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TEMASEK LIFESCIENCES LABORATORY

25 September 2015 (Friday), 11am
The Auditorium (Level 1)
Hosted by: Dr KOH Tong-Wey

Systems-genetics approaches to identify functional gene targets for complex disease

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Dr Enrico Petretto obtained his degree in Physical Chemistry in 1998 and then moved into computational modeling, specializing in statistical genetics during his MSc and then during the PhD (2003). In 2009, he becomes Senior Lecturer in Genomic Medicine at Imperial College London and in 2012 Tenured Track at the MRC Clinical Science Centre where he led the Integrative Genomics and Medicine Group. In November 2014 he has moved to Singapore where he holds a full-time appointment as tenured Associate Professor at Duke-NUS Graduate Medical School, within the Cardiovascular and Metabolic Disorders Section and the Centre for Computational Biology. He has established a research program in Systems-Genetics, which is centred on network approaches to determine the consequences of multiple genetic and epigenetic variants on cellular phenotypes, complex traits and disease.

Traditional genetics strategies such as GWAS or WES have provided limited insights into functional gene targets for complex disease. Instead of continuing to evaluate single-gene associations to predict gene targets, we have developed a Systems-Genetics approach for the identification of genes, pathways and networks that underlie common human diseases. Systems-Genetics identified functional gene targets, including EBI2 regulating an anti-viral expression network and type 1 diabetes risk (Nature 2010), KCNN4 regulating cell-multinucleation and inflammatory disease (Cell Reports 2014) and SESN3 regulating a proconvulsant transcriptional program in human epileptic hippocampus (Nature Communications 2015).

Recent Publications:

1. M Heinig*, **E Petretto*,** C Wallace, L Bottolo, M Rotival, H Lu, Y Li, R Sarwar, SR Langley, A Bauerfeind, O Hummel, Y Lee, S Paskas, C Rintisch, K Saar, J Cooper, R Buchan, EE Gray, JG Cyster, Cardiogenics Consortium, J Erdmann, Ch Hengstenberg, S Maouche, WH Ouwehand, CM Rice, NJ Samani, H Schunkert, AH Goodall, H Schulz, H Roider, M Vingron, S Blankenberg, T Münzel, T Zeller, S Szymczak, A Ziegler, L Tiret, DJ Smyth, M Pravenec, TJ Aitman, F Cambien, D Clayton, JA Todd, N Hubner, SA Cook. A trans-acting locus regulates an anti-viral expression network and type 1 diabetes risk. Nature 2010 467:460-4.
2. H Kang, A Kerloc'h, M Rotival, X Xu, Q Zhang, Z D'Souza, M Kim, J Carlson Scholz, JH Ko, PK Srivastava, T Rossetti, JR Genzen, W Cui, TJ Aitman, L Game, JE Melvin, A Hanidu, J Dimock, J Zheng, D Souza, A Behera, G Nabozny, HT Cook, D Bassett, GR Williams, J Li, A Vignery, **E Petretto** and J Behmoaras. Kcnn4 is a regulator of macrophage multinucleation in bone homeostasis and inflammatory disease. Cell Reports 2014 8(4):1210-24
3. MR Johnson, J Behmoaras, L Bottolo, ML Krishnan, K Pernhorst, PL Meza Santoscoy, T Rossetti, D Speed, PK Srivastava, M Chadeau-Hyam, N Hajji, A Dabrowska, M Rotival, B Razzaghi, S Kovac, K Wanisch, F Grillo, A Slaviero, SR Langley, K Shkura, P Roncon, T De, M Mattheisen, P Niehusmann, TJ O'Brien, S Petrovski, M von Lehe, P Hoffmann, J Eriksson, Alison Coffey, S Cichon, M Walker, M Simonato, B Danis, M Mazzuferi, P Foerch, S Schoch, V De Paola, RM Kaminski, VT Cunliffe, AJ Becker and **E Petretto**. Systems-genetics identifies Sestrin 3 as a regulator of a proconvulsant gene network in human epileptic hippocampus. Nature Communications 2015 6:6031