Master Biologie Moléculaire et Cellulaire 'BMC',
Université Paris Cité - *UFR Sciences du Vivant*

Parcours : **Biologie et Développement Cellulaires 'BDC'**
http://www.master2bdc.fr/
Fiche de Projet de Stage de M2, 2022-2023

Unité INSERM ou CNRS ou Université : **Institut Pasteur/ U1224** **Intitulé Equipe :** **Stroma, Inflammation and Tissue Repair** **ED d'appartenance : BIOSPC** **Responsable de l'Equipe : Lucie Peduto**	**Responsable du Stage : Lucie Peduto** **Contacts** Adresse : Institut Pasteur 25, rue du Docteur Roux 75015 Paris Email : lucie.peduto@pasteur.fr Tel : 0144 38 95 27

Titre du projet : Stromal regulation of skin homeostasis, defense and repair

Résumé du Projet de Stage (en 300 mots maximum, mots clés en gras)

Barrier surfaces such as the skin are exposed constantly to the external environment, exposing them to infections and injuries. Barrier tissues are therefore equipped with various populations to ensure protection from pathogens, promote repair upon injury and maintain tissue homeostasis. These functions are ensured by a complex crosstalk between epithelial cells, tissue stem cells, immune cells, and several populations of stromal cells including myofibroblasts, mesenchymal cells, fibroblasts and pericytes.

Stromal cells are essential for the proper functioning of blood vessels, to build a niche for tissue stem cells and to ensure immune homeostasis. **Overactivation of stromal cells is implicated in a number of pathologies including chronic inflammatory diseases, autoimmune diseases, allergic diseases and poor tissue regeneration, yet how stromal cells get dysregulated is still poorly understood**. Here, we want to understand how stromal cells sense their environment to maintain tissue homeostasis and ensure efficient responses to injury. To go beyond the state-of-the-art, we will perform **phenotypic and transcriptomic based screens to identify stromal subsets and genes that regulate innate immunity and repair responses** in conditions of activation and injury, building on existing data obtained in the lab. By using imaging, genetic lineage tracing, cellular approaches and unique mouse models our lab has generated, we expect to clarify **how stromal cells adapt, sense and respond to the skin microenvironment**, thereby ensuring tissue homeostasis and efficient repair responses. The student will be part of a team routinely using molecular biology, flow cytometry, imaging, genetic models and transcriptomic approaches to investigate the role of stromal cells in tissue homeostasis, immunity and disease pathogenesis including cancer and metabolic diseases.

Publications de l'équipe relatives au projet de stage (max 5)

- Jacob JM, Di Carlo SE, Stzepourginski I, Lepelletier A, Ndiaye PD, Varet H, …, Nigro G, Peduto L. 2022. PDGFRα-induced stromal maturation is required to restrain postnatal intestinal epithelial stemness and promote defense mechanisms. **Cell Stem Cell**, 29(5): 856-868.
- Benabid A, Peduto L. 2020. Mesenchymal perivascular cells in immunity and disease. **Curr Opin Immunol** 64 :50-55.
- Di Carlo S, Peduto L. 2018. The perivascular origin of pathological fibroblasts. **J Clin Invest**, 128(1):54-63.
- Stzepourginski I, Nigro G, Jacob JM, Dulauroy S, Sansonetti PJ, Eberl G, Peduto L. 2017. CD34+ mesenchymal cells are a major component of the intestinal stem cells niche at homeostasis and after injury. **PNAS**, 114(4): E506-E513.
- Dulauroy S, Di Carlo SE, Vives FL, Eberl G, and Peduto L. 2012. Lineage tracing and genetic ablation of ADAM12(+) perivascular cells identify a major source of profibrotic cells during acute tissue injury. **Nature Medicine**, 18(8): 1262-1270.