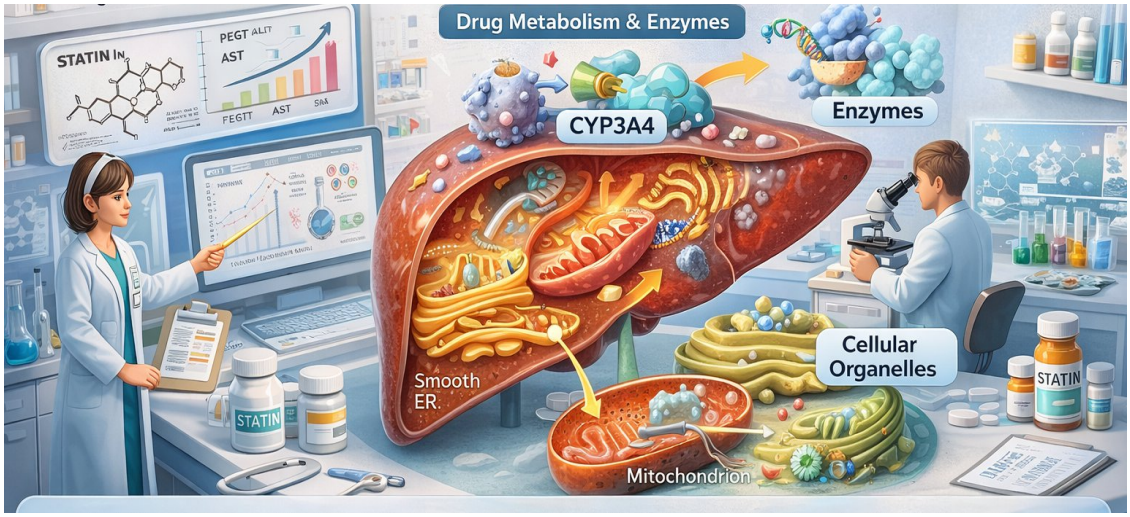
CASE STUDY BASED PUZZLE

ER20-25T:BIOCHEMISTRY AND CLINICAL PATHOLOGY

UNIT 1: INTRODUCTION TO BIOCHEMISTRY

Puzzle 1: Understanding Biochemistry in Pharmacy Practice

A newly recruited pharmacist in a tertiary care hospital notices that several patients receiving long-term statin therapy show elevated liver enzyme levels. The pharmacist collaborates with clinicians to understand how drug metabolism affects liver cells at the molecular level. During discussion, it becomes evident that knowledge of enzymes, cellular organelles, and biochemical pathways is crucial for optimizing therapy and preventing adverse drug reactions.

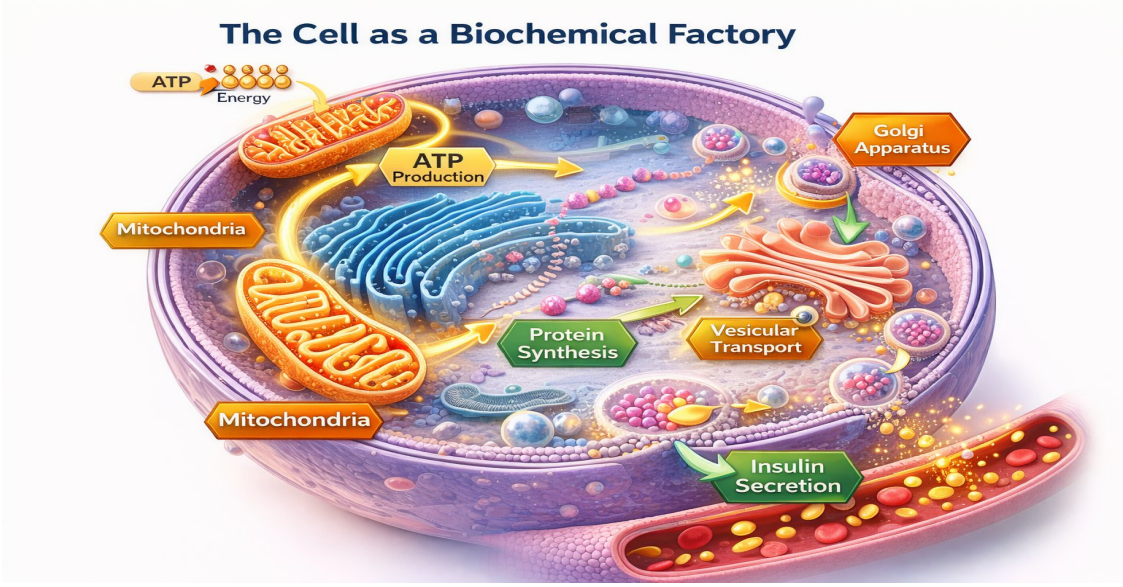


1. **Explain how biochemistry helps pharmacists understand drug metabolism and adverse drug reactions.**
2. **Identify the cellular organelle primarily involved in drug metabolism and justify its role.**

Puzzle 2: The Cell as a Biochemical Factory

A pharmaceutical research student is studying insulin secretion in pancreatic β-cells. He observes that ATP production, protein synthesis, and vesicular transport are tightly coordinated processes within the cell.

Any defect in these biochemical processes results in impaired insulin release and altered glucose homeostasis.



1. **Describe the role of mitochondria, ribosomes, and Golgi apparatus in the biochemical functioning of the cell.**
2. **Explain how disruption of cellular biochemical organization can lead to metabolic disorders like diabetes mellitus.**

Puzzle 3: Scope of Biochemistry in Drug Development

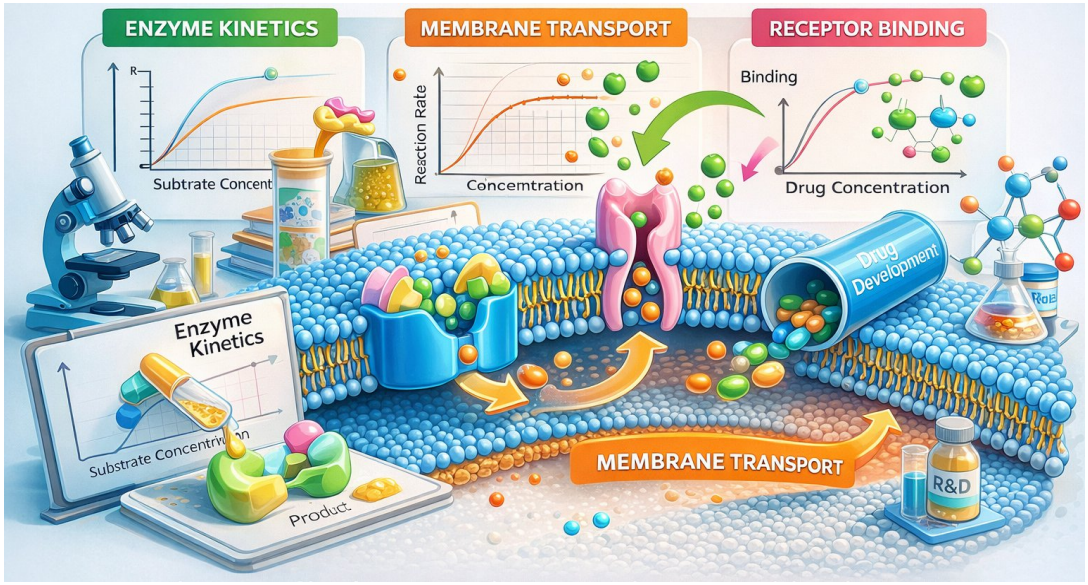
During the development of a new oral hypoglycemic agent, a pharmaceutical company evaluates the drug's interaction with plasma proteins and its transport across cell membranes.

CASE STUDY BASED PUZZLE

ER20-25T:BIOCHEMISTRY AND CLINICAL PATHOLOGY

UNIT 1: INTRODUCTION TO BIOCHEMISTRY

The R&D team emphasizes the importance of biochemical principles such as enzyme kinetics, membrane transport, and receptor binding.



1. **Discuss the scope of biochemistry in pharmaceutical research and drug development.**
2. **Explain how knowledge of cell membrane structure aids in predicting drug absorption and distribution.**

Puzzle 4: Cellular Damage and Biochemical Basis of Disease

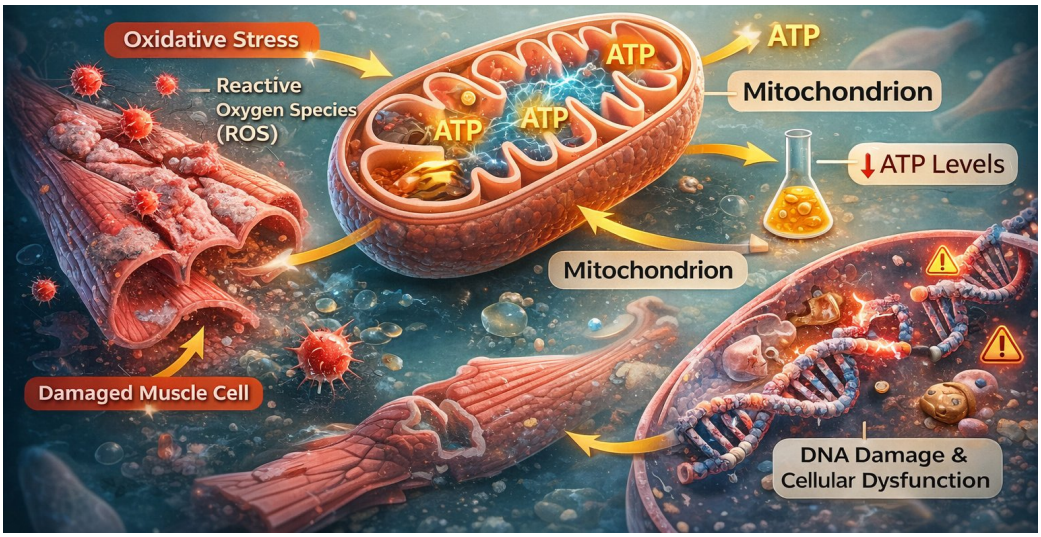
A patient undergoing chemotherapy develops severe fatigue and muscle weakness. Laboratory investigations reveal decreased ATP levels and increased oxidative stress markers in muscle cells.

CASE STUDY BASED PUZZLE

ER20-25T:BIOCHEMISTRY AND CLINICAL PATHOLOGY

UNIT 1: INTRODUCTION TO BIOCHEMISTRY

The clinician suspects mitochondrial dysfunction at the cellular biochemical level.



1. **Explain the biochemical role of mitochondria in energy metabolism.**
2. **Relate oxidative stress to cellular damage and its biochemical consequences.**