and metabolism. He is interested in identifying pathways that could prevent obesity and diabetes in humans. His research is focused on skeletal muscle, which represents 40% of body mass and burns approximately 80% of the glucose and fat we consume. Current research projects include muscle-based thermogenesis, recruitment of skeletal muscle based non-shivering thermogenesis in health and disease and Ca^{2+} -regulation of the ryanodine receptor.

Professor Periasamy's laboratory has identified a novel protein in muscle named sarcolipin (SLN) that regulates the Ca^{2+} ion transport ATPase (SERCA), which uses ATP for Ca^{2+} transport. Interestingly, SLN binding to SERCA results in uncoupling of SERCA activity (promotes futile cycling of SERCA) but increases ATP demand for Ca^{2+} transport. SLN uncoupling of SERCA increases local Ca^{2+} and promotes Ca^{2+} entry into mitochondria, stimulating oxidative phosphorylation/fatty acid metabolism. Studies using genetically engineered mouse models for SLN have revealed that SLN regulates thermogenesis and energy metabolism; loss of SLN leads to cold intolerance and diet-induced obesity, whereas SLN overexpression in muscle resists against diet-induced obesity. Therefore, research is currently focused on understanding the role of SLN in whole-body metabolism and obesity. The ultimate goal is to identify targets and

develop novel therapeutics to increase energy expenditure in muscle so that we can prevent obesity and its associated health problems.

Professor Periasamy has been a pioneer in the SLN/SERCA work, leading to research focus on the SERCA pump for other researchers, including in Norway. Currently a PhD student, led by professor Arild C. Rustan at the Department of Pharmacy, University of Oslo, is investigating how energy metabolism in human skeletal muscle cells is affected by modification of SERCA pump activity.



Arild C. Rustan
Professor
Department of Pharmacy
University of Oslo



Jenny Lund
Postdoc
Department of Pharmacy
University of Oslo



Abel M. Mengeste
PhD-student
Department of Pharmacy
University of Oslo