



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY
Division of Life Science

LIFS Seminar Series

**LTRs and transcription-coupled DNA methylation in oocytes:
implications for intergenerational epigenetic inheritance**

by

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Abstract:

DNA methylation (DNAm) is highly dynamic in mammalian development. Following the wave of DNA demethylation that takes place in early germ cell development, de novo methylation in the female germline occurs after birth in growing germinal vesicle oocytes (GVOs). Curiously, while DNAm levels are significantly higher in sperm than in GVOs, a significantly greater number of CpG Islands (CGIs) are hypermethylated in GVOs. Retrotransposons constitute >40% of the human and mouse genomes. A subset of these intracellular parasites, including specific long terminal repeat (LTR) elements, are transcriptionally active only at specific developmental stages. RNAseq analysis of GVOs reveals that the mouse transposon (MT) LTR family, the most abundant ERV in the mouse, is highly transcribed in growing oocytes. I will present our recent work employing ultra-low input Chip-seq and WGBS, which reveals that active LTRs are likely responsible for transcription-coupled deposition of H3K36me3 and de novo DNA methylation at a significant fraction of genomic regions in GVOs, including the DMRs of rodent-specific maternal imprinted genes. CRISPR/Cas9 based deletion of one such LTR in vivo confirms the essential role of this oocyte-specific promoter in the establishment of imprinting at the Impact locus. The persistence of “oocyte-deposited” DNA methylation on the maternal genome through the inner cell mass (ICM) stage in F1 hybrid offspring will also be discussed. Taken together, these observations reveal that LTR elements have a profound effect on the methylome of the female germline and early embryo, with implications for the establishment of new imprinted regions during mammalian evolution.

Date : 16 June 2017 (Friday)

Time : 4:00 p.m.

**Venue : Lecture Theatre G
The Hong Kong University of Science &
Technology
Clear Water Bay, Kowloon**

(Host faculty: Dr. Danny Leung)

All are Welcome!!