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Level: HL IB in Biology
Subject: Biology
Topic: IB HL Biology
Type: Mark Scheme

All International Baccalaureate IB Topic Questions HL Biology

BIOLOGY

HL - IB

Key skills

Answer 1

The correct answer is A. Acetyl and phosphate groups can be added to the tails of histones to chemically modify them.

Answer 2

The correct answer is A because activator proteins bind to enhancer sequences to increase the rate of transcription

- Option B is incorrect as it is the opposite - this would decrease or block transcription
- Option C is incorrect as HRE is a DNA sequence and not a protein
- Option D is incorrect as general transcription factors bind directly to the promoter to help initiate transcription. In this example HIF binds to the enhancer sequence

Answer 3

The correct answer is A because histone tails contain positively charged lysine which binds to negatively charged DNA. Methylation neutralises this charge causing the DNA to be less tightly wrapped.

- Option C is incorrect as it is the opposite of what happens
- Option B is incorrect as methylation stimulates gene expression as the DNA is more readily accessible
- Option D is incorrect as methylation neutralises the positive charge of the histone tail

Answer 4

The correct answer is C because methylation of DNA suppresses the transcription of the affected gene by inhibiting the binding of transcription factors.

- Option A is incorrect as the expression of the gene is repressed through methylation
- Option B is an incorrect statement as methylation does not disrupt the hydrogen bonds between base pairs
- Option D is incorrect, breaks in DNA can actually trigger methylation (but you don't need to know this for IB!)

Answer 5

The correct answer is C.

Changes in DNA Methylation occurs throughout the lifetime and can be affected by numerous factors. It is thought that gaining a better understanding of these changes will lead to better treatment and prevention of diseases like cancer. The only incorrect statement is IV, although certain cytosine bases can become methylated they are still cytosine and base-pair normally with guanine. Consequently, the base sequence of DNA does not change.