2ND INTERNATIONAL SYMPOSIUM ON INFECTIOUS DISEASES AND VIROLOGY

November 14-15, 2025 | London, UK

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BACH2 drives the development and function of group 2 innate lymphoid cells

Group 2 innate lymphoid cells (ILC2s) represent one of the major drivers of allergic inflammation; however, the precise mechanisms governing the development and function of ILC2s remain unknown. Here, we show that the transcription factor BACH2 was abundantly expressed and epigenetically activated in ILC2s and their progenitors. Conditional ablation of BACH2 diminished the ability of ILC2 progenitors to differentiate into ILC2s. Integration of the scRNA-seq, ATAC-seq, and CUT&Tag-seq techniques revealed that BACH2 modulated the transcriptional profiles and epigenetic landscapes of ILC2 progenitors. Furthermore, BACH2 ablation compromised the functionality of ILC2s, resulting in a resolution of allergic airway inflammation. Notably, the different binding sites of BACH2 in ILC2s and TH2 cells suggested that BACH2 binds to IRF4 to control the function of ILC2, underscoring its context-specific effects on allergic airway inflammation. These findings shed promising light on the importance of BACH2 in type 2 immunity and its multifaceted role in asthma.

Keywords
group 2 innate lymphoid cells, development, functionality, BACH2, allergic airway inflammation

Biography
Dr. Wang received his Ph.D. from Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences in 2012. He completed postdoctoral training consecutively at Markey Cancer Center, University of Kentucky (Lexington, KY, US) and Lawrence Berkeley National Laboratory (Berkeley, CA, US). He joined Guangzhou Women and Children's Medical Center in 2018 and appointed as PI in 2021. He moved to Shanghai General Hospital in 2023. He has been focusing on characterizing the mechanisms governing tissue regional immune imbalance in chronic diseases associated with mucosal barrier injuries and exploring novel targeted therapeutics. During the past few years, Dr. Wang and his co-workers have published works in high-impact journals, such as Cell, Nature Communications, Science Advances, Mucosal Immunology, Oncogene, etc., and proposed novel therapeutics for clinical practice.

doi.org/10.51219/URForum.2025.Jun-Wang

ISBN: 978-1-917892-31-5