

Chapter – 5 | Molecular Basis of Inheritance**QUIZ
PART-08**

1. Regulation of gene expression results in the production of:

- A. DNA molecules
- B. Polypeptides
- C. Ribosomes
- D. Nucleotides (B)

Explanation : Regulation of gene expression controls the production of polypeptides at different levels.

2. In prokaryotes, the major control point of gene expression is:

- A. Translation
- B. Transcriptional initiation
- C. DNA replication
- D. Protein degradation (B)

Explanation : In prokaryotes, control of the rate of transcriptional initiation is the main site for regulation.

3. The lac operon was first described by:

- A. Watson and Crick
- B. Jacob and Monod
- C. Hershey and Chase
- D. Meselson and Stahl (B)

Explanation : François Jacob and Jacques Monod explained the transcriptional regulatory mechanism of the lac operon.

4. The lac operon is composed of:

- A. Only structural genes
- B. Regulatory gene and three structural genes
- C. Only promoter region
- D. Only operator region (B)

Explanation : Lac operon contains the regulatory gene (i gene) and three structural genes (z, y and a).

5. The i gene of lac operon codes for:

- A. Beta-galactosidase
- B. Permease
- C. Repressor protein
- D. Transacetylase (C)

Explanation : The i gene produces the repressor protein that regulates the lac operon.

6. Which gene of lac operon codes for beta-galactosidase?

- A. i gene
- B. z gene
- C. y gene
- D. a gene (B)

Explanation : The z gene encodes beta-galactosidase, which breaks lactose into glucose and galactose.

7. In the absence of lactose, the lac repressor:

- A. Activates transcription
- B. Binds to operator and prevents transcription
- C. Produces more lactose
- D. Activates RNA polymerase (B)

Explanation : Without lactose, the active repressor binds to the operator and blocks RNA polymerase activity.

8. Lactose acts as an inducer by:

- A. Activating the repressor
- B. Binding with repressor and making it inactive
- C. Destroying RNA polymerase
- D. Blocking promoter region permanently (B)

Explanation : Lactose binds with the repressor protein and prevents it from blocking transcription.

9. The enzyme responsible for hydrolysis of lactose into glucose and galactose is:

- A. Permease
- B. Transacetylase
- C. Beta-galactosidase
- D. Repressor (C)

Explanation : Beta-galactosidase breaks lactose into glucose and galactose during lactose metabolism.

10. Regulation of lac operon by a repressor is called:

- A. Positive regulation
- B. Negative regulation
- C. Translation regulation
- D. Mutation regulation (B)

Explanation : Since the repressor inhibits transcription, lac operon regulation by a repressor is called negative regulation.