CALL FOR EXPRESSION OF INTEREST - CHAIRE DE PROFESSEUR JUNIOR

Supporting institution: INSERM
Name of the head of the institution: Gilles Bloch
Site concerned: Paris-Saclay University
Academic region: Île-de-France

Proposed partner institutions/organizations: Paris-Saclay University

Project name: Skin Immunosurveillance in relationships with commensal virus homeostasis and dysbiosis
Acronym: VIGILE

Keywords: Immunosurveillance, Inflammation, Pathogenic potential of the skin-virome, Human papillomaviruses (HPV), Phages, Infectious diseases, Models, Therapeutic intervention.

Target period: 5 years

Scientific fields: Immunology, microbiology

Corresponding CNU/CoNRS/CSS sections: CSS5, CSS7

Strategy of the host laboratory:

The UMR996 "Inflammation, Microbiome and Immunosurveillance" Inserm-UPSaclay project benefits from its double affiliation with the schools of Medicine and Pharmacy of the Paris-Saclay university. It is developing in a multidisciplinary context relying on a strong community of experts in Biology, Chemistry, and Pharmacotechnics with whom collaborations are favored by grant programs led by the Interdisciplinary action "Health and Therapeutic Innovation" and the graduate schools (GS) "Health & Drug Sciences" and "Life Sciences and Health". The researchers, professors, associate-professors and clinicians of the UMR996 have the shared ambition of conducting fundamental research related to diagnostic and therapeutic applications in the fields of inflammation and immunosurveillance. One of the research axes of the unit focuses on skin immunosurveillance mechanisms and, in turn, the role of viral communities inhabiting human epithelia (*i.e.* virome) in their homeostasis and immunity. We are investigating the mechanisms that trigger the pathogenic potential of the virome leading to inefficient epithelial immune responses, uncontrolled inflammation and the emergence of pathologies (autoimmunity, allergy, cancer) in which these commensal microbes may play an initiating or worsening role, with a perspective to develop new therapeutic approaches. The UMR996 recently integrated the new Henri Moissan Institute in Saclay Campus, hosting a large panel of technical facilities, where it benefits from a scientific environment of excellence. In this attractive context, but also in the perspective of the departure of senior leaders, the recruitment of a young leader within the framework of an Inserm chair would make it possible to reinforce this challenging theme, to contribute to the development of innovative research within the immuno-inflammation axis and thus to preserve the competitiveness and ambition of the UMR996 project.

Summary of the scientific project:

The homeostasis of the skin, a barrier interface with the external environment, is controlled by interactions between immune cells (resident or recruited from the circulation) and non-immune cells (keratinocytes, melanocytes and dermal cells including fibroblasts, endothelial cells and sensory nerve cells). Recent discoveries over the past two decades about the skin microbiome, which encompasses large communities of bacteria and viruses, have significantly provided a new conceptual framework for studying the mechanisms controlling epithelial barrier integrity and defenses against pathogens. Along these lines, how the responses of skin-resident immune cells and non-immune cells may be shaped by the skin microbiome remains an unresolved question. Also, the existence of some commensal viruses with pathogenic potential raises the question of immunological and environmental factors that may bias these viruses towards pathobionts. In this respect, the case of human papillomaviruses (HPV), which is the virus on which the projects of the team "Immunoregulation, Chemokines and Viral Persistence" focus, is particularly edifying; metagenomics has revealed that this large family of more than 400 viruse types that represent the main commensal viruses of the skin, even though some of them are responsible for ~5% of cancers and constitute important comorbidity factors of various inflammatory diseases. One of the aims of the junior professor will be to characterize the dialogue between the skin's immune sentinels, the skin microenvironment and the virome and how the imbalance on these tripartite interactions can promote a commensal-to-pathogen transition of virome communities and a harmful inflammatory response. The junior professor is expected to develop an original project built on his/her expertise in immunology and, ideally, on the skin environment. Alternatively, we will also consider candidates with expertise in microbiology, given that the team/unit scientists will provide complementary expertise in microbiology or immunology depending the expertise of the candidate. The junior professor will consider the implementation of models relevant to the study of the organization and physiopathology of the human skin environment, including the significant potential of skin organoids. These objectives will commit interdisciplinary projects with abroad biologists, chemists, or pharmacochemists, to contribute to the development of therapeutic strategies in the framework of the Henri Moissan scientific strategy.

Summary of the teaching project:

28 hours of lectures or 42 hours of tutorials.

The CPJ laureate will:

(i) Provide courses in the Master 2 Program "Biology applied to therapeutic and diagnostic innovation" (BioInnov), in the Master Degree "Pharmaceutical Sciences", based on their scientific expertise (https://www.universite-paris-saclay.fr/en/education/master/pharmaceutical-science/m2-biologie-appliquee-linnovation-therapeutique-et-diagnostique);

(ii) Organize thematic teaching sessions (lectures and practical) for the PhD students of the Therapeutic Innovation doctoral school (https://www.universite-paris-saclay.fr/en/doctoral-schools/therapeutic-innovation: https://www.universite-paris-saclay.fr/en/phd-program-health-and-drug-sciences-graduate-school-health-and-drug-sciences-heads);

(iii) Contribute to informing students regarding international mobility based on their own professional background, in relationship with our international relations department.

The contribution to the teaching and student education will take place in the frame of the Graduate School "Health & Drug Sciences" (HeaDS) (https://www.universite-paris-saclay.fr/graduate-schools/health-and-drug-sciences).

The CPJ will organize a Summer School (Twice in the 5-year contact) for the Paris-Saclay community and beyond, with the support of the Graduate School, as part of an interdisciplinary center (*e.g.* Microbes, https://www.universite-paris-saclay.fr/objets-interdisciplinaires/microbes).

Financial summary:

Total funded on CPJ (own resources (operating) ANR package) - for the 5-year period	200k€
Co-financing (operation (animal models and organoids/3D cultures)- for the 5-year period	100k€
Total of the project	300k€
Annual charged-Salary	59k€ minimum

Scientific dissemination:

The junior professor is expected to develop an original multidisciplinary project that will generate innovative concepts and models breaking technological barriers. This work will be the source of publications in leading specialized and generalist journals (rank A), of valorization (patent, industrial collaboration) and of oral communications at international congresses/conferences/workshops, some of which may be set up by the junior professor and his/her team in Paris-Saclay.

Open science:

Publications will be deposited on the HAL-Inserm platform. Omics data (*e.g.* genomics, transcriptomics, proteomics) will be shared and disseminated via publications. The junior professor will implement the guidelines for making data "FAIR" (Findable, Accessible, Interoperable, Reusable) in accordance with the global policy promoted by Inserm.

Science and Society:

The field of research on the relationship between viruses and their hosts (*e.g.* description and benefit of a virome, risk and susceptibility factors for the commensal/pathogenic transition, experimental systems as an alternative to animal models, etc.) is well suited for communication to a non-initiated public. Numerous actions led by Inserm (*e.g.* Sciences with and for society) or Paris-Saclay (e.g. international virtual café, Café Cadithe, Scoop.it) will offer the junior professor communication platforms for science popularization.

Indicators:

Several criteria will make possible to follow and support the evolution of the junior professor in his/her research activities. Beyond the usual bibliometric indicators (*e.g.* publications, communications), the project must be deployed through a network of collaborations (national or European consortia or bilateral relations) giving rise to financial support (e.g. regional, national and European calls for projects) and to the recruitment of master's degree trainees, PhD students or post-doctoral fellows The teaching activities of the junior professor will also be periodically evaluated by the accredited training committee. In addition to this regular follow-up, an in-depth annual evaluation of the active progress of the Chair project will be carried out by a follow-up committee in order to offer all the guarantees that, at the end of the position, the junior professor will be able to join the ranks of Research Directors.