C.M. EMATOLOGIA SPERIMENTALE

6 CFU - 2° Semester

Teaching Staff

CESARINA GIALLONGO - Module Experimental Hematology- - MED/15 - 3 CFU
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LEARNING OBJECTIVES

- **Experimental Hematology-**
  The aim of the course is to allow the student to recognize the different hematological diseases with insights in the molecular biology and physiology of leukemic cell and tumor microenvironment.

- **APPLICAZIONI CLINICHE**
  Knowledge on the progress of scientific, translational and clinical research in the onco-haematological field (cell manipulation and therapy, CAR-T, gene therapies) will be deepened

COURSE STRUCTURE

- **Experimental Hematology-**
  1. Structure of bone marrow and hematopoiesis
  2. Molecular pathogenesis of the myeloproliferative neoplasms
  3. The Impact of Epigenetic Modifications in Myeloid Malignancies
  4. Acute myeloid leukemia pathobiology
  5. Pathogenesis of lymphoproliferative disorders
  6. Intimate cross-talk between leukemic cells and the tumor microenvironment

- **APPLICAZIONI CLINICHE**
  The course will be based on lectures and interactive discussions, with in-depth analysis from scientific articles, integrated with systemic diagrams that can show at each lesson the application of the integration of multiomics for the understanding and treatment of hematological neoplasms.

Attendance is highly recommended due to the interactive nature of the lessons.

DETAILED COURSE CONTENT

- **Experimental Hematology-**
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- **APPLICAZIONI CLINICHE**
  Preclinical mouse models for the development of cell therapy in haematological neoplasms
  Clinical applications of genetic manipulation of hematopoietic stem cells: targeted gene editing, telomerase gene therapy
  Cell manipulation in the treatment of haematological neoplasms: autologous and allogeneic transplantation of hematopoietic stem cells, haploidentical transplantation
  Cell therapy strategies: donor lymphocyte infusion, tumor vaccines, TILs, CAR-T, CAR-NK
  Mechanisms of resistance to cell therapy with CAR-T and CAR-NK: the paradigm of multiple myeloma
  Multiomics approach through the application of systems thinking
  Laboratory exercises: Interpretation of results and attribution of antigens obtained from HLA typing investigations, cryopreservation of hematopoietic stem cells, dielectrophoresis, development of a systemic diagram on the co-evolution of tumor cells and of the immune system in haematological neoplasms

TEXTBOOK INFORMATION

- **Experimental Hematology-**
  Scientific articles

- **APPLICAZIONI CLINICHE**
  1. Manuale di malattie del Sangue, Bosi, De Stefano, Di Raimondo, La Nasa
  2. Gene and Cell Therapy: Biology and Applications
  3. Chimeric Antigen Receptor T-Cell Therapies for Cancer 1st Edition A Practical Guide
  4. Handouts and articles provided by the teacher
  5. Naldini L. Gene therapy returns to centre stage. Nature. 2015 Oct 15;526(7573):351-60. doi: 10.1038/nature15818. PMID: 26469046.
  6. Cazzagon V, Romano A, Gonella F. Using Stock-Flow Diagrams to Visualize Theranostic Approaches to Solid Tumors in Personalized Nanomedicine. Front Bioeng Biotechnol. 2021 Jul 22;9:709727. doi: 10.3389/fbioe.2021.709727. PMID: 34368102; PMCID: PMC8339728.
  7. Rodríguez-Lobato LG, Ganzetti M, Fernández de Larrea C, Hudecek M, Einsele H, Danhof S. CAR T-Cells in Multiple Myeloma: State of the Art and Future Directions. Front Oncol. 2020 Jul 28;10:1243. doi: 10.3389/fonc.2020.01243. PMID: 32850376; PMCID: PMC7399644.
  8. Narkhede M, Mehta A, Ansell SM, Goyal G. CAR T-cell therapy in mature lymphoid malignancies: clinical opportunities and challenges. Ann Transl Med. 2021 Jun;9(12):1036. doi: 10.21037/atm-20-5546. PMID: 34277836; PMCID: PMC8267254.