

This print-out should have 34 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

Raven18 33

001 10.0 points

What is a bacterial gene regulatory system *not* likely to have?

1. a coding sequence
2. one or more introns
3. a promoter
4. a ribosome recognition site
5. an operator

Raven20 41

002 10.0 points

In bacteria, genes may be transferred through a pilus which acts like a bridge in which process?

1. transfection
2. recombination
3. inversion
4. conjugation
5. transformation

Starr 15 01

003 10.0 points

In the lactose operon of *E.coli*, the operators

1. encode enzymes that break down lactose.
2. releases the repressor protein.
3. bind the repressor protein.
4. are binding sites for RNA polymerase.

5. encode the repressor protein.

Starr 16 03

004 10.0 points

A plasmid is

1. a collection of DNA fragments produced by restriction enzymes.
2. a linear fragmentary DNA.
3. a small circular molecule of DNA with only a few genes besides the chromosomal DNA.
4. found only in eukaryotes.
5. a bacterial chromosome.

Viruses and Prokaryotes34

005 10.0 points

In transduction,

1. only the F plasmid can be transferred.
2. only a particular part of the bacterial chromosome can be transferred.
3. only the part of the bacterial chromosome near the F plasmid can be transferred.
4. None of these
5. a part of the bacterial chromosome may be transferred.

Viruses and Prokaryotes41

006 10.0 points

Genetic diversity is introduced into bacterial populations through

1. transduction.
2. transformation.
3. the acquisition of new genes via plasmids and transposable elements.
4. All of these

5. conjugation.

Viruses and Prokaryotes42

007 10.0 points

The most efficient means of regulating protein synthesis is by

1. translation of the mRNA.
2. transcription of the gene.
3. degradation of the protein.
4. inhibition of the protein.
5. selective blocking of transcription.

Viruses and Prokaryotes46

008 10.0 points

A promoter is the region of

1. None of these
2. the mRNA that binds tRNAs.
3. the mRNA that binds to a ribosome.
4. DNA that binds RNA polymerase.
5. plasmid that binds the enzymes for replication.

Viruses and Prokaryotes48

009 10.0 points

The three basic parts of an operon are the

1. promoter, the operator, and the structural gene(s).
2. None of these
3. structural gene(s), the mRNA, and the tRNAs.
4. promoter, the mRNA, and the termination codons.
5. promoter, the structural gene(s), and the

termination codons.

Viruses and Prokaryotes50

010 10.0 points

The mechanism by which the inducer causes the repressor to detach from the operator is an example of

1. transposition.
2. catabolite repression.
3. allosteric modification.
4. transcription.
5. recombination.

Viruses and Prokaryotes52

011 10.0 points

An inducer

1. combines with a repressor and prevents it from binding the promoter.
2. binds to the operator and prevents the repressor from binding at this site.
3. binds to the termination codons and allows protein synthesis to continue.
4. binds to the promoter and prevents the repressor from binding to the operator.
5. combines with a repressor and prevents it from binding the operator.

Viruses and Prokaryotes54

012 10.0 points

Which operon is turned “off” in response to molecules present in the environment of the cell?

1. Degraded
2. Inducible
3. Suppressible

4. Repressible

5. Impressible

Viruses and Prokaryotes55

013 10.0 points

In a repressible operon, the repressor molecule

1. binds to the mRNA.
2. can repress the transcription of the operon on its own.
3. is a molecule made from the operon.
4. must first be made negative to control the operon.
5. must first be activated by a corepressor.

Viruses and Prokaryotes56

014 10.0 points

It is found that a certain enzyme is synthesized whenever the solution in which the cells are growing lacks substance X. This phenomenon is most likely an example of _____ gene regulation.

1. repressible
2. positive
3. positive-negative
4. inducible
5. negative

Viruses and Prokaryotes57

015 10.0 points

It is found that a certain enzyme is synthesized whenever the solution in which the cells are growing contains substance X. This phenomenon is most likely an example of

1. negative gene regulation.
2. repressible gene regulation.

3. positive-negative gene regulation.

4. inducible gene regulation.

5. positive gene regulation.

Raven26 12

016 10.0 points

The genetic alteration of a cell's genome by introduction of foreign DNA is called

1. reproduction.
2. syngamy.
3. transfection.
4. transformation.
5. alternation of generation.

Viruses and Prokaryotes60

017 10.0 points

How are inducible and repressible systems similar?

1. They both block transcription.
2. Both systems are unique to prokaryotes.
3. They both control catabolic pathways.
4. They both control biosynthetic pathways.
5. In both systems the regulatory molecules function by binding to the operator.

Viruses and Prokaryotes64

018 10.0 points

What effect does the presence of ample glucose have on the amount of lac operon transcription?

1. It decreases the cAMP concentration, which in turn causes an increased rate of transcription.
2. None of these

3. It increases the rate of transcription.
4. It increases the cAMP concentration, which in turn causes a decreased rate of transcription.
5. It decreases the rate of transcription.

Eukaryotic Genome 01

019 10.0 points

Cheetahs are very susceptible to disease because

1. they have many more regulatory proteins compared to prokaryotes.
2. they lack genetic diversity.
3. they have very large genomes compared to prokaryotes.
4. much of their DNA is noncoding.
5. they have many mutated genes.

Eukaryotic Genome 14

020 10.0 points

The similarity between the human genome and the genome of the puffer fish indicates that

1. humans and puffer fish have a large amount of repetitive DNA.
2. the complexity of an organism is not determined by genes alone.
3. alternative splicing may be a key to the levels of complexity in organisms.
4. chromosomal rearrangements account for phenotypic differences.
5. there are more human mRNAs than human genes.

Raven11 48
021 10.0 points

Histones are proteins that

1. serve as spindle fibers to pull sister chromatids apart during anaphase.
2. are tightly bound to mRNA.
3. are tightly bound to inside of the nuclear membrane.
4. are tightly bound to the double strands of DNA.
5. are tightly bound with only one of the strands of DNA.

StarrC 08 05

022 10.0 points

A chromosome consists of DNA wrapped around which of the following?

1. lipids
2. lysosomes
3. nucleic acids
4. carbohydrates
5. proteins

Eukaryotic Genome 29

023 10.0 points

In eukaryotic cells, promoters are

1. sequences of RNA that are spliced out.
2. neither transcribed nor translated.
3. transcribed.
4. transcribed and then removed.
5. transcribed and translated.

Eukaryotic Genome 52

024 10.0 points

Transcription factors are

1. RNA sequences that bind to RNA polymerase.
2. proteins that bind to DNA near the promoter sequence.
3. polysaccharides that bind to the transcripts.
4. factors that bind to enhancers.
5. DNA sequences that regulate transcription.

Eukaryotic Genome 68
025 10.0 points

Nucleosomes disaggregate to allow transcription and then reaggregate

1. through insertion of nucleotides.
2. by acetylation and deacetylation.
3. through alternative splicing.
4. by attaching ubiquitin.
5. through alternation of nucleotides.

Eukaryotic Genome 77
026 10.0 points

In neurons, the globin gene contains many methylated cytosines. The globin gene, therefore, is

1. regulated by posttranslational control.
2. regulated by posttranscriptional control.
3. not expressed.
4. expressed only in males.
5. expressed only in females.

Eukaryotic Genome 82
027 10.0 points

The expression of some genes can be regulated

in part by the pattern of RNA splicing. This is an example of

1. posttranscriptional control.
2. transcriptional regulation.
3. DNA methylation.
4. catalytic RNA activity.
5. the endosymbiotic theory.

Eukaryotic Genome 89
028 10.0 points

Some metabolic pathways are regulated in part by changes in the rate of degradation of key enzymes. This is an example of

1. transcriptional control.
2. liquid hybridization.
3. posttranslational control.
4. operon control.
5. feedback inhibition.

GA SB2 13
029 10.0 points

Some mammals have genes for fur color that produce pigment only when the outside air is above a certain temperature. This effect on pigment production is an example of how the environment can

1. destroy sensitive genes.
2. stop the process of evolution.
3. influence the expression of genes.
4. cause new mutations to occur.

Raven18 12
030 10.0 points

Transcriptional control-proteins increase the rate of transcription by binding to what part

of DNA?

1. operator sequences
2. tRNA sequences
3. promotor sequences
4. enhancer sequences
5. mRNA sequences

Raven18 24
031 10.0 points

Which statement(s) concerning transcriptional control is/are true?

- A. RNA polymerase must be capable of binding to the gene's promoter;
 - B. RNA polymerase must have access to the DNA helix;
 - C. Proteins binding at other regions on the DNA affect the binding of RNA polymerase to the promoter positively or negatively.
1. B only
 2. A only
 3. None is true.
 4. C only
 5. All are true.

Raven18 35
032 10.0 points

The *lac* regulatory system is important to bacteria because the sugar lactose

1. is only rarely available; producing enzymes all of the time is costly.
2. cannot be made by bacteria unless the genes are turned on.
3. switches the system off and on whether or not lactose is present.

4. is the most common source of food; regulatory enzymes are needed all of the time.

5. is incorporated into the nucleic acid of the bacteria.

Raven18 36
033 10.0 points

Small RNAs can regulate gene expression.

One type called microRNA (miRNA) acts by binding

1. indirectly to the tRNAs, thus preventing codon and anti-codon binding.
2. directly to the ribosomes, thus preventing transcription.
3. directly to the template DNA strand, thus preventing mRNA production.
4. directly to the tRNAs, thus preventing their transport of amino acids to the ribosomes.
5. directly to the mRNAs, thus preventing their translation into proteins.

Starr 15 09
034 10.0 points

Which statement is correct?

1. A transcript's stability affects the rate at which it is transcribed.
2. During differentiation, cell lineages activate a fraction of their genes in selective ways.
3. Methylation is necessary to activate a gene.
4. Gene amplification allows your white blood cells to make millions of different antibodies.
5. Transcription of genes takes place with or without a promoter.