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For immediate release

Isolation of adult muscle stem cells for skeletal muscle repair

EuroStemCell researchers from the Institut Pasteur have isolated muscle stem cells displaying a high potential for muscle repair. These stem cells are much more effective in promoting muscle repair than the cultured cells previously used. This work, published on September 1st in Science, tells us more about adult muscle stem cells and sheds new light on the potential of these cells in the treatment of muscular defects.

Following the successful use of blood stem cells to reconstitute cells damaged in diseases like leukaemia, researchers have been interested in the use of other types of stem cells to repair adult tissue damaged through injury or degenerative disease. However, it has until now been difficult to isolate pure populations of adult stem cells in large numbers.

The researchers have developed a new purification procedure that gives direct access to muscle stem cells. These cells can both repair and contribute to the progenitor cell population of damaged muscles. Says researcher Didier Montarras: "the cells we have isolated are major contributors to muscle regeneration, and have therapeutic potential."

The cells are also more efficient contributors to muscle repair than the cultured muscle precursor cells previously used. 20,000 purified muscle stem cells were as efficient as one million cultured cells in muscle fibre repair, when grafted in dystrophic mouse muscles. Margaret Buckingham, leading the Institut Pasteur team, explains: "this higher regenerative capacity reflects these cells' ability to more effectively colonise grafted muscle. Cultured cells undergo modifications that make them less efficient, probably partly because they tend to differentiate too quickly, losing their ability to regenerate damaged cells."

This work from the Institut Pasteur and CNRS in France, follows a series of recent EuroStemCell discoveries about the origin and evolution of skeletal muscle stem

cells. It paves the way for the isolation of human muscle stem cells and, ultimately, their therapeutic use for the repair of degenerated skeletal muscles.

This research has been financed jointly by the Institut Pasteur, the CNRS (Centre National de la Recherche Scientifique), The AFM, (Association Française contre les Myopathies), the Integrated project EuroStemCell (European Consortium for Stem Cell Research), the MRC (Medical Research Council) and the Muscular Dystrophy Campaign.

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NOTES FOR EDITORS

Source :

« ***Direct isolation of satellite cells for skeletal muscle regeneration*** » **Science**, 1 September 2005.

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Definitions :

Stem cell - cell that has the ability to multiply without limit, and can also give rise to specialized cell types in the body.

Muscle stem cell – stem cell present in muscle that can make copies of itself as well as giving rise to the muscle precursor cells, which contribute to fiber repair or new fiber formation.

EuroStemCell is a four-year Integrated Project of the European Union's Sixth Framework Programme, and will receive up to €11.9 million in funding from the EU. The 24 participating laboratories are from Scotland, England, Sweden, France, Denmark, Italy, Germany, and Switzerland, and comprise universities, research institutes and 3 biotechnology companies. EuroStemCell's mission is to build the scientific foundations required to take stem cell technology to the clinic. Further information on EuroStemCell is available at www.eurostemcell.org

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