



VIRTUAL BIOLOGY COLLOQUIUM

Friday, 14 Jan 2022 | 4 pm | Online Zoom Session

Hosted by A/P Lu Gan

Investigating the 3-dimensional genome organization of silencers and enhancers

By **Melissa Fullwood**

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About the Speaker

*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. She also holds an adjunct appointment at the Institute for Molecular and Cell Biology of A*STAR. Her research interest is to study 3-dimensional genome organization in cancer. She is a recipient of the Agency for Science, Technology and Research (A*STAR) National Science Scholarships, L'Oreal-UNESCO for Women in Science National Fellowships in Singapore, international winner of the GE and Science prize, A*STAR/SNAS Young Scientist Award and the National Research Foundation (NRF) fellowship.*

The 3D genome organization controls transcription in our genomes. Besides enhancers which are well known to loop to target genes to activate them, there is growing interest in silencers which can loop to target genes to repress them. H3K27me3-rich regions (MRRs) have been characterized as human silencers which can repress genes via chromatin interactions. We found that double knock-out of two silencers of an MRR causes synergistic upregulation of target gene expression and synergistic cell identity changes as well. Dramatic changes of distal chromatin interactions and compensated chromatin interactions between two silencers appear to underlie such synergism. Synergism between silencers suggest that different silencer constituents can cooperate to form “super-silencers”. Upon combinatorial treatment of GSK343 and REST inhibitor which can target silencers, we found a dramatic loss of 3D genome organization, severe apoptosis and cell death, indicating the potential significance of this combinational drug treatment in killing cancer cells.

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