



RESEARCH TOOL

Methods to Expand and Manipulate Hematopoietic Stem and Progenitor Cells

Brief Description of Technology

Culture strategies for cost effective, *ex vivo* expansion of hematopoietic stem and progenitor cells (HSPCs) with enhanced *in vivo* repopulating ability.

BUSINESS OPPORTUNITY

Exclusive license
 Sponsored research
 Startup

TECHNOLOGY TYPE

Cell therapy
 Therapeutic
 Method

STAGE OF DEVELOPMENT

Preclinical *in vitro*

PATENT INFORMATION

US 9,834,755; EP 2788476
 US: 10,370,643; EP: 3146041

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Technology Overview

HSPCs can be used to treat over 70 types of diseases including a variety of hematological disorders through transplantation and genetic therapies. Insufficient numbers of HSPCs introduced during transplantations prolong engraftment which can limit the use of single-unit patient samples. *Ex vivo* expansion increases the dose of HSPCs and promotes rapid and sustained engraftment, which is critical to patient recovery and survival. Fred Hutch researchers have discovered several methodologies of generating higher numbers of HSPCs in a cost-effective manner by delaying differentiation and enhancing proliferation of HPSCs *ex vivo*. In one methodology, researchers activated the Notch pathway using Delta^{ext-IgG} and inhibited the aryl hydrocarbon receptor using SR1 in cultured HSPCs. Furthermore, the team cultured HSPCs with a Notch agonist and a leukocyte immunoglobulin-like receptor B2 agonist. Both techniques significantly enhanced the generation of repopulating HSPCs compared to either reagent alone. These innovations allow for improved clinical access to HSPCs and HSPC derived products.

Applications

- *Ex vivo* expansion of HSPCs for autologous and allogeneic transplantation
- Generation of HSPCs for cell-based therapies

Advantages

- Increase stem cell dose yield from a single cord blood unit
- Faster immune system recovery after transplantation
- Improves the cost-effectiveness of HSPC transplantation therapies

Market Overview

The global market for stem cells and regenerative medicines in the therapeutic product sector accounted for \$9.1 billion in revenue in 2018 and is expected to generate revenue of \$28.2 billion in 2024, at a CAGR of 20.8%. In parallel, the global cord blood banking market is estimated to reach US\$21 billion by 2026, indicating the rising demand for cord blood-HSPC applications.