

Young post-doctoral researcher in extracellular vesicles biology

Molecular and functional study of health promoting properties of probiotic-derived extracellular vesicles

Location: STLO, INRAE, Rennes, France

Start: 1st of September 2023

Length: 36 months

Context and job description: For this position we are looking for a microbiologist or cellular biologist with experience in the study of extracellular vesicles (EVs) to investigate the health-promoting properties of EVs secreted by probiotics, notably *Propionibacterium freudenreichii*, and their mechanisms of action on the host. Young researcher will work as part of the PEPR BBIT BACTER-EV-BOOSTER research programme that brings together groups from Université de Paris (UMR7057), Université Paris-Saclay/INRAE (MICALIS), Institut Agro Dijon (UMR PAM), ENS Paris (UMR7203), UMR1107 (Clermont Ferrand) and Université de Nantes/Inserm (UMR1235 TENS) to develop multidisciplinary approach to stimulate the bioproduction and engineering of Gram+ bacteria's EVs for therapeutic applications to treat inflammation. Indeed, the aim of the BACTER-EV-BOOSTER project is to propose a biotherapy based on therapeutic EVs as an alternative to live probiotics. EVs will be produced in a scalable bioreactor at high yield from Gram+ bacteria with anti-inflammatory activities such as *Propionibacterium freudenreichii* and *Faecalibacterium prausnitzii*, respectively, a food bacterium, and an intestinal bacterium isolated from the human gut. The EVs will be characterised at both biophysical and molecular levels (proteins, lipids, sugars, nucleic acids, metabolites). We will also engineer the content of EVs to enhance their intrinsic immunomodulatory activity. The anti-inflammatory and neuromodulatory properties of EVs from an isolated species or a pool of EVs from a combination of species (grown individually) will be tested *in vitro* in a cell model and *in vivo* in preclinical models. We will use models of acute inflammation (Inflammatory Bowel Diseases-IBD), low-noise inflammation (Irritable Bowel Syndrome-IBS) associated with cognitive-emotional and behavioral disorders, or in model of neurodegenerative pathology (Alzheimer's).

Hosting conditions: Young researcher will be welcomed at the STLO INRAE laboratory (140 persons) in Rennes. The research group where He/She will work is composed of 25 permanent staff (scientists, engineers and technicians) and 10 to 15 temporary workers (CDD, master, PhD, post-doc). The group is internationally recognized as the leading team working on *P. freudenreichii*, a dairy bacterium widely used as a cheese ripening starter, with probiotic characteristics, such as the production of beneficial metabolites (Vitamin B12, SCFAs, DHNA) and modulation of host microbiota. STLO has demonstrated the ability of some *P. freudenreichii* strains to display anti-inflammatory properties *in vitro* on various cell models, including human PBMCs and cultured human intestinal epithelial cells. Such strains also alleviate *in vivo* the inflammation in experimentally induced colitis (TNBS and DSS-induced) and mucositis. STLO has shown that the surface-exposed Slp proteins, notably SlpB, are involved in the anti-inflammatory properties of the bacterium *in vitro* and *in vivo*. More recently, STLO has demonstrated that *P. freudenreichii* produces EVs and has provided a complete characterization of their physiochemical, biochemical and functional features. *P. freudenreichii*-derived EVs exhibit anti-inflammatory activity towards cultured human intestinal epithelial cells via NF- κ B pathway modulation and bacterial growth media impact EVs properties, including anti-inflammatory activity.

Mode of application: If interested, please contact Eric Guédon (eric.guedon@inrae.fr) for an informal chat. To apply, please send an email containing a short letter of motivation, a detailed CV (including a brief description of research interests, previous employments, and publication list), and contact details of at least two references. Deadline of submission: 30th June of 2023.

la science pour la vie, l'humain, la terre

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