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

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PhD student – Early Stage Researcher (ESR7)
Investigating the role of osteocyte and mechanotransduction on bone fragility in type 2 diabetes

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

Founded in 1559 by Jean Calvin, the **University of Geneva (UNIGE)** is dedicated to thinking, teaching, dialogue and research. With 16'500 students (1580 from the medical faculty) of more than 150 different nationalities, it is Switzerland's second largest university. UNIGE offers UNIGE offers more than 500 programs (including 129 Bachelor's and Master's degree programs, 80 doctoral programs) and more than 300 continuing education programs. UNIGE is also host and co-host to seven National Centres of Competence in Research. the The **Bone Disease Service** headed by Prof. Serge Ferrari is one of the leading facilities in the field of bone research with strong links to national and international partners and as a long expertise in the physiopathology of bone fragility in different chronic disease from 1983, and is also a clinical center. Since 2015, they have integrated the Diabetic center where they emphasize the importance of the bone tissue in the context of type 2 diabetes.

We are a dynamic and enthusiastic team of PhD and MD researchers striving to unravel the mechanisms underlying osteoporosis, and bone fragility in other diseases. The state-of-the-art scientific infrastructure at UNIGE and HUG fosters active scientific networking and dialogue, thereby providing the best conditions for conducting excellent research (https://www.unige.ch/medecine/fr/).

Task description

Your PhD project:

You will investigate in vitro whether hyperglycemia in osteocyte cell lines (MLOY4, IDG-SW3 and Ocy454) affect mitochondrial activity, autophagy, apoptosis and signaling pathway involved in mechanotransduction (PPARϒ, Postn, Sost…). In vivo you will characterizes whether Pparγ inhibition in osteocyte, periostin recombinant, and sclerostin-antibody affect autophagy and bone mechanical response in a model of high fat diet & Db/Db mice. The mouse model will be characterized in terms of bone and glucose homeostasis. Two-exercise model will be used treadmill and axial compression of long bone. The student will receive a profound training in cell and molecular biology (culture of cell lines and primary cells, transfections for siRNA/plasmids, WB, real-time PCR, immunofluorescence, viability/apoptosis assays, ELISAs, etc.), animal experimentation, comprehensive bone phenotyping (µCT, mineralization, serum analysis of bone turnover markers, biomechanical testing of bones, histomorphometry) and glucose homeostasis (Euglycemic hyperinsulinmic clamp, GTT, ITT, PET/CT, histology).
Finally, in collaboration with the clinical service periostin and sclerostin new markers of bone quality and fragility will be test in relation to glucose homeostasis in the Geneva Retirees Cohort.

Secondments:

You will embark on secondments to other FIDELIO partners (SDU (DK), UKE (DE)) to access experimental models or tools or receive training not available in the home laboratory. This will include comparing the similarity and difference between our in vitro model and the bioenergetics of human osteoblasts from T2DM, collagen orientation, spatial measurement of non-enzymatic cross-link ratio, and calculation of bone formation/resorption through microCT imaging. Total secondment time is 3 to 6 months.

Further qualifications will be obtained through the collaboration with X. Edward Guo and N Vilayphiou (Scanco) regarding bone response to loading and imagery technics.

Benefits of working in an ITN:

- You will be working within our international group of > 30 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 biology, physiology or a related discipline
- Applicants must have a solid knowledge of cell and molecular biology as well as histology. Experience with animal experimentation is desired. Willingness to work with animals 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.
Eligible researchers must not have spent more than 12 months in the 3 years immediately prior to the date of selection in the same appointing international organisation.

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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