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Cell Cellul ular ar foun founda dati tion onss Pages: C In a bacterial cell, the DNA is in the: A B C D E cel cell env envelo elope. Cell Cellul ular ar foun founda dati tion onss Page: E A major change occurring in the evolution of eukaryotes from prokaryotes was the development of: B In eukaryotes, the nucleus is enclosed by a double membrane called the: A B C D E cel cell mem memb bran rane. C The dimensions of living cells are limited, on the lower end by the minimum number of biomolecules necessary for function, and on the upper end by the rate of diffusion of solutes such as oxygen. Except for highly elongated cells, they usually have lengths and diameters in the range of: B Which group of single-celled micro-organisms has many members found growing in extreme environments? A B C D E bacteria. F G H I J chemoautotroph. A The three-dimensional structure of macromolecules is formed and maintained primarily through noncovalent interactions. A B C D E carbon-carbon bonds hydrogen bonds hydrophobic interactions ionic interactions van der Waals interactions 9. B The four covalent bonds in methane CH 4 are arranged around carbon to give which one of the following geometries? A linear B tetrahedral C trigonal bipyramidal D trigonal planar E trigonal pyramidal B What functional groups are present on this molecule? D The macromolecules that serve in the storage and transmission of genetic information are: A B C D E carbohydrates. D Stereoisomers that are nonsuperimposable mirror images of each other are known as: A B C D E anomers. E The enzyme fumarase catalyzes the reversible hydration of fumaric acid to l-malate, but it will not catalyze the hydration of maleic acid, the cis isomer of fumaric acid. This is an example of: A B C D E biological activity. A Humans maintain a nearly constant level of hemoglobin by continually synthesizing and degrading it. This is an example of a n: A B C D E dynamic steady state. C If heat energy is absorbed by the system during a chemical reaction, the reaction is said to be: A B C D E at equilibrium. Chapter 1 The Foundations of Biochemistry C The major carrier of chemical energy in all cells is: A B C D E acetyl triphosphate. A Enzymes are biological catalysts that enhance the rate of a reaction by: A B C D E decreasing the activation energy. B Energy requiring metabolic pathways that yield complex molecules from simpler precursors are: A B C D E amphibolic. A Hereditary information with the exception of some viruses is preserved in: A B C D E deoxyribonucleic acid. C When a region of DNA must be repaired by removing and replacing some of the nucleotides, what ensures that the new nucleotides are in the correct sequence? Specific enzymes bind the correct nucleotides. The new nucleotides basepair accurately with those on the complementary strand. The repair enzyme recognizes the removed nucleotide and brings in an identical one to replace it. The three-dimensional structure determines the order of nucleotides. E The three-dimensional structure of a protein is determined primarily by: A B C D E electrostatic guidance from nucleic acid structure. Short Answer Questions Living organisms 1 are chemically complex and highly organized; 2 extract, transform, and use energy from their environment; 3 have the capacity to precisely self-replicate and self-assemble; 4 exploit a chemical interplay with their environment; 5 possess programmatically defined functions; and 6 evolve to new forms over many generations. What is the function of the plasma membrane? It contains proteins that can transport specific ions or molecules. Other membrane proteins act as receptors that transmit signals from the outside to the inside of the cell. What is the function of the cell wall? The cell wall provides a rigid, protective shell for the cell. It is porous, allowing water and small molecules to pass readily, but it is rigid enough to resist the swelling of the cell caused by the accumulation of water. This is important to maintain the flexibility needed in macromolecules. Given this biochemical similarity, how is the structural and functional diversity of living things possible? Diversity is thus achieved through the nearly limitless variety of sequences that can exist when amino acids are linked to form proteins, nucleotides are linked to form nucleic acids, and monosaccharides are linked to form polysaccharides. Branching in the latter can contribute additional heterogeneity. Each type of organism

constructs a unique set of macromolecules from these monomeric units, resulting in the structural and functional diversity among species. Many answers are possible including: An asymmetric carbon has four different substituents attached, and cannot be superimposed on its mirror imageâ€”as a right hand cannot fit into a left glove. Thus a molecule with one chiral carbon will have two stereoisomers, which may be distinguishable from one another in a biological system. Configuration denotes the spatial arrangement of the atoms of a molecule that is conferred by the presence of either double bonds, around which there is no freedom of rotation, or chiral centers, which give rise to stereoisomers. One sample rotated polarized light to the left; the mirror image crystals rotated polarized light to the right. Why is it important that she separate the two enantiomers and test each for its biological activity? Chapter 1 The Foundations of Biochemistry 9 In contrast, because all enzymes are made of chiral precursors, all enzymes are inherently chiral catalysts. Thus, they will show strong stereoselectivity in reactants and mechanisms, leading to the production of chiral products. The proteins in a cell are continuously being synthesized and degraded. The cell maintains a dynamic steady state in which the amount of each protein remains fairly constant at the level required under given conditions. To maintain this situation, the organism must acquire energy from its surroundings, either in the form of chemical energy or directly from sunlight. How, then, do cells accomplish this process? The endergonic thermodynamically unfavorable reaction is coupled to an exergonic thermodynamically favorable reaction through a shared intermediate, so that the overall free-energy change of the coupled reactions is negative the overall reaction is exergonic. Although this process is clearly spontaneous, the products are colder than the reactants. Feedback inhibition is the regulation of a biochemical pathway in which a reaction product inhibits an earlier usually the first step in the pathway. It is an important type of regulation because it ensures that energy is not wasted by an organism producing molecules it does not need. The genetic information is encoded in the linear sequence order of the four different deoxyribonucleotides in the DNA. When a new copy of DNA is needed, the two strands of the DNA unwind and each strand serves as a template on which a new strand is synthesized. Hereditary transmission of genetic information occurs via replication of DNA, the informationcontaining molecule. This process is very accurate and thus results in relatively few changes in genetic information. These mutations are essential for generating genetic diversity, which allows for adaptation of species. Chapter 1 The Foundations of Biochemistry 11 Some mutations lead to the synthesis of an inactive or defective enzyme or other protein that can no longer carry out its proper function, which is thus harmful to the organism. Miller subjected a gaseous mixture of ammonia, methane, water vapor, and hydrogen to electrical sparks for periods of a week or more. When he analyzed the contents of the closed reaction vessel, the gas phase contained CO and CO 2, as well as unreacted starting materials. The water phase contained a variety of organic compounds, including some amino acids, hydroxy acids, aldehydes, and hydrogen cyanide. Initially, RNA molecules were both genes and catalysts. Self-replication of these molecules over long periods of time produced variants that were able to catalyze polymerization of amino acids to form peptides that assumed the function of catalysts. This would give a selective advantage to aerobic organisms which utilized O 2 as electron acceptor over anaerobic organisms for which O 2 was toxic. An endosymbiotic association is the envelopment of one organism by another to form a relationship that is beneficial to both organisms. The aerobic bacteria then evolved into the mitochondria found in modern eukaryotic cells, and the photosynthetic bacteria evolved into the chloroplasts found in plant cells.

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This is the test bank. This is NOT the book. Table of Contents = 28 Chapters. 1. The Foundations of Biochemistry Cellular Foundations Chemical Foundations.

C In a bacterial cell, the DNA is in the: A B C D E cell envelope. E A major change occurring in the evolution of eukaryotes from prokaryotes was the development of: B In eukaryotes, the nucleus is enclosed by a double membrane called the: A B C D E cell membrane. C The dimensions of living cells are limited, on the lower end by the minimum number of biomolecules necessary for function, and on the upper end by the rate of diffusion of solutes such as oxygen. Except for highly elongated cells, they usually have lengths and diameters in the range of: B Which group of single-celled microorganisms has many members found growing in extreme environments? B The bacterium E. A B C D E chemoautotroph. D Which is a list of organelles? A Mitochondria, chromatin, endoplasmic reticulum B Peroxisomes, lysosomes, plasma membrane C Proteasomes, peroxisomes, lysosomes D Mitochondria, endoplasmic reticulum, peroxisomes E All of the above 8. B Which one of the following has the cellular components arranged in order of increasing size? A The three-dimensional structure of macromolecules is formed and maintained primarily through noncovalent interactions. Which one of the following is not considered a noncovalent interaction? E Which one of the following is not among the four most abundant elements in living organisms? B The four covalent bonds in methane CH4 are arranged around carbon to give which one of the following geometries? B What functional groups are present on this molecule? D The macromolecules that serve in the storage and transmission of genetic information are: A B C D E carbohydrates. D Stereoisomers that are nonsuperimposable mirror images of each other are known as: A B C D E anomers. D The catalog of all proteins functioning in a cell is the: A B C D E metabolome. C Use the terms a chemoautotrophs, b chemoheterotrophs, c photoautotrophs, and d photoheterotrophs and identify the answer that correctly finishes the statement: Carnivores are and herbivores are. E The enzyme fumarase catalyzes the reversible hydration of fumaric acid to l-malate, but it will not catalyze the hydration of maleic acid, the cis isomer of fumaric acid. This is an example of: A B C D E biological activity. A Humans maintain a nearly constant level of hemoglobin by continually synthesizing and degrading it. This is an example of a n: A B C D E dynamic steady state. C If heat energy is absorbed by the system during a chemical reaction, the reaction is said to be: A B C D E at equilibrium. C The major carrier of chemical energy in all cells is: A B C D E acetyl triphosphate. A Enzymes are biological catalysts that enhance the rate of a reaction by: A B C D E decreasing the activation energy. B Energy requiring metabolic pathways that yield complex molecules from simpler precursors are: A B C D E amphibolic. A Hereditary information with the exception of some viruses is preserved in: A B C D E deoxyribonucleic acid. C When a region of DNA must be repaired by removing and replacing some of the nucleotides, what ensures that the new nucleotides are in the correct sequence? Specific enzymes bind the correct nucleotides. The new nucleotides base pair accurately with those on the complementary strand. The repair enzyme recognizes the removed nucleotide and brings in an identical one to replace it. The three-dimensional structure determines the order of nucleotides. E The three-dimensional structure of a protein is determined primarily by: A B C D E electrostatic guidance from nucleic acid structure. E When two genes in an organism share detectable sequence similarity, those genes or their gene products, are said to be: B and C Short Answer Questions Living organisms 1 are chemically complex and highly organized; 2 extract, transform, and use energy from their environment; 3 have the capacity to precisely self-replicate and self-assemble; 4 exploit a chemical interplay with their environment; 5 possess programmatically defined functions; and 6 evolve to new forms over many generations. What is the function of the plasma membrane? The plasma membrane acts as a barrier to the free passage of inorganic ions and most other charged or polar compounds into or out of the cell. It contains proteins that can transport specific ions or molecules. Other membrane proteins act as receptors that transmit signals from the outside to the inside of the cell. What is the function of the cell wall? The cell wall

provides a rigid, protective shell for the cell. It is porous, allowing water and small molecules to pass readily, but it is rigid enough to resist the swelling of the cell caused by the accumulation of water. This is important to maintain the flexibility needed in macromolecules. The cytoplasm is the internal volume enclosed by the plasma membrane; the cytosol is the aqueous portion of the cytoplasm. The cytosol is very crowded and gel-like. The diffusion of macromolecules is slowed by collisions with other large molecules and structures. Given this biochemical similarity, how is the structural and functional diversity of living things possible? Living things are composed primarily of macromolecules, polymers of simple compounds of just a few different types. The properties of these polymers are determined by their sequence of monomers and these can be combined in many different ways. Diversity is thus achieved through the nearly limitless variety of sequences that can exist when amino acids are linked to form proteins, nucleotides are linked to form nucleic acids, and monosaccharides are linked to form polysaccharides. Branching in the latter can contribute additional heterogeneity. Each type of organism constructs a unique set of macromolecules from these monomeric units, resulting in the structural and functional diversity among species. A proteome is the list of all proteins that function in a given cell. A proteasome is a molecular machine or supramolecular structure responsible for protein degradation in a cell. Many answers are possible including: An asymmetric carbon has four different substituents attached, and cannot be superimposed on its mirror imageâ€”as a right hand cannot fit into a left glove. Thus, a molecule with one chiral carbon will have two stereoisomers, which may be distinguishable from one another in a biological system. Configuration denotes the spatial arrangement of the atoms of a molecule that is conferred by the presence of either double bonds, around which there is no freedom of rotation, or chiral centers, which give rise to stereoisomers. Configurational isomers can only be interconverted by temporarily breaking covalent bonds. Conformation refers to the spatial arrangement of substituent groups that, without breaking any bonds, are free to assume different positions in space because of the freedom of bond rotation. One sample rotated polarized light to the left; the mirror image crystals rotated polarized light to the right. Why is it important that she separate the two enantiomers and test each for its biological activity? Biomolecules such as receptors for drugs are stereospecific, so each of the two enantiomers of the drug may have very different effects on an organism. One may be beneficial, the other toxic; or one enantiomer may be ineffective and its presence could reduce the efficacy of the other enantiomer. Laboratory syntheses usually use achiral reagents and thus produce racemic mixtures of products. In contrast, because all enzymes are made of chiral precursors, all enzymes are inherently chiral catalysts. Thus, they will show strong stereoselectivity in reactants and mechanisms, leading to the production of chiral products. The proteins in a cell are continuously being synthesized and degraded. The cell maintains a dynamic steady state in which the amount of each protein remains fairly constant at the level required under given conditions. Living organisms are open systems and exchange both matter and energy with their surroundings. They are not at equilibrium with their surroundings; that is, the concentrations of molecules inside the cells of the organism are not the same as their concentrations in the surroundings. To maintain this situation, the organism must acquire energy from its surroundings, either in the form of chemical energy or directly from sunlight. How, then, do cells accomplish this process? The endergonic thermodynamically unfavorable reaction is coupled to an exergonic thermodynamically favorable reaction through a shared intermediate, so that the overall free-energy change of the coupled reactions is negative the overall reaction is exergonic. Although this process is clearly spontaneous, the products are colder than the reactants. Feedback inhibition is the regulation of a biochemical pathway in which a reaction product inhibits an earlier usually the first step in the pathway. It is an important type of regulation because it ensures that energy is not wasted by an organism producing molecules it does not need. The genetic information is encoded in the linear sequence order of the four different deoxyribonucleotides in the DNA. When a new copy of DNA is needed, the two strands of the DNA unwind and each strand serves as a template on which a new strand is synthesized. Hereditary transmission of genetic information occurs via replication of DNA, the informationcontaining molecule. This process is very accurate and thus results in relatively few changes in genetic information. This stability is important to

maintain individual and species characteristics over long periods of time.

Chapter 3 : Maintenance | Testbanknew

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Structural lipids in membranes Pages: A Which of the following statements concerning fatty acids is correct? Phosphatidic acid is a common one. They all contain one or more double bonds. They are a constituent of sterols. They are strongly hydrophilic. E Which of the following molecules or substances contain, or are derived from, fatty acids? B Which of the following statements is true of lipids? Most are simply polymers of isoprene. Testosterone is an important sphingolipid sphingolipid found in myelin. They are more soluble in water than in chloroform. They play only passive roles as energy-storage molecules. D Which of the following contains an ether-linked alkyl group? A B C D E cardiolipin. Structural lipids in membranes Page: D Which of the following statements about membrane lipids is true? A Glycerophospholipids are found only in the membranes of plant cells. B Glycerophospholipids contain fatty acids linked to glycerol through amide bonds. C Lecithin phosphatidylcholine , which is used as an emulsifier in margarine and chocolate, is a sphingolipid. D Some sphingolipids include oligosaccharides in their structure. E Triacylglycerols are the principal components of erythrocyte membranes. A Which of the following is true of sphingolipids? Phosphatidylcholine is a typical sphingolipid. They always contain glycerol and fatty acids. They contain two esterified fatty acids. They may be charged, but are never amphipathic. Lipids as signals, cofactors, and pigments Pages: B Fatty acids are a component of: A B C D E carotenes. A Which of the following statements about sterols is true? Sterols are found in the membranes of all living cells. Sterols are soluble in water, but less so in organic solvents such as chloroform. Stigmasterol is the principal sterol in fungi. The principal sterol of animal cells is ergosterol. A Cholesterol is a sterol that is commonly found in mammals. B They are commonly found in bacterial membranes. C They are more common in plasma membranes than in intracellular membranes mitochondria, lysosomes, etc. D They are precursors of steroid hormones. E They have a structure that includes four fused rings. A Which of the following best describes the cholesterol molecule? A Tay-Sachs disease is the result of a genetic defect in the metabolism of: A B C D E gangliosides. C An example of a glycerophospholipid that is involved in cell signaling is: A B C D E arachidonic acid. Chapter 10 Lipids C Which vitamin is derived from cholesterol? Lipids as signals, cofactors, and pigments Page: E Identify the molecule s derived from sterols. All other things being equal, a the longer the acyl chain, the higher the melting temperature; and b the more unsaturation, the lower the melting temperature. When a shorter acyl chain lies between two longer chains in a nearly crystalline array of lipid molecules, there is a cavity at the end of the short acyl group that allows freer motion to the neighboring acyl chains. A cis double bond introduces a "kink" into the acyl chain, so that it does not pack as easily with its straighter neighbors. Most double bonds in fatty acids are in the cis configuration. This results in a rigid bend in the hydrocarbon chain. They form lipid droplets within adipocytes, which do not contribute to the osmolarity of the cytosol in those cells, and do not require any water of hydration. Triacylglycerols are nonpolar hydrophobic molecules that can be stored in specialized nonaqueous cellular compartments. Glycerophospholipids are amphipathic molecules that can serve as structural components of membranes, which have hydrophilic and hydrophobic regions. In plants, oxidation of the triacylglycerols stored in seeds provides the energy and precursors for biosynthetic processes during germination, before photosynthetic mechanisms become functional. A wax consists of a long-chain fatty acid in ester linkage with a long-chain fatty alcohol. For this structure, see Fig. At neutral pH, there is a charge on the phosphate group, and serine is in the zwitterionic form; it has a protonated amino group and an ionized carboxyl group. Show the ionic form expected at pH 7. How many ester bonds are there in this compound? There are two carboxylate esters and two phosphate esters one phosphodiester in the molecule. Circle the part of the molecule that is polar and draw an arrow to the part that is nonpolar. The acyl chains attached to glycerol are the nonpolar part of the molecule. All

glycerophospholipids have two fatty acids in ester linkage with C-1 and C-2 of glycerol; often the fatty acid at C-1 is saturated, and that at C-2 is unsaturated. C-3 of glycerol is joined to an alcohol-containing head group through a phosphodiester linkage, which is negatively charged at neutral pH. The structure of sphingosine is shown in Fig. A cerebroside has a single sugar residue joined to ceramide; a ganglioside has an oligosaccharide joined to ceramide. Answers are used only once. The mutant enzyme is defective and unable to catalyze its reaction in the metabolic pathway; this results in the accumulation of the metabolic intermediate that is the substrate for the enzyme. See Box , p. Vitamins A, D, E, K. The structure is shown on page They are all lipids with potent biological activities derived from isoprenoid precursors. Working with Lipids Pages: Lipids are either strongly hydrophobic or amphipathic. Because the solvent in tissues is water, lipids are mainly present in aggregates. This aggregation does not occur in organic solvents; as a result, the lipids are more soluble and thus extractable from the tissues.

Chapter 4 : Test Bank for Lehninger Principles of Biochemistry 7th Edition

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C In a bacterial cell, the DNA is in the: A B C D E cell envelope. E A major change occurring in the evolution of eukaryotes from prokaryotes was the development of: B In eukaryotes, the nucleus is enclosed by a double membrane called the: A B C D E cell membrane. C The dimensions of living cells are limited, on the lower end by the minimum number of biomolecules necessary for function, and on the upper end by the rate of diffusion of solutes such as oxygen. Except for highly elongated cells, they usually have lengths and diameters in the range of: B Which group of single-celled micro-organisms has many members found growing in extreme environments? A B C D E bacteria. B The bacterium E. F G H I J chemoautotroph. B Which one of the following has the cellular components arranged in order of increasing size? A The three-dimensional structure of macromolecules is formed and maintained primarily through noncovalent interactions. Which one of the following is not considered a noncovalent interaction? A B C D E carbon-carbon bonds hydrogen bonds hydrophobic interactions ionic interactions van der Waals interactions 9. E Which one of the following is not among the four most abundant elements in living organisms? B The four covalent bonds in methane CH4 are arranged around carbon to give which one of the following geometries? A B C D E linear tetrahedral trigonal bipyramidal trigonal planar trigonal pyramidal B What functional groups are present on this molecule? A B C D ether and aldehyde hydroxyl and aldehyde hydroxyl and carboxylic acid hydroxyl and ester 3 Chapter 1 The Foundations of Biochemistry 4 E hydroxyl and ketone D The macromolecules that serve in the storage and transmission of genetic information are: A B C D E carbohydrates. D Stereoisomers that are nonsuperimposable mirror images of each other are known as: A B C D E anomers. Chapter 1 The Foundations of Biochemistry 5 E The enzyme fumarase catalyzes the reversible hydration of fumaric acid to l-malate, but it will not catalyze the hydration of maleic acid, the cis isomer of fumaric acid. This is an example of: A B C D E biological activity. A Humans maintain a nearly constant level of hemoglobin by continually synthesizing and degrading it. This is an example of a n: A B C D E dynamic steady state. C If heat energy is absorbed by the system during a chemical reaction, the reaction is said to be: A B C D E at equilibrium. Chapter 1 The Foundations of Biochemistry 6 C The major carrier of chemical energy in all cells is: A B C D E acetyl triphosphate. A Enzymes are biological catalysts that enhance the rate of a reaction by: A B C D E decreasing the activation energy. B Energy requiring metabolic pathways that yield complex molecules from simpler precursors are: A B C D E amphibolic. A Hereditary information with the exception of some viruses is preserved in: A B C D E deoxyribonucleic acid. C When a region of DNA must be repaired by removing and replacing some of the nucleotides, what ensures that the new nucleotides are in the correct sequence? Specific enzymes bind the correct nucleotides. The new nucleotides basepair accurately with those on the complementary strand. The repair enzyme recognizes the removed nucleotide and brings in an identical one to replace it. Chapter 1 The Foundations of Biochemistry 7 E The three-dimensional structure determines the order of nucleotides. E The three-dimensional structure of a protein is determined primarily by: A B C D E electrostatic guidance from nucleic acid structure. Short Answer Questions Living organisms 1 are chemically complex and highly organized; 2 extract, transform, and use energy from their environment; 3 have the capacity to precisely self-replicate and self-assemble; 4 exploit a chemical interplay with their environment; 5 possess programmatically defined functions; and 6 evolve to new forms over many generations. What is the function of the plasma membrane? The plasma membrane acts as a barrier to the free passage of inorganic ions and most other charged or polar compounds into or out of the cell. It contains proteins that can transport specific ions or molecules. Other membrane proteins act as receptors that transmit signals from the outside to the inside of the cell. What is the function of the cell wall? The cell wall provides a rigid, protective shell for the cell. It is porous, allowing water and small molecules to pass readily, but it is rigid enough to resist the

swelling of the cell caused by the accumulation of water. This is important to maintain the flexibility needed in macromolecules. Given this biochemical similarity, how is the structural and functional diversity of living things possible? Living things are composed primarily of macromolecules, polymers of simple compounds of just a few different types. The properties of these polymers are determined by their sequence of monomers and these can be combined in many different ways. Diversity is thus achieved through the nearly limitless variety of sequences that can exist when amino acids are linked to form proteins, nucleotides are linked to form nucleic acids, and monosaccharides are linked to form polysaccharides. Branching in the latter can contribute additional heterogeneity. Each type of organism constructs a unique set of macromolecules from these monomeric units, resulting in the structural and functional diversity among species. Chapter 1 The Foundations of Biochemistry 9 Many answers are possible including: Thus a molecule with one chiral carbon will have two stereoisomers, which may be distinguishable from one another in a biological system. Configuration denotes the spatial arrangement of the atoms of a molecule that is conferred by the presence of either double bonds, around which there is no freedom of rotation, or chiral centers, which give rise to stereoisomers. Configurational isomers can only be interconverted by temporarily breaking covalent bonds. Conformation refers to the spatial arrangement of substituent groups that, without breaking any bonds, are free to assume different positions in space because of the freedom of bond rotation. One sample rotated polarized light to the left; the mirror image crystals rotated polarized light to the right. Why is it important that she separate the two enantiomers and test each for its biological activity? 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They are not at equilibrium with their surroundings; that is, the concentrations of molecules inside the cells of the organism are not the same as their concentrations in the surroundings. To maintain this situation, the organism must acquire energy from its surroundings, either in the form of chemical energy or directly from sunlight. How, then, do cells accomplish this process? The endergonic thermodynamically unfavorable reaction is coupled to an exergonic thermodynamically favorable reaction through a shared intermediate, so that the overall free-energy change of the coupled reactions is negative the overall reaction is exergonic. Although this process is clearly spontaneous, the products are colder than the reactants. Chapter 1 The Foundations of Biochemistry 11 Feedback inhibition is the regulation of a biochemical pathway in which a reaction product inhibits an earlier usually the first step in the pathway. It is an important type of regulation because it ensures that energy is not wasted by an organism producing molecules it does not need. The genetic information is encoded in the linear sequence order of the four different deoxyribonucleotides in the DNA. When a new copy of DNA is needed, the two strands of the DNA unwind and each strand serves as a template on which a new strand is synthesized. Hereditary transmission of genetic information occurs via replication of DNA, the informationcontaining molecule. This process is very accurate and thus results in relatively few changes in genetic information. This stability is important to maintain individual and species characteristics over long periods of time. On the other hand, regular changes in genetic information mutations do occur, primarily as a result of infrequent errors in replication. These mutations are essential for generating genetic diversity, which allows for adaptation of species. Chapter 1 The Foundations of Biochemistry 12 Some mutations lead to the synthesis of an inactive or defective enzyme or other protein that can no longer carry out its proper function, which is thus harmful to the organism. However, other mutations may lead to a more stable enzyme or to a protein that is better able to carry out its function in

a particular environment, making it beneficial to the organism.

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