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## 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.

### ESR9 – KU (double degree with Friedrich Alexander University Erlangen-Nuremberg)

#### Nano-delivery to enhance stem-cell/synthetic hybrid-based tendon regeneration protocol

**Objectives:** To determine *in vitro* the optimized cell/synthetic hybrid combinations to improve tendon regeneration protocols.

**Expected Results:** (1) Comparative stem cells tenogenic and immunomodulatory activities, using hBM-MSC as a benchmark cell lineage under 2D and 3D culture conditions. (2) Optimization of *in vitro* culture conditions (e.g., oxygen tension, biomechanical stimulation) to improve biological cell performance. (3) Proof-of-concept studies on nanovectors (NVs) or functionalized related electrospun fibrous scaffolds for cell-instructive effect by orienting biomolecular and spatial cues. (4) Tenogenic *in vitro* assessment of stem cells embedded in composite living fibers (CLFs) made by hydrogels containing NVs with teno-inductive cues with controlled spatial-temporal release. (5) Cytotoxicity tests on hydrogel and NVs. (6) Assessment of differentiating capacity in 3D bioreactor system of scaffold from immature to co-mature status. (7) Non-invasive and invasive imaging to measure tendon fibril formation, and scaffold/cell interface by using, e.g., P-OCT, SEM, birefringence, histology and junction stability under force. (8) Biomechanical features including isometric force, specific force and tangent modulus will be confirmed alongside native tissue.

**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 [School of Pharmacy and Bioengineering, University of Keele \(United Kingdom\)](#) and at [Institute of Biomaterials, Friedrich Alexander University Erlangen-Nuremberg \(FAU, Germany\)](#), and secondments at [Faculty of Pharmacy, University of Helsinki \(UH, Finland\)](#) and at [Fidia Farmaceutici S.p.A. \(Italy\)](#).

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

#### Main contact:

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

[www.p4fit.eu/jobs](http://www.p4fit.eu/jobs)