


**BOSCH INSTITUTE
DISTINGUISHED
LECTURE**

Date Thursday, 5 May 2016
Time 1.00 - 2.00 pm
Venue Norman Gregg LT
Edward Ford
Building
University of Sydney



THE UNIVERSITY OF
SYDNEY

Speaker Professor Peter Thorn
Title Beta cell function within the islets of Langerhans
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Peter Thorn is Professor and Chair of Cardiovascular Physiology at the University of Sydney. He received his PhD from Edinburgh University in 1987 and since then has pursued a career studying the mechanisms of stimulus-secretion coupling. Post-doctoral training with Ole Petersen at Liverpool University led to a number of papers that described the structure and function of local calcium signals induced by inositol trisphosphate. These experiments provided some of the first evidence for compartmentalised calcium responses, a paradigm that is now dogma in the field of second messenger signalling.

Peter took up a faculty position at the Babraham Institute in 1994 and then at the Department of Pharmacology in Cambridge in 1996. Peter was a visiting Professor at the University of California Irvine in 2003. Over this time his focus was on epithelia cell biology and the study of the mechanisms that control granule fusion. In 2006 he moved to the University of Queensland, Australia where he build a high-speed multiphoton microscope for use in the study of the final steps of granule fusion.

Peter joined the University of Sydney in 2015 and leads a team at the Charles Perkins Centre studying the regulation of insulin secretion in pancreatic beta cells. He has a track record of using innovative imaging methods to study cell behaviour and is applying these to the understanding of how insulin secretion is controlled within the native environment of the islets of Langerhans.



Title: **Beta cell function within the islets of Langerhans**

The loss of control of insulin secretion is recognised as a causal factor in type 2 diabetes and many current treatments target the insulin secreting beta cells in an attempt to increase their secretory output. However, these treatments usually only temporarily restore blood glucose levels and new approaches are therefore needed. Further understanding as to how insulin secretion is regulated could lead to new therapeutic targets and strategies to prevent the disease.

Work studying beta cell function has led to remarkable progress in understanding how glucose regulates secretory output. But most of this work has been conducted on isolated cells which we have known for a long time do not recapitulate the extent or kinetics of insulin secretion seen from intact islets of Langerhans where thousands of beta cells, and other cell types, are closely-packed into a micro-organ.

To fully understand the control of insulin secretion, therefore, we need methods to record from single cells within the islet. We have developed and refined a number of methods that are enabling us to do just that, and image beta cells within the intact architecture of the islets that includes the complex capillary bed. This lecture will present evidence that insulin secretion from pancreatic beta cells is targeted towards the islet capillaries. It will discuss the idea that the beta cells may possess synaptic like mechanisms that regulate insulin secretion and the implications of this for our understanding of type 2 diabetes.