Institute of Medical Biology
A*STAR

Seminar Announcement

- All Are Welcome -



Speaker : **Prof Eric Schirmer**

Professor of Nuclear Envelope Biology
Wellcome Trust Senior Research Fellow
Wellcome Centre for Cell Biology
Centre for Translational and Chemical Biology
University of Edinburgh, UK

Title : ***"An additional layer of genome regulation in development and disease through tissue-specific nuclear envelope-gene tethering"***

Date : 12 December 2017 (Tuesday)
Time : 11:00am – 12:00pm
Venue : Training Room, Neuros Level 6
Host : Dr Oliver Dreesen / Dr Brian Burke

Abstract:

Spatial genome organization clearly contributes to the regulation of gene expression; however, little is known about how different spatial patterns are established in tissues during development or the contribution of gene positioning to expression. We identified several tissue-specific nuclear envelope transmembrane proteins (NETs) that each increased peripheral incidence of specific subsets of genes during differentiation. The identification of these endogenous gene-positioning factors enabled testing the effects of manipulating the positions of endogenous genes +/- differentiation and thus distinguishing positioning effects from other changes in differentiation. Applying DamID, fluorescence in situ hybridization (FISH) and transcriptomics in muscle, fat and liver using tissue differentiation systems and animal models further revealed that many genes regulated in position by these NETs are important for differentiation and their expression level is strongly affected by their spatial position. Three muscle-specific gene repositioning NETs influenced the expression levels of 38% of all genes normally changing in expression during myogenesis, though some of these were secondary effects as their position was not directly regulated by the NET. Interestingly, the genes under specific repositioning regulation by these NETs tended to encode proteins needed at the earliest stages of myogenesis, but which subsequently become strongly inhibitory such as those involved in myoblast fusion. In a separate study sequencing 74 unlinked Emery-Dreifuss muscular dystrophy (EDMD) patients for novel alleles revealed several of these spatial genome organization NETs from muscle as strong disease candidates, arguing that gene misregulation may contribute significantly to EDMD pathophysiology.