INHIBITORS OF TYROSINE PHOSPHATES AND APOPTOSIS REPROGRAM LINEAGE MARKED DIFFERENTIATED MUSCLE TO MYOGENIC PROGENITOR CELLS

Tech ID: 21826 / UC Case 2011-186-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,934,527	03/02/2021	2011-186

BRIEF DESCRIPTION

Dedifferentiation and reprogramming of terminally differentiated cells is a recent powerful source of tissue stem cells for therapeutic purposes. Muscle is classic example of differentiation where adult muscle stem cells (satellite cells) upon activation give rise to progenitor cells (myoblasts), which fuse together to form multinucleated post mitotic myotubes/ myofibres. The decline of muscle regeneration upon traumatic injury, aging and myopathies is a challenging issue and can be addressed by repopulating muscle cell pool. This can be achieved, either by boosting muscle stem cells or reversing the fate of differentiated muscle to yield progenitor cells.

Scientists at UC Berkeley have investigated the capability of differentiated muscle to undergo dedifferentiation to yield proliferating progenitor cells by using small molecule inhibitors. They developed a novel method of physiologically labeling myotubes with YFP that allowed them to track labeled reprogrammed cells from mononucleated unlabeled reserve cells present in culture. They found that a significant percentage of the YFP+ lineage marked multinucleated myotubes dedifferentiated into YFP+ proliferating progenitor cells/myoblasts in the presence of small molecule inhibitors. These dedifferentiated progenitor cells expressed myogenic markers (Pax7 and MyoD1) and retained their capacity to fuse and form de novo myotubes. This dedifferentiation of lineage marked myotubes into reprogrammed myoblasts by small molecules that can modulate signaling pathways has fundamental implications for understanding adult tissue regeneration and for novel therapies aimed to enhance muscle repair.

SUGGESTED USES

- Repair genetically defective muscle
- Determination of cell fate
- Developing stem cell therapeutics

ADVANTAGES

- Reprogrammed cells are easy to distinguish from reactivated reserve cells.
- Use of small molecule inhibitor makes it easy to control the fate of the outcome

RELATED MATERIALS

» Chem Biol. 2011 Sep 23;18(9):1153-66. doi: 10.1016/j.chembiol.2011.07.012. - 10/23/2011

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

▶ Neuro-protective Effect of Human Pluripotent Stem Cell-derived Secretome in ALS

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OTHER INFORMATION

CATEGORIZED AS

» **Biotechnology**
» Genomics
» Proteomics
» **Imaging**
» Medical
» Molecular
» **Medical**
» Diagnostics
» Disease: Cardiovascular and Circulatory System
» Disease: Musculoskeletal Disorders
» Gene Therapy

RELATED CASES

2011-186-0

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- CRISPR-based Graphene Biosensor for Digital Detection of DNA Mutations

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