STUDY GUIDE: GENE EXPRESSION

KEY TERMS

differential gene activity
structural gene
regulator gene
operator
operon
promoter
inducer
repressor
activator
repressible enzymes
inducible enzymes
cAMP-CAP complex
intron
exon
chromatin
euchromatin
heterochromatin
histone proteins
nonhistone proteins
DNA methylation
chromosome puffs
enhancers
transcriptional control
postranscriptional control
totipotency
homeotic genes
homeobox

QUESTIONS

1. About what percentage of human genes are being expressed in a cell at any given time?

2. Describe the Jacob-Monod model of procaryotic gene induction. Explain the role of inducer, operator, promoter and repressor, the regulator gene and the structural genes.

3. Using a diagram, describe the function of a repressible operon and explain how it differs from an inducible operon.

4. Using a diagram, describe how the cAMP-CAP complex facilitates transcription.
5. Explain why the models for the control of gene transcription in bacteria are not directly applicable to eucaryotes.

6. Explain how a chromosome can contain large quantities of DNA.

7. Give the percentage of the eucaryotic genome that is both transcribed and translated and contrast that with the percentage of the procaryote genome that is both transcribed and translated.

8. Differentiate between euchromatin and heterochromatin.

9. Explain "transcriptional control" and "post transcriptional control".

10. Describe the operon concept and the roles of regulatory genes, operator sites and structural genes in the control of gene function.

11. Why must gene activity be regulated?

12. Distinguish between an operator and promoter. Between a repressor and an inducer.