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: Immunosurveillance & skin virome: relationships and role in inflammatory conditions
Acronym: VIGILE

Keywords: Inflammation, microbiome, immunosurveillance, modeling, therapies
Target period: 5 years

Scientific fields: Immunology, microbiology
Corresponding CNU/CoNRS/CSS sections: CSS5, CSS3, CSS7

Institution strategy:

Strategy of the host laboratory:

The UMR996 Inserm-UPSaclay project benefits from its double affiliation with the faculties of medicine and pharmacy of the University of Paris-Saclay. It develops in a multidisciplinary context counting on a strong community of experts in the field of immuno-inflammation with whom collaborations are favored by 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, teacher-researchers and clinicians of the UMR996 have the shared ambition of conducting basic research related to diagnostic and therapeutic applications in the fields of inflammation and immunosurveillance. One of the research axes of the unit concerns the biological role and the pathological potential of microbial communities or microbiome inhabiting human skin epithelia. This axis is particularly focused on immune dysfunctions leading to uncontrolled inflammation and the emergence of pathologies (autoimmunity, allergy, cancer) in which these commensal microbes can play an initiating or worsening role as well as modulate the efficacy of treatments. In July 2022, UMR996 will move to the new Henri Moissan Institute in Saclay Campus, where it will benefit from a scientific environment of excellence. In this attractive context and also in the perspective of the departure of senior leaders, the recruitment of a young leader within the framework of an Inserm chair would reinforce this challenging thematic, contribute to the development of innovative research within the "immuno-inflammation" axis and thus preserve the competitiveness and ambition of the UMR996 project.

Summary of the scientific project:

Our perception of the microbial world and the interactions it establishes with each individual has evolved considerably over the last two decades. Like the bacterial microbiome, a large community of viruses, or virome, populates our epithelia bringing a new conceptual framework to the study of some viruses considered until now as strict pathogens. In this respect, the case of human papillomaviruses (HPV) is particularly edifying; metagenomics has revealed the diversity of this large family of more than 400 types that represent the main commensal viruses of the skin, even though they are responsible for ~5% of cancers and constitute important comorbidity factors of various inflammatory diseases. The nature of the immunological, environmental and viral factors that bias these commensals towards pathobionts as well as their suspected role in immunosurveillance and maintenance of skin barrier integrity remain open questions. The junior professor will build on his/her expertise in microbiology, immunology and cell biology to shed light on these homeostatic and inflammatory processes by investing in the development of innovative models (e.g. organoids/3D cultures). The ambition of the junior professor will be to characterize the dialogue between the skin immune sentinels, the skin microenvironment and the virome and how the imbalance of these tripartite interactions can promote an detrimental inflammatory response. These objectives will engage interdisciplinary actions and contribute to the development of therapeutic strategies.

Summary of the teaching project:

The teaching project will be part of the thematic courses of Master and PhD programs, which are developed within the GS "Health & Drug Sciences" and "Life Sciences and Health" of the University Paris-Saclay. The objective of these courses will be to introduce the conceptual and methodological issues of the fast-moving research field of host/virus interaction. More specifically, the junior professor will have to introduce the different concepts that this field integrates, from genetics, to cell biology, immunology and systems biology. He/she will give an overview of the human microbiome communities with an emphasis on recent knowledge of the virome (i.e. phages, eukaryotic viruses). This approach will embrace a methodological field by addressing metagenomics and more broadly "Omics" analyses (e.g. genomics, transcriptomics, proteomics). Finally, experimental models relevant to the study of the relationships between viruses and their human host will be discussed, from their implementation to their use to identify therapeutic targets or to screen new therapies. An important part will be devoted to the presentation of the technical and conceptual barriers that currently limit the development of models for the study of the human virome by highlighting the important potential of 3D cultures and organoids to reconstitute the organization and physiology of a human organ/tissue.

Financial summary:

Total funded on CPJ (own resources (operating) plus ANR package)	300k€
Co-financing (operation (animal models and organoids/3D cultures, 2 years engineer)	250k€
Total of the project	550k€

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 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.

Indicators:
Several criteria will make it 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 will have to 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.