

MOLECULAR RECOGNITION

I. GENERAL PRINCIPLES

1. Structural elements of biomolecules (amino acids, bases, additive biomolecules, proteins, nuclear acids).
2. Types of interactions involved in recognition (qualitative and quantitative analysis).
 - a. Interactions between individual atoms.
 - b. Interactions of structural elements of molecules.
3. Energy interaction analysis.
 - a. Molecular Engineering
 - b. Molecular Dynamics.
4. Recognition levels, high fidelity recognition.
 - a. Definition of Molecular Recognition.
 - b. The contribution of individual interactions to recognition.
- j. Hydrogen bonds.
- ii. Electrostatic interactions.
- iii. Stereotypical obstruction.
 - c. General internal stabilization methodology. electric cargo.
5. Protein recognition areas.
 - a. Grades of recognition, high fidelity recognition.
 - b. Size and complexity of areas of recognition.
 - c. Structural elements
 - d. The position of the substrate.
6. Size and complexity of recognition areas.

II. CHEMICAL TRANSFER TRANSPORTATION AND INTERVENTION OF CELLS

1. Common molecular mechanisms for signal transduction.
 - a. Mechanisms
 - b. Active groups.
2. Hormones, neurotransmitters, local chemical mediators.
3. Signal transmission to membranes and cytoplasm.
4. Steroid hormones and their receptors. Pheromones
5. Structure of membrane proteins. Channels and receivers.

III. APPLICATIONS IN BIOTECHNOLOGY

1. Rational drug design.
2. Creation of antibodies against viruses and bacteria.
3. Insecticides-Pesticides. Biochemical processes.
4. Explain important plant processes at the molecular level.
 - a. Movement of ions in plants.
 - b. Photosynthesis.
 - c. The movement in the plants.
5. Antibody design against virii and bacteria.
6. Steroid hormones and their receptors.

IV. LABORATORY: Amino acids and protein stereotypes. Molecular identification of nuclear acids. Membrane proteins. Hemoglobin. Proteolytic enzymes - Molecular action. Substrate design. The molecular action of insecticides.

LEARNING OBJECTIVES

Upon successful completion of the course, the student will:

- Knows the basic structural units that make up biomolecules.
- It will be able to perceive and quantify the interactions between biomolecules at the molecular level.
- Knows the methods and techniques used to quantify the interactions between biomolecules on a molecular scale.
- Knows the processes and protagonists on a molecular scale for chemical signal transmission.
- Knows the processes and methods for drug design.
- Knows the mechanisms of protein folding and cellular displacement.
- Be able to handle molecular graphics programs on the PC and build and analyze biomolecules.

It can compose work and analyze results from the study of structural elements of biomolecules and develop the ability for online access to libraries and scientific journals.