



Generating teratoma-derived skeletal muscle stem cells

A method for generating teratoma-derived skeletal muscle stem cells with functional regenerative capacity.

IP Status: US Patent Issued

Applications

- Regenerative therapy
- Research tool

Key Benefits & Differentiators

- **Regenerative potential:** Teratoma-derived skeletal muscle stem cells have comparable regenerative potential to human skeletal muscle stem cells (satellite cells)
- **High potency:** Potency of teratoma-derived cells is greater than that of conventional methods used to generate skeletal muscle stem cells

Technology Overview

Muscular dystrophy (MD) is a group of hereditary diseases characterized by progressive weakness and loss of muscle mass. MD affects about 250,000 people in the United States. Regenerative medicine offers promise in the treatment of MD. However, the inability to derive transplantable skeletal muscle stem cells from wild-type pluripotent stem cells hinders this promise. New approaches are needed to turn pluripotent stem cells into a viable regenerative therapy for MD.

Researchers at the University of Minnesota have developed a method for generating teratoma-derived skeletal muscle stem cells with functional regenerative capacity. This method involves injecting pluripotent stem cells into an immunodeficient mouse, allowing one or more teratomas to form, and isolating skeletal muscle stem cells from one or more teratomas using a novel antibody cocktail. Following the injection of as few as 40,000 teratoma-derived skeletal muscle stem cells into a tibialis anterior muscle of diseased mice, approximately 80% of the muscle volume is reconstituted. Newly generated muscle fibers are innervated, express adult myosins, and significantly improve dystrophy-related force deficit and fatigability. Teratoma-derived skeletal muscle stem cells also contribute to quiescent muscle stem cells, enabling long-term maintenance of regenerated muscle and allowing muscle regeneration in response to subsequent injuries. This method for generating teratoma-derived skeletal muscle stem cells can potentially be used for regenerative therapy development and as a research tool for studying muscle diseases.

Phase of Development

TRL: 4-5

Method for generating teratoma-derived skeletal muscle stem cells has been successfully demonstrated in mice.

Technology ID

20160361

Category

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Life Sciences/Human Health
Life Sciences/Research Tools
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Researchers

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References

1. Sunny Sun-Kin Chan, Robert W. Arpke, Antonio Filareto, ..., Jacqueline S. Penaloza, Rita C.R. Perlingeiro, Michael Kyba(July 05, 2018) , [https://www.cell.com/cell-stem-cell/fulltext/S1934-5909\(18\)30292-3?_returnURL=https%3A%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS1934590918302923%3Fshowall%3Dtrue](https://www.cell.com/cell-stem-cell/fulltext/S1934-5909(18)30292-3?_returnURL=https%3A%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS1934590918302923%3Fshowall%3Dtrue), <https://www.cell.com/cell-stem-cell/home>, 23, 74-85