

CSIR NET UNIT 4 SYLLABUS

Cell Communication and Cell Signaling

CSIR NET UNIT 4 covers host-parasite interactions, cell signaling, cellular communication, cancer, and the innate and adaptive immune system. Topics include pathogen recognition, cell signaling pathways, cancer genetics, and immune responses.

CSIR NET UNIT 4	Topics
A) Host-Parasite Interaction	<ul style="list-style-type: none">- Recognition and entry processes of different pathogens (bacteria, viruses) into animal and plant host cells- Alteration of host cell behavior by pathogens- Virus-induced cell transformation- Pathogen-induced diseases in animals and plants- Cell-cell fusion in both normal and abnormal cells
B) Cell Signaling	<ul style="list-style-type: none">- Hormones and their receptors- Cell surface receptor- Signaling through G-protein coupled receptors- Signal transduction pathways- Second messengers- Regulation of signaling pathways- Bacterial and plant two-component systems- Light signaling in plants- Bacterial chemotaxis and quorum sensing
C) Cellular Communication	<ul style="list-style-type: none">- Regulation of hematopoiesis- General principles of cell communication- Cell adhesion and roles of different adhesion molecules- Gap junctions- Extracellular matrix- Integrins- Neurotransmission and its regulation
D) Cancer	<ul style="list-style-type: none">- Genetic rearrangements in progenitor cells- Oncogenes- Tumor suppressor genes- Cancer and the cell cycle- Virus-induced cancer- Metastasis- Interaction of cancer cells with normal cells- Apoptosis

E) Innate and Adaptive Immune System

- Therapeutic interventions of uncontrolled cell growth
- Cells and molecules involved in innate and adaptive immunity
- Antigens, antigenicity, and immunogenicity
- B and T cell epitopes
- Structure and function of antibody molecules
- Generation of antibody diversity
- Monoclonal antibodies
- Antibody engineering
- Antigen-antibody interactions
- MHC molecules
- Antigen processing and presentation
- Activation and differentiation of B and T cells
- B and T cell receptors
- Humoral and cell-mediated immune responses
- Primary and secondary immune modulation
- The complement system
- Toll-like receptors
- Cell-mediated effector functions
- Inflammation
- Hypersensitivity and autoimmunity
- Immune response during bacterial (tuberculosis), parasitic (malaria), and viral (HIV) infections
- Congenital and acquired immunodeficiencies
- Vaccines

Study tips CSIR NET UNIT 4: Focus on understanding signaling pathways in detail, use visual aids for immune system processes, relate cancer mechanisms to cell cycle regulation, practice identifying key components of host-parasite interactions, and create summaries for effective revision.