



RESEARCH TOPIC MECM6

Unveiling the dynamics of neutrophil recruitment and heterogeneity in cancer Curriculum MECM standard

Research Area

Immunology

Laboratory name

Innate immunity in inflammation and cancer

Research Supervisor

Prof. Jaillon Sebastien sebastien.jaillon@hunimed.eu

Abstract

Neutrophils are the most abundant circulating leukocytes in humans. Neutrophilia is typically observed in cancer patients, and neutrophils represent an important component of the tumor microenvironment. However, their role in tumors remains controversial.

We recently showed that neutrophil-deficient mice are more susceptible to sarcomas and colitis-associated colorectal cancer, revealing their protective potential. We also uncovered unexpected heterogeneity among tumor-infiltrating neutrophils, suggesting distinct functional subsets. This project aims to dissect the dynamics of neutrophil recruitment, localization, and function in tumors using a multitasking approach, including genetically modified mouse models and state-of-the-art technologies available in our institute. By integrating patient samples through collaboration with clinicians, this PhD will uncover new mechanisms of tumor immunity and identify neutrophil subsets as potential therapeutic targets.

Main technical approaches

Animal handling (mouse cancer models), cellular biology (purification and culture of cells), multiparametric flow cytometry, fluorescent imaging microscopy, molecular biology (PCR, Real-time PCR, sequencing), bioinformatics analysis.

Scientific references

- NaCl enhances CD8+ T cell effector functions in cancer immunotherapy.

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Nat Immunol. 2024 Oct;25(10):1845-1857.

- Neutrophils mediate protection against colitis and carcinogenesis by controlling bacterial invasion and IL-22 production by $\gamma\delta$ T cells.

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- Neutrophil diversity and plasticity in tumour progression and therapy.

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- Neutrophils driving unconventional T cells mediate resistance against murine sarcomas and selected human tumors.

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Int J Cancer. 2016 Jul 15;139(2):446-56.

Type of contract

PhD scholarship of € 21.000 gross per year awarded by Humanitas University. This sum is exempt from IRPEF income tax according to the provisions of art. 4 of Law no. 476 of 13th August 1984, and is subject to social security contributions according to the provisions of art. 2, section 26 and subsequent sections, of Law no. 335 of 8th August 1995 and subsequent modifications.



Borsa di dottorato pari a € 21.000 annui lordi erogata da Humanitas University. Importo non soggetto a tassazione IRPEF a norma dell'art. 4 della L. 13 agosto 1984 n. 476 e soggetto, in materia previdenziale, alle norme di cui all'art. 2, commi 26 e segg., della L. 8 agosto 1995, n. 335 e successive modificazioni.