

Research title

Basic science for tissue engineering in veterinary orthopaedic research

Approccio morfofunzionale all'ingegneria dei tessuti nella ricerca ortopedica veterinaria

Tutor

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State of the art and aims of the project

Current orthopaedic tissue engineering efforts are focused on replacement of target tissue (i.e. bone, cartilage, fibro-cartilaginous tissue). The tissue engineering approach on articular reconstruction combines cells, biomaterials and biological agents that controls the formation and maintenance of tissue with properties similar to the native tissue. For engineered constructs to succeed, the characterization of the native tissue properties (cellular, biochemical, biomechanical) must be conducted as first, so that tissue engineering efforts can be designed to create constructs to simulate the native tissue. Each level of tissue characterization and development, is the focus of active research.

Targets:

1. Use of native chondrocytes and/or osteoblasts to understand how some biological agents may modulate proliferation and/or differentiation.
2. Use of alternative cell populations in the definition of optimal culture and timing. Analysis of the morphological, biochemical and mechanical properties acquired from the cellular compounds at different culture and times in vitro.

Recent publications of the tutor in the field

1. Peretti GM, Polito U, Di Giancamillo M, Andreis ME, Boschetti F, Di Giancamillo. Swine meniscus femoral-tibial surfaces properly tuned to bear the forces exerted on the tissue? *Tissue Engineering Part A*. 2019. doi: 10.1089/ten.TEA.2018.0197.
2. Di Giancamillo A, Deponti D, Raimondi MT, Boschetti F, Gervaso F, Modina S, Mangiavini L, Peretti GM. 2017. Comparison between different cell sources and culture strategies for tendon tissue engineering. *Journal of Biological and Regulatory Homeostatic Agents*. 2017 Oct-Dec;31(4 suppl 1):61-66.
3. Di Giancamillo A, Deponti D, Modina S, Tessaro I, Domeneghini C, Peretti GM. (2017), Age-related modulation of angiogenesis-regulating factors in the swine meniscus. *Journal Cellular and Molecular Medicine*. 2017 Jun 4. doi: 10.1111/jcmm.13218. [Epub ahead of print]. ISSN: 1582-4934.
4. Di Giancamillo A, Deponti D, Gervaso F, Salvatore L, Scalera F, Mangiavini L, Scurati R, Sannino A, Peretti GM. 2017. The analysis of different scaffolds and the benefit of fibrin glue for tendon tissue engineering at different culture times. *Journal of Biological and Regulatory Homeostatic Agents*. 2017 Oct-Dec;31(4 suppl 1):67-73.
5. Di Giancamillo A, Andreis ME, Taini P, Veronesi MC, Di Giancamillo M, Modina SC. (2016). Cartilage canals in newborn dogs: histochemical and immunohistochemical findings. *European Journal of Histochemistry*. 2016. 15;60(3):2701. doi: 10.4081/ejh.2016.2701. ISSN: 1121-760X.