OPEN PhD POSITION in Innovative Training Networks

We are looking for a dedicated and highly motivated Early Stage Researcher (ESR), who will join our team to build multidisciplinary expertise for fostering future medical solutions applied to tendon repair and diagnosis.

P4 FIT description (4 years MCSA-ITN-EJD project starting January 2021)

Perspectives For Future Innovation in Tendon repair (P4 FIT) fosters to build a new generation of ESRs with adequate skills to explore non-conventional therapeutic and diagnostic solutions by exploiting the technological advances in nanomedicine. The translation of innovative nanodevices carried out on integrated pre-clinical and vet/human clinical settings are expected to produce solid evidence-based datasets able to reduce fragmentation still limiting the impact of biomedical discoveries and to offer a unique opportunity for identifying new predictive biomarkers through the use of AI and deep learning data analysis. Working across disciplines and sectors, **P4 FIT** will foster the 15 ESRs to be creative, critical, autonomous intellectual risk takers at the frontiers of research with the R&I mind-set necessary for thriving careers. **P4 FIT** will allow to fill the EU gap in tendon healthcare, building up a generation of researchers able to develop nano-based biomedical devices by integrating biology advances to technology innovation, and to computational revolution. The **P4 FIT** cross-disciplinary approach includes 6 beneficiaries and 21 partner organizations (10 academic and 11 non-academic) from across Europe.

ESR10 – FAU (double degree with University of Keele)
Novel porous natural-origin polymeric patches for rotator cuff tendon repair

Objectives: To use polymers of natural origin in combination with benign solvents for the fabrication of porous patches, by using freeze drying and porogen leaching technique for rotator cuff tendon repair.

Expected Results: (1) Combination of different polymers of natural origin (collagen, gelatin, cellulose, and chitosan) to trigger and optimize the mechanical properties of the scaffolds (patches). (2) Investigation of the use of “green” (or at least with low toxicity) cross-linkers for the selected polymers and blends. (3) For the selected polymers and blends, optimization of the parameters of freeze-drying (modification of freezing and drying conditions) for the formation of ordered porous structure. (4) Optimization of the porogen leaching technique for selected polymers and blends. (5) *In vitro* biocompatibility tests assessed with amniotic membrane-derived stem cells. (6) Explore the biomechanical functionality, ensuring the required non-linear behavior and load transmission competence of the composite tendon biomimetic scaffold. (7) Test *in vitro* the biocompatibility and teno-inductive properties of developed tendon biomimetic scaffold bio-engineered with hBM-MSCs cultivated under static and dynamic teno-inductive conditions. (8) Optimize imaging procedures to acquire high-resolution, high-content, 3D representations of collagen and fibrin fibrillar structure on bio-hybrid scaffolds using advanced microscopy techniques (SHIM and TPEM). (9) Comparative physicochemical and in vitro studies of innovative scaffolds using hBM-MSCs under teno-inductive culture conditions.

Keywords: Tendon, Stem Cells, Tissue Engineering, Biomaterials, Bioreactors, Imaging, Biomedical Engineering

Applicant Profile: Master level in biology, chemistry, engineering or related fields, ideally with a background in biology, materials science, biotechnology, biomedical engineering, biochemistry, tissue engineering, animal studies or immunotherapy. Excellent communication skills (both written and oral) in English.

PhD main locations: The recruited ESR is given the opportunity to conduct 3-years of PhD studies at Institute of Biomaterials, Friedrich Alexander University Erlangen-Nuremberg (FAU, Germany) and at School of Pharmacy and Bioengineering, University of Keele (United Kingdom), and secondements at University of Minho (Portugal) and at ASSUT Europe S.p.A. (Italy).

Double PhD Tutors: Prof. A. R. Boccaccini (Doctoral Programme in Engineering (Biomaterials), FAU); Prof. N. Forsyth (Doctoral Programme in Cell and Tissue Engineering, KU).

Main contacts:

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More details about P4 FIT project, requirements for the candidates and recruitment procedure:

www.p4fit.eu/jobs