**Master 2 internship project**

**Year 2023-2024**

**Laboratory/Institute:** Institute for Advanced Biosciences (IAB) **Director:** Pierre Hainaut

**Team:** Mechanobiology, Immunity and Cancer **Head of the team:** Arnaud Millet

**Name and status of the scientist in charge of the project:** MILLET **HDR: yes X no ☐**

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**Program of the Master’s degree in Biology:**

**☐** Microbiology, Infectious Diseases and Immunology **☐** Structural Biology of Pathogens

**X** Physiology, Epigenetics, Differentiation, Cancer **☐** Neurosciences and Neurobiology

**Title of the project: 3D organization of the immune response in cancer and its role in treatment resistance**

Objectives (up to 3 lines):

The purpose of this project is to develop a 3D model of a tumor in a hydrogel mimicking the extracellular matrix in order to study the role of the innate immune response in the treatment resistance in solid tumors.

Abstract (up to 10 lines):

Immune infiltration in solid tumors has been recognized recently as an important physiopathological event that determine the evolution of the cancer. In this context, tumor associated macrophages (TAM) have been implicated in the resistance to chemotherapeutic agents but the mechanisms involved were not completely understood. We have recently discovered an unexpected connection between the immunometabolism of macrophages and their ability to induce chemoresistance in colon cancers. We have also found more recently that the initial mechanism directed toward a first line chemotherapeutic agent (5-FU) does not resume all the consequences of the metabolism of macrophages in the tumor environment. In the current project we want to develop a relevant 3D model of a human tumor in vitro comprising the immune response in order to assess the quantitative importance of the mechanisms that we have identified and open the possibility to test the innovative therapeutic strategies currently developed un the lab to counteract the macrophage-driven chemoresistance.

Methods (up to 3 lines):

3D cell culture – primary cell culture

Hypoxic culture

Fluorescence microscopy – Flow cytometry

Up to 3 relevant publications of the team:

Malier et al, Cancer Research 2021

Court et al, Biomaterials, 2019

Requested domains of expertise (up to 5 keywords):

Immunology, oncology, metabolism, chemoresistance