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Identification and characterization of murine dermal precursor cells with myogenic potential

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It is recently shown that bona fide, pulsating skeletal muscle myofibres may be generated from dermis-derived cells through recreation of 3D myogenic niche. Interestingly, and after one month culture engineered muscle constructs showed progressive degradation of the myofibres concomitant with fatty infiltration, paralleling the natural course of muscular degeneration. However a critical point to translate these results to humans is to determine the origin and identity of myogenic precursor cells enriched within murine dermal cultures. Knowing that dermal and muscle cells share a common embryonic origin at the dermomyotomal stage, and taking into account that there might be different types of cells within adult skin presenting myogenic potential, the main objective was to identify and characterize the origin and identity of myogenic cells present in dermal cultures. To this end, it was tested as working hypotheses the enrichment of (i) satellite cells from the dermal Panniculus carnosus (PC) muscle, (ii) dermomyotome-derived adult stem/precursor cells, (iii) perivascular cells, and (iv) neural crest-derived precursor cells. In order to trace the origin and identity of dermal myogenic cells, advantage of the following transgenic mice was taken to perform lineage tracing experiments: (i) Pax3-GFP and Pax7CE (tracers of PC-derived satellite cells); (ii) Myf5-Cre (dermomyotome), (iii) Cspg4-Cre (perivascular and glial marker), and (iv) Sox10-Cre (neural crest). Cell tracing combined with FACS-based isolation and myogenic differentiation assays showed a major contribution of Myf5+ cells to the dermis-derived myogenic precursor cell subset, which was at least in part derived from PC satellite cells.

Biography

Patricia García-Parra has completed BSc in Biochemistry (2005) and PhD in Molecular Biology and Biomedicine (2011) from the Basque Country University (Spain) and Master's degree in Neurosciences and Developmental Biology (Pablo de Olavide's University of Seville, Spain) and on Innovation and Technology Management (University of Deusto, Spain). During her Doctoral period in Tecnalia Research and Innovation Co., she formed in the field of biomaterials and stem cells for use in Tissue Engineering. Since 2011, she is working in Biodonostia Health Research Institute (Hospital Donostia, San Sebastian, Spain) where she is a member of the Tissue Engineering team (Neuromuscular Department).

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