TRANSLATION

3: REGULATORY AND TRANSPORT PROTEIN

REGULATORY PROTEIN

01 What is Regulatory Protein?

A type of protein that plays a key role in controlling and regulating various biological processes, particularly gene expression and cellular functions.

02 Characteristics

- very enormously
- can bind both small signal molecules and DNA
- the protein that bind with the specific DNA sequence in response to the presence of a small molecule inducer

03 Function

Gene Expression Regulation:

- bind to specific DNA sequences to promote or inhibit the transcription of genes.
- allow cell to regulate not only the amounts but also the activities of its protein constituents

Signal Transduction:

act as switches to turn on or off biochemical signals within the cell in response to external stimuli, like hormones or environmental changes.

04 Example

Lac Repressor (LacI)

-represses transcription of the operon involved in transport and catabolism of lactose

TRANSPORT PROTEIN

01 What is Transport Protein?

A type of protein that facilitates the movement of substances (such as ions, nutrients, gases, and waste products) within an organism.

02 Function

- Help move specific molecules or ions across the cell membrane.
- Only allow certain molecules or ions to pass through.
- Work through passive transport (no energy needed) or active transport (uses energy).

03 Example

Carrier & Channel Protein

-Bring in nutrients (e.g., glucose, amino acids) and remove waste.
-Balance the cell's environment by controlling what goes in and out.
- Create energy differences (ion gradients) for processes like nerve signals or muscle movement.
- Support cell communication and energy production

Eg: In Sodium & potassium pump,

Carrier protein
- moves 3 sodium ions out and 2 potassium ions into the cell
- maintain a higher concentration of sodium outside the cell and a higher concentration of potassium inside the cell

Potassium ion channel: conduct potassium ions down their electrochemical gradient

Sodium ion channel: allow sodium ions to pass through the cell membrane