**RESEARCH TOPIC-MEM13**
**CELLULAR IMMUNE RESPONSES AGAINST HUMAN CANCER**

**Curriculum MEM Standard**

**Laboratory name:** Lab of Translational Immunology, Humanitas University

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## Abstract

We use high-content single cell approaches including single cell RNA sequencing, epigenetics, high-dimensional flow cytometry and bioinformatics to dissect the diversity of the human T cell compartment, with the final aim of identifying those T cell subsets to be targeted by immunotherapy. Our approach enables the rapid investigation of dozens of human specimens from patients with immune-related disease, with a special focus on cancer, and during the course of immunotherapeutic treatments, so to identify mechanistic insights at the basis successful therapeutic response. We make further use of xenogeneic models at the preclinical level to test the rapid translatability of our findings.

## Main technical approaches

Cellular and molecular immunology, single cell genomics, high-dimensional flow cytometry, bioinformatics (with the support of in-lab expertise)

## Scientific references

1. Alvisi G, Brummelman J, Puccio S, Mazza EMC, Paoluzzi-Tomada E, Losurdo A, Zanon V, Peano C, Colombo FS, Scarpa A, Alloisio M, Vasanthakumar A, Roychoudhuri R, Kallikourdis M, Pagani M, Lopci E, Novellis P, Blume J, Kallies A, Veronesi G, and Lugli E. IRF4 instructs effector Treg differentiation and immune suppression in human cancer. J Clin Investig. 2020; in press.

2. Lugli E, Galletti G, Boi SK, and Youngblood BA#. Stem, Effector, and Hybrid States of Memory CD8(+) T Cells. Trends Immunol. 2020;41(1):17-2810.1016/j.it.2019.11.004.

3. Kared H, Tan SW, Lau MC, Chevrier M, Tan C, How W, Wong G, Strickland M, Malleret B, Amoah A, Pilipow K, Zanon V, Mc Govern N, Lum J, Chen JM, Lee B, Florian MC, Geiger H, Ginhoux F, Ruiz-Mateos E, Fulop T, Rajasuriar R, Kamarulzaman A, Ng TP, Lugli E, and Larbi A. Immunological history governs human stem cell memory CD4 heterogeneity via the Wnt signaling pathway. Nature communications. 2020;in press; https://doi.org/10.1038/s41467-

020-14442-6.

4. Brummelman J, Mazza EMC, Alvisi G, Colombo FS, Grilli A, Mikulak J, Mavilio D, Alloisio M, Ferrari F, Lopci E, Novellis P, Veronesi G, and Lugli E. High-dimensional single cell analysis identifies stem-like cytotoxic CD8(+) T cells infiltrating human tumors. J Exp Med. 2018;215(10):2520-3510.1084/jem.20180684.

5. Pilipow K, Scamardella E, Puccio S, Gautam S, De Paoli F, Mazza EM, De Simone G, Polletti S, Buccilli M, Zanon V, Di Lucia P, Iannacone M, Gattinoni L, and Lugli E. Antioxidant metabolism regulates CD8+ T memory stem cell formation and antitumor immunity. JCI insight. 2018;3(18)10.1172/jci.insight.122299

**Type of contract**

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Borsa di studio pari a € 21.000 annui lordi erogata da Istituto Clinico Humanitas. Importo soggetto a tassazione IRPEF ed esente da contribuzione previdenziale.

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