

Derivation of Human Microglia from Pluripotent Stem Cells

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Technology description

Microglia act as the first and main form of active immune defense in the central nervous system. They are the primary source of brain cytokines and have been implicated in chronic neuroinflammation (e.g., Alzheimer's disease), stroke and traumatic brain injury. Long thought to be derived from bone marrow, microglia have recently been shown to be derived from primitive macrophages in the earliest wave of blood cell formation in the yolk sac.

To date the majority of microglia studies have been performed in rodent models, with limited relevance to humans. Despite the intense interest to research and potential clinical applications there has been no known protocol for deriving microglia from human pluripotent stem cells, until now. UW-Madison researchers have discovered a primitive, macrophage-like cell type of the hematopoietic lineage that has the capability to develop ramified human microglia when added to a neural tissue construct. Accordingly, they have developed the first known protocol of its kind for differentiating and expanding microglia suitable for clinically relevant therapeutic applications.

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a highly efficient and reproducible method for obtaining human primitive macrophages and microglial cells suitable for clinical applications.

Additional Information

WARF reference number P140400US02 describes the researchers' development of xenogen-free, 3-D neuronal tissue models derived from hPSCs.

<http://www.warf.org/technologies/summary/P140400US02.cmsx>

WARF reference number P140372US02 describes the researchers' method to make endothelial cells for the vascularization of this model.

<http://www.warf.org/technologies/summary/P140372US02.cmsx>

Application area

Production of microglia for predictive analysis of candidate neurotoxic agents and other human tissue modelling applications

Advantages

First opportunity to study microglia in an in vitro human model

Highly efficient and reproducible method

Institution

[Wisconsin Alumni Research Foundation](#)

Inventors

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