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Use of mesenchymal stem cells and scaffolds for improving tendon and skin regeneration

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Tissue engineering techniques and cell-based therapies are commonly accepted *modus operandi* to treat frequently occurring conditions such as traumatic tendon rupture or skin damages since available remedies appear to be ineffective in restoring the original structure and function of the injured tissue. Moreover, the mechanisms behind effectiveness of novel approaches in treating tendon and skin injuries remain poorly characterised. Our laboratory is interested i) in the characterization of adult mesenchymal stem cells (MSC) from different sources, ii) in studying the tenogenic differentiate pathway and iii) in the application of MSC on bio-scaffolds, taking into account that one of the major aim of regenerative medicine is to realize experimental techniques that take maximal advantage of natural reparative processes. For instance, the regenerative capabilities are formidable in marine invertebrates, especially thanks to their mutable connective tissue that can be isolated and used to prepare film and 3D scaffolds. Therefore, one of our research goals is to mix adult stem cells with an innovative and low-cost source of native intact collagen fibril since these matrices have the potential to be used particularly where high mechanical performances are required. It has also been studied the delivery and viability of cells injected in different kind of bio-scaffolds; in particular, two main types of cells were injected: undifferentiated cells (mesenchymal stem cells) or cells differentiated towards a specific fate with the use of TAT sequence. Here, I summarize and discuss the most significant results of our research obtained *in vitro* and *in vivo*, regarding the production of bio-scaffolds together with the use of adult stem cells for treating tendon and skin lesions.

Biography

Marco Patruno is an Associate Professor of the Department of Comparative Biomedicine & Food Science, University of Padova, Italy. Patruno obtained the degree of Animal Science from the University of Milano, Italy in 1995 and his PhD in Developmental Biology from Royal Holloway, University of London, UK, in 2001. He published several international papers and chapters in scientific books. Patruno teaches Veterinary Histology, Embryology and Anatomy and his interests are related to regenerative processes, muscle development and the potential of adult stem cells isolated from different.

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