

Effect of uniaxial cyclic strain on myogenesis of adipose-derived stem cells

Zachar, Vladimir; Botha, Jaco; Bundgaard-Nielsen, Caspar; Hahn-Pedersen, Julie; Pennisi, Cristian Pablo

Publication date:
2012

Document Version
Early version, also known as pre-print

[Link to publication from Aalborg University](#)

Citation for published version (APA):

Zachar, V., Botha, J., Bundgaard-Nielsen, C., Hahn-Pedersen, J., & Pennisi, C. P. (2012). *Effect of uniaxial cyclic strain on myogenesis of adipose-derived stem cells*. Abstract from ISSCR Annual Meeting, International Society for Stem Cell Research, Yokohama, Japan.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

Take down policy

If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.

EFFECT OF UNIAXIAL CYCLIC STRAIN ON MYOGENESIS OF ADIPOSE-DERIVED STEM CELLS

Zachar, Vladimir, Botha, Jaco, Bundgaard-Nielsen, Caspar, Hahn-Pedersen, Julie, Pennisi, Cristian P.

Aalborg University, Aalborg, Denmark

Abstract:

Adipose-derived stem cells (ASCs) hold potential for engineering of muscle tissue due to their ability to differentiate into the skeletal myogenic lineage. Current approaches to induce *in vitro* skeletal muscle differentiation require long culturing time and result in a poor yield. Previously, we have established the role of uniaxial cyclic tensile strain (CTS) in driving the assembly and differentiation of skeletal myocytes *in vitro* using mouse model system. The aim of the current work was to explore the effect of CTS on the skeletal myogenic differentiation of ASCs.

ASCs were cultured on flexible-bottomed culture plates (Flexcell). After confluence, the cells were incubated in reduced serum conditions and subjected to uniaxial CTS for 48 h. Differentiation profiles were assessed by morphological and biomolecular indicators.

The CTS protocol produced an array of cells aligned perpendicularly to the axis of strain. In addition, mechanical stimulation induced a significant increase in the number of multinucleated cells. Immunofluorescence staining revealed the presence of a large percentage of myosin heavy chain positive myotubes. Furthermore, the myofibrillogenesis was confirmed by the presence of actin/myosin cross striations.

These results indicate that mechanical stimulation increases the rate of myogenic differentiation of ASCs *in vitro*. This opens the perspective of using mechanically preconditioned ASCs for tissue engineering applications involving muscle tissue.

:

[International Society for Stem Cell Research](#)

111 Deer Lake Rd, Suite 100

Deerfield, IL USA 60015

General questions can be directed to ISSCR headquarters at isscr@isscr.org

If you need technical support:

[OASIS Helpdesk](#) or 217-398-1792

Powered by [OASIS](#), The Online Abstract Submission and Invitation System SM

© 1996 - 2012 [Coe-Truman Technologies, Inc.](#) All rights reserved.