



Immune System

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Overview

The **Immune System** can be defined as a collection of tissues spread throughout the body and dedicated to its protection by the innate or adaptive deployment of cellular and humoral resources for the control of infection. Immunology is the field that focuses on the study of the components of the immune system and its alterations. More specifically, the field looks into the pathophysiology of immunodeficiencies, hypersensitivity reactions, organ transplantation, cancer, and vaccinations.

For optimal comprehension, the student needs to be familiar with all lymphoid organs and tissues, the types of immune cells from both the erythroid and lymphoid lines, and the biochemistry of immune globulins (Ig) and complement proteins.

The pathophysiology of immune disorders can be challenging to master. The key to maximizing comprehension of such complex orders lies in getting a good grasp of the basics of how the immune system works.

For the general physician, understanding the pathophysiology and manifestations of immunological illnesses can ensure adequate referral of patients to the specialized care they need, as some require attention by an immunologist and others by an oncologist. Furthermore, a good understanding of the basics of vaccines allows the physician to properly advocate for such interventions in their community.

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Immune System: Overview & Cells

- Introduction: Pathogens and the Immune System
- Immune Response
- Strategies to Eliminate Pathogens
- Organization of the Immune System
- Cells of the Innate Immune Response
- Phagocytic Cells
- Dendritic Cells, Eosinophils, Basophils, Mast Cells and Innate Lymphoid Cells
- Cells of the Adaptive Immune System

Innate Immune System

- Introduction: The Innate Immune Response
- Pattern Recognition Receptors (PRRs)
- Inflammatory Signaling and Inflammasomes
- Acute Phase Response
- Acute Inflammation
- Chronic Inflammation
- Complement System
- Acute inflammatory, Type I interferon and NK cell responses

Adaptive Immune System

- Recognition of Antigens – Lymphocyte Development
- B-Cell Development in the Bone Marrow – Lymphocyte Development

- Immunoglobulin Genes and Recombination – Lymphocyte Development
- Mediation of Antigen Receptor Genetic Recombination – Lymphocyte Development
- Antibody Variable Region Diversity – Lymphocyte Development
- Junctional Diversity, N-Nucleotide Addition and Somatic Hypermutation – Lymphocyte Development
- Class Switch Recombination, Co-Expression and B-Cell Development – Lymphocyte Development
- T-Cell Development – Lymphocyte Development
- T-Cell Development in Thymus and Genetic Recombination of TCR – Lymphocyte Development
- Natural Killer T-Cells (NKT-Cells) – Lymphocyte Development
- Overview of Lymphoid Tissues – Lymphocyte Activation
- Secondary Lymphoid Tissues – Lymphocyte Activation
- Germinal Center – Lymphocyte Activation
- B- and T-Cell Activation – Lymphocyte Activation
- B-Cell Differentiation – Lymphocyte Activation
- Migration and Maturation of Interdigitating Dendritic Cells and T-Cell Differentiation – Lymphocyte Activation
- Costimulation – Lymphocyte Activation
- Introduction to Lymphocyte Recirculation – Lymphocyte Recirculation and Homing
- Blood/Lymphatic Circulation and High Endothelial Venules – Lymphocyte Recirculation and Homing
- Chemokines – Lymphocyte Recirculation and Homing
- Migration of Central Memory and Effector Memory T-Cells – Lymphocyte Recirculation and Homing
- Cell Adhesion Molecules (CAMs) – Lymphocyte Recirculation and Homing
- Trafficking and Homing – Lymphocyte Recirculation and Homing

- Introduction – Antigen Processing and Presentation
- Major Histocompatibility Complex (MHC) – Antigen Processing and Presentation
- Polymorphism and TCR Recognition of Major Histocompatibility Complex – Antigen Processing and Presentation
- Diversity of Major Histocompatibility Complex – Antigen Processing and Presentation
- Structure of Major Histocompatibility Complex – Antigen Processing and Presentation
- Main Pathways and Endogenous/Exogenous Antigens – Antigen Processing and Presentation
- Cross-Presentation – Antigen Processing and Presentation
- Presentation of Lipid Antigens by CD1 – Antigen Processing and Presentation

Humoral Immunity & Cell-mediated Immunity

- Humoral Immunity: Introduction
- Humoral Immunity: T-Dependent, T-Independent Antigens, and Class Switching
- Humoral Immunity: Structure of Antibodies and Immunoglobulin Domains
- Humoral Immunity: Antibody Polymers and Antibody Binding to Antigens
- Humoral Immunity: Function of Antibodies
- Cell-mediated Immunity: Introduction
- Cell-mediated Immunity: Gamma-Delta T-Cells, T-Cell Receptor, and Alpha-Beta T-Cells
- Cell-mediated Immunity: Th0, Th1, and Th2 Cells
- Cell-mediated Immunity: Regulatory T-Cells, Cytotoxic T-Cells, Macrophages, and Intraepithelial Lymphocytes

- Cell-mediated Immunity: Cytokines, Interferons, Interleukins, and Colony Stimulating Factors
- Cell-mediated Immunity: Chemokines, Tumor Necrosis Factors, and Transforming Growth Factors
- Cell-mediated Immunity: Functional Modes of Cytokines and Cytokine Receptor Signaling
- Cell-mediated Immunity: Therapeutic Blocking of Pathological Cytokines and Therapeutic Cytokines

Immunodeficiency and Immune Deficiency Diseases

Introduction – Primary Immunodeficiency

- Complement Deficiencies – Primary Immunodeficiency
- Phagocytic Cell Disorders – Primary Immunodeficiency
- Autoinflammatory Disorders – Primary Immunodeficiency
- Mutations Affecting T-cell Maturation
- B-Cell Immunodeficiencies: Common Variable Immunodeficiency, X-linked Agammaglobulinemia and Selective IgA Deficiency – Primary Immunodeficiency
- T-Cell Immunodeficiencies: Hyper IgM Syndrome, Wiskott-Aldrich Syndrome and MHC Class II Deficiency – Primary Immunodeficiency
- Primary Immunodeficiencies Associated with Autoimmune Disease
- Severe Combined Immunodeficiency (SCID) – Primary Immunodeficiency
- Diagnosis – Primary Immunodeficiency
- Treatment – Primary Immunodeficiency
- Introduction – Secondary Immunodeficiency
- Causes: Immaturity & Pregnancy – Secondary Immunodeficiency Diseases

- Causes: Aging & Infections – Secondary Immunodeficiency Diseases
- HIV Infection and HIV Life Cycle– Secondary Immunodeficiency Diseases
- HIV Disease: Clinical Course, Treatment & Prophylaxis – Secondary Immunodeficiency Diseases

Hypersensitivity and Autoimmune Disease

- Introduction to Hypersensitivity
- Hypersensitivity: Types
- Hypersensitivity: Type 1 – Causes
- Allergy: Genetics and IgE
- IgE, Mast Cells and Eosinophils
- Allergy: Diagnosis, Therapy and Treatment of Asthma
- Hypersensitivity: Type 2
- Hypersensitivity: Type 3
- Hypersensitivity: Type 4
- Introduction to Autoimmune Diseases
- Immune Tolerance and Autoimmune Regulator (AIRE)
- Genetic Susceptibility to Autoimmune Diseases and Mechanisms
- Autoimmune Diseases: Types
- Autoimmune Hemolytic Anemia
- Goodpasture's Syndrome, Hashimoto's Thyroiditis, Graves' Disease and Type I Diabetes
- Rheumatoid Arthritis (RA)
- Acute Rheumatic Fever
- Systemic Lupus Erythematosus (SLE)
- Multiple Sclerosis (MS) and Guillain-Barré Syndrome (GBS)
- Celiac Disease
- Autoimmune Diseases: Therapy

Transplantation Immunology

- Introduction to the Problems and Rules of Transplantation
- Allograft Rejection and Blood Transfusion
- Blood Transfusion
- Direct and Indirect Alloantigen Recognition
- Major Histocompatibility Complex (MHC) and MHC Disparity
- Tissue Typing, Immunosuppressive Drugs and GVHD

Tumor Immunology

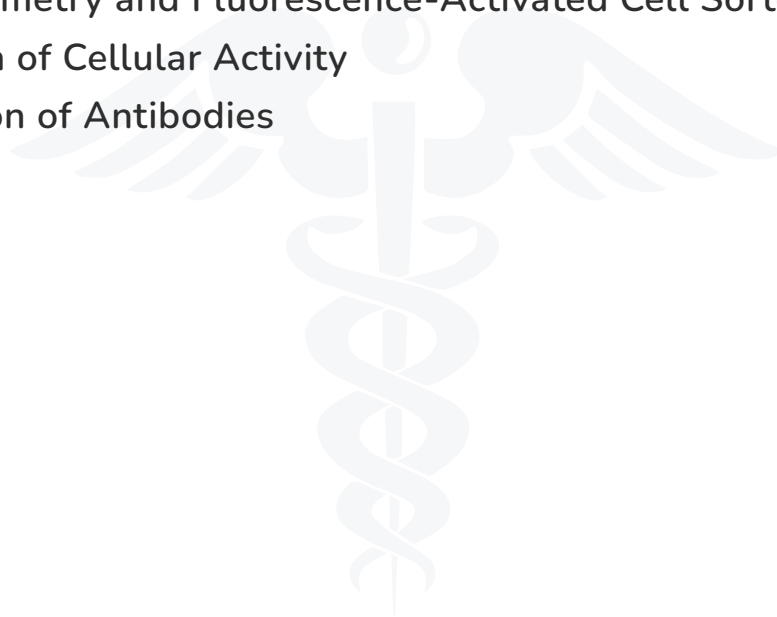
- Introduction to Tumor Immunology
- Leukemia, Lymphoma & Myeloma
- Immune Response to Tumors: Tumor Antigens and Antitumor Immunity
- Tumor-Infiltrating NK Cells
- Tumor Evasion of the Immune Response and Immune Checkpoint Blockade
- Monoclonal Antibodies and Nonspecific Immunotherapy
- Tumor Vaccines

Vaccine Immunology

- History of Vaccination
- Vaccine Components: Antigen, Carrier and Adjuvant
- Types of Vaccines (1): Live Attenuated Vaccines and Inactivated Vaccines
- Vaccination: Subunit Vaccines, Toxoid Vaccines, Conjugate Vaccines
- Future Needs for Vaccines: Influenza, COVID, Malaria, Tuberculosis, HIV

Immunodiagnosics

- Introduction to Immunodiagnosics
- Immunodiagnostic Methods: Agglutination, Nephelometry, Immuno-precipitation and Radial Immunodiffusion
- Electrophoresis and Western Blot
- Immunoassays: ELISA, RIA and Luminex™
- Immunofluorescence and Immunohistochemistry
- Flow Cytometry and Fluorescence-Activated Cell Sorter (FACS)
- Evaluation of Cellular Activity
- Preparation of Antibodies



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Why Mediversal?

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NMC Guideline	✔ Advantages in accordance with provision 1.4.2 of NMC regulations	⚠ Not all. (Very few)
Renowned International faculties	✔ Yes	⚠ Only for few subjects
Faculty to learner ratio	✔ 1:10	✔ 1:50 or 1:75
Case based learning	✔ Yes	✘ No
AI supported learning	✔ Yes	✘ No
Live Interaction Sessions	✔ Yes	✘ No
Clinical Attachments	✔ Yes (Case to Case basis)	✔ Yes
Associated with Hospitals for Clinical Training	✔ Yes	✔ Yes
Books	✔ Yes (Printable Pdf copy)	✘ No
Complementary e-Learning Module & Certification	✔ Yes	✘ No
Learner Support	✔ Yes	✘ No
Community of Doctors for peer support (Mediversal Alumni only)	✔ Yes	✘ No
Alumni Support	✔ Yes	⚠ Only a few
e-Certification	✔ Yes	✔ Yes
Physical Certification	✔ Yes	⚠ Only a few
Lifetime certificate validity	✔ Yes	✔ Yes
Digital Marketing and Business Support for your hospital/clinic	✔ Yes	✘ No
Admission process	✔ Smooth, Transparent & all details provided	⚠ Spamming through multiple channels.
Data and privacy protection	✔ Yes	✘ No
CME access	✔ Yes (Lifetime)	✘ No
Medico Legal Session	✔ Yes (Free. By renowned high court advocates)	✘ No
National Level Felicitation Award (for Mediversal Alumni)	✔ Yes	✘ No



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