

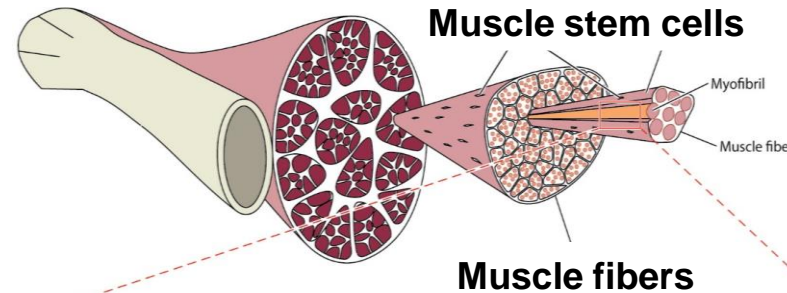
New Approaches to Model Skeletal Muscle Regeneration in Vitro

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Institute of Human Movement Sciences and Sport
Regenerative and Movement Biology Lab



The skeletal muscle system



Muscle diseases

Age-related



Cancer-related



Injury-related



Dystrophies

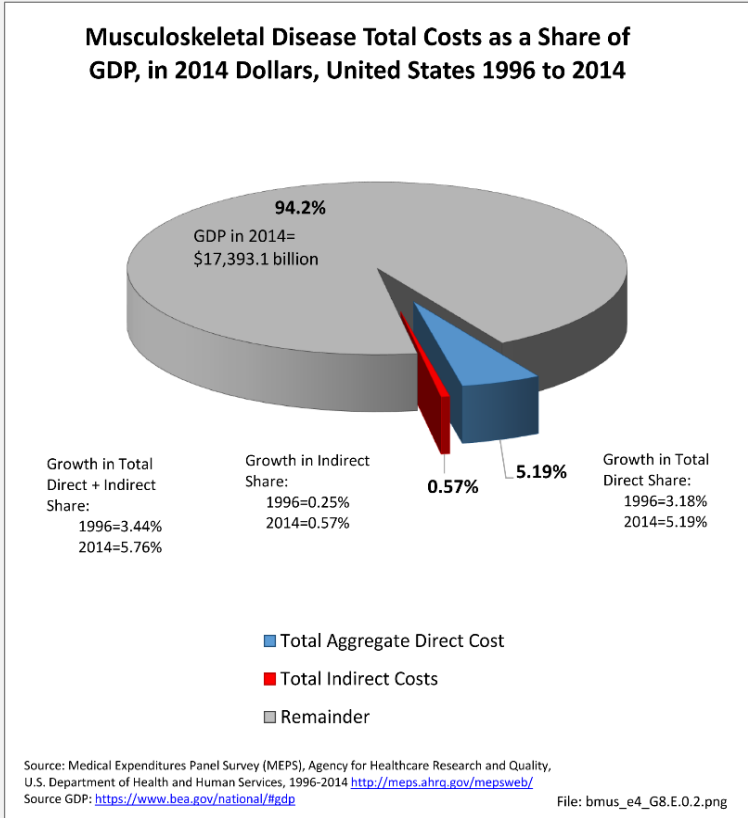
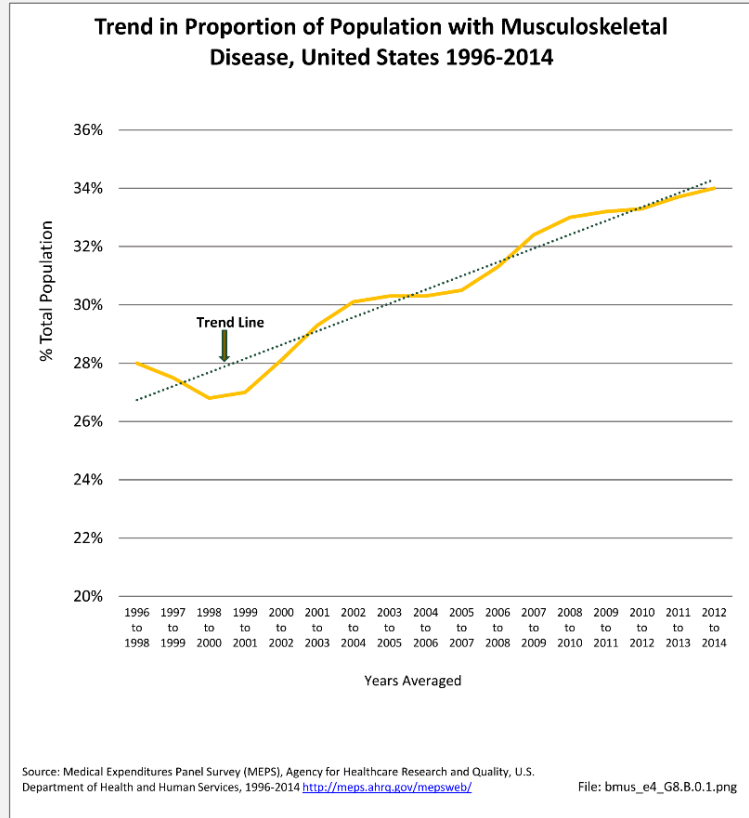


**Generates movement,
35% of human body mass**

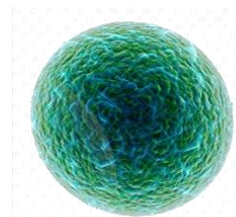
**Made of muscle fibers that
contract and muscle stem
cells that can regenerate
the fibers upon injury or
disease state**

**Muscle diseases affect
millions of people
worldwide, many of which
do not have a cure**

Healthcare costs associated with muscle diseases



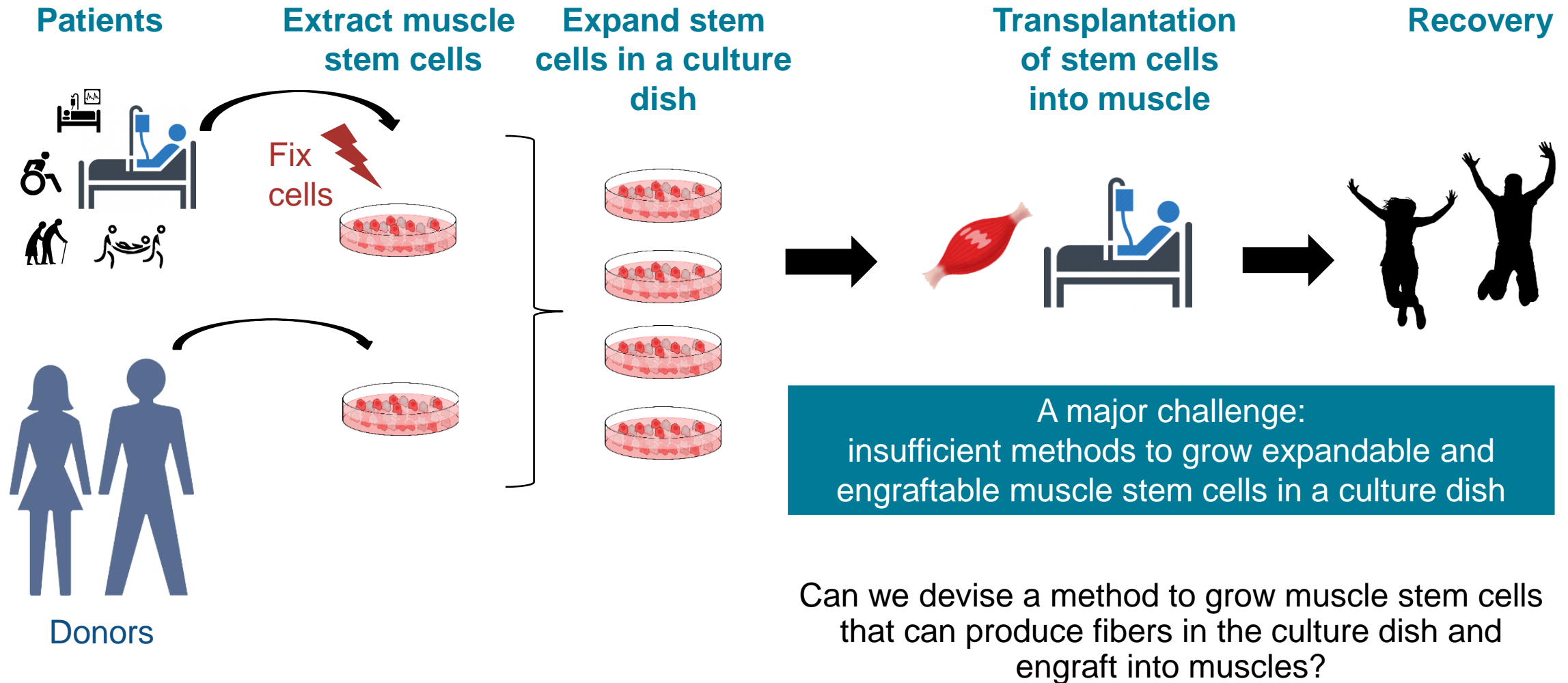
Treatment approaches:



Stem Cell Therapy?

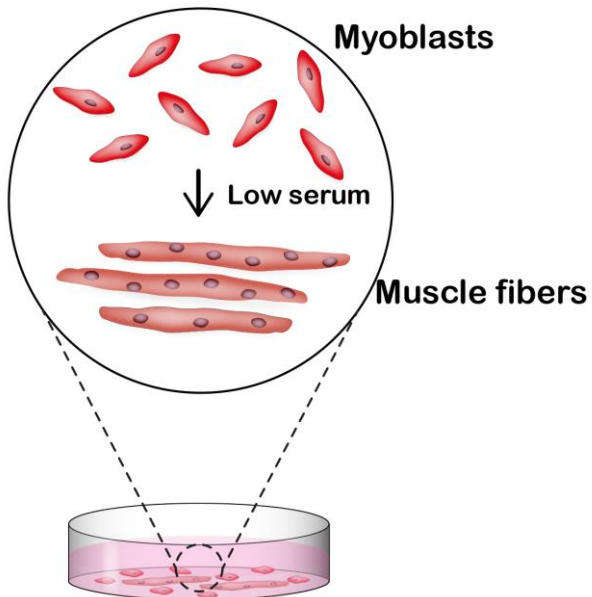
Muscle-related diseases cost the worldwide healthcare system hundreds of billions of dollars

The mission of stem cell therapy for muscle diseases



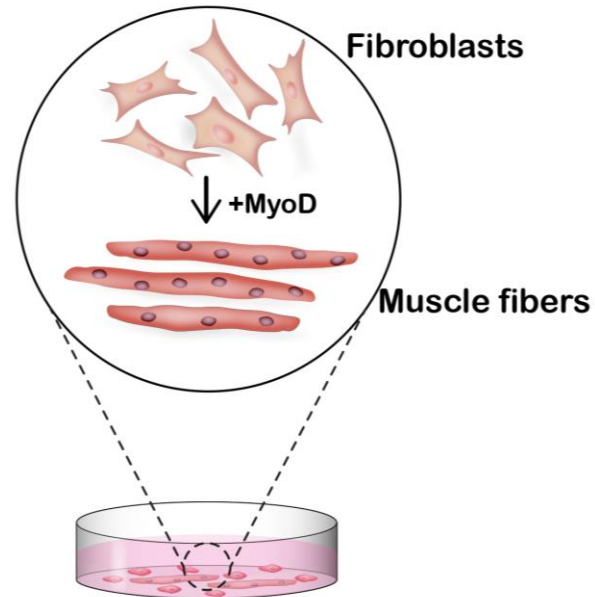
Methods to generate and expand mouse skeletal muscle cells in a culture dish

Differentiation (1980s)



**Limited expansion
and engraftment**

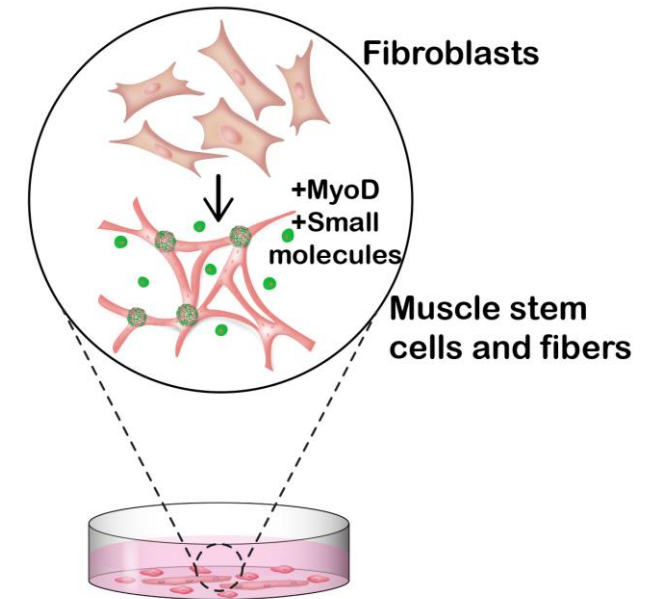
Trans-differentiation (Davis et al., 1987)



**No expansion
or engraftment**

Our approach:

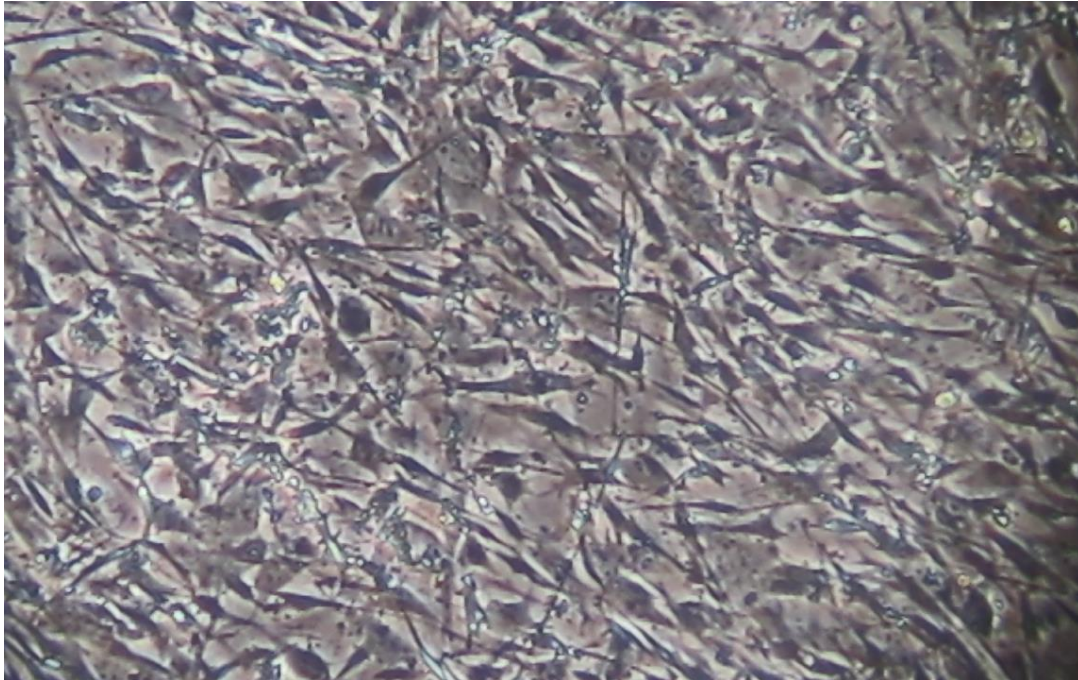
Cellular reprogramming (Bar-Nur et al., 2018)



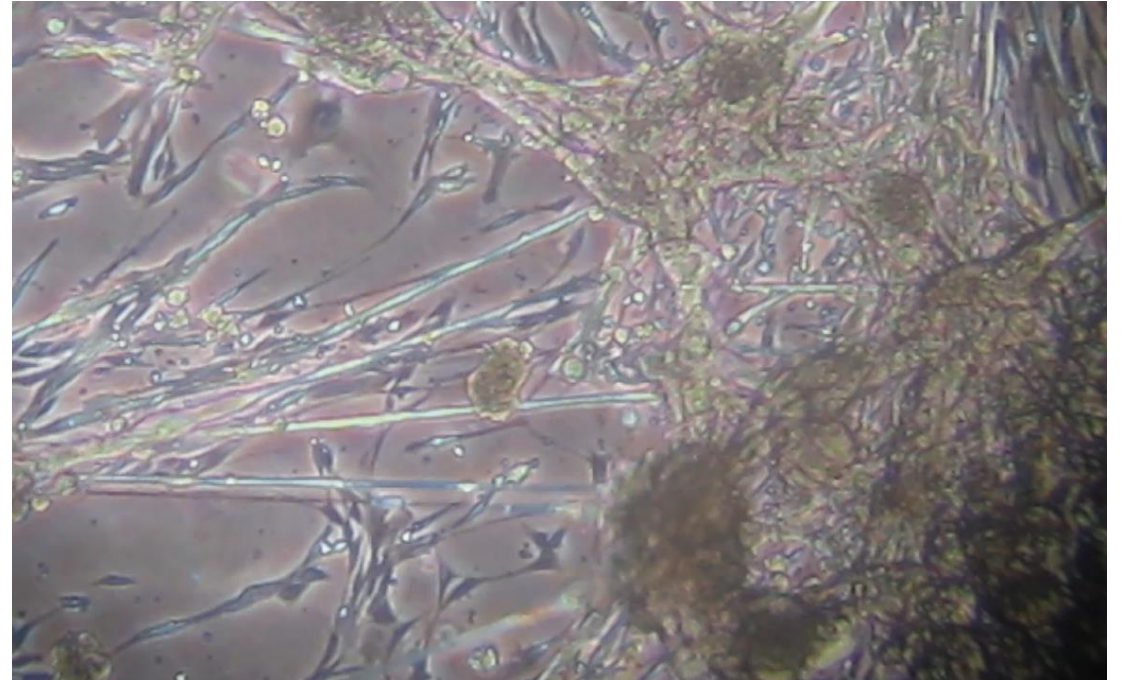
**Expandable
and engraftable**

Cellular reprogramming of fibroblasts into induced muscle stem / progenitor cells and fibers

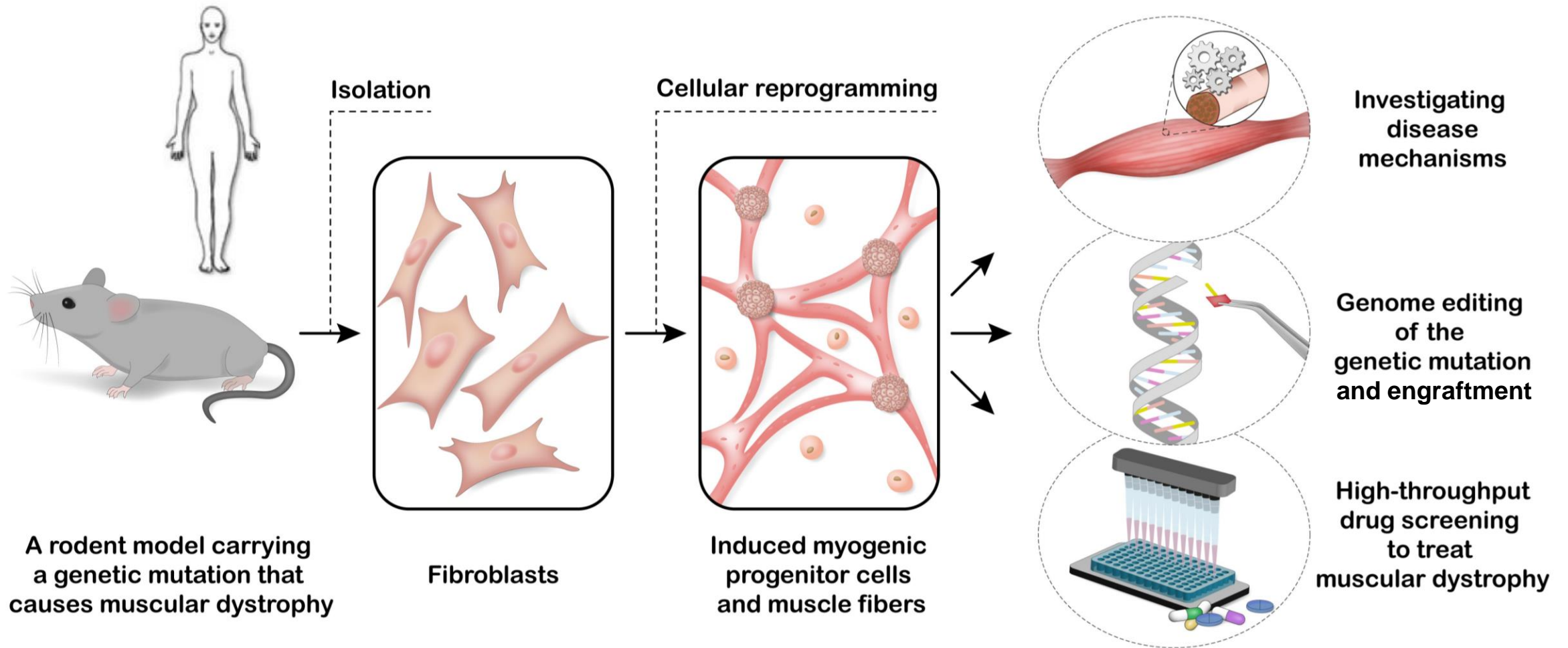
**Fibroblasts
(connective tissue cells)**



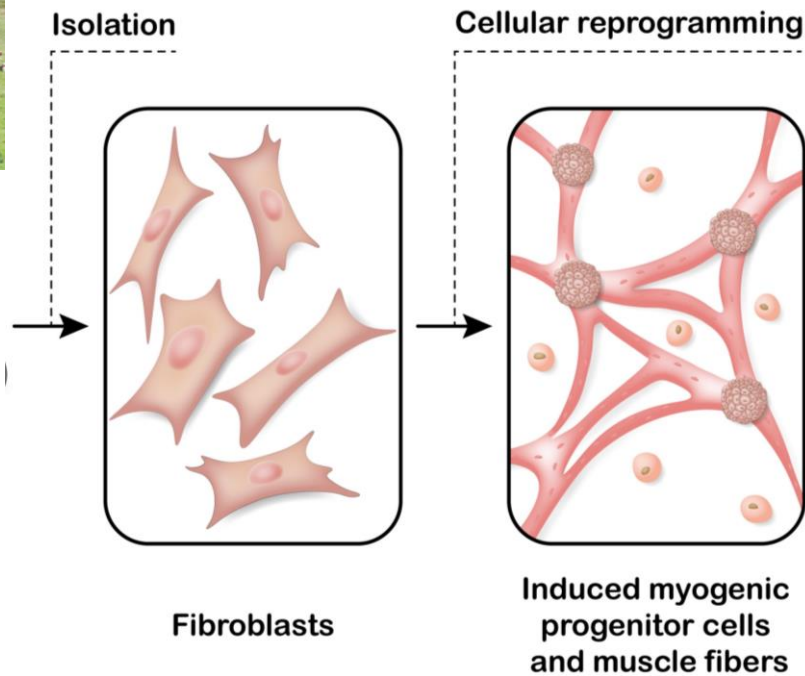
**Muscle stem / progenitor cells
and contracting muscle fibers**



Potential applications of reprogrammed muscle cells for research and stem cell therapy



Cellular reprogramming for cultivated meat production



Cultivated meat grown in lab



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Thank you for your attention!

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