

## Mechanisms of breast cancer metastasis: Interaction with the bone marrow tumor microenvironment

Following treatment of the primary tumor, breast cancer patients often experience recurrence after a prolonged disease-free period ranging from several years to decades, sometimes exceeding 30 years. This clinical course suggests the existence of mechanisms that regulate tumor cell dormancy and subsequent reactivation over extended periods. Breast cancer stem-like cells are thought to play a central role in these processes.

In addition, breast cancer metastasis exhibits a strong organ tropism, preferentially targeting specific organs such as the bone, lung, liver, and brain. These characteristic features of recurrence and metastasis suggest that these events are not merely stochastic, but rather are governed by spatiotemporally regulated mechanisms.

In this seminar, I will provide an overview of the metastatic mechanisms of breast cancer cells, with a particular focus on bone metastasis. Furthermore, I will present our recent findings on the interactions between disseminated tumor cells and the bone marrow tumor microenvironment during the early stages of metastasis.



### Dr. Yasuto Takeuchi

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Dr. Yasuto Takeuchi received his D.D.S. degree from Hokkaido University in 2009 and completed his Ph.D. at the Graduate School of Dental Medicine, Hokkaido University in 2014. From 2010 to 2014, he conducted research on hypoxia PET imaging of cancer as a graduate research fellow at the National Institute of Radiological Sciences. He then worked as a postdoctoral researcher at the Institute for Genetic Medicine, Hokkaido University, and as a JSPS Research Fellow (PD) from 2014 to 2019, where he studied cell competition. Since 2019, he has been serving as an Assistant Professor at the Cancer Research Institute, Kanazawa University, where his research focuses on breast cancer stem cells and the tumor microenvironment.

- Y. Takeuchi, et al. Highly plastic macrophage niches orchestrate acquired quiescence and reactivation in breast-cancer bone metastasis. under revision
- M. Li†, T. Nishimura†, Y. Takeuchi† (†Equally contribution) et al., FXYD3 functionally demarcates an ancestral breast cancer stem cell subpopulation with features of drug-tolerant persisters. **J.Clin. Invest.**, 2023

- Y. Takeuchi, N. Gotoh. Inflammatory cytokines-enriched microenvironment plays key roles for the development of breast cancers. **Cancer Sci.**, 2023
- Y. Takeuchi†, N. Kimura†, T. Murayama†, (†Equally contribution) et al. The membrane-linked adaptor FRS2b fashions a cytokine-rich inflammatory microenvironment that promotes breast cancer carcinogenesis. **Proc Natl Acad Sci USA**.

The seminar will be in English.

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18時～19時半  
金沢医科大学  
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