

Project title	Study crosstalk between Cancer-Associated Adipocytes and Tumor Cells in Breast Cancer in obese patients
Type of position	Laboratory technician position (Ingénieur d'Etudes IE)
Starting date	March 1 st 2021
Duration	18 months
Level	minimum 3-5 years of experience
Salary	between 2282 and 2403 euros/month (depending of the experience level)
Short description	<p>The aim of the project is to decipher the role of obesity in breast cancer, specifically, the effect of adipose cells on tumor invasiveness and the molecular mechanisms responsible for this. We will analyse patient's tumor and surrounding adipose tissue. In addition, we'll perform co-culturing of breast cancer cell lines and fresh adipocytes from breast cancer patients and study how the two types of cell interact and affect each other over time and what molecular mechanisms are implicated in the cross-talk. All samples will be profiled for gene expression. In addition, lipidomics, metabolomics and biochemical studies of invasive state of breast cancer cell and differentiation states of adipocytes cell will be generated. The final goal of the project is to retrieve multi-omics signatures of adipose cell in invasive breast cancers that might serve as biomarkers of invasiveness and resistance to treatment.</p>
Environment	<p>The suggested position is under the interdisciplinary project LipoCanPredict, involving four partners with complementary expertise in a collaborative environment in the Centre de Recherche St. Antoine (located in the St. Antoine hospital) and in the Institut Curie. The project is equipped by of four complementary know-how of the partners: 1) biolab for the co-culture model; 2) pathology department for primary adipose tissue from patient biopsies; 3) high-end equipment for lipidomics and metabolomics; and 4) bioinformatics and biostatistical expertise for data analysis.</p> <p>The project is supported by ITMO-MIC grant.</p> <p>The successful applicant will perform the majority of work in the St. Antoine hospital and partially in the Institut Curie, depending on the nature of the experiment and essential equipment and instruments.</p>
Requirements	<p>Expertise in cell biology and molecular biology, preferably in the domain of cancer. Hand-on experience with patient samples, primary culture, co-culture handling; current techniques as Western blot, PCR, immuno-cyto/histochemistry, imaging techniques, invasion assays, etc.</p>

Objective	The goal of the applicant is to perform tumor cell and cancer-associated adipocytes co-culture experiments and study mutual influence between these two cell types using typical biochemical and cell biology techniques.
Host Institutes	Centre de Recherche St. Antoine, St. Antoine Hospital TGF β signaling in cellular plasticity and cancer team 34 rue Crozatier, Bâtiment Kourilsky, 75012, Paris, FR In collaboration with Institut Curie UNIT 900 INSERM - Mines ParisTech - PSL Bioinformatics and Computational Systems Biology of Cancer team 26 rue d'Ulm 75248 Paris CEDEX 05 FR
Supervisors	Mathieu Boissan (mathieu.boissan@inserm.fr, +33(0)149284632, https://www.crsa.fr/boissan-mathieu.html) Inna Kuperstein (inna.kuperstein@curie.fr, +33(0)156246987, http://sysbio.curie.fr , https://www.linkedin.com/in/inna-kuperstein-62265078)
How to apply	Send the following documents via e-mail to Drs. Boissan and Kuperstein (mathieu.boissan@inserm.fr , inna.kuperstein@curie.fr) CV, letter of motivation , two letters of recommendation, or complete contact information for 2 references
Deadline for application	Applications can be submitted at any time until February 15 th 2021
For further information	Please contact the supervisors of this project

References

1. Havel P.J. Role of adipose tissue in body-weight regulation: Mechanisms regulating leptin production and energy balance. *Proc Nutr Soc.* 2000;59(3):359–71.
2. Nkhata KJ, Cleary MP, Dogan S, Rogozina OP, Ray A, Grossmann ME, et al. Obesity and breast cancer: status of leptin and adiponectin in pathological processes. *Cancer Metastasis Rev.* 2010;29(4):641–53.
3. Park J, Euhus DM, Scherer PE. Paracrine and endocrine effects of adipose tissue on cancer development and progression. *Endocr Rev.* 2011;32(4):550–70.
4. Dirat B, Bochet L, Dabek M, Daviaud D, Dauvillier S, Majed B, et al. Cancer-associated adipocytes exhibit an activated phenotype and contribute to breast cancer invasion. *Cancer Res.* 2011;71(7):2455–65.
5. Wang Y-Y, Laurent V, Dauvillier S, Valet P, Dirat B, Lehuédé C, et al. Adipose tissue and breast epithelial cells: A dangerous dynamic duo in breast cancer. *Cancer Lett.* 2012;324(2):142–51.
6. Pusapati R, Settleman J. Lipid metabolic reprogramming in cancer cells. *Cell Cycle.* 2016;15(18):2387–8.
7. Balaban S, Shearer RF, Lee LS, van Geldermalsen M, Schreuder M, Shtein HC, et al. Adipocyte lipolysis links obesity to breast cancer growth: adipocyte-derived fatty acids drive breast cancer cell proliferation and migration. *Cancer Metab.* 2017;5(1):1.
8. Picon-Ruiz M, Pan C, Drews-Elger K, Jang K, Besser AH, Zhao D, et al. Interactions between adipocytes and breast cancer cells stimulate cytokine production and drive Src/Sox2/miR-302b-mediated malignant progression. *Cancer Res.* 2016;76(2):491–504.
9. Lodillinsky C, Infante E, Guichard A, Chaligné R, Fuhrmann L, Cyrtta J, et al. p63/MT1-MMP axis is required for in situ to invasive transition in basal-like breast cancer. *Oncogene.* 2016; 10. Lehuédé C, Li X, Dauvillier S, Vaysse C, Franchet C, Clement E, et al. Adipocytes promote breast cancer resistance to chemotherapy, a process amplified by obesity: Role of the major vault protein (MVP). *Breast Cancer Res.* 2019;21(1):1–17.
11. Sampaio JL, Gerl MJ, Klose C, Ejsing CS, Beug H, Simons K. Membrane lipidome of an epithelial cell line. 2011;108(5):1903–7.