Universität Zürich[UZH]

Zentrum für Zahnmedizin

Universität Zürich[UZH]

Postdoctoral Fellow Position (80%) – Extracellular Vesicles and Bone Regeneration

University of Zurich – Center for Dental Medicine

Duration: 3 years | **Employment:** 80% | **Starting date:** Ideally January 2027

About the Position

The Center for Dental Medicine at the University of Zurich is seeking a highly motivated **Postdoctoral Fellow (80%)** to join an interdisciplinary research project focused on the development of advanced, cell-free strategies for bone regeneration.

Large bone defects remain a major clinical challenge in craniofacial and orthopedic surgery. This 3-year research project aims to investigate the regenerative potential of **matrix-bound extracellular vesicles (MBEs)** compared with conventionally secreted **media-derived extracellular vesicles (MEs)** obtained from osteogenically induced human adipose stromal/stem cells.

The project combines extracellular vesicle biology, stromal cell research, molecular and omics approaches, tissue engineering, biomaterials, and preclinical models. A particular focus will be placed on the integration of extracellular vesicles (EVs) with **3D ceramic-based scaffolds** to enhance osteogenesis, angiogenesis, immunomodulation, and ultimately bone regeneration.

The successful candidate will join a dynamic and interdisciplinary research environment at the **Center of Dental Medicine, University of Zurich**, and contribute to all major aspects of this ambitious project.

Your Responsibilities

- Isolation and purification of EVs.
- Characterization of EVs using techniques such as nanoparticle tracking analysis, transmission electron microscopy, Western blotting, flow cytometry, and molecular analyses.
- Participation in proteomic, transcriptomic, and other omics analyses, including data interpretation and integration with functional datasets.
- Culture and osteogenic differentiation of human adipose stromal cells and other primary cells.
- Development and optimization of 2D and 3D *in vitro* models.
- Functionalization of 3D ceramic-based scaffolds with EVs.
- Evaluation of osteogenic differentiation and mineralization using molecular, biochemical, histological, and imaging approaches.
- Investigation of angiogenic effects using relevant cellular and 3D culture models.
- Assessment of the immunomodulatory properties of EVs.
- Participation in preclinical animal experiments involving bone regeneration and ectopic implantation models.

- Analysis of *in vivo* samples using micro-computed tomography, histology, immunohistochemistry/immunofluorescence, molecular analyses, and image analysis.
- Statistical analysis, interpretation of experimental data.
- Preparation of scientific publications, and presentation of results at national and international conferences.

Your Profile

We are looking for a highly motivated and scientifically curious researcher who enjoys working independently while also contributing to a collaborative and interdisciplinary research environment.

The successful candidate should have:

- A PhD in **Biomedical Sciences, Bioengineering, Biology, Biotechnology**, or a closely related discipline.
- A strong interest in regenerative medicine, tissue engineering, EV biology, or biomaterials research.
- Experience with **EVs** and their isolation and characterization is highly desirable.
- Experience with **primary cells and/or stromal cell culture**.
- Solid experience in molecular and cellular biology techniques, including **qPCR, Western blotting, and flow cytometry**.
- Experience in **bone tissue engineering, biomaterials, and/or 3D cell culture systems**.
- Experience with microscopy and image analysis.
- Experience with animal experimentation and preclinical models is an advantage.
- Experience with proteomics, transcriptomics, bioinformatics, or other omics approaches would be beneficial.
- Skills in **CRISPR/Cas-based approaches, lentiviral infection, or other genetic modification techniques** are desirable but not mandatory.
- Excellent organizational, analytical, and problem-solving skills.
- The ability to work independently while interacting effectively within an interdisciplinary research team.
- Good communication skills and proficiency in written and spoken English.

Additional technical skills and expertise not listed above are also highly welcome.

What we offer

We offer an exciting opportunity to contribute to a multidisciplinary and translational research project at the interface of **EV biology, regenerative medicine, biomaterials, and bone tissue engineering**.

The successful candidate will benefit from:

- A **3-year funded Postdoctoral Fellow position at 80%**.
- An interdisciplinary and collaborative research environment at the University of Zurich.
- Access to advanced technologies and expertise in EV research, molecular biology, cell culture, tissue engineering, biomaterials, imaging, and preclinical models.

- The opportunity to develop an independent scientific profile and contribute substantially to high-impact scientific publications.
- Opportunities for national and international scientific networking and conference participation.
- Close collaboration with researchers and experts across complementary scientific disciplines.

Application

Interested candidates should submit the following documents:

- A detailed **curriculum vitae (CV)**.
- A **motivation letter** describing their research experience, interests, and suitability for the position.
- A **list of publications**.
- Contact details for **references**.

Applications should be sent to **Dr. Julien Guerrero** (julien.guerrero@zzm.uzh.ch) **and PD. Dr. Chafik Ghayor** (chafik.ghayor@usz.ch).