NEW INSIGHTS INTO MUTABLE COLLAGENOUS TISSUE: WORK IN PROGRESS AND APPLIED PERSPECTIVES IN *PARACENTROTUS LIVIDUS*

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The mechanically adaptable connective tissue of echinoderms (Mutable Collagenous Tissue, MCT), which can undergo drastic nervously-mediated changes in stiffness, tensile strength and viscosity, represents a promising model for biomaterial design and biomedical applications. MCT could be a source of inspiration for new composite materials whose molecular interactions and structural conformation can be changed in response to external stimuli.
MCT is composed of collagen fibrils comparable to those of mammals plus other fibrillar structures, proteoglycans and glycoproteins. According to literature, the extracellular matrix of holothurians includes at least two glycoproteins, *stiparin* and *tensilin*, that can modulate the aggregation of collagen fibrils and their capacity for reciprocal sliding.
This contribution presents the latest results of a detailed analysis of MCT components in *Paracentrotus lividus*: focusing on biochemical characterization of the fibrillar components (extraction, purification and quantification) and biomolecular analysis of the glycoprotein components. The final aims will be to confirm the presence and the role of these glycoproteins in echinoids and to manipulate simpler components in order to produce a composite with mutable mechanical properties.
In the long term, MCT could provide inspiration for biomimetic materials and offer great potential for economically relevant biotechnological and clinical applications that require the controlled and reversible plasticization and/or stiffening of connective tissue.