

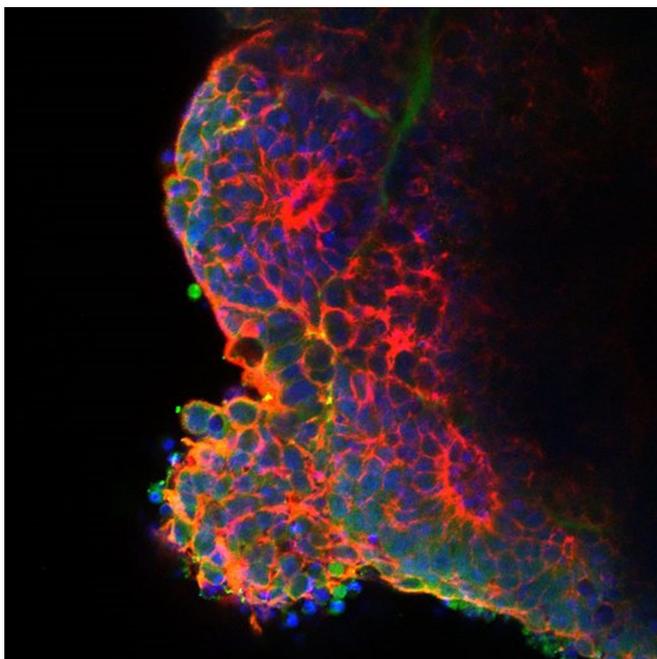
## FIRST PERSON

# First person – Kazuko Okamoto

First Person is a series of interviews with the first authors of a selection of papers published in *Biology Open*, helping early-career researchers promote themselves alongside their papers. Kazuko Okamoto is first author on 'Pressure-induced changes on the morphology and gene expression in mammalian cells', published in *BiO*. Kazuko conducted the research described in this article while a research scientist in Tomonobu M. Watanabe's lab at RIKEN Center for Biosystems Dynamics Research, Kobe, Japan. She is now an assistant professor in the lab of Satoru Okuda at Nano Life Science Institute, Kanazawa University, Japan, investigating intracellular communication and transcription regulation.

### What is your scientific background and the general focus of your lab?

I am currently an assistant professor in the lab of Dr Okuda at Nano Life Science Institute Kanazawa University. For my research, I am particularly interested in how cellular morphology regulates gene expression. Dr Okuda's lab has a technology to form organoids, and I have started to study how morphological deformation changes gene expression. Before coming to Kanazawa University, I received my PhD at Kyoto University, with a major in evolutionarily



Cortex organoid induced from mouse embryonic stem cells as model to investigate intracellular communication. Green, Sox1; red: F-actin; cyan, Hoechst.

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developmental (evo-devo) biology. After my doctorate, I joined the RIKEN Center for Biosystems Dynamics Research (BDR), where the focus was on the development of microscopes and imaging technology for quantitative observation of the dynamics of living biological systems. Eventually, I started to use various types of microscopes. There, I analysed collective phenomena in mouse embryonic stem cells (Okamoto et al., 2018), pressure-induced effects on mammalian cells in our paper for *Biology Open*, and molecular dynamics of transcription factors in living cellular nuclei (Okamoto et al., 2020).

### What are the potential implications of these results for your field of research?

Recently, it has been reported that cells sense external mechanical stimuli and change transcription and translation. We demonstrated that hydrostatic pressure changes cellular morphology and transcription. Previous literatures described pressure-induced effects on the structure and function of actomyosin. We reported hydrostatic pressure effects on the morphology by using various types of mammalian cells. That will help to analyse the molecular processes underlying how hydrostatic pressure effects propagate transcription and change morphology.

### What's next for you?

The next challenge for me is to clarify how mechanical stimuli change cell fate by using organoids and spheroids. Mechanical stimuli induce cellular morphological change, and then cells change their cellular state. The change may be a big issue to cell fate decision in the context of development.

### References

- Okamoto, K., Watanabe, T. M., Horie, M., Nishiyama, M., Harada, Y. and Fujita, H. (2021). Pressure-induced changes on the morphology and gene expression in mammalian cells. *Biol. Open* **10**, bio058544. doi:10.1242/bio.058544
- Okamoto, K., Germond, A., Fujita, H., Furusawa, C., Okada, Y. and Watanabe, T. M. (2018). Single cell analysis reveals a biophysical aspect of collective cell state transition in embryonic stem cell differentiation. *Scientific Reports* **8**, 11965. doi:10.1038/s41598-018-30461-2
- Okamoto, K. (2020) From a young BSJ member: advanced technologies encouraged me to dive into biophysics field. *Biophys. Rev.* **12**, 205-206. doi:10.1007/s12551-020-00648-x