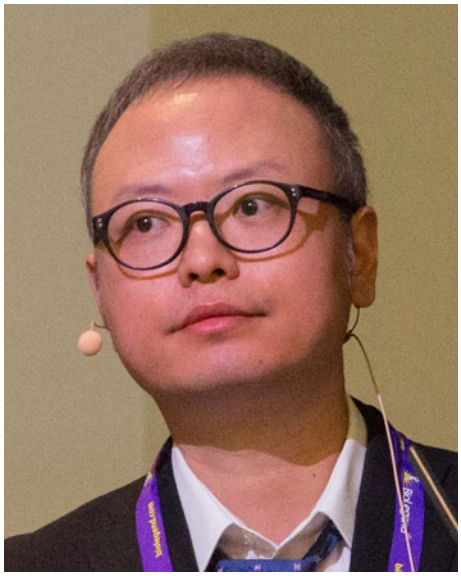
Organic osmolyte-mediated adaptations critical for immune homeostasis and T-cell mediated anti-tumor responses



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Abstract

Antigen recognition by adaptive immune cells, like B cells and T cells, triggers a plethora of events involving activation, proliferation and differentiation programs, ultimately leading to the development of various effector cells as well as memory cells. These immune cells navigate such energy demanding events in parallel with their migration and adaptation to different environmental conditions. Various sensing and adaptation mechanisms must exist for cells to adapt to external and internal stress. For example, small molecules known as organic osmolytes are known to play critical roles in adaptation of T cells to osmotic stress. However, how exactly osmolytes contribute to T cell biology, from the development to the effector stages remain largely unknown. I will discuss the role of immuno-metabolites acting as osmolytes and the mechanisms by which such small molecules contribute to the development, activation, expansion and survival of T cells in normotonic or hypertonic stress such as tumor microenvironment, and propose therapeutic strategies targeting osmolytes for improving cell immunotherapy in cancers.

Biography

Dr. Baihao Zhang is a Senior Research Scientist at the Laboratory for Mucosal Immunity, Institute of Medical Science (IMS), RIKEN. He earned his Ph.D. in Medical Science from Kyoto University in 2016. He has extensive experience in immunology and metabolism, focusing on immune cell-related diseases. His research revealed that activated immune cells in PD-1-deficient mice alter the body's metabolome profile, enhancing anxiety and fear responses. Additionally, Dr. Zhang identified the role of B cell-derived GABA in promoting anti-inflammatory macrophages and inhibiting anti-tumor function of CD8+ T cell. His research interests include identification and analysis of immune-metabolites and their impacts on anti-tumor responses.