



**University of Naples Federico II**  
**Department of Pharmacy**  
*Doctoral Course in Pharmaceutical Sciences XL Cycle*



**CHARACTERIZATION OF IMMUNE CELLS IN CANCER PATIENTS: IMPLICATIONS FOR IMMUNOTHERAPY**

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The immune system plays a critical role in cancer progression and response to therapy. Key immune cell populations, including T cells, natural killer (NK) cells, macrophages, and innate lymphoid cells (ILCs), influence tumor growth and therapeutic outcomes. Despite advancements in immunotherapy, the detailed characterization of these immune cell subsets within the tumor microenvironment and their implications for treatment remains underexplored. This project aims to comprehensively characterize immune cell populations in cancer patients to better understand their roles in tumor immunity and identify potential targets for improving immunotherapy. Using techniques such as flow cytometry and RNA sequencing we will analyze immune cell subsets in tumor and peripheral blood samples from patients with various cancer types in order to: 1) delineate the phenotypic and functional profiles of immune cells in tumor tissues and peripheral blood, 2) correlate the immune cell characteristics with clinical outcomes, and 3) evaluate changes in immune cell profiles in patients before and after immunotherapy to identify predictive markers of treatment response. Furthermore, we will investigate the role of novel compounds, both natural and synthetic, in overcoming cancer resistance to immunotherapy. Through in vitro and in vivo pharmacological approaches, we aim to understand how these compounds shape the tumor-immunosuppressive microenvironment, enhancing immunotherapeutic effectiveness. Collectively, this project will unveil significant changes in immune cell populations with specific profiles serving as potential biomarkers for predicting treatment efficacy. Further, will identify novel compounds to overcome immunotherapy resistance and improving patient outcomes.