Grenoble Alliance for Integrated Structural & Cell Biology

INTERNSHIP PROPOSAL

Institute and Group: IBS/MEM

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Research project title: Design and pre-clinical evaluation of new vaccine vectors stimulating the immune system in cancer immunotherapy.

5 Keywords to describe the project: Vector Design - Cancer Vaccine - Immuno-oncology - Tumour Antigen - Preclinical studies

Description of the project (aims, experimental techniques, recommended background):
This project is based on a disruptive vaccination platform called "ADDomer" which allows by it self-assembly properties to display 60 copies of epitopes while being self-adjuvant. This technology has been approved in infectious diseases and we now propose to evaluate it in immuno-oncology. Initially, two major epitopes of the "ovabulmine" model system will be integrated into the ADDomer platform. A preclinical evaluation will then be carried out on a model of a mouse carrying Ova-melanoma (Collaboration with Professor Julie Charles and Docteur Chaperot, Grenoble University Hospital). This work will then be continued with the insertion of human melanoma tumor antigens (MelanA, Meloe1,...) to the ADDomer platform in order to initiate future experiments on models with humanized mice carrying melanomas. Experimental techniques cover molecular biology, biochemistry (protein expression/ purification) and cellular biology including FACS.

The recruited student should have expertise in the techniques cited above as well as good knowledge in immuology. The student should be motivated to cross the barrier between basic research and applications and would be able to work with collaborators.

Justification that the internship's subject fits with the general theme of GRAL:
The creation of the ADDomer platform was funded by the Labex Gral 'Valorisation' in 2015. The M2 student will take part of the clinical validation of its effectiveness in a new field of application. This will not only strengthen the intellectual property of the 2017 patent, but also show how structural work can create new therapeutic pathways. This project is therefore in line with Gral's objectives.

Relevant publications of the team:

1. Vassal-Stermann E, Mottet M, Ducournau C, Iseni F, Vragniau C, Wang H, Zubieta C, Lieber A, Fender P. *Mapping of Adenovirus of serotype 3 fibre interaction to desmoglein 2 revealed a novel 'non-classical' mechanism of viral receptor engagement.* **Sci Rep. 2018 30;8(1):8381**

2. Charles Vragniau, Joshua C. Bufton, Frédéric Garzoni, Emilie Stermann, Fruzsina Rabi, Céline Terrat, Mélanie Guidetti, Véronique Josserand, Matt Williams, Christopher J. Woods, Gerardo Viedma, Phil Bates, Bernard Verrier, Laurence Chaperot, Christiane Schaffitzel, Imre Berger and Pascal Fender. *Synthetic Self-assembling ADDomer Platform for Highly Efficient Vaccination by Genetically-encoded Multi-epitope Display.* **Sciences Advances** (Under review)

3. 2017 Patent: https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2017167988