RESEARCH TOPIC MEM9

Cellular immune responses against human cancer
Curriculum MEM

Laboratory name
Lab of Translational Immunology, IRCCS Humanitas Research Hospital

Pre-clinical Supervisor
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Abstract
We use high-content single cell approaches including single cell RNA sequencing, epigenetics, high-dimensional flow cytometry, tissue profiling and bioinformatics to dissect the diversity of the human T cell compartment in the cancer microenvironment, 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, especially during the course of immunotherapeutic treatments. We have identified cell:cell interactions in the cancer microenvironment that are critical to support or, conversely, inhibit anti-tumor immune responses. In the next few years, we will mine these interactions at the cellular, molecular and organismal level to induce potent anti-tumor immunity.

Main technical approaches
Cellular and molecular immunology, single cell genomics, high-dimensional flow cytometry and in situ tissue profiling, bioinformatics (with the support of in-lab expertise) applied to human patients' samples.

Scientific references
1. Alvisi, G. et al. Multimodal single-cell profiling of intrahepatic cholangiocarcinoma defines hyperactivated Tregs as a potential therapeutic target. bioRxiv, 2022.2003.2006.483155 (2022).

2. De Biasi, S. et al. Circulating mucosal-associated invariant T cells identify patients responding to anti-PD-1 therapy. Nature communications 12, 1669 (2021).

3. Galletti, G. et al. Two subsets of stem-like CD8(+) memory T cell progenitors with distinct fate commitments in humans. Nat. Immunol. 21, 1552-1562 (2020).

4. Alvisi, G. et al. IRF4 instructs effector Treg differentiation and immune suppression in human cancer. J. Clin. Invest. 130, 3137-3150 (2020).

5. Brummelman, J. et al. High-dimensional single cell analysis identifies stem-like cytotoxic CD8(+) T cells infiltrating human tumors. J. Exp. Med. 215, 2520-2535 (2018).

Type of contract

Scholarship of € 21.000 gross per year awarded by Istituto Clinico Humanitas. This sum is subject to IRPEF income tax and exempt from social security contributions.

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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