Biographical Sketch of Leon Collis

Dr. Leon Collis is a research associate level scientist at the Marine Biological Laboratory (MBL) in Woods Hole (MA) and has been an active member within the biological research community for 12 years. He has published in numerous high-impact peer-reviewed scientific journals and has presented his findings at national meetings. Dr. Collis earned his B.Sc. in Biology from Lancaster University, located in England, his home country. He consequently received his Ph.D. in Biology from the University of Rhode Island in Kingston (RI) in 2002, where he studied the physiology of invertebrate cardiac muscle. Prior to joining the MBL, Dr. Collis worked for 3 years as a post-doctoral fellow at the NYU School of Medicine, New York, NY, where he studied the developmental changes in β-adrenergic regulation of the heart.

Leon's current research involves studying the bioenergetics of single, excitable cells using novel technologies. His work involves close collaborations with investigators from the National Institute of Aging (NIH) and Yale University. In order to identify potential therapeutic targets for the remodeling of damaged heart, it is imperative to have a full understanding of the pathways that govern the progression of apoptosis. Preliminary studies have found a decrease in oxygen consumption but paradoxically higher ATP levels in neurons that overexpress the anti-apoptotic protein, Bcl-$_{xL}$. On the basis of these observations, he is addressing the hypothesis that Bcl-$_{xL}$ promotes an increase in coupling of oxidative phosphorylation in the heart, which in part may explain the cardioprotective role of Bcl-$_{xL}$ during ischemia. Concomitant assessment of metabolic parameters using non-invasive electrochemical sensors and imaging of fluorescent and luminescent probes are being used to assess the degree of metabolic coupling, and thus metabolic efficiency in the diseased heart.

Leon is also involved with projects dedicated to development of electrochemical probes. Maintaining the probe position adjacent to a cell is vital to the long-term monitoring of extracellular chemical gradients. By combining scanning ion conductance technologies with the self-referencing microsensor, it is anticipated that both the position of the sensor can be assessed and corrected for, while providing information on cell topography. During the instrument-development phase, an emphasis will be placed on ease of function and automation of the device since the overall aim will be to provide a user-friendly electrochemical detection system for visiting scientists. Leon is also currently engaged in furthering the development of high signal:noise ion-selective electrodes, so that single ion channel events can be assessed non-invasively from primary cultures of excitable cells.