

During my career, I touched upon basic topics in biology like cell division and genomic instability, and I kept my scientific interests as broad as I could. Now that my efforts are fully dedicated to translating basic science into beneficial therapies, being able to understand the minute details of the molecular machineries and mastering the most advanced technologies gives me a privileged vision on the outstanding question in my field: establishing causal interactions between the microenvironment, tumor progression and response to immunotherapy.

After my Master in Medical Biotechnology at University “Federico II” in Naples, my scientific passion brought me to Milan, where I got a PhD in Molecular Oncology under the supervision of Dr. Andrea Musacchio. Thus, I moved to USA, where I spent 10 years training between Harvard Medical School-DFCI in Boston and MD Anderson Cancer Center in Houston, where I obtained my first faculty appointment.

A manuscript I co-first authored [PMID: 29097493] is considered a turning point in the microbiome field and led to a series of clinical trials involving faecal microbiota transplantation (FMT) in patients undergoing immunotherapy. The first study I led as an independent scientist, instead, aimed to understand the reason behind failure of immunotherapy in treating pancreatic cancer (PDAC). We discovered that lipid accumulation in the tumor microenvironment drives CD8⁺ T cells dysfunction during cancer progression by restricting their metabolic flexibility (PMID: 32491160). These findings are of particular clinical interest because they address one of the main mechanisms exploited by PDAC for immune evasion. The manuscript I last-authored also led to the filing of a patent (in collaboration with Phil Greenberg, Fred Hutch) for metabolic reprogramming of CAR-T cells). In my laboratory at Istituto Europeo di Oncologia (IEO) in Milan, which I started early on 2018, we are focusing on developing innovative approaches to modulate the interaction between the microenvironment and the immune system in human cancers. The lab has two main focuses: 1) microbiome studies to implement response to cancer immunotherapy; 2) metabolic crosstalk between microbiome and immune system in cancer. Currently, I am leading or co-leading 4 different clinical trials: 1) Neoadjuvant combo-immunotherapy with Ipilimumab and Nivolumab in locally advanced or limited metastatic melanoma; 2) Microbiome Immune system Tumor Interaction in Colorectal Oncology (MITICO); 3) Microbiome and Immune system Interaction in Non-Small Cell Lung Cancer; 4) Diet intervention on life style and interaction with microbiota in prostate cancer patients undergoing radiotherapy (MicroStyle). Also, as part of our efforts to develop innovative systems to dissect the molecular details of immune system-microbiome interaction, I am closely collaborating with MiMic lab at Politecnico of Milano to develop innovative mechanically-activated 3D microfluidic devices. Leveraging on my multidisciplinary background and technical expertise, I am building here at IEO an integrated technological platform to perform multilayered analysis on unique patient samples.

It is with enthusiasm and commitment that I give my availability to serve as member of the Board of Directors of NIBIT.