

# 12th nanobiofluids seminar

2025 April 3rd, 10:30-11:30

Seminar Room (Room 119), 1<sup>st</sup> Floor, Bldg. No.1

<https://www.infront.kyoto-u.ac.jp/en/access/>

Zoom registration

[https://kyoto-u-edu.zoom.us/meeting/register/mcZgUsxtTSG\\_-681HNz\\_Xg](https://kyoto-u-edu.zoom.us/meeting/register/mcZgUsxtTSG_-681HNz_Xg)

## **Mechanogenetics: toward an understanding of organ-specific gene regulation**



Shintaro Yamada, PhD

Chief researcher

Genome Dynamics Project, Tokyo Metropolitan Institute  
of Medical Science

### **Abstract**

Gene regulation has been primarily explained with signal transduction and transcription factor binding to the genome. However, emerging evidence suggests that gene expression controls through mechanical “forces” such as cleavage and structural changes of the genome, and physical pressure to the cell is essential for organ development and functions. Moreover, its disruption can cause aging and diseases such as cancer. This seminar focuses on mechanical regulation of the genome and, as an example, involvement of DNA cleavage and repair machinery in gene expression in response to extracellular stimuli. We will discuss how such intracellular “forces” can be linked to cellular mechano-microenvironments. Understanding types, degrees, and frequencies of “forces” as gene regulatory elements brings a unique perspective on mechanisms in development and disease, and therapeutics.

### **Biography**

Shintaro Yamada graduated from Department of Biophysics and Biochemistry at the University of Tokyo, Faculty of Science, and received his Ph.D. from the department in 2013. He worked as a postdoctoral researcher at the University of Tokyo (2013) and Memorial Sloan Kettering Cancer Center in New York, USA (2013-20). From 2018 to 2020, Yamada had a cross-appointment at Kyoto University. He was an Assistant Professor (2018-23), a Specially Appointed Senior Lecturer (2023-24), and a Hakubi Program-Specific Assistant Professor (2024) at Kyoto University before he joined his current lab in 2024. He is examining molecular mechanisms of DNA recombination and repair, which can help understand sexual reproduction, cancer, aging, and genetic engineering.

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