



CDD job offer – Postdoctoral researcher – Mitochondrial transplantation (1 year - renewable contract)

Environment

MSC-Med laboratory UMU7057 (CNRS and Université de Paris) has renowned expertise in translational nanomedicine approaches for cancer therapy and regenerative medicine [1-4]. MSC-Med has pioneered breakthrough technologies that overcome current limitations in the bioproduction and engineering of extracellular vesicles (EVs) for large scale and cost effective clinical use. Particularly, technologies based on turbulence-induced mechanical stress in scalable bioreactors were patented for high yield/high throughput EV production from different adherent and non-adherent cell sources including stromal cells. A 10-fold higher EV yield in a 10-fold faster production time can be achieved with the turbulence technology, compatible with good manufacturing practice (GMP) procedures. A spin-off (EVerZom) was launched to develop large-scale GMP production of on-demand clinical grade EVs based on MSC-Med patented technologies. Another spin-off was launched to develop EV-based therapies combined with a thermoresponsive hydrogel to treat digestive fistulas (Evora Biosciences). MSC-Med team is also developing an EV facility and center of expertise (IVETH) based on innovative and high-throughput analytic methods for EV quantification (Nanoparticle tracking analysis - NTA, Exoview), EV characterization (Raman imaging) and EV isolation/analytics (Asymmetric Flow Field-Flow Fractionation-A4F coupled to multiple detectors) to define quality control for standardized EV in a production flow for industrialization.

Background: Mitochondrial transplantation is a novel therapeutic modality that may be promising to treat several disorders. This approach replaces impaired mitochondria from disease sites by viable, respiration-competent ones isolated from healthy cells.

Mission: We are seeking an **extremely motivated rigorous postdoctoral researcher** to investigate mitochondrial transplantation from bioproduction to biotherapy aspects. The project aims to set-up a manufacturing process in 1 L bioreactors, characterize the obtained mitochondria and analyze their functionality as well as the functionality of the recipient cells.

In this project, the role of the post-doc to be recruited is to implement the bioproduction set-up, a characterization toolbox that will be used to analyze, for instance, the size, the amount and morphology of mitochondria by a combination of analytical approaches. The post-doc will be in charge of **developing protocols, performing analytical and functional tests in a comprehensive way.**

Profile: Background on biochemistry, biophysics, biology or pharmacy is preferred. **Consolidated expertise (≥3 years) in the field of mitochondria is absolutely required. In particular, consolidated expertise on the isolation and characterization of mitochondria is requested.**

Starting date: January 2022 or some months later

Type of contract: 1-year CDD (renewable)

Contact:

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References:

- [1] Pinto, A. et al.: Immune Reprogramming Precision Photodynamic Therapy of Peritoneal Metastasis by Scalable Stem-Cell-Derived Extracellular Vesicles. *ACS Nano*, **15** (2), 2021, p. 3251–3263.
- [2] Coffin, Elise, et al. "Extracellular vesicles from adipose stromal cells combined with a thermoresponsive hydrogel prevent esophageal stricture after extensive endoscopic submucosal dissection in a porcine model." *Nanoscale* (2021) In Press.
- [3] Piffoux, M. et al.: Modification of Extracellular Vesicles by Fusion with Liposomes for the Design of Personalized Biogenic Drug Delivery Systems. *ACS Nano*, **12** (7), 2018, p. 6830–6842.
- [4] Berger, Arthur, et al. "Local administration of stem cell-derived extracellular vesicles in a thermoresponsive hydrogel promotes a pro-healing effect in a rat model of colo-cutaneous post-surgical fistula." *Nanoscale* **13.1** (2021): 218-232