AP BIO INSTA-REVIEW

TOPIC 1.1

Structure of Water and Hydrogen Bonding

SYI-1.A.1

The subcomponents of biological molecules and their sequence determine the properties of that molecule.

SYI-1.A.2

Living systems depend on properties of water that result from its polarity and hydrogen bonding.

AP BIO INSTA-REVIEW

TOPIC 1.1

Structure of Water and Hydrogen Bonding

SYI-1.A.3

The hydrogen bonds between water molecules result in cohesion, adhesion, and surface tension.

AP BIO INSTA-REVIEW

TOPIC

1.1

What type of bond is found in water molecules?

A. Covalent

B. Hydrogen

C. Ionic

D. Van der Waals

AP BIO INSTA-REVIEW

TOPIC 1.1

What type of bond is found in water molecules?

A. Covalent

Bonds between hydrogen and oxygen in water are covalent bonds. The two atoms are sharing their valence electrons.

Recall: This is a POLAR covalent bond since it is unequal sharing of the electrons

AP BIO INSTA-REVIEW

TOPIC

1.1

How does the covalent bond IN water create the hydrogen bond BETWEEN water molecules?

AP BIO INSTA-REVIEW

TOPIC 1.1

How does the covalent bond IN water create the hydrogen bond BETWEEN water molecules?

The covalent bond is a POLAR covalent bond. This leads to an unequal sharing of electrons. This causes a partial positive end (hydrogen) and partial negative end (oxygen). The partially negative oxygen of one water molecule is attracted to the partially positive hydrogen of another water molecule.

AP BIO INSTA-REVIEW

TOPIC

1.1

Water property responsible for water movement UP the stem

A. Adhesion/Cohesion

B. Less dense as solid

C. Specific heat

D. Surface tension

AP BIO INSTA-REVIEW

TOPIC 1.1

Water property responsible for water movement UP the stem

A. Adhesion/Cohesion

Adhesion is the attraction of water molecules to other polar substances. The water is hydrogen bonded to the walls of the capillary tubes (xylem) of the plant.

Cohesion is the attraction of water molecules to other water molecules. The water is hydrogen bonded to another water molecule creating a "string" of like when you connect a barrel of monkeys.

AP BIO INSTA-REVIEW

TOPIC

1.1

Water property responsible for evaporating cooling

A. Adhesion/Cohesion

B. Less dense as solid

C. Specific heat

D. Surface tension

AP BIO INSTA-REVIEW

TOPIC 1.1

Water property responsible for evaporating cooling

C. Specific heat

Specific heat involves the amount of heat absorbed or released to increase or decrease the temperature of the substance by 1 degree Celsius.

Water has a high specific heat, and the water (sweat) will absorb the heat to cool off the animal.

AP BIO INSTA-REVIEW

TOPIC

1.1

Water property responsible for lake life surviving winter

A. Adhesion/Cohesion

B. Less dense as solid

C. Specific heat

D. Surface tension

AP BIO INSTA-REVIEW

TOPIC 1.1

Water property responsible for lake life surviving winter

B. Less dense as solid

Due to the hydrogen bonds, water molecules are unable to compact tightly which leaves space between the molecules and causes it to expand upon freezing making it less dense. This causes water to float to the surface creating a buffer to inhibit the lake from freezing which preserves life during winter.

AP BIO INSTA-REVIEW

TOPIC

1.1

What type of bond is found between water molecules?

A. Covalent

B. Hydrogen

C. Ionic

D. Van der Waals

AP BIO INSTA-REVIEW

TOPIC 1.1

What type of bond is found between water molecules?

B. Hydrogen

The bond **WITHIN** water between the oxygen and hydrogen is a covalent bond since the atoms are sharing electrons from their valence shells. This causes a partial positive charge at the hydrogen and a partial negative charge at the oxygen. Those partial charges lead to hydrogen bonds **BETWEEN** water molecules as the oxygen of one water is attracted to a hydrogen of another water.

AP BIO INSTA-REVIEW

TOPIC

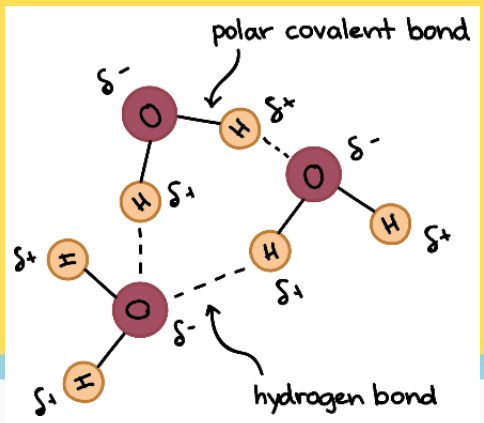
1.1

What is a hydrogen bond?

AP BIO INSTA-REVIEW

TOPIC 1.1

What is a hydrogen bond?



Attractive bond between an electronegative atom (e.g., oxygen or nitrogen) bonded to a hydrogen AND a hydrogen

Recall, the oxygen/nitrogen is partially negative, and the hydrogen is partially positive so the oppositely charged poles are attracted leading to the hydrogen

AP BIO INSTA-REVIEW

TOPIC

1.1

What property of water is responsible for skipping rocks on a pond?

A. Adhesion

B. Cohesion

C. Evaporative Cooling

D. Less Dense Solid

AP BIO INSTA-REVIEW

TOPIC 1.1

What property of water is responsible for skipping rocks on a pond?

B. Cohesion

Cohesion is due to the water molecules being attracted to other water molecules. These water molecules create a surface to the pond. Due to the large number of hydrogen bonds, the water has a high surface tension which is why the rock skips on the pond. Not enough force to break the bonds.

AP BIO INSTA-REVIEW

TOPIC

1.1

What property of water is responsible for aquatic life surviving winter?

A. Adhesion

B. Cohesion

C. Evaporative Cooling

D. Less Dense as Solid

AP BIO INSTA-REVIEW

TOPIC 1.1

What property of water is responsible for aquatic life surviving winter?

D. Less Dense as Solid

Due to the hydrogen bonds, water molecules are unable to compact tightly which leaves space between the molecules and causes it to expand upon freezing making it less dense. This causes water to float to the surface creating a buffer to inhibit the lake from freezing which preserves life during winter.

AP BIO INSTA-REVIEW

TOPIC

1.1

What property of water is used by organism during sweating?

A. Adhesion

B. Cohesion

C. Evaporative Cooling

D. Less Dense as Solid

AP BIO INSTA-REVIEW

TOPIC 1.1

What property of water is used by organism during sweating?

C. Evaporative Cooling

Evaporative cooling is the act of water molecules absorbing the heat from the surface causing the water to evaporate (and taking the heat energy away from the organism).

AP BIO INSTA-REVIEW

TOPIC

1.1

What property of water is responsible for water reaching the leaves from the soil?

AP BIO INSTA-REVIEW

TOPIC 1.1

What property of water is responsible for water reaching the leaves from the soil?

Adhesion and Cohesion

Adhesion is where water is attracted to another polar substance (aka the sides of the xylem in the plant)

Cohesion is where water is attracted to other water molecules.

AP BIO INSTA-REVIEW

TOPIC

1.1

Where are hydrogen bonds in proteins?

Note: There is more than one answer to this. Focus on the place where ONLY hydrogen bonds exist.

A. Between amino acids

B. Between the backbone

C. Between the R groups

D. Between polypeptides

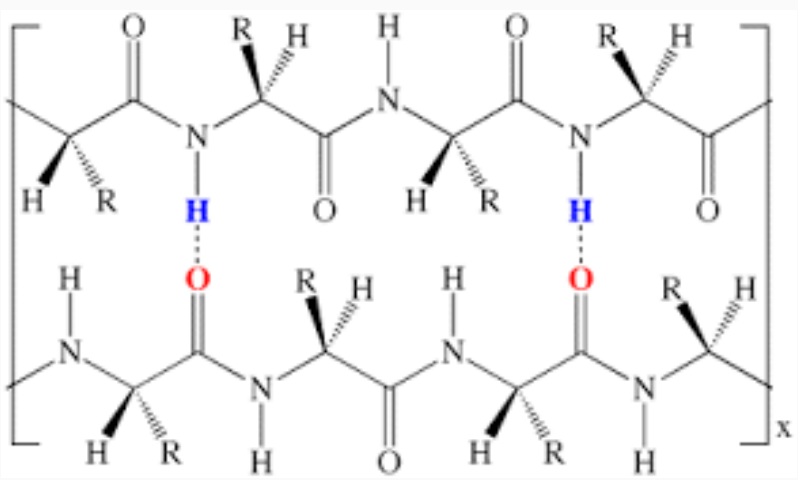
AP BIO INSTA-REVIEW

TOPIC 1.1

Where are hydrogen bonds in proteins?

B. Between the backbone

Hydrogen bonds are attractive bonds between an electronegative atom (e.g. O or N) and a hydrogen bonded to an electronegative atom. The backbone consists of the repeated amino and carboxyl groups. The amino has a nitrogen/hydrogen that is attracted to the carbonyl of the carboxyl group.



AP BIO INSTA-REVIEW

TOPIC

1.1

Where are hydrogen bonds in nucleic acids?

A. Between carbons of sugar ring

B. Between nitrogenous bases

C. Between nucleotides

D. Between phosphates

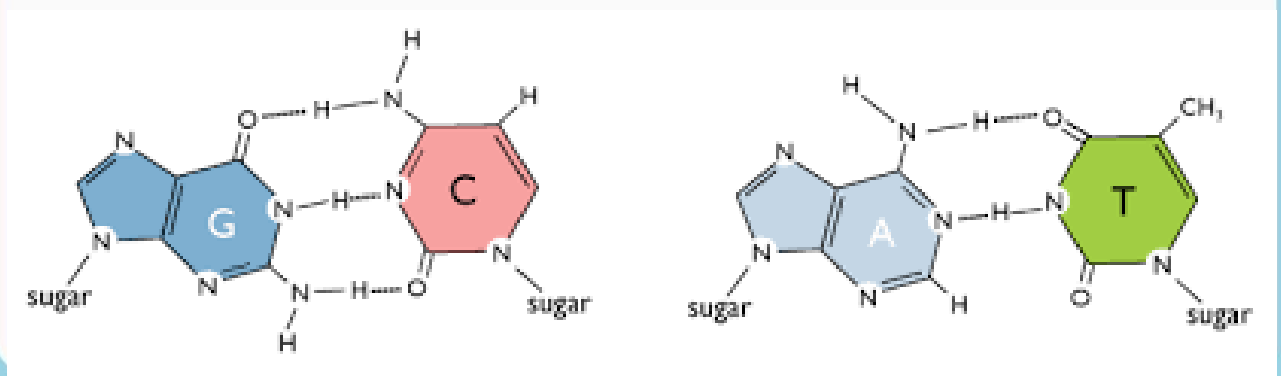
AP BIO INSTA-REVIEW

TOPIC 1.1

Where are hydrogen bonds in nucleic acids?

B. Between nitrogenous bases

Hydrogen bonds are attractive bonds between an electronegative atom (e.g. O or N) and a hydrogen bonded to an electronegative atom. The nitrogenous bases have the nitrogen/hydrogen attracted to the oxygen of the carbonyl or nitrogen of another nitrogenous base.



AP BIO INSTA-REVIEW

TOPIC

1.1

How do polar substances dissolve in water?

AP BIO INSTA-REVIEW

TOPIC 1.1

How do polar substances dissolve in water?

Due to the polar covalent bond in water molecules, there is a partial positive hydrogen and a partially negative oxygen/nitrogen. The solute will have the same polarity. This allows the substance to hydrogen bond to the opposite charge. In addition, salts can dissolve with the cation attracted to the partial negative and the anion attracted to the partial negative.

AP BIO INSTA-REVIEW

TOPIC 1.2

Elements of Life

ENE-1.A.1

Organisms must exchange matter with the environment to grow, reproduce, and maintain organization.

AP BIO INSTA-REVIEW

TOPIC 1.2

Elements of Life

ENE-1.A.2

Atoms and molecules from the environment are necessary to build new molecules–

a. Carbon is used to build biological molecules such as carbohydrates, proteins, lipids, and nucleic acids. Carbon is used in storage compounds and cell formation in all organisms.

b. Nitrogen is used to build proteins and nucleic acids. Phosphorus is used to build nucleic acids and certain lipids.

AP BIO INSTA-REVIEW

TOPIC

1.2

A macromolecule is found to have C, H, O, N, and S. Identify?

A. Carbohydrate

B. Lipid

C. Nucleic Acid

D. Protein

AP BIO INSTA-REVIEW

TOPIC 1.2

A macromolecule is found to have C, H, O, N, and S. Identify?

D. Protein

All of the macromolecules have carbon (C), hydrogen (H), and oxygen (O). Nitrogen is found in proteins and nucleic acids. Sulfur is found in the R group of some amino acids. Proteins are the only macromolecule with C, H, O, N, and S.

AP BIO INSTA-REVIEW

TOPIC

1.2

A macromolecule is found to have C, H, O, N, and P. Identify?

A. Carbohydrate

B. Lipid

C. Nucleic Acid

D. Protein

AP BIO INSTA-REVIEW

TOPIC 1.2

A macromolecule is found to have C, H, O, N, and P. Identify?

C. Nucleic Acid

All of the macromolecules have carbon (C), hydrogen (H), and oxygen (O). Nitrogen is found in proteins and nucleic acids. Phosphorous is found in nucleotides (and phospholipids) which is found in nucleic acids. Nucleic acids are the only macromolecule with C, H, O, N, and P.

AP BIO INSTA-REVIEW

TOPIC

1.2

What macromolecule also has phosphate?

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TOPIC 1.2

What macromolecule also has phosphate?

Phospholipids

Note: lipids wasn't the answer earlier because they don't have a Nitrogen (and all the members don't have Phosphate)

AP BIO INSTA-REVIEW

TOPIC

1.2

Two students are attempting to recreate the Hershey and Chase experiment to identify the genetic information for a cell. They use radioactive Nitrogen to track the material of interest. Why can't they identify the genetic material?

AP BIO INSTA-REVIEW

TOPIC 1.2

Two students are attempting to recreate the Hershey and Chase experiment to identify the genetic information for a cell. They use radioactive Nitrogen to track the material of interest.
Why can't they identify the genetic material?

Nitrogen is found in both Nucleic Acids and Proteins. So, by using radioactive Nitrogen you marked both macromolecules and were unable to track the material of interest.

AP BIO INSTA-REVIEW

TOPIC

1.2

Where is the Nitrogen in proteins?

AP BIO INSTA-REVIEW

TOPIC 1.2

Where is the Nitrogen in proteins?

The Nitrogen is found in the Amine group (NH_3) on the central carbon in each amino acid.

AP BIO INSTA-REVIEW

TOPIC

1.2

Where is the Nitrogen in nucleic acids?

AP BIO INSTA-REVIEW

TOPIC 1.2

Where is the Nitrogen in nucleic acids?

The Nitrogen is in the nitrogenous bases (A, T, C, G, U) that branch from the pentose sugar in each nucleotide (specifically the 1' BUT THAT'S NOT IMPORTANT)

AP BIO INSTA-REVIEW

TOPIC

1.2

How many valence electrons does Carbon have?

A. 2

B. 3

C. 4

D. 5

AP BIO INSTA-REVIEW

TOPIC 1.2

How many valence electrons does Carbon have?

C. 4

Valence electrons are the electrons found in the outermost energy level. The first energy level can hold 2 electrons and the second energy level can hold 8 electrons. If you look at the periodic table, carbon has 6 electrons. There are 2 in the first level leaving 4 for the outermost energy level.

AP BIO INSTA-REVIEW

TOPIC

1.2

What type of bond does Carbon make other atoms?

A. Covalent

B. Hydrogen

C. Ionic

D. Van der Waals

AP BIO INSTA-REVIEW

TOPIC 1.2

What type of bond does Carbon make other atoms?

A. Covalent

Carbon has four valence electrons (so it is equidistant from a complete valence shell). Due to this, carbon will share its valence electrons. Sharing valence electrons is due to covalent bonding.

AP BIO INSTA-REVIEW

TOPIC

1.2

Why is the carbon/carbon bond non-polar but with carbon/oxygen polar?

AP BIO INSTA-REVIEW

TOPIC 1.2

Why is the carbon/carbon bond non-polar but with carbon/oxygen polar?

Carbon/Carbon have the same electronegativity, so equal pull of electron (nonpolar)

Carbon/Oxygen have different electronegativity, so unequal pull of electron (polar)

AP BIO INSTA-REVIEW

TOPIC

1.2

Which of the following macromolecules include nitrogen?

A. Carbohydrates & Lipids

B. Lipids & Nucleic Acids

C. Nucleic Acids & Proteins

D. Proteins & Carbohydrates

AP BIO INSTA-REVIEW

TOPIC 1.2

Which of the following macromolecules include nitrogen?

C. Nucleic Acids & Proteins

Nitrogen is

> found in the amine group of amino acids (which is protein's monomer)

> found in the nitrogenous base of nucleotides (which is nucleic acid's monomer)

AP BIO INSTA-REVIEW

TOPIC

1.2

Where is the nitrogen in nucleic acids and proteins?

AP BIO INSTA-REVIEW

TOPIC 1.2

Where is the nitrogen in nucleic acids and proteins?

Nucleic acids' monomer (nucleotide) have nitrogenous bases containing nitrogen. Proteins' monomer (amino acid) have the functional group of an amino.

AP BIO INSTA-REVIEW

TOPIC

1.2

Which of the following macromolecules has phosphate?

A. Carbohydrate

B. Fat

C. Nucleic Acid

D. Protein

AP BIO INSTA-REVIEW

TOPIC 1.2

Which of the following macromolecules has phosphate?

C. Nucleic Acid

Phosphate is

> found in phospholipids which has a glycerol bound to one phosphate and two fatty acids

> found in nucleotides which is the monomer of nucleic acids

AP BIO INSTA-REVIEW

TOPIC

1.2

Which of the following macromolecules has sulfur?

A. Carbohydrate

B. Fat

C. Nucleic Acid

D. Protein

AP BIO INSTA-REVIEW

TOPIC 1.2

Which of the following macromolecules has sulfur?

D. Protein

Sulfur is found in the R group of some amino acids (methionine and cysteine).

AP BIO INSTA-REVIEW

TOPIC

1.2

Which macromolecule has a ratio of 1:2:1 ratio with C:H:O?

A. Carbohydrates

B. Lipids

C. Nucleic Acids

D. Proteins

AP BIO INSTA-REVIEW

TOPIC 1.2

Which macromolecule has a ratio of 1:2:1 ratio with C:H:O?

A. Carbohydrates

Each carbon in a carbohydrate has a hydrogen (H) and a hydroxyl (OH) attached. This means that carbohydrates have approximately a 1C: 2H: 1O ratio.

AP BIO INSTA-REVIEW

TOPIC

1.2

Phospholipids are a type of lipid that include...

A. Nitrogen

B. Phosphorus

C. Sulfur

AP BIO INSTA-REVIEW

TOPIC 1.2

Phospholipids are a type of lipid that include...

B. Phosphorus

Phospholipids have:

> phosphate

> 2 fatty acids

> glycerol

AP BIO INSTA-REVIEW

TOPIC

1.2

Describe the difference between the dehydration and hydrolysis

AP BIO INSTA-REVIEW

TOPIC 1.2

Describe the difference between the dehydration and hydrolysis

Dehydration involves the building of a polymer. When two monomers are joined, a water molecule is removed and a bond formed between the two monomers.

Hydrolysis involves the breaking up of a polymer. A water molecule is added to break bonds.

AP BIO INSTA-REVIEW

TOPIC

1.2

What are the four components bound to a central carbon in an amino acids?

AP BIO INSTA-REVIEW

TOPIC 1.2

What are the four components bound to a central carbon in an amino acids?

>Amine group (NH_2) making up the N terminus

>Carboxyl group (COOH) making up the C terminus

>Hydrogen

>R group (or variable group) is a side chain. This is the first thing that's different in the 20 amino acids)

AP BIO INSTA-REVIEW

TOPIC

1.2

What elements are found in all lipids?

A. CHO

B. CHON

C. CHOS

D. CHOP

AP BIO INSTA-REVIEW

TOPIC 1.2

What elements are found in all lipids?

A. CHO

There are three types of lipids:

> Steroids: four fused rings with different functional groups

> Fats: glycerol and 3 fatty acids

> Phospholipids: glycerol, one phosphate, and 2 fatty acids

So, overall they are made up of carbon, hydrogen, and oxygen

AP BIO INSTA-REVIEW

TOPIC 1.3

Introduction to Biological Macromolecules

SYI-1.B.1

Hydrolysis and dehydration synthesis are used to cleave and form covalent bonds between monomers.

X EXCLUSION STATEMENT—The molecular structure of specific nucleotides and amino acids is beyond the scope of the AP Exam.

X EXCLUSION STATEMENT—The molecular structure of specific carbohydrate polymers is beyond the scope of the AP Exam.

AP BIO INSTA-REVIEW

TOPIC 1.3

The process of breaking bonds by splitting water

A. Dehydration

B. Hydrolysis

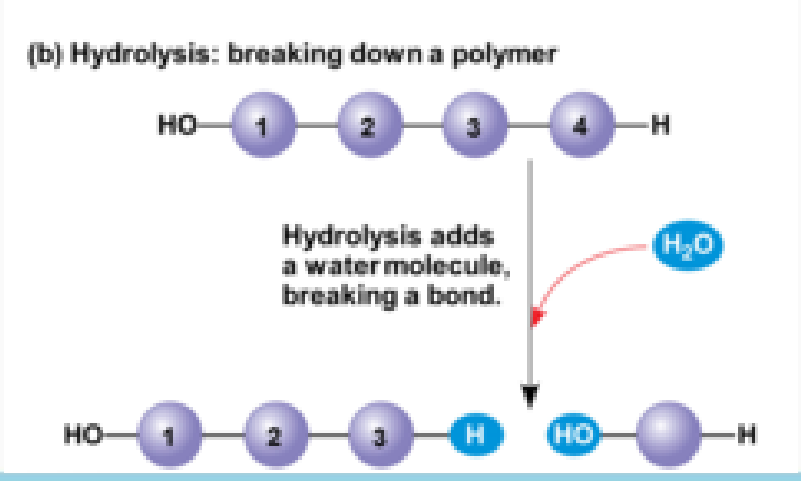
AP BIO INSTA-REVIEW

TOPIC 1.3

The process of breaking bonds by splitting water

B. Hydrolysis

Hydro for "water" and lysis for "to break". The water molecule is broken into a hydrogen and a hydroxyl. When the bond in a polymer is broken, the hydrogen binds to one side and the hydroxyl binds to the other.



AP BIO INSTA-REVIEW

TOPIC 1.3

What is formed from hydrolysis of proteins?

A. Amino acids

B. Glycerol & fatty acids

C. Monosaccharides

D. Nucleotides

AP BIO INSTA-REVIEW

TOPIC 1.3

What is formed from hydrolysis of proteins?

A. Amino acids

During hydrolysis, a bond is broken using water releasing a monomer of the polymer. When the peptide bond in a protein is broken, one of the monomers (an amino acid) is released.

AP BIO INSTA-REVIEW

TOPIC 1.3

Process of forming bonds by removing water molecules

A. Dehydration

B. Hydrolysis

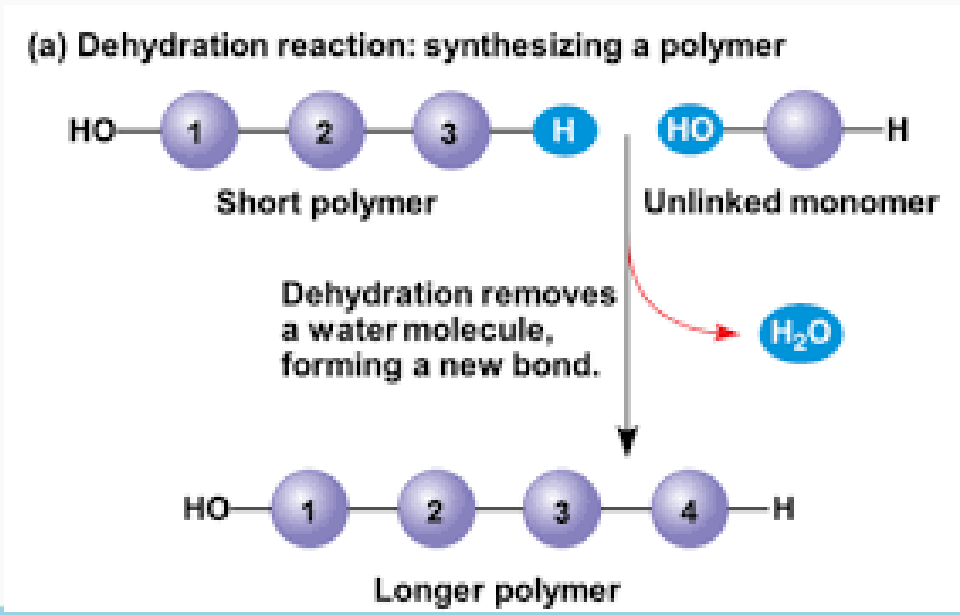
AP BIO INSTA-REVIEW

TOPIC 1.3

Process of forming bonds by removing water molecules

A. Dehydration

During dehydration, water is released forming a bond between monomers to form the polymer.



AP BIO INSTA-REVIEW

TOPIC 1.3

Dehydration with nucleotides form what?

A. Carbohydrate

B. Nucleic Acid

C. Protein

D. Triglyceride

AP BIO INSTA-REVIEW

TOPIC 1.3

Dehydration with nucleotides form what?

B. Nucleic Acid

During a dehydration reaction, the water is removed to bind together a monomer with a growing polymer. The nucleotide is the monomer of nucleic acids.

AP BIO INSTA-REVIEW

TOPIC 1.3

Dehydration with glycerol and fatty acids forms what?

A. Carbohydrate

B. Nucleic Acid

C. Protein

D. Triglyceride

AP BIO INSTA-REVIEW

TOPIC 1.3

Dehydration with glycerol and fatty acids forms what?

D. Triglyceride

During a dehydration reaction, the water is removed to form a bond. The fatty acids are bound to the glycerol in a triglyceride. Recall, the triglyceride is a fat molecule made up of one glycerol with three fatty acids.

AP BIO INSTA-REVIEW

TOPIC

1.3

Describe how a peptide bond is formed

AP BIO INSTA-REVIEW

TOPIC 1.3

Describe how a peptide bond is formed

Peptide bond is the bond between two amino acids. It is a type of covalent bond formed upon the removal of a water molecule. The hydroxyl comes from the carboxyl group of one amino acid and the hydrogen come from the amine group of another amino acid. This forms the bond between the carbon in the carboxyl group of one to the nitrogen of amine in the next amino acid.

AP BIO INSTA-REVIEW

TOPIC

1.3

Why aren't lipids considered polymers?

AP BIO INSTA-REVIEW

TOPIC 1.3

Why aren't lipids considered polymers?

There are three types of lipids. Fats formed from one glycerol and three fatty acids. Phospholipids formed from one glycerol, one phosphate (& choline) group, and two fatty acids. Steroids with four fused rings.

None of these involve a repeating subunit (monomer). Amino acids repeat to form proteins. Nucleotides repeat to form nucleic acids. Monosaccharides repeat to form carbohydrates (polysaccharides).

AP BIO INSTA-REVIEW

TOPIC 1.3

Reaction to synthesize polymers from monomers

A. Dehydration

B. Hydrolysis

AP BIO INSTA-REVIEW

TOPIC 1.3

Reaction to synthesize polymers from monomers

A. Dehydration

Dehydration reactions will form bonds between monomers to make polymers. The water molecule is removed with forms a bond between the two molecules.

AP BIO INSTA-REVIEW

TOPIC 1.3

Reaction to remove monomers from polymers

A. Dehydration

B. Hydrolysis

AP BIO INSTA-REVIEW

TOPIC 1.3

Reaction to remove monomers from polymers

B. Hydrolysis

Hydrolysis reactions will break bonds in polymers releasing the monomers. A water molecule is broken to break the bond between the molecules which detaches one of the monomers.

AP BIO INSTA-REVIEW

TOPIC 1.3

Type of bond broken when amino acids released

A. Ester Linkage

B. Peptide Bond

C. Phosphodiester linkage

AP BIO INSTA-REVIEW

TOPIC 1.3

Type of bond broken when amino acids released

B. Peptide Bond

The bond found between amino acids in a protein is a called a peptide bond. This is a type of covalent bonds specific to proteins. This is also why we call a protein a “polypeptide” since it has multiple peptide bonds.

AP BIO INSTA-REVIEW

TOPIC

1.3

Specifically, where is the peptide bond in proteins?

AP BIO INSTA-REVIEW

TOPIC 1.3

Specifically, where is the peptide bond in proteins?

Bond between the carboxyl group of one amino acid and the amine group of the next amino acid

AP BIO INSTA-REVIEW

TOPIC

1.3

Where would you find the phosphodiester linkage in nucleic acids?

AP BIO INSTA-REVIEW

TOPIC 1.3

Where would you find the phosphodiester linkage in nucleic acids?

This is the bond between the hydroxyl of the pentose sugar in the first nucleotide and the phosphate group in the second nucleotide

AP BIO INSTA-REVIEW

TOPIC 1.4

Properties of Biological Macromolecules

SYI-1.B.2

Structure and function of polymers are derived from the way their monomers are assembled–

a. In nucleic acids, biological information is encoded in sequences of nucleotide monomers. Each nucleotide has structural components: a five-carbon sugar (deoxyribose or ribose), a phosphate, and a nitrogen base (adenine, thymine, guanine, cytosine, or uracil). DNA and RNA differ in structure and function.

AP BIO INSTA-REVIEW

TOPIC 1.4

Properties of Biological Macromolecules

SYI-1.B.2

Structure and function of polymers are derived from the way their monomers are assembled–

b. In proteins, the specific order of amino acids in a polypeptide (primary structure) determines the overall shape of the protein. Amino acids have directionality, with an amino (NH_2) terminus and a carboxyl (COOH) terminus. The R group of an amino acid can be categorized by chemical properties (hydrophobic, hydrophilic, or ionic), and the interactions of these R groups determine structure and function of that region of the protein.

AP BIO INSTA-REVIEW

TOPIC 1.4

Properties of Biological Macromolecules

SYI-1.B.2

Structure and function of polymers are derived from the way their monomers are assembled–

c. Complex carbohydrates comprise sugar monomers whose structures determine the properties and functions of the molecules.

AP BIO INSTA-REVIEW

TOPIC 1.4

Properties of Biological Macromolecules

SYI-1.B.2

Structure and function of polymers are derived from the way their monomers are assembled–

d. Lipids are nonpolar macromolecules–

i. Differences in saturation determine the structure and function of lipids.

ii. Phospholipids contain polar regions that interact with other polar molecules, such as water, and with nonpolar regions that are often hydrophobic.

AP BIO INSTA-REVIEW

TOPIC

1.4

What are the three components of a nucleotide?

AP BIO INSTA-REVIEW

TOPIC 1.4

What are the three components of a nucleotide?

Nucleotides are composed of:

> pentose sugar

> nitrogenous base

> phosphate group

AP BIO INSTA-REVIEW

TOPIC

1.4

What are the components of an amino acid?

AP BIO INSTA-REVIEW

TOPIC 1.4

What are the components of an amino acid?

Amino acids are composed of:

> central carbon

> carboxyl group

> amine group

> hydrogen

> variable (R) group

AP BIO INSTA-REVIEW

TOPIC

1.4

If R group is polar, how does the section fold? Why?

A. Folds in because hydrophilic

B. Folds out because hydrophilic

C. Folds in because hydrophobic

D. Folds out because hydrophobic

AP BIO INSTA-REVIEW

TOPIC 1.4

If R group is polar, how does the section fold? Why?

B. Folds out because hydrophilic

The exterior environment is polar as organisms have aqueous environments. Polar and charged R groups fold towards the exterior environment which nonpolar R groups fold toward the interior to "hide" from the polar region outside.

AP BIO INSTA-REVIEW

TOPIC 1.4

What level of structure does the R group interact effect?

A. Primary

B. Secondary

C. Tertiary

D. Quaternary

AP BIO INSTA-REVIEW

TOPIC 1.4

What level of structure does the R group interact effect?

C. Tertiary

Tertiary structure is the three - dimensional structure of the polypeptide. This involves the R groups interacting which provides that shape. Any bond is available in the tertiary structure to form but occurs between the R groups.

AP BIO INSTA-REVIEW

TOPIC 1.4

Which lipid makes up the plasma membrane?

A. Fats

B. Phospholipids

C. Steroids

AP BIO INSTA-REVIEW

TOPIC 1.4

Which lipid makes up the plasma membrane?

B. Phospholipids

The plasma membrane or lipid bilayer is made up of two layers of phospholipids. They orient so the phosphate heads face the intracellular and extracellular regions while the fatty acids tails face the interior of the membrane.

AP BIO INSTA-REVIEW

TOPIC

1.4

How do phospholipids associate to form a membrane?

AP BIO INSTA-REVIEW

TOPIC 1.4

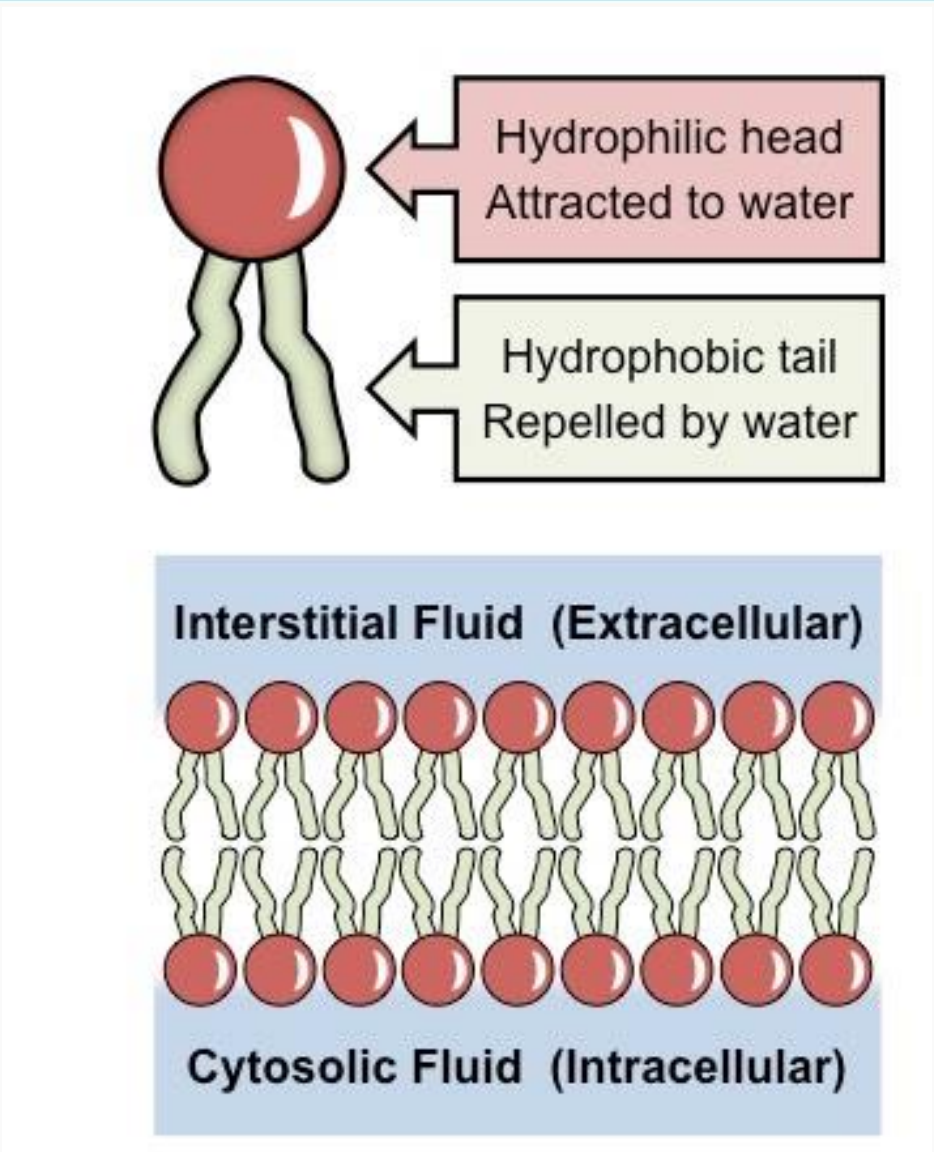
How do phospholipids associate to form a membrane?

Phospholipids associate with the phosphate group facing the aqueous intercellular and extracellular regions of the cell and the fatty acid tails on the interior of the membrane. It forms a BI-layer so there are two layers of the phospholipids. The fatty acids face one another while the phosphate heads are facing out.

AP BIO INSTA-REVIEW

TOPIC 1.4

How do phospholipids associate to form a membrane?



AP BIO INSTA-REVIEW

TOPIC 1.4

What is the function of cellulose?

A. Storage carbohydrate for animals

B. Storage carbohydrate for plants

C. Structural carbohydrate for animals

D. Structural carbohydrate for plants

AP BIO INSTA-REVIEW

TOPIC 1.4

What is the function of cellulose?

D. Structural carbohydrate for plants

Cellulose is the polysaccharide found in the cell walls of plants. This provides structural support for the plant cells.

AP BIO INSTA-REVIEW

TOPIC 1.4

What type of fatty acid has double bonds to inhibit compression?

A. Saturated

B. Unsaturated

AP BIO INSTA-REVIEW

TOPIC 1.4

What type of fatty acid has double bonds to inhibit compression?

B. Unsaturated

Unsaturated fatty acids have at least one double bond. I always say that the carbons are not saturated with hydrogens. Traditionally in a saturated fatty acid, each carbon has 2 hydrogens, but an unsaturated fatty acid has 1.

AP BIO INSTA-REVIEW

TOPIC 1.4

Which of the following is the monomer of carbohydrates?

A. Amino Acid

B. Fatty Acid

C. Monosaccharide

D. Nucleotide

AP BIO INSTA-REVIEW

TOPIC 1.4

Which of the following is the monomer of carbohydrates?

C. Monosaccharide

Monosaccharides binds together to form polysaccharides which are carbohydrates.

An example of a monosaccharide is glucose, galactose, or fructose.

AP BIO INSTA-REVIEW

TOPIC 1.4

Which of the following is the monomer of proteins?

A. Amino Acid

B. Fatty Acid

C. Monosaccharide

D. Nucleotide

AP BIO INSTA-REVIEW

TOPIC 1.4

Which of the following is the monomer of proteins?

A. Amino Acid

Amino acids bind together to form a polypeptide which are proteins.

An example of an amino acid is methionine, tyrosine, or alanine.

AP BIO INSTA-REVIEW

TOPIC 1.4

Which of the following is the monomer of nucleic acids?

A. Amino Acid

B. Fatty Acid

C. Monosaccharide

D. Nucleotide

AP BIO INSTA-REVIEW

TOPIC 1.4

Which of the following is the monomer of nucleic acids?

D. Nucleotide

Nucleotides bind together to form a polynucleotide which is a nucleic acid (like DNA or RNA).

AP BIO INSTA-REVIEW

TOPIC 1.4

Lipids are not considered polymers since they have no monomers.

A. True

B. False

AP BIO INSTA-REVIEW

TOPIC 1.4

Lipids are not considered polymers since they have no monomers.

A. True

There are three different types of lipids, but there is no repeating structure that makes them up.

Steroids are four fused rings, fats are three fatty acids and a glycerol, and a phospholipid is two fatty acids, a phosphate, and a glycerol.

AP BIO INSTA-REVIEW

TOPIC

1.4

Identify the three components of a phospholipid.

AP BIO INSTA-REVIEW

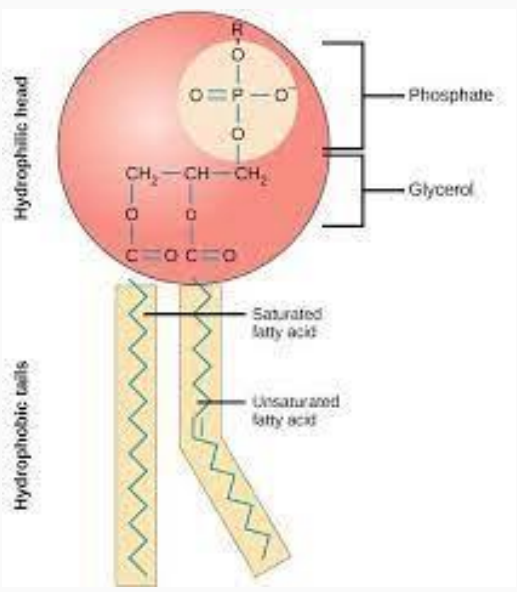
TOPIC 1.4

Identify the three components of a phospholipid.

> Phosphate Group

> Glycerol

> Two Fatty Acids



AP BIO INSTA-REVIEW

TOPIC 1.4

DNA and RNA differ in their sugar and a nitrogenous base. DNA has...

A. Deoxyribose; Thymine

B. Deoxyribose; Uracil

C. Ribose; Thymine

D. Ribose; Uracil

AP BIO INSTA-REVIEW

TOPIC 1.4

DNA and RNA differ in their sugar and a nitrogenous base. DNA has...

A. Deoxyribose; Thymine

The D in DNA stands for deoxyribo- because DNA has deoxyribose.

DNA has thymine which binds with adenine.

AP BIO INSTA-REVIEW

TOPIC 1.4

DNA and RNA differ in their sugar and a nitrogenous base. RNA has...

A. Deoxyribose; Thymine

B. Deoxyribose; Uracil

C. Ribose; Thymine

D. Ribose; Uracil

AP BIO INSTA-REVIEW

TOPIC 1.4

DNA and RNA differ in their sugar and a nitrogenous base. RNA has...

D. Ribose; Uracil

The R in RNA stands for ribo- because RNA has ribose.

RNA has uracil which binds with adenine.

AP BIO INSTA-REVIEW

TOPIC

1.4

Hydrophilic side chains will fold ___ of the polypeptide.

A. Towards the exterior

B. Towards the interior

C. No affect on folding

AP BIO INSTA-REVIEW

TOPIC 1.4

Hydrophilic side chains will fold ___ of the polypeptide.

A. Towards the exterior

Hydrophilic means "water-loving". They will fold towards the polar region which is the exterior environment of the protein.

AP BIO INSTA-REVIEW

TOPIC 1.4

Which side chain of amino acids would fold inward?

A. Charged

B. Hydrophilic

C. Hydrophobic

AP BIO INSTA-REVIEW

TOPIC 1.4

Which side chain of amino acids would fold inward?

C. Hydrophobic

Hydrophobic means "water-fearing" so it will fold interior to avoid the polar/hydrophilic exterior surrounding the protein.

AP BIO INSTA-REVIEW

TOPIC

1.4

Describe the difference between a saturated vs. unsaturated fatty acid?

AP BIO INSTA-REVIEW

TOPIC 1.4

Describe the difference between a saturated vs. unsaturated fatty acid?

Saturated fatty acids involve every carbon saturated (maximum bonding) with hydrogens.

Unsaturated fatty acids have a double bond reducing the number of hydrogen carbons (allowing them to be unsaturated)

AP BIO INSTA-REVIEW

TOPIC

1.4

Which describes polarity of phospholipids?

A. Polar head facing exterior, fatty acid tails face interior

B. Polar head facing interior, fatty acid tails face exterior

C. Both polar head and fatty acid tails is hydrophobic

D. Both polar head and fatty acid tails is hydrophilic

AP BIO INSTA-REVIEW

TOPIC 1.4

Which describes polarity of phospholipids?

A. Polar head facing exterior, fatty acid tails face interior

The phospholipid is made up of a hydrophilic phosphate head which will face towards the polar exterior environment. The phospholipid is made up of two fatty acid tails which will face towards the interior of the protein to "hide" from exterior.

AP BIO INSTA-REVIEW

TOPIC 1.5

Structure and Function of Biological Macromolecules

SYI-1.C.1

Directionality of the subcomponents influences structure and function of the polymer–

a. Nucleic acids have a linear sequence of nucleotides that have ends, defined by the 3' hydroxyl and 5' phosphates of the sugar in the nucleotide. During DNA and RNA synthesis, nucleotides are added to the 3' end of the growing strand, resulting in the formation of a covalent bond between nucleotides.

AP BIO INSTA-REVIEW

TOPIC 1.5

Structure and Function of Biological Macromolecules

SYI-1.C.1

Directionality of the subcomponents influences structure and function of the polymer–

b. DNA is structured as an antiparallel double helix, with each strand running in opposite 5' to 3' orientation. Adenine nucleotides pair with thymine nucleotides via two hydrogen bonds. Cytosine nucleotides pair with guanine nucleotides by three hydrogen bonds.

AP BIO INSTA-REVIEW

TOPIC 1.5

Structure and Function of Biological Macromolecules

SYI-1.C.1

Directionality of the subcomponents influences structure and function of the polymer–

c. Proteins comprise linear chains of amino acids, connected by the formation of covalent bonds at the carboxyl terminus of the growing peptide chain.

AP BIO INSTA-REVIEW

TOPIC 1.5

Structure and Function of Biological Macromolecules

SYI-1.C.1

Directionality of the subcomponents influences structure and function of the polymer–

d. Proteins have primary structure determined by the sequence order of their constituent amino acids, secondary structure that arises through local folding of the amino acid chain into elements such as alpha-helices and beta-sheets, tertiary structure that is the overall three-dimensional shape of the protein and often minimizes free energy, and quaternary structure that arises from interactions between multiple polypeptide units. The four elements of protein structure determine the function of a protein.

AP BIO INSTA-REVIEW

TOPIC 1.5

What is at the 5' end of a nucleic acid?

A. Carbon

B. Hydroxyl

C. Nitrogenous Base

D. Phosphate

AP BIO INSTA-REVIEW

TOPIC 1.5

What is at the 5' end of a nucleic acid?

D. Phosphate

Nucleotides are made of a pentose sugar. Each carbon is numbered, and we use the different numbers to identify the functional groups. 1' is the nitrogenous base, 3' is the hydroxyl of the sugar, and 5' is the phosphate group.

AP BIO INSTA-REVIEW

TOPIC

1.5

What is at the 3' end of a nucleic acid?

A. Carbon

B. Hydroxyl

C. Nitrogenous Base

D. Phosphate

AP BIO INSTA-REVIEW

TOPIC 1.5

What is at the 3' end of a nucleic acid?

B. Hydroxyl

Nucleotides are made of a pentose sugar. Each carbon is numbered, and we use the different numbers to identify the functional groups. 1' is the nitrogenous base, 3' is the hydroxyl of the sugar, and 5' is the phosphate group.

AP BIO INSTA-REVIEW

TOPIC 1.5

What is the direction of DNA synthesis?

A. 3' to 5'

B. 5' to 3'

C. It's anti-parallel so either direction is correct

AP BIO INSTA-REVIEW

TOPIC 1.5

What is the direction of DNA synthesis?

B. 5' to 3'

DNA polymerase is the enzyme responsible for DNA synthesis. The enzyme is only able to add to an open 3' end. This means that it will assemble the new DNA strand in the 5' to 3' direction.

AP BIO INSTA-REVIEW

TOPIC

1.5

What does antiparallel mean in terms of the nucleic acids?

AP BIO INSTA-REVIEW

TOPIC 1.5

What does antiparallel mean in terms of the nucleic acids?

Antiparallel describes the directionality of the two strands that are complementary base paired. The strands are equidistant (parallel) and in opposite directions (anti). This means that the 5' end is across from a 3' end.

AP BIO INSTA-REVIEW

TOPIC 1.5

What type of bond is between nitrogenous bases?

A. Covalent

B. Hydrogen

C. Ionic

D. Van der Waals

AP BIO INSTA-REVIEW

TOPIC 1.5

What type of bond is between nitrogenous bases?

B. Hydrogen

Hydrogen bonds are between the nitrogenous bases. There are 2 hydrogen bonds between adenine and thymine. There are 3 hydrogen bonds between cytosine and guanine.

AP BIO INSTA-REVIEW

TOPIC

1.5

Why would a strand with more G/C bonding be more stable than A/T bonding?

AP BIO INSTA-REVIEW

TOPIC 1.5

Why would a strand with more G/C bonding be more stable than A/T bonding?

There are 3 hydrogen bonds between G & C while there are 2 hydrogen bonds between A & T. So, if there are more G/C bonding there will be more hydrogen bonds between the nitrogenous bases than if there were more A/T bonding.

AP BIO INSTA-REVIEW

TOPIC 1.5

Where are new bonds formed in a growing polypeptide?

A. Amine group

B. Carboxyl group

C. Hydrogen

D. R-group

AP BIO INSTA-REVIEW

TOPIC 1.5

Where are new bonds formed in a growing polypeptide?

B. Carboxyl group

There is an N terminus (amine group) and a C terminus (carboxyl group). The polypeptide is synthesized in the N terminus to C terminus direction. The new bonds will be formed at the C terminus binding to amine group of next amino acid.

AP BIO INSTA-REVIEW

TOPIC 1.5

What is the bond between amino acids called?

A. Ester linkage

B. Glycosidic linkage

C. Peptide bond

D. Phosphodiester linkage

AP BIO INSTA-REVIEW

TOPIC 1.5

What is the bond between amino acids called?

C. Peptide bond

Peptide bonds are specific covalent bonds between amino acids. This forms between the carboxyl group of one amino acid and the amine group of the next amino acid.

AP BIO INSTA-REVIEW

TOPIC

1.5

Describe the orientation of the amino acids that form the peptide bond

AP BIO INSTA-REVIEW

TOPIC 1.5

Describe the orientation of the amino acids that form the peptide bond

The amine group of one amino acid is bonded with a carboxyl group of the next amino acid. The formed bond will look like bond between a carbon double bonded to an oxygen (carboxyl) and to a nitrogen (amine).

AP BIO INSTA-REVIEW

TOPIC 1.5

What level of protein structure of is described as hydrogen bonds between backbone?

A. Primary

B. Secondary

C. Tertiary

D. Quaternary

AP BIO INSTA-REVIEW

TOPIC 1.5

What level of protein structure of is described as hydrogen bonds between backbone?

B. Secondary

Secondary structure is described as the alpha helix or beta pleated sheets resulting from the hydrogen bonds between the backbone of the polypeptide.

AP BIO INSTA-REVIEW

TOPIC 1.5

What level of protein structure of is described as peptide bonds between amino acids?

A. Primary

B. Secondary

C. Tertiary

D. Quaternary

AP BIO INSTA-REVIEW

TOPIC 1.5

What level of protein structure of is described as peptide bonds between amino acids?

A. Primary

The peptide bond is between the amino acids. This describes the primary structure which is a "string" of amino acids.

AP BIO INSTA-REVIEW

TOPIC 1.5

What level of protein structure of is described as bonding between two polypeptide chains?

A. Primary

B. Secondary

C. Tertiary

D. Quaternary

AP BIO INSTA-REVIEW

TOPIC 1.5

What level of protein structure of is described as bonding between two polypeptide chains?

D. Quaternary

The final three-dimensional shape is the tertiary structure. When two different tertiary structures (polypeptides) bond together through R group interactions, then it is considered the quaternary structure.

AP BIO INSTA-REVIEW

TOPIC 1.5

What level of protein structure of is described as alpha helix/beta-pleated sheet?

A. Primary

B. Secondary

C. Tertiary

D. Quaternary

AP BIO INSTA-REVIEW

TOPIC 1.5

What level of protein structure of is described as alpha helix/beta-pleated sheet?

B. Secondary

Secondary structure is described as the alpha helix or beta pleated sheets resulting from the hydrogen bonds between the backbone of the polypeptide.

AP BIO INSTA-REVIEW

TOPIC

1.5

What level of protein structure of is described as bonding between R-groups or the final three-dimensional shape?

A. Primary

B. Secondary

C. Tertiary

D. Quaternary

AP BIO INSTA-REVIEW

TOPIC 1.5

What level of protein structure of is described as bonding between R-groups or the final three-dimensional shape?

C. Tertiary

The tertiary structure is the final three-dimensional structure resulting from the R group interactions. Polar or charged R groups will face the hydrophilic environment while nonpolar R groups will hide in the hydrophobic center.

AP BIO INSTA-REVIEW

TOPIC

1.5

What happens if a protein loses its three-dimensional structure?

AP BIO INSTA-REVIEW

TOPIC 1.5

What happens if a protein loses its three-dimensional structure?

The three-dimensional structure allows for the active site to bind to specific molecules. With a change in shape, the active site will change which will change the function of the protein.

AP BIO INSTA-REVIEW

TOPIC 1.5

What pairs with adenine in DNA?

A. Cytosine

B. Guanine

C. Thymine

D. Uracil

AP BIO INSTA-REVIEW

TOPIC 1.5

What pairs with adenine in DNA?

C. Thymine

Adenine pairs with thymine.

AT, CG

AP BIO INSTA-REVIEW

TOPIC

1.5

Why does adenine pair with thymine?

AP BIO INSTA-REVIEW

TOPIC 1.5

Why does adenine pair with thymine?

Adenine is a purine and thymine is a pyrimidine. If two purines bind, the DNA it too wide. If two pyrimidines binds, the DNA is too narrow. The purine and pyrimidine pairing allows for constant width.

Adenine and thymine form 2 hydrogen bonds. With the cytosine there would be 3 hydrogen bonds, so these binding "spots" don't pair up (yes, I'm making this one up but it sounds good, right?)

AP BIO INSTA-REVIEW

TOPIC 1.5

What is at the 5' end of the DNA?

A. Hydroxyl

B. Nitrogenous Base

C. Phosphate

D. Sugar

AP BIO INSTA-REVIEW

TOPIC 1.5

What is at the 5' end of the DNA?

C. Phosphate

Nucleotides are made of a pentose sugar. Each carbon is numbered, and we use the different numbers to identify the functional groups. 1' is the nitrogenous base, 3' is the hydroxyl of the sugar, and 5' is the phosphate group.

AP BIO INSTA-REVIEW

TOPIC 1.5

What is at the 3' end of the DNA?

A. Hydroxyl

B. Nitrogenous Base

C. Phosphate

D. Sugar

AP BIO INSTA-REVIEW

TOPIC 1.5

What is at the 3' end of the DNA?

A. Hydroxyl

Nucleotides are made of a pentose sugar. Each carbon is numbered, and we use the different numbers to identify the functional groups. 1' is the nitrogenous base, 3' is the hydroxyl of the sugar, and 5' is the phosphate group.

AP BIO INSTA-REVIEW

TOPIC

1.5

How many hydrogen bonds are between C & G?

A. 1
B. 2
C. 3
D. 4

AP BIO INSTA-REVIEW

TOPIC 1.5

How many hydrogen bonds are between C & G?

c. 3

There are three bonds between C and G while there are two bonds between A and T.

Note: I remember this because C is the third letter in the alphabet

AP BIO INSTA-REVIEW

TOPIC

1.5

How many hydrogen bonds are between A & T?

A. 1
B. 2
C. 3
D. 4

AP BIO INSTA-REVIEW

TOPIC 1.5

How many hydrogen bonds are between A & T?

B. 2

There are two hydrogen bonds between A and T while there are three bonds between C and G.

Note: I remember this because it takes two lines to make the T.

AP BIO INSTA-REVIEW

TOPIC 1.5

What is the type of bond in the secondary structure of proteins?

A. Covalent

B. Hydrogen

C. Ionic

D. Peptide

AP BIO INSTA-REVIEW

TOPIC 1.5

What is the type of bond in the secondary structure of proteins?

B. Hydrogen

Secondary structure is described as the alpha helix or beta pleated sheets resulting from the hydrogen bonds between the backbone of the polypeptide.

AP BIO INSTA-REVIEW

TOPIC 1.5

The tertiary structure involves interactions of the

A. Amino group

B. Carboxyl group

C. Hydrogen

D. R group

AP BIO INSTA-REVIEW

TOPIC 1.5

The tertiary structure involves interactions of the

D. R group

The tertiary structure is the final three-dimensional structure resulting from the R group interactions. Polar or charged R groups will face the hydrophilic environment while nonpolar R groups will hide in the hydrophobic center.

AP BIO INSTA-REVIEW

TOPIC 1.5

What is the type of bond found in the primary structure of proteins?

A. Covalent

B. Hydrogen

C. Ionic

D. Peptide

AP BIO INSTA-REVIEW

TOPIC 1.5

What is the type of bond found in the primary structure of proteins?

D. Peptide

Yes, the peptide bond is a type of covalent bond. The peptide bond is the specific covalent bond found in proteins.

The primary structure is due to bonding between amino acids. There are peptide bonds between amino acids. Yes, I know that peptide bonds are a type of covalent bond but covalent was not the most correct option.

AP BIO INSTA-REVIEW

TOPIC 1.5

Which describes the orientation for the new peptide bond?

A. Amino to Amino

B. Amino to Carboxyl

C. Carboxyl to Amino

D. Carboxyl to Carboxyl

First functional group is on the pre-peptide bond structure and the second functional group is on the post-peptide bond structure.

AP BIO INSTA-REVIEW

TOPIC 1.5

Which describes the orientation for the new peptide bond?

C. Carboxyl to Amino

Proteins are synthesized in the N terminus to C terminus orientation. This means that the carboxyl of the amino acid before the peptide bond must bond with the amine of the amino acid after the peptide bond.

AP BIO INSTA-REVIEW

TOPIC

1.5

How does the structure of fat differ from the structure of a phospholipid?

A. Fat has an extra fatty acid

B. Fat has a phosphate group instead of a fatty acid

C. Phospholipid has an extra fatty acid

D. Phospholipids have a phosphate instead of a fatty acid

AP BIO INSTA-REVIEW

TOPIC 1.5

How does the structure of fat differ from the structure of a phospholipid?

D. Phospholipids have a phosphate instead of a fatty acid

A fat has a glycerol with 3 fatty acids. A phospholipid has a glycerol with 2 fatty acids and a phosphate. The difference is that phospholipids have one less fatty acid (and a phosphate instead).

AP BIO INSTA-REVIEW

TOPIC 1.5

When new nucleotides are added, which side does it add to?

A. 3' end
B. 5' end

AP BIO INSTA-REVIEW

TOPIC 1.5

When new nucleotides are added, which side does it add to?

A. 3' end

DNA polymerase binds to an open 3' end so this means that new nucleotides will be added to this end to synthesize the new DNA strand in the 5' to 3' direction.

AP BIO INSTA-REVIEW

TOPIC 1.6

Nucleic Acids

IST-1.A.1

DNA and RNA molecules have structural similarities and differences related to their function–

a. Both DNA and RNA have three components–sugar, a phosphate group, and a nitrogenous base–that form nucleotide units that are connected by covalent bonds to form a linear molecule with 5' and 3' ends, with the nitrogenous bases perpendicular to the sugar-phosphate backbone.

AP BIO INSTA-REVIEW

TOPIC 1.6

Nucleic Acids

IST-1.A.1

DNA and RNA molecules have structural similarities and differences related to their function–

b. The basic structural differences between DNA and RNA include the following:

i. DNA contains deoxyribose and RNA contains ribose.

ii. RNA contains uracil and DNA contains thymine.

iii. DNA is usually double stranded; RNA is usually single stranded.

iv. The two DNA strands in double-stranded DNA are antiparallel in directionality

AP BIO INSTA-REVIEW

TOPIC

1.6

What are the three components that make up a nucleotide?

AP BIO INSTA-REVIEW

TOPIC 1.6

What are the three components that make up a nucleotide?

> Pentose sugar

> Nitrogenous Base

> Phosphate

AP BIO INSTA-REVIEW

TOPIC

1.6

How are all of the components of a nucleotide oriented?

AP BIO INSTA-REVIEW

TOPIC 1.6

How are all of the components of a nucleotide oriented?

The pentose sugar has three sites that are important to binding:

1'- nitrogenous base
3'- hydroxyl (but this is a functional group on the pentose sugar not an additional component)
5'- phosphate

AP BIO INSTA-REVIEW

TOPIC

1.6

How does the pentose sugar differ between DNA and RNA?

A. DNA= deoxyribose, RNA= ribose

B. DNA= dextrose, RNA= ribose

C. DNA= deoxyribose, RNA= ribozyme

D. DNA= dextrose, RNA= ribozyme

AP BIO INSTA-REVIEW

TOPIC 1.6

How does the pentose sugar differ between DNA and RNA?

A. DNA= deoxyribose, RNA= ribose

DNA is deoxyribonucleic acid while RNA is ribonucleic acid. DNA has deoxyribose and RNA has ribose. The deoxyribose is missing an oxygen on the 2nd carbon of the sugar.

AP BIO INSTA-REVIEW

TOPIC 1.6

How does the nitrogenous base differ between DNA and RNA?

A. DNA - cytosine, RNA - guanine

B. DNA - uracil, RNA - thymine

C. DNA - guanine, RNA - cytosine

D. DNA - thymine, RNA - uracil

AP BIO INSTA-REVIEW

TOPIC 1.6

How does the nitrogenous base differ between DNA and RNA?

D. DNA - thymine, RNA - uracil

DNA has adenine, thymine, cytosine, & guanine.
RNA has adenine, uracil, cytosine, & guanine.

Adenine will pair with either thymine or uracil depending whether its DNA or RNA.
Test Tip: If you are asked for DNA and there are "U"s in the answer, you can cross those options out.

AP BIO INSTA-REVIEW

TOPIC

1.6

How does the phosphate differ between DNA and RNA?

A. DNA- 1 phosphate,
RNA- 2 phosphate

B. DNA- phosphate acts as acid,
RNA- phosphate acts as base

C. There is no difference

AP BIO INSTA-REVIEW

TOPIC 1.6

How does the phosphate differ between DNA and RNA?

C. There is no difference

All nucleotides have:

> pentose sugar (deoxyribose or ribose)

> nitrogenous base (adenine, thymine, uracil, cytosine, or guanine)

> phosphate

AP BIO INSTA-REVIEW

TOPIC

1.6

Traditionally, how are the strands different?

A. DNA - single, RNA - double

B. DNA - single, RNA - triple

C. DNA - double, RNA - single

D. DNA - triple, RNA - single

AP BIO INSTA-REVIEW

TOPIC 1.6

Traditionally, how are the strands different?

C. DNA - double,
RNA - single

DNA is a double stranded molecule with strands running antiparallel and bound by hydrogen bonds

mRNA is a single stranded molecule formed from base pairing with a split DNA strand.

AP BIO INSTA-REVIEW

TOPIC 1.6

Which nitrogenous base is not found in DNA?

A. Adenine

B. Cytosine

C. Thymine

D. Uracil

AP BIO INSTA-REVIEW

TOPIC 1.6

Which nitrogenous base is not found in DNA?

D. Uracil

DNA has adenine, thymine, cytosine and guanine.

There is no uracil. This is only found in RNA molecules.

AP BIO INSTA-REVIEW

TOPIC

1.6

What is the pentose sugar found in DNA?

A. Deoxyribose

B. Dextrose

C. Ribose

D. Rubisco

AP BIO INSTA-REVIEW

TOPIC 1.6

What is the pentose sugar found in DNA?

A. Deoxyribose

DNA stands for deoxyribonucleic acid and has the sugar deoxyribose. This is the same as the ribose, except it is missing an oxygen on the 2nd carbon in the pentose sugar.

AP BIO INSTA-REVIEW

TOPIC

1.6

What is the pentose sugar found in RNA?

A. Deoxyribose

B. Dextrose

C. Ribose

D. Rubisco

AP BIO INSTA-REVIEW

TOPIC 1.6

What is the pentose sugar found in RNA?

C. Ribose

RNA stands for ribonucleic acid and has the sugar ribose. This is the same as the deoxyribose, except it has an oxygen (specifically a hydroxyl group) on the 2nd carbon in the pentose sugar.

AP BIO INSTA-REVIEW

TOPIC

1.6

Which nitrogenous base is not found in RNA?

A. Adenine

B. Cytosine

C. Thymine

D. Uracil

AP BIO INSTA-REVIEW

TOPIC 1.6

Which nitrogenous base is not found in RNA?

C. Thymine

RNA has adenine, uracil, cytosine and guanine.

There is no thymine. This is only found in DNA molecules.

AP BIO INSTA-REVIEW

TOPIC

1.6

What is the directionality of a DNA strand?

A. DNA is 3' to 5' and antiparallel

B. DNA is 5' to 3' and antiparallel

C. DNA is 3' to 5' and parallel

D. DNA is 5' to 3' and parallel

AP BIO INSTA-REVIEW

TOPIC 1.6

What is the directionality of a DNA strand?

B. DNA is 5' to 3' and antiparallel

DNA is always synthesized in the 5' to 3' direction. The DNA polymerase responsible for synthesis of the DNA polymer can only add to an open 3' end thus it moves 5' to 3'. The two strands run in opposite directions equidistant apart (hence the antiparallel).

AP BIO INSTA-REVIEW

TOPIC

1.6

DNA is usually ___ and RNA is usually ___

A. Double stranded; double stranded

B. Double stranded; single stranded

C. Single stranded; double stranded

D. Single stranded; single stranded

AP BIO INSTA-REVIEW

TOPIC 1.6

DNA is usually ___ and RNA is usually ___

B. Double stranded; single stranded

DNA is a double stranded molecule with strands running antiparallel and bound by hydrogen bonds

mRNA is a single stranded molecule formed from base pairing with a split DNA strand.