NCRIS Virtual Seminar Series

Investigating the 3D genome organization of enhancers and silencers in regulating gene transcription

Date: 28th September 2020 (Monday)
Time: 12noon-1.00pm (SGT)

Venue: *via* **Zoom**
For details, please contact:
Lilian Poon – lilian.poon@duke-nus.edu.sg or +65 6601 3779

Abstract:
The 3-dimensional (3D) organization of our genome is important in controlling gene transcription. Chromatin interactions are two or more regions that come together in close proximity. Enhancers are known to loop over to gene promoters in the crowded 3D space of the nucleus. In the first story that I will present, we obtained the first ever 3D genome organization maps by Hi-C in haematopoietic stem cells from the bone marrow of 3 healthy individuals and 3 individuals with Acute Myeloid Leukemia (AML), which is a highly lethal cancer. We found that MEIS1, a key oncogenic transcription factor in AML, is regulated by a recently-described 3D genome structure called a Frequently Interacting Region (FIRE). In the second story, we found that silencers in the genome can similarly loop over to target gene promoters through chromatin interactions. Removal of silencers led to upregulation of interacting target genes, altered chromatin interactions, changes in phenotype associated with cell identity, and altered xenograft tumor growth. Taken together, our results illustrate the importance of chromatin interactions both in gene activation and gene silencing in cancer progression.

Speaker:

Asst. Prof Melissa J. Fullwood

Nanyang Assistant Professor School of Biological

Sciences Nanyang Technological University &
Cancer Science Institute

Dr. Melissa J. Fullwood is a Nanyang Assistant Professor in the School of Biological Sciences in NTU, with a joint appointment as a Principal Investigator in the Cancer Science Institute of Singapore. Her lab works on understanding the roles of 3-dimensional organization of our genome in transcription regulation in cancer cells. She completed her undergraduate degree in Biological Sciences at Stanford University and her PhD with the National University of Singapore Graduate School for Integrative Sciences and Engineering (NGS), at the Genome Institute of Singapore. She worked as a Lee Kuan Yew Post-doctoral Fellow in Duke-NUS Graduate Medical School. She became a Junior Principal Investigator in the Cancer Science Institute of Singapore upon winning a National Research Foundation Fellowship, and joined School of Biological Sciences, NTU as an Assistant Professor in 2015. She was a recipient of the Agency for Science, Technology and Research (A*STAR) National Science Scholarships, a L'Oreal-UNESCO for Women in Science National Fellowships in Singapore in 2009, and was the international winner of the GE and Science prize, as well as the A*STAR/SNAS Young Scientist Award.

Host:

SHANG Li
Associate Professor
Programme in Cancer & Stem Cell Biology
Duke-NUS Medical School, Singapore

No registration is required.
All are welcome.