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## Building Skeletal Muscle from Scratch

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Several acquired or congenital pathological conditions can affect skeletal muscle, leading to irreversible loss of muscle mass and function - volumetric muscle loss (VML). Decellularised tissues are natural scaffolds derived from tissues or organs, in which the cellular and nuclear contents are eliminated, and the tridimensional (3D) structure and composition of the extracellular matrix (ECM) are preserved. Such scaffolds retain biological activity, are biocompatible and do not show rejection after allogeneic or xenogeneic transplantation. Increasing reports suggest that decellularised tissues are promising candidates for their clinical application in patients affected by VML. We investigated the ability of three different decellularised skeletal muscle scaffolds to support muscle regeneration in axenogeneic immune-competent model of VML, in which the EDL muscle was surgically resected. All implanted acellular matrices, used to replace the resected muscles, were able to generate functional artificial muscles by promoting host myogenic cell migration and differentiation, as well as nervous fibres, vascular networks, and satellite cell (SC) homing. However, acellular tissue mainly composed of ECM allowed better myofibre 3D organization and the restoration of SC pool, when compared to scaffolds which also preserved muscular cytoskeletal structures. Finally, we showed that fibroblasts are indispensable to promote efficient migration and myogenesis by muscle stem cells across the scaffolds *in vitro*. This data strongly support the use of xenogeneic acellular muscles as device to treat VML conditions in absence of donor cell implementation, as well as *in vitro* model for studying cell interplay during myogenesis.

### Biography:

Anna Urciuolo started her scientific career at University of Padova (Italy), in the lab of Prof. Paolo Bonaldo, where Anna Urciuolo had the possibility to reach high stages of competence on ECM, skeletal muscle homeostasis, disease and regeneration. By moving in the lab of Prof. Paolo De Coppi at UCL-ICH (UK) Anna Urciuolo entered in the field of tissue engineering, by applying decellularized organs for regenerative medicine. Then in Prof. Nicola Elvassore's lab at University of Padova, Anna Urciuolo implement her specialization on tissue engineering, stem cells and biomaterials. At date, Anna Urciuolo a young principal investigator at the University of Padua.