

Research options available for topic A

Research topics a) and b) offered by every Doctoral Course involved in UNIPHD are frameworks within which every applicant has to present an original research project in collaboration with a Supervisor at the University of Padua.

Potential Supervisors at Unipd have proposed the following detailed research options, which are related to the research topic. They are offered as a guideline and should facilitate your contact with potential Supervisors. Supervisors' e-mail is specified in every research option table. You are welcome to contact them directly.

Note that this research option list is not at all exhaustive and, within the topic you have chosen, you are free to propose a different research project.

Doctoral Course	CLINICAL AND EXPERIMENTAL ONCOLOGY AND IMMUNOLOGY
Macro-area	Medical and Biomedical Sciences
Department name	Department of Surgery, Oncology and Gastroenterology
Webpage	https://www.discoq.unipd.it/doctorate/mission
Research topic A	<p>Immunology of tumors</p> <p>The immune system has the potential of eradicate cancer, nevertheless the establishment of an immunosuppressive environment at the tumor site often dampens anti-tumor immunity. Our research aims to deconvolute immunosuppressive interactions in the context of tumor microenvironment thanks to the analysis of experimental models and patient samples. These studies will allow to discover novel prognostic biomarkers to better select patient therapy, and to identify novel therapeutic targets.</p>
Link to the UNIPHD Call (Academic Year 2022/2023)	https://www.unipd.it/en/uniphd
Latest Update	12.01.2022
#Number of available Research Options	3 <i>Scroll down to see all the Research Options</i>

#1 Research Option Description

Doctoral Course	Clinical and Experimental Oncology and Immunology
Department name	Department of Surgery Oncology and Gastroenterology (DiSCOG)
Research topic A	Immunology of tumors
Research option	Deciphering tumor-immune interactions <i>in vivo</i>
Supervisor	Giulia PASQUAL (giulia.pasqual@unipd.it)
Webpage	https://www.pasqual-lab.org
Context of the research activity and objectives	The interaction between tumor cells and immune cells play a critical role in tumor progression. On one side, the immune system has the ability, if properly stimulated, to eradicate malignant cells; on the other side tumor microenvironment can negatively affect the efficacy of the immune response. Our lab recently developed a novel technology, called LIPSTIC (Pasqual et al., Nature, 2018) which allows for the tracking via enzymatic labelling of cell-cell interactions in living animals. In this project we propose to extend the LIPSTIC technology to the study of tumor-immune cell communication <i>in vivo</i> , with the goal of identifying and characterizing novel signalling axis shaping the interactions of T lymphocytes in the context of the tumor microenvironment.
Infrastructures	Our lab is located in via Gattamelata 64, Padova. The same building also hosts state of the art flow cytometry facility, BL2 and BL3 biocontainment facility, specific pathogen free animal facility equipped with BL3 biocontainment area, and imaging facility counting confocal and wide field microscopes. The PhD candidate will also have access to external UNIPD facilities.
Skills and competencies for the development of the activity	The ideal candidate will have solid knowledge of basic immunology and willingness to acquire competences in <i>in vivo</i> experimentation and tumor immunology.
Training offer	The PhD candidate will attend the course in. as well as have the possibility to attend seminars in tumor immunology organized in the context of the doctoral course. The PhD candidate will also have the possibility to attend national and international meeting focused on tumor immunology (e.g. International Cancer Immunotherapy Meeting).
Possible Secondments	Academic secondment can be carried out at the University of Geneva, Switzerland, and/or at the University University Medical Center Hamburg-Eppendorf, Germany. Non-academic secondment will be carried out at the Veneto Institute of Oncology IOV IRCCS.

#2 Research Option Description

Doctoral Course	Clinical and Experimental Oncology and Immunology
Department name	Department of Surgery Oncology and Gastroenterology (DISCOG)
Research topic A	Immunology of tumors
Research option	Dissecting the role of tumor-associated macrophages in T cell infiltration and function in triple-negative breast cancer
Supervisor	PI: Dr Ilaria Marigo, ilaria.marigo@unipd.it Team members: Dr Elisa Peranzoni, Dr Vincenzo Ingangi
Webpage	https://www.discog.unipd.it/doctorate/mission
Context of the research activity and objectives	In the era of immunotherapy, triple-negative breast cancer (TNBC) still remains a high medical need. Less than half of TNBC patients are eligible to immune checkpoint inhibitors and most of them do not respond to these treatments. It is well established that the amount of effector lymphocytes, especially, CD8 T cells, is crucial for the efficacy of immunotherapy, but recent evidence suggests that the spatial distribution of these cells might be equally important. As we previously observed in other types of cancer and preclinical models, tumor-associated macrophages (TAMs) can trap CD8 T cells in the stroma of tumors, limiting their infiltration into tumor islets and contributing to resistance to immunotherapy. We plan to understand if this phenomenon also applies to TNBC and to investigate the molecular mechanisms involved. The study will allow to discover novel TAM-related prognostic and predictive biomarkers for patient selection, as well as specific targets for therapeutic combinations that could improve CD8 T cell infiltration and, ultimately, the survival of non-responder TNBC patients.
Infrastructures	Our lab is located in via Gattamelata 64, Padova. The same building also hosts state of the art flow cytometry facility, BL2 and BL3 biocontainment facility, specific pathogen free animal facility equipped with BL3 biocontainment area, and imaging facility counting confocal and wide field microscopes. The PhD candidate will also have access to external UNIPD facilities.
Skills and competencies for the development of the activity	Outstanding preparation in tumor immunology an intense sense of scientific pursuit and a very strong work ethic. FACS analysis, imaging, confocal microscopy, experience in in vivo work and RNA sequencing.
Training offer	The PhD candidate will attend the course in. as well as have the possibility to attend seminars in tumor immunology organized in the context of the doctoral course.
Possible Secondments	Professor Emmanuel Donnadieu, Cochin Institute, Paris, France. EcamRicert, Vicenza, Italy.

#3 Research Option Description

Doctoral Course	Clinical and experimental Oncology and Immunology
Department name	Surgery, Oncology and Gastroenterology
Research topic A	Immunology of tumors
Research option	Exploring, exploiting and imaging the tumor microenvironment
Supervisor	Susanna MANDRUZZATO, susanna.mandrizzato@unipd.it
Webpage	https://www.discog.unipd.it/doctorate/mission
Context of the research activity and objectives	<p>Our laboratory studies myeloid cells with immune suppressive ability in cancer patients with a focus on primary brain tumors. These tumors present a heterogeneous microenvironment in which different cell types interact influencing tumor growth and response to therapy. Of note, during tumor growth, the immune landscape of the brain drastically changes with the infiltration of myeloid cells, endowed with immunosuppressive function. We have shown the heterogeneity of tumor microenvironment (TME) in gliomas, and demonstrated that blood-derived monocytes in glioma patients are responsible for the strong immunosuppression exerted in the TME. The constant recruitment of myeloid cells from bone marrow into the TME is an obstacle that limits treatment efficiency, and we are studying new strategies to restrain myeloid recruitment or to eliminate them in TME. To this aim we have ongoing projects focused on exploring the TME of gliomas to identify new target of intervention in myeloid suppressive cells. In addition, we exploit the use of new nanotechnologies to reprogram or modulate the immune response by precisely targeting biological pathways. A new line of research concerns the possibility of imaging immune suppression in glioma patients. Patients undergoing neurosurgery are studied before surgery by magnetic resonance imaging (MRI). This technology offers the opportunity to combine and integrate data obtained from immunophenotyping, obtained from the study of the tumor microenvironment, with quantitative neuroimaging measures. Preliminary analysis show that metabolic and vascular information derived from the quantification of PET and MRI images supports an association between neuroimaging biomarkers and immune contexture, containing a myeloid suppressive signature.</p>
Infrastructures	<p>Our laboratories are equipped with all the relevant instruments for cell culture and immune assays. We have a flow cytometry core facility composed of three analyzers and one cell sorter. Laboratories are equipped for cell and molecular biology, standard plasmid cloning, retroviral vector production, SBL2 and SBL3 containment labs, cyto- and histopathology labs, laser microdissection and digital pathology instrument (Mantra) and confocal microscopy.</p>

Skills and competencies for the development of the activity	Applicants with a background in basic and tumor immunology are encouraged to apply.
Training offer	The PhD candidate will attend the courses organized in the context of the doctoral course. In addition, he/she will have the possibility to attend seminars in tumor immunology and to attend national and international meeting focused on tumor immunology.
Possible Secondments	Academic secondment can be done at the University of Florence, and/or at the University of Tübingen, Germany. Non-academic secondment will be carried out at the Veneto Institute of Oncology IOV IRCCS.