Docket #: S22-494

Purifying Human Pluripotent Stem Cell-Derived Liver Cells by Metabolic Selection

Obtaining pure cell types from mixed cell populations continues to be a significant obstacle in the fields of stem cell biology and regenerative medicine. Specifically, the task of obtaining a homogenous population of liver cells from human pluripotent stem cells has proven to be challenging. Current methods result in a mixture of liver cells and non-liver cell populations. To remedy this problem, Stanford researchers have developed a new approach based on metabolic selection to create purified human pluripotent stem cell (hPSC) derived hepatocytes by selectively killing non-liver cells.

The new approach is based on the concept that different cell-types have distinct metabolic requirements to survive, and can thus be killed by withholding specific nutrients. Using this method, the researchers are able to create essentially homogeneous populations of hPSC-derived hepatocytes, without recourse to surface marker-based cell sorting or other purification schemas. Ultimately, a pure population of hepatocytes cells will be immensely useful for applications in regenerative medicine and disease modeling.

Stage of Development
Pre-clinical: Stanford researchers are performing additional mouse transplantation studies to test whether the human pluripotent stem cell-derived liver cells can engraft long term in the injured mouse liver.

Applications

- Purify stem cell-derived liver cells
- Purify mixed population of liver and non-liver cells

Advantages

- Simple, scalable, and inexpensive
- Compatible with cells produced by various differentiation methods

Publications

- Lay Teng Ang et al. Metabolically purified human stem cell-derived hepatocytes reveal distinct effects of Ebola and Lassa viruses. *bioRxiv* 2025.02.17.638665.

Patents

- Published Application: WO2024173685
- Published Application: 20260258368

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