



VIRTUAL BIOLOGY COLLOQUIUM

Friday, 8 Oct 2021 | 4 pm | Online Zoom Session

Hosted by A/P Liou Yih-Cherng

Cell cycle control of the *Drosophila* early embryonic development

By **Yuan Kai**

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About the Speaker

Dr. Kai Yuan is currently a professor in the Xiangya Hospital and an adjunct professor in the School of Life Sciences, Central South University. He obtained the BS degree from University of Science and Technology of China in 2004 and the Ph.D degree in 2009. He was a postdoctoral researcher and specialist at University of California San Francisco, with Prof. Patrick O'Farrell (2010-2016). He is a recipient of the National Thousand Talents Program for Young Scientists. Dr. Yuan's group uses fly model to study early embryonic development, and patient-derived organoids to dissect molecular mechanisms of cancer from a developmental perspective.

Most metazoans lay eggs to reproduce themselves. The externally deposited eggs start embryogenesis with an immense cytoplasm and a single naïve nucleus, making the biology of the early embryo strikingly different from that of the somatic tissues. We are very interested in understanding how the early embryo uses maternal supplies to replicate and functionalize its genome, with a special focus on the coordination of the rapid mitoses and other early developmental events, particularly the zygotic genome activation. Our studies demonstrate that the rapid cell cycles in the early embryos are supported by the synergistic actions of different mitotic cyclins. This rapid cell cycles slow at the mid-blastula transition as a result of the onset of late replication on repetitive sequences. Premature slowing of the cell cycle is sufficient to trigger large-scale zygotic genome activation as well as heterochromatin formation, suggesting that the early embryonic events are orchestrated by the changes of the cell cycle.

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