ESRF	**Experiment title:** Muscle-derived stem cells for musculoskeletal tissue regeneration: a comparative study by microCT in various experimental environments	**Experiment number**: SC-2129
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Report:

Tissue engineering approaches for skeletal muscle regeneration have been proposed [1], new efforts to better understand the reciprocal interactions between cells and bio scaffolds should be made. In this context, we compared how human mesenchymal stem cells (hMSC) and murine MSC (mMSC), induced toward myoblastic differentiation, interacted with several different materials used as scaffolds, namely PLGA/PLLA (50/50) (Concordia Fibers, USA) and Tissucol (Baxter SpA, Italy) [2,3].
In particular $50x10^3$ MSC, undergone myoblastic differentiation using 5-Azacytidine (10μM/l) and labelled with Endorem®, were seeded in each scaffold. After 15 days in culture, the cells/scaffold combinations were processed for cell growth and differentiation analysis by Thymidine uptake test and molecular analysis by RT-PCR, respectively. Twin cells/scaffold combinations were formalin-fixed for microCT analysis using Synchrotron Radiation (ESRF Beamline BM05, Grenoble, France) with the aim to identify whether muscle and hematopoietic stem cells from normal and dystrophic tissues express changes in vitro in various experimental environments. [4]. Cells growing rate was higher for cells seeded on Tissucol, but the micro-CT images were clearer for cells seeded on the PLGA/PLLA scaffold, depicting a three-dimensional organization of cells around the fibres (Fig.1). Moreover, the obtained data showed the spatial distribution of

injected human stems cells and large differences in muscle formation in respect various three-dimensional scaffolds.
These results support the possibility of using stem/precursor cells and bio scaffold for the repair of damaged skeletal muscle.

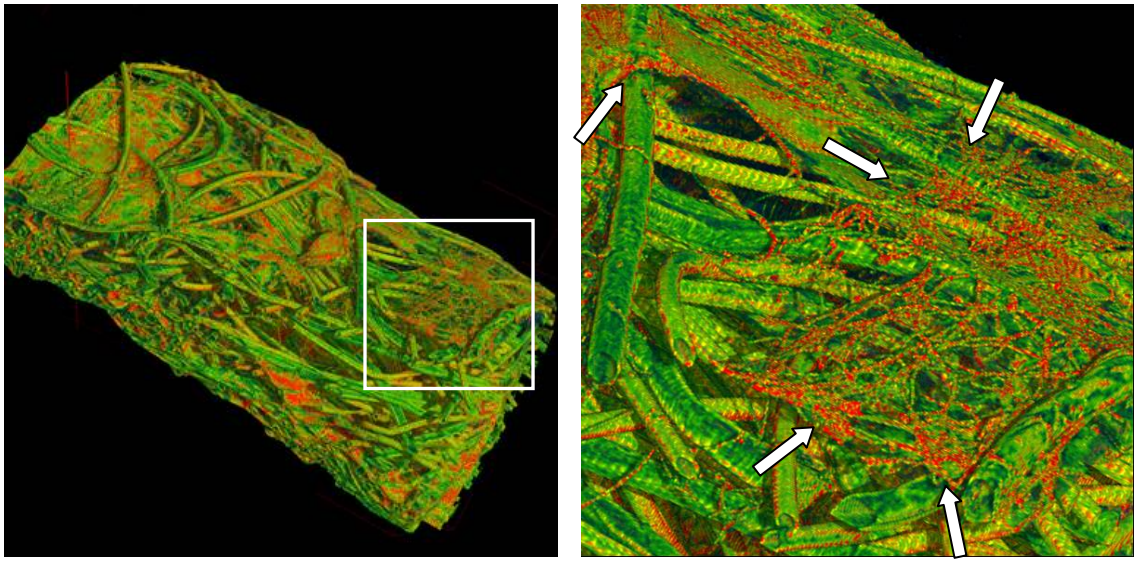

Fig. 1. MicroCT images showed cells seeded on the PLGA/PLLA scaffold, depicting 3D organization of cells around the fibres.

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