

Select the amino acid that has a sulfur (S) atom in its side chain:

- A. Arginine B. Proline
 C. Aspartic Acid D. Methionine
 E. Serine

The bond between alpha carbon and carboxyl carbon in amino acids is called:

- A. Hydrogen. B. Hydrophobic.
 C. Covalent. D. Ionic.
 E. Peptide bond.

All of the followings are true regarding Aspartam (NutraSweet) **except**

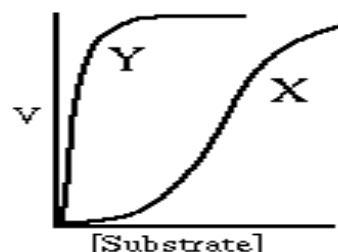
- A. It is a dipeptide.
 B. Contains L-amino acids.
 C. Contains one peptide bond
 D. Consists of phenylalanine and aspartic acid.
 E. It has exactly the same sweetness taste compared to sugar.

Which amino acid side chain is most likely to be on the surface of a water soluble protein?

- A. Alanine B. Phenylalanine
 C. Isoleucine D. Tryptophane
 E. Lysine

"X" represents the native enzyme and "Y" the enzyme plus a fixed concentration of a modifier. The **modifier**

- A. Does not affect the V_{max} of the enzyme.
 B. Increases the K_m of the enzyme.
 C. Is a non-competitive inhibitor.
 D. Is a competitive inhibitor.
 E. Is an allosteric inhibitor.



Which is true regarding oxytocin?

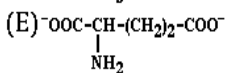
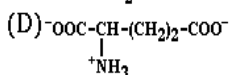
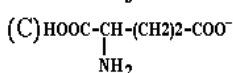
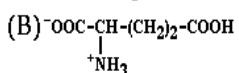
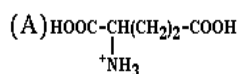
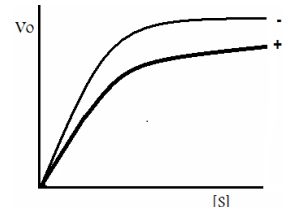
- A. Inhibit prostaglandin synthesis
 B. A peptide hormone consists of 100 amino acids.
 C. A lipid molecule
 D. Induce labor in pregnant woman
 E. Controls blood pressure

The interactions that give stability of a protein tertiary structure is (are):

- A. Electrostatic interactions.
 B. Hydrogen bonds.
 C. Disulphide bridge.
 D. Hydrophobic interactions.
 E. All of the above.

An enzyme was incubated with the inhibitor (+I) or without the inhibitor (-I) as shown in the Figure. What is the most reasonable interpretation of the data?

- A. The inhibitor binds irreversibly to the active site.
 B. The inhibitor binds on a location other than the active site.
 C. The inhibitor does not change V_{max} .
 D. The inhibitor decreases K_m .
 E. The I is a competitive inhibitor.



Which of the following ionic species of glutamate

is predominant at pH 7?

Which element is always found in proteins but usually **not in triacylglycerol**?

- A. Carbon
B. Phosphorus
C. Nitrogen
D. Oxygen
E. Hydrogen

The melting temperature of oleic fatty acid (18:1 cis) is 16° C. Which of the following fatty acid has a melting temperature less than 16° C?

- A. 18:1 trans
B. 18:0
C. 18:2 (both cis)
D. 20:1 cis
E. 20:0

All of the followings are true about cholesterol except:

- A. Cholesterol is part of cellular membrane in animals and human.
B. Cholesterol is a precursor of vitamin D.
C. Cholesterol is a precursor of sex hormones.
D. Cholesterol structure contains three hydroxyl group linked to three carbons.
E. Cholesterol moves in blood on cholesterol carrier proteins such as LDL and HDL.

Which of the followings is an **aldehyde**:

- A. R-NH₂
B. R-OH
C. CH₃-O-CH₃
D. R-(C=O)-OH
E. R-(C=O)-H

All of the followings inhibit prostaglandin biosynthesis **except**

- A. Omega 3 fatty acids
B. Aspirin
C. Steroid drugs
D. Panadol drug
E. Non-steroidal anti-inflammatory drugs.

All are general characteristics of lipids **except**:

- A. Insoluble in water.
B. Soluble in organic solvent such as chloroform.
C. All contain fatty acids.
D. Considered as non-polar compounds.
E. Considered hydrophobic.

All the following are true for Watson & Crick model of double helix **except**

- A. Molar ratio of guanine equal to cytosine.
B. The DNA has a double helix structure.
C. The two strands are in anti-parallel directions (5' to 3" and 3' to 5').
D. The DNA contains ribose.
E. The DNA contains phosphate group.

Which of the following is needed for formation of a **new** phosphodiester bond in a DNA strand?

- A. Free 3'-OH on that strand.
B. Ribosomes.
C. Ribonucleotides.
D. Free 5' – Phosphate on that strand
E. All of the above.

Glycogen structure is most similar to the structure of

- a. Amylose b. Amylopectin c. Cellulose d. Pectin e. Chitin

Which of the following carbohydrates is a **structural** component of some cells:

- a. Starch b. Glycogen c. Amylopectin d. Amylose e. Cellulose

Which of the following is considered as a **dietary fiber**:

- a. Sucrose b. Glycogen c. Pectin d. Amylose e. Plastic

Number of stereoisomers of **ketoexoses** (linear not circular) is:

- a. 2 b. 4 c. 8 d. 16 e. 32

Example of **reducing sugars** is (are):

<p>a. Sucrose. b. Fructose. c. Glucose. d. A ketose monosaccharide. e. All are reducing sugars.</p>
<p>Characteristic of glycosidic bonds between glucose molecules of amylose is</p> <p>a. α (1,4) in chains with α (1,6) in branches b. Contain only chains of α (1,4) in chains c. α (1,6) in chains with α (1,4) in branches d. Contain only chains of α (1,6) in chains e. None of the above</p>
<p>Number of chiral carbons of glucose (the circular glucose)</p> <p>a. 2 b. 3 c. 4 d. 5 e. 6</p>
<p>All are true regarding catabolism except</p> <p>a. Break down of molecules into smaller. b. Oxidation process. c. Produce energy (net). d. Catabolism uses the same enzymes for the reverse anabolism pathway. e. Example of catabolism is glycolysis.</p>
<p>The pentose phosphate pathway is alternative pathway to glycolysis and used to</p> <p>a. Generate NADH. b. Generate five carbon backbones. c. Generate energy such as ATP. d. Only a and b. e. Only b and c.</p>
<p>All of the followings are produced directly from the citric acid cycle except</p> <p>a. CO₂ b. GTP c. NADH d. NAD⁺ e. FADH₂</p>
<p>All of the followings are true regarding pyruvate dehydrogenase except:</p> <p>a. The enzyme has five different isozymes. b. The different isozymes are made of two subunits (M and H). c. Each enzyme molecule has a total of two subunits. d. The activity of the enzyme from blood is used as a clinical test for heart disease. e. It is possible to differentiate heart isozyme from other isozymes.</p>
<p>Citric acid cycle is inhibited in some cells by</p> <p>a. High amounts of ATP and NADH. b. High amounts of ADP and NAD⁺. c. The cell needs energy. d. High amounts of oxygen. e. The cycle is not regulated and runs at all the time.</p>
<p>13 Acetyl CoA is the central compound in many anabolic and catabolic pathways. The name of the main catabolic pathway that produces acetyl CoA is</p> <p>a. Amino acid synthesis b. Fatty acid synthesis c. Citric acid cycle d. β-oxidation e. Pentose phosphate pathway</p>
<p>Several enzymatic steps in metabolic pathways are consists of an enzyme complex. The main advantage(s) of such complex rather than having separate enzymes is (are):</p> <p>a. Increase the efficiency b. Easier regulation c. Allow different substrates to be used d. Allows the reverse reaction e. Only a and b</p>
<p>The number of CO₂ molecules produced in yeast fermentation for each one glucose molecule is</p> <p>a. 1 b. 2 c. 4 d. 6 e. 0</p>
<p>The cellular location of citric acid cycle in human is</p> <p>a. Mitochondrial outer membrane. b. Mitochondrial matrix. c. Mitochondrial inner membrane. d. Cytoplasm. e. None of the above.</p>

Pyruvate dehydrogenase complex converts the substrate pyruvate into acetyl CoA. Another direct **product(s)** of the reaction is (are):

- a. CO₂ b. ATP c. NAD⁺ d. a and b e. a and c

Which is **true** in regards to pyruvate metabolism into lactate by the enzyme lactate dehydrogenase during anaerobic conditions

- a. NAD⁺ is used to form NADH.
 b. NADH is used to form NAD⁺
 c. ATP is used to form ADP.
 d. ADP is used to for ATP.
 e. Lactate converted in muscles into glucose.

All the followings are true about **glycogen except**

- a. Glycogen loading used to increase glycogen storage in muscles and liver.
 b. Glycogen is converted into glucose when it is needed.
 c. Glycogen is usually used in less than 30 minutes.
 d. Brain store glycogen to convert into glucose when it is needed.
 e. Glycogen is a branched polymers of glucose.

The **role** of citric acid cycle in metabolism is (are)

- a. Catabolism of fatty acids after β -oxidation.
 b. Catabolism of some amino acids after removal of nitrogen.
 c. Catabolism of carbohydrates after glycolysis.
 d. Intermediates in the citric acid cycle are used in anabolism.
 e. All of the above.

The protein that carries electrons between two of the electron transport complexes is

- a. CoQ b. CoS c. Cytochrom C d. Cytochrome P450 e. NADH

Lactose intolerance in human is the result from all of the following **except**:

- a. The response of the immune system to lactose.
 b. Inability to digest lactose.
 c. Microorganisms in the colon metabolize lactose.
 d. Low or absence of lactase enzyme.
 e. Drinking milk.

After complete aerobic oxidation of **one glucose** molecule, how many equivalent molecules of ATP are only produced during the citric acid cycle?

- a. 4 b. 8 c. 10 d. 20 e. 32

For every molecule of FADH₂ oxidized by the electron transport system, how many molecules of **ATP are formed**?

- a. 1.0 b. 1.5 c. 2.0 d. 2.5 e. 3.0

Cyanide is a poison **because** it

- a. Binds to hemoglobin.
 b. Interferes with oxidative phosphorylation.
 c. Interferes with electron transport.
 d. Acts as un-coupler in the mitochondria.
 e. Inhibits the cytochrome P-450 monooxygenases.

After oxygen accept electrons at the end of oxidative phosphorylation the following compound is formed:

- a. H₂O b. CO₂ c. Proton d. Cyanide Azide

Which is the main source of blood glucose after 10 hour starvation (no food)?

- a. Glycogen. b. Nucleic acids. c. Triacylglycerols.
 d. Muscle proteins. e. Fat.

Which is true regarding electrons transport from NADH and creating the chemiosmotic potential:

- a. NADH transfers electrons from matrix into intermembrane space.
 b. NADH transfers electron from intermembrane space into matrix.
 c. NADH transfers protons from matrix into intermembrane space.
 d. NADH transfers protons from intermembrane space into matrix.
 e. NADH loses electrons to complex II.

The compounds the separate electron transport from oxidative phosphorylation in cellular respiration are

called

- a. Respiratory inhibitors b. Uncouplers c. Cytochrome d. Separators

Name of the main enzyme in oxidative phosphorylation

- a. ATP phosphorylase b. ATP kinase c. ATP dehydrogenase d. ATP synthase