



This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 955685.



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.

ESR12 – FAU (double degree with University of Keele)

Bio-activated nanofibers scaffolds integrated with advanced drug delivery systems for tendon treatments

Objectives: To use electrospinning technique to synthesize functionalized bioactive nanofibers integrated with nanovectors (NVs) and multidrug delivery systems for tendon cure.

Expected Results: (1) Synthesis functionalized nanofiber scaffolds by combining electrospinning and layer-by-layer deposition of bioactive molecules involved in immune-stimulation and tendon regeneration, and loading with therapeutic multilayered and complex nanohybrid platforms (MCNPs). (2) Characterize the biochemical and biophysical properties of functionalized bioactive fiber scaffolds (FBFS) before and after surface conjugation of bioactive molecules and MCNPs loading. (3) Quantify the concentration of bioactive molecules per scaffold surface area and the number of loaded MCNPs per FBFS. (4) Test *in vitro* the biocompatibility and teno-inductive potential of the functionalized nanofiber scaffold embedded with human bone marrow stem cells (hBM-MSCs) cultivated in static and dynamic culture conditions, using a bioreactor system. (5) Explore the biomechanical functionality ensuring the required non-linear behaviour and load transmission competence of FBFS. (6) Test *in vivo* the biocompatibility and therapeutic activity of FBFS on mice model pre-clinical studies. (7) Recording mice movement and vital data in the DVC Digi-Lab cages. (8) Optimize imaging procedures to acquire high-resolution, high-content, 3D representations of collagen and fibrin fibrillar structure in *ex vivo* tendon explants by advanced microscopy techniques, and visualize tendon regeneration.

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 secondments at [University of Minho \(Portugal\)](#), at [Faculty of Bioscience, Agri-Food and Environmental Technology, University of Teramo \(UNITE, Italy\)](#), at [Consiglio Nazionale delle Ricerche \(CNR-EMMA, Italy\)](#), at [Tecniplast \(Italy\)](#), and at [iDelivery \(Italy\)](#).

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