PhD project No. 9, Prof. Maitre

Scientific Area	Innate and adaptive immunity
Two project titles	A) Cellular mechanisms of platelet allo-immunization B) Regulation of the immune response by the spleen
Host country	France
Supervisor, institution	Blandine Maître, University of Strasbourg, France
Co-Supervisor, institution	A) and B) Marten Trendelenburg, University of Basel, Switzerland
Mentor, institution	A) and B) Christopher Mueller, University of Strasbourg, France
Secondment institution	A) and B) University of Strasbourg, Etablissement français du sang, France, UMR_S1255

Short description of the supervisor's lab with introduction to the topic

Our group has a solid expertise in blood platelet physiology. A major research axis of our team is devoted to transfusion research and medicine, which implies studies in humans and the development of animal models. We are focusing on the alloimmune response occurring after platelet transfusion and on the regulation of this response by the spleen.

Topic description, including techniques to be used

Project A)

Platelet alloimmunization remains a serious adverse transfusion event. Alloantibodies produced by the recipient, mainly directed against HLA I donor antigens, can compromise the therapeutic efficiency of ensuing platelet transfusion and lead to refractoriness. Identifying the cellular and molecular mechanisms responsible for the uptake of transfused platelets is a necessary step to understand and ultimately prevent platelet alloimmunization. We will use a mouse model reproducing the incompatibility between donor and recipient. By specifically targeting splenic subpopulations of antigen presenting cells, we will study the importance of different cell subsets in the alloimmune response.

Techniques: Flow cytometry, animal model, immunohistology, cell biology (cell culture, ELISA).

Project B)

The spleen plays an important dual role in the orchestration of the immune response and in regulating the survival of circulating platelets. Using intravital microscopy, we will examine how transfused platelets interact with the splenic microenvironment of the recipient. We will study how these interactions regulate the platelet alloimmune response and the transfusion efficiency using animal models mimicking transfusion and platelet refractoriness.

Techniques: Intravital microscopy, confocal microcopy, cell biology, animal model

Recommended applicant's training (technical expertise and knowledge)

Techniques: Flow cytometry, microscopy, cell culture, animal model

Knowledge: Solid theoretical knowledge in the field of immunology and cell biology

Maximum two relevant publications

Angénieux C. et al., 2019, Journal of Thrombosis and Hemostasis, Cell surface expression of HLA I molecules as a marker of young platelets.

El Mdawar MB. et al., 2019, Scientific Reports The ATP-gated $P2X_1$ ion channel contributes to the severity of antibody-mediated Transfusion-Related Acute Lung Injury in mice.

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Ethics description

1. Humans	
This research involves human participants.	YES ☐ / NO ☒
This research involves physical interventions on the study participants.	YES ☐ / NO ☒
2. Human Cells /Tissues	
This research involves human cells or tissues, such as blood.	YES ☒ / NO ☐
3. Personal Data	
This research involves personal data collection and/or processing.	YES ☐ / NO ☒
This research involves further processing of previously collected personal data (secondary use).	YES ☐ / NO ☒
4. Animals	
This research involves animals, such as mice.	YES ☒ / NO ☐

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