## COURSE OF MEDICINE AND SURGERY STUDENT HANDBOOK a.y. 2015-2016

#### **IMMUNOLOGY AND IMMUNOPATHOLOGY** Scientific II° YEAR **TUTOR** DISCIPLINE Field IMMUNOLOGY and MED/04 Immunology and Immunopathology Florence Malisan **IMMUNOPATHOLOGY** MED/04 Roberto Testi Immunology MED/38 CFU 7 Paolo Rossi *Immunopathology* Coordinator Florence Malisan

#### Specific aims

This course provides a comprehensive overview of immunology beginning with the innate immune responses, followed by a study of the main aspects of adaptive immunity. Antigen specific-T cell receptors, specific interactions between target cells and T cells, regulated by the MHC molecules and peptide antigens, are studied. The generation and molecular structure of B and T cell antigen receptors, and signaling through immune receptors are covered in detail. Additionally, the development of antigen specific T and B cells, and specific roles for some cytokines are also explored. T and B cell-mediated immunity and topics of clinical relevance, such as microbial immunity, allergy, autoimmunity, tumor immunology, congenital and acquired immunodeficiencies, and transplantation immunology are also examined.

#### PROGRAM Immunology

#### General characteristics of the immune response:

Immune system organization. Innate immunity and adaptive immunity: humoral and cellular components. Antigen specific lymphocyte receptors.

#### Innate immunity:

Functions of granulocytes (neutrophils, basophils, eosinophils), dendritic cells, NK cells, monocytes and macrophages. Pattern Recognition Receptors (PRR) recognizing Pathogen-associated Molecular Pattern (PAMP) and Damage-associated Molecular Pattern (DAMP).

#### Cells and tissues of the immune system:

Role of primary lymphoid organs (bone marrow and thymus) and secondary lymphoid tissues (lymph nodes, spleen, MALT: Mucosa-Associated Lymphoid Tissues) in the immune response.

#### Leukocyte migration:

Adhesion molecules. Homing and migration of leukocytes into tissues.

### Antigens:

Definition and properties. Superantigens. Mitogens.

### Antibodies and repertoire diversity:

Structure and effector functions of immunoglobulins. Classes/isotypes of immunoglobulins. Immunoglobulin gene organization and somatic recombination.

#### Monoclonal antibodies:

Production and application

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B lymphocyte development and humoral immunity: B cell development and maturation. B cell receptor (BCR).

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Activation, proliferation and differention of B lymphocytes. Response to T-dependent and T-independent antigens. Primary and secondary immune response. Germinal center reaction: somatic hypermutation, isotype switch, selection and memory B cells generation.

#### **Complement:**

Classical, alternative, and lectin pathway. Functions of complement.

#### Major Histocompatibility Complex and Antigen presentation to T lymphocytes:

Gene Organization. Structure and functions of MHC molecules. Antigen presenting cells (APC). Antigen processing.

#### T lymphocyte cell-mediated immunity:

T cell receptor (TCR). TCR gene organization and somatic recombination. T cell development and thymic selection. Activation and differentiation of T cells into effector T cells. Functions of T helper subsets, regulatory T cells and cytotoxic T cells. Effector mechanisms of cell-mediated cytotoxicity.

#### PROGRAM Immunopathology

Hypersensitivity disorders, IgE-dependent immune responses and allergic disease, immunologic tolerance and autoimmunity, transplantation immunology, immunity to tumors, congenital and acquired immunodeficiencies.

**TEXTBOOK** 

CELLULAR AND MOLECULAR IMMUNOLOGY - Abbas, A.K. - Elsevier, 7th Edition

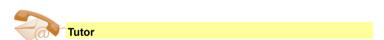
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**EXAMINATION** ORAL EXAM

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### IMMUNOLOGY AND IMMUNOPATHOLOGY



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