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Musculoskeletal

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The Musculoskeletal Disease Area (MSD) is focused on the identification of therapies for acquired and inherent forms of muscle loss and weakness; neuromuscular degeneration and inherent neuromuscular diseases; debilitating bone and mineral metabolism disorders as well as tendon/ joint repair subsequent to injury and tendinopathy. MSD's efforts are evolving toward 1) integrated approaches to musculoskeletal healthcare, for example pursuing the discovery of myokines that impact tendon, cartilage, bone, and motor neurons, and the elucidation of signaling mechanisms underlying the mechano-responsiveness of musculoskeletal tissues and 2) in situ guided musculoskeletal tissue regeneration by combining matrix and device technologies with drug candidates, enabling controlled on-demand release into the target tissue, to augment or direct repair processes in particular musculoskeletal tissues.

We aim to improve tendon injury repair and to develop causal treatments of tendinopathy to restore functionality. In order to do so, we aim to better understand the processes responsible for tendon growth and pathogenesis. In particular, the validation of tendon markers and robust cellular tenogenic differentiation protocols would benefit to the whole tendon community. In order to identify the second generation of tendon markers and the mechanisms regulating tendon cell fate determination, we you will create and implement novel cellular and organotypic assays. A wide range of pathway modulating tools and techniques ranging from epigenetic profiling to intravital imaging of tendon organ culture will allow us to better understand this challenging but fascinating organ.

Selected Publications

Age-dependent regulation of tendon crimp structure, cell length and gap width with strain
Legerlotz K, Dorn J, Richter J, Rausch M, Leupin O.
Acta Biomater. 2014 Oct;10(10):4447-55.

Bone overgrowth-associated mutations in the LRP4 gene impair sclerostin facilitator function.
Leupin O, Piters E, Halleux C, Hu S, Kramer I, Morvan F, Bouwmeester T, Schirle M, Bueno-Lozano M, Fuentes FJ, Itin PH, Boudin E, de Freitas F, Jennes K, Brannetti B, Charara N, Ebersbach H, Geisse S, Lu CX, Bauer A, Van Hul W, Kneissel M.
J Biol Chem. 2011 Jun 3;286(22):19489-500.

Exclusion of CD45 from the T-cell receptor signaling area in antigen-stimulated T lymphocytes.
Leupin O, Zaru R, Laroche T, Müller S, Valitutti S.
Curr Biol. 2000 Mar 9;10(5):277-80.

Click here for additional publications.

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