Master 2 internship project
Year 2019-2020

Laboratory/Institute: Biology of Cancer and Infection (BCI) **Director:** Jean Jacques Feige
Team: BAL **Head of the team:** Sabine Bailly

Name and status of the scientist in charge of the project: Emmanuelle Tillet **HDR: yes** X
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Program of the Master's degree in Biology:
☐ Immunology, Microbiology, Infectious Diseases ☐ Integrative Structural Biology
XPhysiology, Epigenetics, Differentiation, Cancer ☐ Neurosciences and Neurobiology

☐ Planta International

Title of the project:

Characterization of BMP9/10 knockout mouse models

Objectives (up to 3 lines):

The project aims at understanding the role of two proteins, BMP9 and BMP10, in vascular remodelling in order to propose new treatments in cardiovascular diseases.

Abstract (up to 10 lines):

BMP9 and BMP10 are circulating factors that bind to the receptor ALK1, which is predominantly expressed by endothelial cells. Mutations in genes involved in the BMP9/BMP10/ALK1 pathway are associated with two rare vascular genetic diseases (Hereditary hemorrhagic telangiectasia and pulmonary arterial hypertension). In order to study the roles of BMP9 and BMP10 *in vivo*, our team has generated knockout mouse models for BMP9 and/or BMP10. The goal of the project is to study the effects of the loss of BMP9 and/or BMP10 on the cardiovascular system and more precisely on the morphology and functionality of blood vessels using imaging techniques such as confocal microscopy, and lightsheet microscopy. In order to study the underlying mechanisms, proteomic and transcriptomic studies will be performed on endothelial cells from different organs.

Methods (up to 3 lines):

Fluorescent imaging, quantitative RT PCR, western blot, proteomic.

Up to 3 relevant publications of the team:

- Ouarné M, Bouvard C, Boneva G, Mallet C, Ribeiro J, Desroches-Castan A, Soleilhac E, Tillet E, Peyruchaud O and Bailly S BMP9, but not BMP10, acts as a quiescence factor on tumor growth, vessel normalization and metastasis in a mouse model of breast cancer. Journal of Experimental & Clinical Cancer Research, 2018, 37(1): 209

- Tillet E, Ouarné M, Desroches-Castan A, Mallet C, Subileau M, Didier R, Lioutsko A, Belthier G, Feige JJ, Bailly S A heterodimer formed by bone morphogenetic protein 9 (BMP9) and BMP10 provides most BMP biological activity in plasma. J Biol Chem. 2018 Jul 13;293(28):10963-10974.
- Desroches Castan A, Tillet E, Ricard N, Ouarné M,n Mallet C, Belmudes L, Couté Y, Boillot O, Scoazec JY, Bailly S, Feige JJ Hepatology, 2019, in press

Requested domains of expertise (up to 5 keywords):

Basic knowledge in cell biology and biochemistry- Acceptance to work with young mice