

DANDRITE Lecture

Monday 9 January 2022

15.00 – 16.00

The MBG Auditorium (1871-120)



Tomohisa Toda

Dr. Tomohisa Toda is Professor at Friedrich-Alexander-Universität Erlangen-Nürnberg and Group Leader at the German Center for Neurodegenerative Diseases (DZNE) in Dresden.

Exploring roles of nuclear structural proteins in the long-term maintenance of brain function

Ageing is one of the most critical risk factors for neurological and psychiatric diseases. However, the biological links between physiological ageing and pathological development are still largely unknown. A solid understanding of the biology of brain ageing will thus be a key to developing the means to treat these diseases. Since neurons and adult neural progenitor cells in the brain are mostly generated during development with limited capacity of replacement, they need to maintain their identity and function throughout our lives.

We recently found that a cell type-specific nuclear architecture organized by nucleoporins and nuclear lamins regulates the maintenance of neural progenitor cells (NPCs). Strikingly, nucleoporins and lamins are the most long-lived proteins in the brain and are known to be damaged during ageing, but their functional contribution in brain function and ageing remain largely elusive. To understand how nuclear structural proteins regulate cell type-specific epigenetic programs, we combined interdisciplinary approaches including biochemical and epigenetic approaches, and found that nuclear pore proteins interact with several chromatin regulators to organize chromatin accessibility and epigenetic programs in NPCs. Our data indicates that nuclear pore proteins work as a structural gatekeeper for cell type-specific gene expression as well as neural plasticity. These data highlight novel roles of nuclear structural proteins in epigenetic regulation, and provide possible links between neural ageing and brain dysfunction.

Host: DANDRITE Group Leader Taro Kitazawa.