Institute of Molecular and Cell Biology
A*STAR

SEMINAR ANNOUNCEMENT

We would like to invite you to attend this seminar hosted by Dr. Adrian Teo:

Date: 23 July 2018, Monday

Time: 11:00AM – 12:00PM

Venue: Level 3, IMCB Seminar Room 3-46, Proteos, Biopolis

Speaker: Prof. Guy Rutter, Section of Functional Genomics, Department of Medicine, Imperial College London, United Kingdom

Title: Pancreatic beta cell pacemakers

Persistently elevated levels of glucose and fatty acids are known to contribute to failed insulin secretion during the development of Type 2 diabetes. We have shown that glucolipotoxic conditions impair cell-cell communication ("connectivity") to impair insulin secretion. Recently we have combined optogenetics and rapid Ca^{2+} imaging across the islet syncytium to demonstrate that a subset (~5%) of beta cells ("hubs") coordinate the activity of "follower" cells. Photo-painting using a light sensitive-RFP revealed that hub cells are enriched for glucokinase, but show low levels of Nkx6.1 and insulin gene expression. These cells also display enhanced mitochondrial membrane potential in response to high glucose. Interrogation of single β cell RNASeq data confirms the existence of a subset of cells with a similar transcriptomic configuration. Hub cells are unusually susceptible to metabolic stresses including high fatty acid/glucose levels, and cytotoxic cytokines, suggesting that they may be targeted in diabetes. Since deletion of GWAS genes for diabetes including *ADCY5* and *TCF7L2* affect cell-cell communication, future work will explore the possibility that genes at other *loci*, including *STARD10* also act in part by altering hub cell-led β cell connectivity. Recent findings exploring the existence of β cell sub-populations in islets in the living animal, including zebra fish and after engraftment into the anterior chamber of the mouse eye, will also be discussed.

Biography:

After studying for a PhD in Bristol with Dick Denton FRS on mitochondrial Ca^{2+} signalling, I subsequently worked on the pancreatic β-cell as an MRC travelling Fellow with Claes Wollheim in Geneva. There, working collaboratively with Tullio Pozzan and Rosario Rizzuto in Padua, I established new approaches to exploring the control of insulin release at the single cell level through the use of recombinant target probes and other techniques. I then returned to Bristol, becoming a full Professor of Biochemistry in 2002, and moved to Imperial College in 2006. My current research is supported by Wellcome Trust Senior Investigator and Royal Society Wolfson Merit Awards, by UK Research Council and Diabetes UK grants, as well as by the European Commission Innovative Medicines Initiative in Diabetes (IMIDIA).