



CDB SEMINAR

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Tuesday, April 18, 2017

16:30~17:30 A7F Seminar Room

Challenges to Understanding the Molecular Mechanisms behind Hematopoietic Stem Cell Physiology and Establishing Tissue Stem Cell-based Regenerative Medicine

Summary

In the coming aging society, it would be prudent for us to prepare for an acceleration in age-related diseases. Regenerative medicine has the potential to significantly mitigate this by providing solutions to prevent or even cure these diseases. Amongst the various options to establish novel regenerative treatments, tissue stem cells have a huge potential to achieve this due to their distinct characteristics of self-renewal and multipotency. Within the group of tissue stem cells, the hematopoietic stem cells (HSCs) are arguably the most applicable and versatile due to their ability to address diseases by utilizing their characteristics as blood and immune cells. However, their safe and stable clinical application has not been fully realized due in part to our incomplete understanding of HSC biology including incomplete purification of HSCs. While the current strategy to identify HSCs by surface markers has improved our ability to isolate this exceedingly rare population (less than 0.001% of total nucleated cells in bone marrow) and our understanding of their physiology, many aspects of HSC biology remain controversial.

To address this issue, we started our project revisiting the strategy by which we identify HSCs. Through unbiased multi-step screening, we recently succeeded in identifying a single gene, *Hoxb5*, expressed exclusively in mouse HSCs within bone marrow and established a mouse reporter system to specifically label this critical fraction (*Nature*, 2016). With this novel system, we now plan to understand the molecular mechanisms of HSC self-renewal and multipotency and establish a novel platform to maintain and proliferate HSCs ex vivo for future clinical application.

Host:

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