



FIDELIO
Bone health in diabetes

Training network for research into bone Fragility In Diabetes in Europe – towards a personalised medicine approach

This project has received funding from the European Union's Horizon 2020 research and innovation program under the MARIE SKŁODOWSKA-CURIE grant agreement no. 860898



PhD student – Early Stage Researcher (ESR8) Mechanoregulation of bone remodeling in type 2 diabetes using HRpQCT in vivo patient data

About FIDELIO

The EU-funded Innovative Training Network FIDELIO (<https://www.fidelio-project.eu>) aims to train the next generation of scientists in order to tackle the challenges of diabetic bone disease from various angles and with the newest technologies available. Interdisciplinary training and implementation of innovative approaches are key. Within this consortium, we will comprehensively unravel the genetic and environmental mechanisms that contribute to bone fragility in diabetes, identify predictors and clinical markers for patient stratification, decipher the underlying molecular mechanisms of bone fragility in diabetes, and establish potential interventions through a personalised medicine approach.

The research programme will address different aspects of diabetic bone disease from the viewpoints of epidemiology, genetics, miRNAs, microbiome, bone biology, bone biomechanics and microstructure, preclinical and clinical research. It will utilise advanced imaging and computational approaches, diabetes mouse models and access to clinical cohorts and registry data to obtain a comprehensive overview of how these mechanisms combine in diabetes to cause increased fracture risk.

With this interdisciplinary approach, we can explore the impact of biological pathways in mouse models and/or humans, and interactions with diet, exercise and other exposures. Collaborations with industry will allow early identification of IP, access to state of the art technologies, and will complement the academic ESR training programme with entrepreneurship and industrial mentoring.

About the host organization

ETH Zurich has come to symbolize excellent education, ground-breaking basic research and applied results that are beneficial for society. Founded in 1855, it today offers researchers an inspiring environment and students a comprehensive education as one of the leading international universities. ETH Zurich has more than 20,000 students and more than 500 professors. 21 Nobel Laureates have studied, taught or conducted research at ETH Zurich, underlining the excellent reputation of the university (www.ethz.ch).

The **Institute for Biomechanics** is a multidisciplinary research unit dedicated to the biomechanical investigation of the musculoskeletal system from macro (organ) to micro (cell) down to nano (molecule) with more than 100 scientists working in the Institute. Professor Müller as the Head of the **Laboratory for Bone Biomechanics** has pioneered micro-tomographic imaging (microCT) of biological tissues both in vitro and in vivo, a technology that has been commercialized as a spin-off from ETH Zurich in the mid-1990s and is now successfully used in hundreds of laboratories and companies around the globe for research and development. The research the Laboratory is currently pursuing employs state-of-the-art biomechanical testing and simulation techniques as well as novel bioimaging and visualization strategies for musculoskeletal tissues. Today, these techniques are successfully employed for the quantitative assessment and monitoring of structure function relationships in tissue regeneration, growth and adaptation. These approaches are now often used for precise phenotypic characterization of tissue response in mammalian genetics, mechanobiology as well as tissue engineering and regenerative medicine (www.bone.ethz.ch).

Task description

Your PhD project:

You will develop novel bone imaging and computational methods for mechanobiological bone remodeling studies from bench (supercomputer) to the bedside (clinical computing) in the hospital environment. These approaches will then be used to investigate the effects of diabetes on local mechanoregulation of bone remodeling in T1D and T2D as well as appropriate controls, identifying its relationship to bone fragility, and the biomarkers, which are directly linked to this impairment in mechanoregulation. This will allow to describe alterations in the mechanobiological control of bone remodelling in T2D and identification of novel biomarkers predicting disturbed mechanoregulation in T2D patients using state-of-the-art high-resolution patient imaging and computational modeling.

Secondments:

You will embark on secondments to other FIDELIO partners (USFD (UK), IBM (CH)) to access experimental models or tools or receive training not available in the home laboratory. This will include training in how HRpQCT imaging is used in clinical practice in Sheffield as well as code optimization at IBM in Zurich. Total secondment time is 4 months.

Benefits of working in an ITN:

- You will be working within our highly international group of more than twenty researchers with experience in a broad range of sciences
- You will get in contact with the other members of this international consortium and will benefit from the joint training platform to develop skills necessary for developing a thorough understanding of the mechanisms of Diabetes and the bone metabolism and for obtaining industry skills

Profile and requirements

- Applicants must hold a MSc or equivalent in the field of biomedical engineering, mechanical engineering, electrical engineering or a related discipline
- Applicants must have a solid knowledge of computer modeling and simulation using Python. Experience with imaging and image processing is desired. Strong interest to work with human clinical data is a prerequisite
- Applicants can be of any nationality
- Applicants must have an ability to understand and express themselves in both written and spoken English to a level that is sufficiently high for them to derive the full benefit from the network training
- Applicants must be eligible to enroll on a PhD program at the host institution (or a designated university in case the host institution is a non-academic organization)

In addition:

H2020 MSCA Mobility Rule: researchers must not have resided or carried out their main activity (work, studies, etc.) in the country of the host organization (Switzerland) for more than 12 months in the 3 years immediately before the recruitment date. Compulsory national service, short stays such as holidays, and time spent as part of a procedure for obtaining refugee status are not taken into account.

H2020 MSCA eligibility criteria: Early Stage Researchers (ESRs) must, at the date of recruitment by the host organization, be in the first four years (full-time equivalent research experience) of their research careers and have not been awarded a doctoral degree. Full-Time Equivalent Research Experience is measured from the date when the researcher obtained the degree entitling him/her to embark on a doctorate (either in the country in which the degree was obtained or in the country in which the researcher is recruited, even if a doctorate was never started or envisaged).

Benefits

- You will be employed by the host organization for 36 months.
- A competitive salary plus allowances. Moreover, funding is available for technical and personal skills training and participation in international research events.
- You will benefit from the designed training program offered by the host organization and the consortium.
- You will participate in international conferences and secondments to other organizations within the FIDELIO network and in outreach activities targeted at a wide audience

Please find additional information in the [Information package for Marie Curie fellows](#)

Application

Interested candidates are invited to apply online at <https://www.fidelio-project.eu/contact/>

Planned key dates:

25 November 2019: Recruitment event in Rome, Italy

Expected start date: January 2020

More information and other vacant positions can be found on <https://www.fidelio-project.eu>

Additional information

We in the FIDELIO consortium value diversity and we commit to equal treatment of all applicants irrespective of gender, sexuality, health status as well as social, cultural or religious background.

For additional information about the research project and this individual position, please contact:

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