

3D SYSTEM FOR DIFFERENTIATION OF OLIGODENDOCYTE PRECUSORS FROM PLURIPOTENT STEM CELLS

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PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,111,375	09/07/2021	2016-018

BRIEF DESCRIPTION

Cell replacement therapies using have long been thought to have the potential to treat demyelinating diseases such as multiple sclerosis or hypomyelinating leukodystrophies - as well as spinal cord and other CNS injuries that involve inflammation and loss of myelin. While pluripotent stem cells represent a potential source of readily available regenerative tissue, they require labor-intensive culturing to differentiate into target cell types. Since Oligodendrocyte precursors cells (OPCs) can migrate, engraft and differentiate when experimentally transplanted onto unmyelinated axons, OPCs have been seen as the future of cell replacement therapies for demyelinating diseases. However, as there is currently no reliable and sustainable source of transplantable OPCs, their therapeutic potential cannot be harnessed.

Researchers at the UC Berkeley have created a 3-dimensional, chemically defined biomaterial system for the large-scale differentiation of OPCs. By systematically optimized chemical cues, this strategy rapidly generated Olig2 and NKX2.2-positive cells with the same efficiency of other protocols, but in a shorter period of time (approximately 18 days instead of 30). This shortened 3D differentiation protocol, which results in up to 2-4 times more cells, enables a significant reduction in the cost of production of pre-OPCs.

SUGGESTED USES

- » Therapy for demyelinating diseases
- » Research studies of human demyelinating diseases

ADVANTAGES

- » Shortened differentiation protocol
- » More cells
- » Reduction in cost

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ Membrane-Associated Accessory Protein Variants Confer Increased AAV Production
- ▶ Self-Inactivating Targeted DNA Nucleases For Gene Therapy
- ▶ Human Central Nervous System (CNS) Targeting AAV Variants
- ▶ Improving Packaging and Diversity of AAV Libraries with Machine Learning

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OTHER INFORMATION

KEYWORDS

stem cells, oligodendrocyte, cell replacement, therapeutics

CATEGORIZED AS

- » **Biotechnology**
- » Other
- » **Materials & Chemicals**
- » Biological
- » **Medical**
- » Disease: Central Nervous System
- » Research Tools
- » Stem Cell

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