Department of Biomedical Sciences

presents the seminar series in

香港城市大學
City University of Hong Kong

"Decoding the transcription circuitry when life begins"

Prof. Wei Xie
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Date : 17 January 2024
Time : 10:00 - 11:30
Venue : P4302, 4/F, Yeung Kin Man Academic Building

Abstract

Zygotic genome activation (ZGA) marks the first transcription event in development. Deciphering key regulators of ZGA is crucial for understanding how life begins and how a totipotent embryo arises from terminally differentiated gametes. Probing these questions in mammals was long hindered by the scarce experimental materials that are available from early embryos. By developing a set of ultra-sensitive chromatin analysis technologies, we previously investigated chromatin accessibility, epigenetic modifications, 3D chromatin architecture, and RNA Pol II engagement during mammalian ZGA. These studies unveiled highly dynamic and non-canonical transcription and chromatin regulation during the maternal-to-zygotic transition. However, how ZGA is kickstarted and how the early development program is progressively driven by transcription factors (TFs) remain enigmatic. Recently, we sought to identify key TFs that act at the onset of ZGA, and those that connect ZGA to the first cell fate commitment. In this talk, I will discuss how these findings help illuminate the core transcription circuitry underlying the beginning of life.

About the Speaker

Prof. Wei Xie is a Professor and Vice Dean of School of Life Sciences, Tsinghua University, and also an HHMI International Research Scholar. He received his B.S. degree in Molecular Biology at Peking University in China in 2003. He pursued his Ph.D study at UCLA, where he joined the laboratory of Michael Grunstein to study the function of histones and histone modifications. He also obtained an M.S. double degree in statistics at UCLA with Ker-Chau Li. After completing his graduate studies in 2008, he continued research in epigenetics and transcription regulation as a postdoctoral fellow in Bing Ren's lab at the Ludwig Institute for Cancer Research, UCSD in 2009. After his postdoc training, he joined Tsinghua University, School of Life Sciences, in Beijing as a Principal Investigator in 2013. He is also a member of the Tsinghua-Peking Joint Center for Life Sciences. Using interdisciplinary approaches, Prof. Xie is dedicated to understanding how the life clock is reset after fertilization in mammalian embryos. His group established a series of ultra-sensitive technologies to analyze chromatin dynamics using hundreds of cells or fewer. By doing so, his team revealed how chromatin accessibility, histone modifications, and 3D chromatin architecture are reprogrammed during early mammalian development. His work also demonstrated how the embryonic program is activated during zygotic genome activation and identified key transcription factors involved. Such epigenetic reprogramming and transcription regulation are essential for successful parental-to-zygotic transition and the ultimate generation of a totipotent embryo, which occurs through regulatory mechanisms that are often distinct from those in somatic cells and embryonic stem cells. He has authored over 90 publications with around 20,000 citations. He also received numerous awards including the HHMI International Research Scholar and New Cornerstone Investigator. Prof. Xie previously or currently served as the Review Editor of *Science*, the editorial board members of *Stem Cell Reports* and *Development*.

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All are welcome!