Post-doctoral position for 16 months at INRAE (Toulouse, France):

Impact of oral chronic exposure to inorganic food additives on the development of metabolic disorders: role of the microbiota

Employer: A 16 months Postdoctoral position is available starting in September-October 2020 in the Research Center in Food Toxicology (Toxalim, UMR 1331) at INRAE Toulouse (https://www6.toulouse.inrae.fr/toxalim_eng/TOXALIM-Research-Centre-in-Food-Toxicology). Our researches aim to study the fate and effects in the gut of chemical substances used as food additives (nanoparticles, as texturizing agents or food pigments) or unintentionally present in food (migrating substances from packaging, pesticides). The team focuses on the mechanisms of deregulation along the microbiota-immune axis and the consequences for host health. Our research will help stakeholders and industrial parties in their future decisions of maintaining or not the authorization and the use of these chemicals in their current form in food. We offer a stimulating scientific environment in a young team with state of art equipment, and an active collaborative network at national and international level.

Scientific goal and Strategy: Concerns are rising about the potential health consequences for Humans daily exposed to inorganic nanoparticles present in common food additives. Among the food additives, titanium dioxide (TiO_2, E171 in UE) and silicon dioxide (SiO_2, E551) are representative of manufactured nanomaterials exposing daily the general population through the diet. A chronic oral exposure to nano-SiO_2 induced an alteration of the microbiota (dysbiosis) in mice, close to the dysbiosis observed in obese human. In addition, mice exposed to TiO2 showed a defect in metabolites production by the gut microbiota that modulates immune responses as well as intestinal and metabolic functions. A defect in such metabolites are known to be implicated in the pathogenesis and maintenance of metabolic disorder in humans. In this context, the aim of this project is to investigate the potential link between chronic oral exposure to TiO_2 (E171) and SiO_2 (E551) and the occurrence and/or the aggravation of metabolic disorders, by assessing the impact these food additives on the microbiota and its consequences on gut barrier function, immune response and metabolic homeostasis. Wild type and KO mice will be used in combination with bacterial microbiota genomic analyses, transcriptomics as well as untargeted and targeted metabolomics. To address the role of the microbiota on the food additives effects, fecal microbiota transplantation experiments will be used.

Partners involved: The position is funded by the "Human nutrition and food safety" scientific division of INRAE. The postdoctoral scientist will work in the team "*Endocrinology & Toxicology of the intestinal barrier*" (ENTeRisk) head by Eric Houdeau (https://www6.toulouse.inrae.fr/toxalim_eng/Research-Teams/ENTeRisk-Endocrinology-Toxicology-of-the-Intestinal-Barrier). In an ANR project directed by Bruno Lamas, the postdoctoral scientist will collaborate with several teams of Toxalim, the "*Laboratoire National de métrologie et d'Essais*" and with different technological platforms (RMN, Transcriptomics, Metabolomics, Flow cytometry, Confocal imaging) available on place (MetaToul Axiom, TRiX, EZOP). The position is vacant from September 2020 to December 2021 on a full-time basis, with an annual gross salary between 25 and 35 K€ depending on the candidat's experience.

Required skills: The project will require a wide variety of techniques including animal experimentation, microbiology, 16S microbiota sequence analysis, transcriptomic analysis, immunology, and metabolism. The candidate should have a recent PhD, be technically accomplished and have a strong knowledge in animal experimentation and at least basic skills in microbiology and immunology. Skills in microbiota studies (bioinformatics) would be a strong additional asset. The candidate should have the required authorization to perform animal experiments.

Highly motivated candidates can send an application including a cover letter, a Curriculum Vitae and the names of (at least) two referees. **Applications should be sent by email as soon as possible and before August 14th 2020 to Eric Houdeau and Bruno Lamas.**

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