Regulation of an enzyme’s activity occurs
A) transcriptionally.
B) translationally.
C) posttranslationally.
D) at any point on the enzymatic production pathway.

Allosteric enzymes have two important binding sites. These are the
A) active site and the allosteric site.
B) active site and the inhibitory site.
C) allosteric site and the effector site.
D) allosteric site and the passive site.

Feedback inhibition mutants can be used for the large scale commercial production of which compound?
A) Glycolipids
B) Amino acids
C) Antibiotics
D) Lipoproteins

When amino acids such as arginine and proline bind to an enzyme, they
A) increase the efficiency of the enzyme.
B) inhibit the enzyme.
C) reconfigure the enzyme so that it becomes functional.
D) extend the functional life of the enzyme.

Arginine in the culture medium
A) enhances the synthesis of the enzymes required for the production of arginine.
B) represses the synthesis of the enzymes required for the production of arginine.
C) neutralizes the enzymes required for the production of arginine.
D) has no effect on the enzymes required for the production of arginine.

Enzyme induction occurs
A) when the substrate is present.
B) when the organism is environmentally stressed.
C) continuously.
D) when the substrate is depleted.

Enzyme repression or induction acts at the level of
A) pre-transcription.
B) transcription.
C) translation.
D) post-translation.
What occurs when an inducer is added to a medium containing an organism with a metabolic pathway controlled by a repressor?
A) The inducer combines with the repressor and activates it.
B) The inducer combines with the repressor and inactivates it.
C) The inducer combines with the substrate and blocks induction.
D) The inducer does not combine with but functions as a chaperone molecule for the enzyme-substrate complex.

Cyclic AMP is synthesized from ATP by an enzyme called
A) adenylate cyclase.
B) catabolite activator protein (CAP) activase.
C) cAMP receptor protein (CRP) receptase.
D) RNA polymerase.

How does the presence of an inducer affect transcription?
A) The inducer binds to the operator.
B) The inducer does not bind to the operator.
C) The inducer causes the repressor to bind to the operator.
D) The inducer prevents the repressor from binding to the operator.

The function of a kinase is
A) methylation.
B) response regulation.
C) phosphorylation.
D) glycosylation.

The processes of transcription and translation are simultaneous processes in
A) eukaryotic cells.
B) prokaryotic cells.
C) both eukaryotic and prokaryotic cells.
D) neither eukaryotic nor prokaryotic cells.

An mRNA transcript may be polycistronic in
A) eukaryotic cells.
B) prokaryotic cells.
C) both eukaryotic and prokaryotic cells.
D) neither eukaryotic nor prokaryotic cells.

What is the direct cause of catabolite repression?
A) The presence of glucose and lactose in a growth medium.
B) The synthesis of β-galactosidase.
C) Binding of CAP to the DNA.
D) A cellular deficiency of cyclic AMP.
A mutant that has a nutritional requirement for growth is an example of a(n)
A) autotroph.
B) auxotroph.
C) heterotroph.
D) organotroph.

Consider a mutation in which the change is from UAC to UAU. Both codons specify the amino acid tyrosine. Which term best describes this event?
A) Silent mutation
B) Nonsense mutation
C) Missense mutation
D) Frameshift mutation

A mutation which readily reverses to restore the original parental type would most likely be due to a(n)
A) deletion.
B) insertion.
C) point mutation.
D) frame-shift mutation.

DNA fragments may be introduced into a recipient by which of the following?
A) Transformation
B) Transduction
C) Conjugation
D) All of the above

The uptake of DNA released from a cell would most likely be the result of __________, while cell-to-cell contact would most likely result in __________.
A) transformation / conjugation.
B) transduction / conjugation.
C) conjugation / transformation.
D) transformation / transduction.

The positions of genes on a genetic map, such as that shown for *Escherichia coli* in the text, are marked according to
A) degrees.
B) nanometers.
C) radians.
D) minutes.
Lysogeny probably carries a strong selective advantage for the host cell because
A) it prevents cell lysis.
B) it confers resistance to infection by viruses of the same type.
C) it confers resistance to infection by viruses of a different type (or strain).
D) all of the above.

A plasmid may
A) replicate independent of the chromosome.
B) be transferred cell-to-cell during conjugation.
C) be integrated into the chromosome.
D) be involved in any of the above.

Plasmids that govern their own transfer are known as
A) transformable.
B) transmutable.
C) conjugative.
D) transfective.

Hfr strains of *Escherichia coli*
A) do not possess an F factor.
B) have the F factor as a plasmid.
C) have an integrated F factor.
D) transfer the complete F factor to recipient cells at high frequency.

*F*+ strains of *Escherichia coli*
A) do not have an F factor.
B) have the F factor as a plasmid.
C) have an integrated F factor.
D) transfer the F factor to recipient cells at a high frequency.

*F*− strains of *Escherichia coli*
A) do not have an F factor.
B) have the F factor as a plasmid.
C) have an integrated F factor.
D) transfer the F factor to other strains at a high frequency.

All Hfr strains integrate into the chromosome at
A) the same locus.
B) several specific sites.
C) the same locus most of the time, although there may be some variation.
D) loci that cannot be accurately determined.
The term point mutation refers to mutations involving
A) a base-pair substitution.
B) a base-pair insertion (microinsertion).
C) a base-pair deletion (microdeletion).
D) any of the above.

A mutation in recA results in
A) a decrease in specific recombination.
B) a decrease in homologous recombination.
C) an increase in homologous recombination.
D) no change in either general or specific recombination.

Consider conjugation in *Escherichia coli*. In which of the following matings would chromosomal genes be transferred most frequently?
A) F\(^+\) x F\(^-\)
B) F\(^-\) x F\(^-\)
C) Hfr x F\(^-\)
D) Hfr x F\(^+\)

Which of the following features are common to transformation, transduction and conjugation?
(1) Unidirectional transfer of genes, (2) Incomplete gene transfer, (3) Homologous recombination, (4) Meiosis occurring in the recipient
A) 1, 2, 3
B) 1, 2
C) 3, 4
D) 1, 2, 4

In the bacterial world, a gene located on which of the following would be the least likely to be transferred?
A) R factor
B) F\(^+\)
C) The phage Mu
D) The chromosome

In Frederick Griffith's experiments, the donor DNA was obtained from what?
A) A mouse
B) The R strain of *Streptococcus pneumoniae*
C) The S strain of *Streptococcus pneumoniae*
D) A combination of both R and S strains of *Streptococcus pneumoniae*
A transducing particle is produced during the type of genetic recombination known as
A) transformation.
B) conjugation.
C) specialized transduction.
D) generalized transduction.

Which is a characteristic of an F- cell?
A) The cell can synthesize an F pilus.
B) The cell can take up DNA from an F plasmid.
C) The chromosomal DNA can be transferred to another cell.
D) The cell can participate as a donor in conjugation.

The appropriate designation for the gene product of a histidine requiring strain of *Escherichia coli* would be ___.

The presence of which element (ion) increases the efficiency of transformation in *Escherichia coli*? ____

The designations Phe-, Leu-, and Ser+ refer to an organism's ________.

A cluster of several genes whose expression is under the control of a single operator is called a(n) ______

Regulatory mechanisms that respond to environmental signals by regulating expression of many different genes are called ________.

The phenomenon in which bacterial regulatory pathways are controlled by the density of cells of their own kind is called _______.

The genes in *Pseudomonas aeruginosa* that enable cells to transition from growth in suspension to growth in a biofilm are expressed due to ________.
• Feedback inhibition has allowed industrial microbiologists to isolate microbial mutants.

• Feedback inhibition or covalent modification is generally sufficient for the regulation of gene expression.

• Proteins that bind to DNA can either block or activate transcription.

• The regulation of enzyme synthesis is usually a more rapid process than the regulation of enzyme activity.

• Enzyme repression is seemingly an inefficient use of the organism's energy.

• Because the repressor's role is inhibitory, regulation involving repressors is referred to as negative control.

• The maltose regulon is an example of a system that involves positive regulation.

• As a general rule, any given gene has only one type of control system.

• For the CAP protein to bind to the CAP binding site (and thus make translation possible), a sufficiently high level of cyclic AMP must be present.

• The lac operon is under the control of catabolite repression as well as its own specific regulatory system.

• In catabolic repression, cells use the least abundant carbon source first.

• In general, attractants increase the rate of autophosphorylation

• Following uptake, transforming DNA becomes attached to a competence-specific protein that prevents it from nuclease attack until it reaches the chromosome.

• The F plasmid of *Escherichia coli* is about 99 kb and is present in both F<sup>+</sup> and F<sup>-</sup> strains.

• Almost all known plasmids are double stranded DNA.
• Most plasmids are circular rather than linear.

• Many *Bacteria* isolated from nature are natural lysogens.

• It is likely that lysogeny has a selective advantage in nature.

• Toxigenicity in *Corynebacterium diphtheriae* is due to phase conversion (lysogenization with β phage).

• All Hfr strains possess an F factor integrated into the host chromosome.