

ASHBi SEMINAR

Developments and applications of ex vivo hematopoietic stem cell expansion cultures

Lecturer: Ms. Kyomi J. Igarashi

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Date

Friday, 17 February 2023

Time

16:00 – 17:00 [JST]

Venue

Conference Room
B1F, Faculty of Medicine Bldg. B

[New!]→Memorial Auditorium
(Faculty of Medicine Campus Map #7)



*Register QR code

Abstract

While the self-renewing and multipotent hematopoietic stem cells (HSCs) can maintain and reconstitute the blood and immune system, their scarcity in vivo has hindered its use in blood disease treatment and in vitro characterization. Despite developments in ex vivo expansion methods, achieving high HSC selectivity in these cultures remains difficult. We have previously introduced a polyvinyl alcohol (PVA)-based HSC culture system that can expand mouse bone marrow HSCs 236-899-fold over the span of a month. However, HSCs comprise < 10% of the total culture, with the majority being differentiated progenitors and mature hematopoietic cells. We have now significantly increased the HSC selectivity of this system by decreasing oxygen (O₂) culture concentrations from the standard 20% to hypoxic 5%. This system further depletes differentiated progenitors and mature hematopoietic cells, while also affording selective expansion of HSCs from heterogeneous populations (unfractionated bone marrow and fetal hematopoietic tissues). To investigate the mechanism of this selectivity, we performed various transcriptomic analyses, revealing an upregulation of sterol and cholesterol metabolism pathways in the 5% O₂ cultures. This highly selective culture system can be used to develop powerful new ex vivo assays for HSC activity, while also providing potential time- and cost-efficient alternatives to in vivo stem cell assays.

Organizer : Graduate School of Medicine

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