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# EXTRACELLULAR MATRIX ENGINEERED WITH EXTRACELLULAR VESICLES SUPPORTS TISSUE REGENERATION IN A MURINE MODEL OF VOLUME MUSCLE LOSS

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**Repair of skeletal muscle loss due to trauma, surgical resection or malformations represent a challenge for clinicians. Several attempts to create a bioscaffold to substitute skeletal muscle have been done and the use of extracellular matrix (ECM) from decellularized tissues to replenish volume muscle loss defects is one of the most promising approaches. However, the development of fibrosis still represents a major drawback. It is known that intercellular signals mediating tissue repair such as tissue renewal, vascularization and immune regulation, are convoyed via extracellular vesicles (EVs), biologically active nanoparticles secreted by the cells and composed of a lipid bilayer including cytoplasmic content. The aim of this work is to analyze the biological effects of EVs added to ECM scaffolds in a murine model of chronic volume muscle loss. ECM samples were obtained using a detergent-enzymatic protocol and were embedded with EVs isolated either from Wharton Jelly mesenchymal stromal cells (MSC-EV) or from BJ fibroblast cell line (BJ-EV). ECM-EVs were transplanted in mice after tibialis anterior damage. 72 hours post implant, EVs were administered by local and systemic injections. Samples were analyzed by immunofluorescence, flow cytometry and qPCR. Myogenic and macrophage markers were clearly directed toward tissue rebuilding in MSC-EV treated mice with respect to controls and to the BJ-EV treated group, as confirmed by qPCR and flow cytometry analysis. Thirty days post implant the fibrosis (collagen quantification) was significantly reduced in the MSC-EV treated group. Marker of neo angiogenesis and new born centrally nucleated fibers (CNFS) were present in a statistically higher percentage in MSC-EV treated mice with respect to controls and to EV-BJ treated group. ECM engineered with EV-MSC showed a boost on actively replenishing the loss of muscle tissue.**

## Biography

Michela Pozzobon has spent three years at Oxford University as Research Fellow at the Nuffield Department of Clinical Sciences, has completed her PhD from Padova University where she carried on also a postdoctoral period of 3 years. She is PI of the Stem Cells and Regenerative Medicine Laboratory at the Department of Women and Children Health, University of Padova, and Institute of Pediatric Research Città della Speranza. He has published more than 60 papers in reputed journals and has been serving as an Editorial Board Member of repute.

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