



**RESEARCH TOPIC-MEM12**  
**APPLICATION OF HIGH-DIMENSIONAL TECHNOLOGIES TO PROFILE THE IMMUNE COMPOSITION IN CANCER**

**Curriculum MEM Standard**

**Laboratory name:** Tumor microenvironment Unit, Humanitas University

**Pre-clinical Supervisor:** Dr. Diletta Di Mitri, [diletta.di\\_mitri@humanitasresearch.it](mailto:diletta.di_mitri@humanitasresearch.it)

**Abstract**

Increasing evidence highlighted the fundamental role of the immune system in the initiation and progression of most cancer types. Indeed, cancer cells are able to reprogram the immune response and get support from infiltrating cells. As a consequence, immunotherapies aimed at restoring an efficient immune response against cancer have been developed and are under further investigation. Main scope of the present proposal is an in depth investigation of the immune composition in cancer patients. Myeloid and lymphoid cells dynamics will be investigated at single cell level. Cell to cell interactions will be analyzed to explore the interplay between immune infiltrating subsets and among cancer and immune cells. Final aim is the identification of target that can be utilized to develop new immunotherapies in cancer

**Main technical approaches**

Single cell RNA sequencing, multiparametric flow cytometry, transgenic mouse models, cellular and molecular biology approaches

**Scientific references**

1. Di Mitri, D., et al., Tumour-infiltrating Gr-1+ myeloid cells antagonize senescence in cancer. *Nature*, 2014. 515(7525): p. 134-7.
2. Di Mitri D., et al., Re-education of Tumor-Associated Macrophages by CXCR2 Blockade Drives Senescence and Tumor Inhibition in Advanced Prostate Cancer. *Cell Reports* 2019.
3. Bezzi, M., et al., Diverse genetic-driven immune landscapes dictate tumor progression through distinct mechanisms. *Nat Med*, 2018. 24(2): p. 165-175.
4. Lu, X., et al., Effective combinatorial immunotherapy for castration-resistant prostate cancer. *Nature*, 2017. 543(7647): p. 728-732



Landscape and Dynamics of Single Immune Cells in Hepatocellular Carcinoma. Zhang Q., et al., Cell 2019 Oct.

**Type of contract**

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