

Immunoglobulin structure has the following feature:

- a) Noncovalent interactions connect the heavy chains to light chains
- b) All immunoglobulin types are found as dimers
- c) Differences in the constant regions make isotypes
- d) The hypervariable regions are present on the tips of the heavy chains but not the light chains
- e) The carbohydrate moiety is linked to the Fc domain of the heavy chains

**ANS:C**

Dialysis is dependent on:

- a) Protein charge
- b) Protein-protein interaction
- c) Protein solubility
- d) Protein hydrophobicity
- e) Protein size

ANS:E

c) Which type of enzyme does catalyze the conversion of a dipeptide into two separate amino acids?

- a) A dehydrogenase
- b) An oxidoreductase
- c) A decarboxylase
- d) A hydrolase
- e) A lyase

ANS:D

The following statement is TRUE regarding hemoglobin:

- a) Each heme molecule can bind to two oxygen molecules
- b) Heme group is attached to the surface of hemoglobin
- c) Hemoglobin has a high affinity to oxygen at peripheral tissues
- d) Proximal histidine is non-covalently bound to the iron of heme
- e) Distal histidine interacts with the bound oxygen

ANS:E

Which of the following statements is TRUE regarding modified amino acids & short peptides:

- a) Enkephalins are pentapeptides that regulate smooth muscle contraction
  - b) Carnosine is a tripeptide that functions as antioxidant
  - c) Both ends of oxytocin and vasopressin are composed of methyl groups
  - d) Gramicidin and tyrocidine A are peptides ends linked by disulfide bonds
  - e) Aspartame is unsuitable for consumption by phenylketonuria patients
- ANS:E**



) The CORRECT statement about myoglobin is:

- a) It is made of beta sheets completely
- b) Its  $p_{50}$  towards oxygen is constant with changing oxygen pressure in muscle tissues
- c) It is an allosteric protein
- d) It has high affinity towards oxygen
- e) Oxygen is released during light exercise

**ANS:D**

) One of the following is NOT true in regard to isozymes:

- a) They may be activated differently
- b) They may catalyze different reactions using the same substrate
- c) They may function in different tissues
- d) They may have different affinities for their substrate
- e) They are produced from different genes

**ANS:B**

Collagen and elastin share the following structural feature:

- a) High concentration of proline residues
- b) High elasticity due to the presence of the hydrophobic segments
- c) The formation of desmosine cross links
- d) Hydroxylation of proline to introduce kinks in their structures
- e) Hydroxylysine that acts as an attachment site for carbohydrate moiety

**ANS:A**



) Activation of protein kinase A involves all of the following EXCEPT:

- a) Dissociation of subunits
- b) Changing the quaternary structure of the whole protein
- c) Binding to its substrate
- d) Binding to cAMP
- e) Binding to a small modifier

ANS:C

The amino acid that disrupts beta sheet is:

- a) Pro
- b) Lys
- c) Gly
- d) Glu
- e) Trp

ANS:A

Denaturation DOES NOT disrupt:

- a) Primary structure
- b) Secondary structure
- c) Tertiary structure
- d) Quaternary structure
- e) Protein function

**ANS:A**

Which group of amino acids is likely to be found in the catalytic active site of an enzyme?

- a) Alanine, valine, threonine
- b) Tyrosine, threonine, leucine
- c) Leucine, lysine, alanine
- d) Serine, histidine, aspartate
- e) Cysteine, isoleucine, phenylalanine

**ANS:D**

) One of the following enzymes is most specific for liver disease:

- a) AST
- b) LDH1/LDH2
- c) ALT
- d) LDH
- e) CPK

**ANS:C**



Arginine amino acid can be used to synthesize:

- a) Nitric oxide
- b) Epinephrine
- c) Glutathione
- d) Serotonin
- e) GABA

**ANS:A**

Secondary structure elements combine to form a \_\_\_\_\_ in proteins.

- a- Native protein
- b- Simple protein
- c- Domain
- d- Motif
- e- Chaperone

ANS:C

**Protein tertiary structure involves all of the following EXCEPT:**

- a- Functionality
- b- Combination of several subunits
- c- Interactions between R- groups
- d- The addition of prosthetic groups
- e- Combination of domains

**ANS:B**

has/have all of the information necessary for determining the three-dimensional shape of a protein.

- a- The protein's peptide bonds.
- b- The protein's interaction with molecular chaperones.
- c- The prosthetic group.
- d- The protein's interactions with other polypeptides.
- e- The protein's amino acid sequence.

ANS:E

**Which of the following is a secondary amine?**

- a- Gly
- b- Gln
- c- Glu
- d- Cys
- e- Pro

**ANS:E**



## **Vasopressin can be described as follows:**

- a- It is an antioxidant.
- b- It is an artificial sweetener.
- c- It can form a cyclic structure.
- d- It has D-amino acids.
- e- It is a natural pain killer.

ANS:C

**- Which of the following amino acid is polar uncharged?**

- a- Arg
- b- Leu
- c- Phe
- d- Tyr
- e- Met

**ANS:A**

**- Which of the following is a correct match between product and precursor amino acid?**

- a- Epinephrine, Tyr
- b- Dopa, Thr
- c- Serotonin, Arg
- d- GABA, Gln
- e- NO, Gly

**ANS:A**

**An amide group is present in the side chain of the following amino acid:**

- a- Thr
- b- Cys
- c- Asn
- d- Glu
- e- Ile

ASN:C

**The amino acid that makes proteins act as buffers at physiological pH is:**

- a- Glu
- b- Asn
- c- Arg
- d- His
- e- Asp

ASN:D



**- Secondary structures are held by:**

- a- Covalent bonds between cysteine residues
- b- Non-covalent interactions between backbone atoms
- c- Peptide bonds
- d- Prosthetic groups such as sugars, heme groups, metal ions ...etc.
- e- Non-covalent interactions between R atoms

**ANS:B**

**) These amino acid stretches CANNOT exist on protein surface that is exposed to aqueous environment:**

- A. Lys. Glu Cys
- B. Pro, His, Tyr
- C. The Leu, Asn
- D. Met val Trp
- E. Arg Asp Ser

**ANS:D**

**which is the largest amino acid ?**

- A. phe
- B. trp
- C. pro
- D. lys

**ANS:B**

**which of these pairs of amino acid have phenol group , thiol group respectively ?**

- A. Cys & phe
- B. Cys & tyr
- C. tyr & cys

**ANS:C**

Decarboxylation of histidine results in the formation of

- a. A monoamine molecule
- b. A sedative molecule
- c. An excitatory neurotransmitter
- d. An inhibitory neurotransmitter
- e. An anti-allergic molecule

ANS:A



Patients with phenylketonuria are advised to ingest an aspartame-like sweetener with phenylalanine replaced by

- a. Alanine
- b. Tryptophan
- c. An amino acid analog
- d. Valine
- e. Tyrosine

**ANS:A**

Amphipathic alpha-helices exist in

- a. Membrane receptor with a single transmembrane domain
- b. Cysteine-rich proteins with disulfide bonds
- c. Conjugated, multimeric proteins
- d. Ion channels
- e. Extracellular proteins

**ANS:D**

One of the following is TRUE in regards to prion disease

- a. The disease can be inherited
- b. The disease is caused by defective chaperones
- c. The defective prion protein disrupts protein synthesis
- d. It is a human-specific disease
- e. The prion protein does not have a tertiary structure

**ANS:A**

One of the following is not true about the peptide bond:

- a- it's planar.
- b- It has partial double bond character
- c- it's weaker than a usual single bond
- d- None of the above

**ANS:C**

What's correct about Gramicidin S?

- a- Has only D amino acids.
- b- Has a cyclic structure due to hydrogen bonding.
- c- Has the amino acid ornithine in its structure.
- d- Is a hexapeptide.

ANS:C



All of the following statements are true about glutathione EXCEPT:

- a- its oxidized form is GSSG.
- b- It makes disulfide bridges within the same molecule.
- c- Is a tripeptide.
- d- It scavenges oxidizing agents.
- e- Reduced glutathione is in the form of GSH.

**ANS:B**

Oxytocin and tyrocidine have what in common:

- a-both are cyclic peptides
- b-They have disulfide bridge
- c-Have d and L amino acids
- d-Have unusual amino acids like Orn

**ANS:A**



The following are components of the secondary structure:

- a. Motif
- b. Domain
- c. Amino acid sequence
- d. Prosthetic groups
- e. Turn

ANS:E

Decrease in Which of the following may cause lung disease?

- a-Albumin
- b- $\alpha$ 1 fetoprotein
- c-Haptoglobin
- d- $\alpha$ 1 antitrypsin

ANS:D

A patient has low levels of plasma proteins. Tests showed that his liver isn't damaged, and his parathyroid gland is working well. Which of the following regarding the patient's condition could be true?

- a-The total plasma calcium level is normal
- b-There is a prolonged period of blood clotting
- c-Albumin is found in the urine
- d-Skin is abnormally red and hot

**ANS:C**

Which of the following is found mainly during inflammation?

- a-Albumin
- b-C-reactive protein
- c-Prealbumin
- d-Transferrin

**ANS:B**

it is an acute phase protein:

- A) fibrinogen
- B) transferrin
- C) albumin
- D) transthyretin

ANS:A

doesn't cause emphysema:

- A) SZ
  - B) MZ
  - C) FS
  - D) smoking
  - E) presence of methionine-sulfoxide at residue no. 358
- ANS:C

prevents loss of hemoglobin in urine:

- A) ceruloplasmin
- B) haptoglobin
- C) alpha1- antitrypsin
- D) alpha1- fetoprotein

ANS:B



Which of the following plasma protein has the higher molecular weight?

- a) Haptoglobin
- b)  $\alpha$ 1-antitrypsin
- c) B globulin
- d) Albumin.

**ANS:C**

The correct order of the amount (abundance) of the globulin plasma proteins is:

- a) Albumin >  $\alpha_1$  >  $\alpha_2$  >  $\beta$  >  $\gamma$
- b)  $\gamma$  >  $\beta$  >  $\alpha_2$  >  $\alpha_1$  > albumin
- c) Albumin >  $\gamma$  >  $\beta$  >  $\alpha_2$  >  $\alpha_1$
- d)  $\gamma$  >  $\beta$  >  $\alpha_2$  >  $\alpha_1$  e)  $\alpha_1$  >  $\alpha_2$  >  $\beta$  >  $\gamma$

ANS:D

## NFKB functions:

- A) while being in the cytosol
- B) after translocated to the cytosol
- C) stimulates Interleukin 1
- D) activates gene transcription

ANS:D

Prealbumin represents:

- a. A band that runs faster on gel electrophoreses
- b. All answers are true
- c. An acute phase protein
- d. Inactive form of albumin
- e. A higher molecular weight protein compared to albumin

ANS:A

A decrease in which of the following proteins will result in deposits of copper in the lens of the eyes, liver, skin and kidneys?

- a. Albumin
- b. Transferrin
- c. Prealbumin
- d. CRP
- e. Ceruloplasmin

ANS:E

- The phosphate groups of thiamin pyrophosphate and ATP requires this to bind to active sites of enzymes:

- a. They do not need a mediator.
- b. Coenzyme A
- c. Zinc ion
- d. FADH<sub>2</sub> or NADH
- e. Magnesium ion

ANS:E



**- The main purpose of the hinge region of antibodies is:**

- a. Antibody clearance
- b. Binding phagocytic cells
- c. Allowing better binding to antigen
- d. Site of sugar binding
- e. Binding to antigenic epitopes

**ANS:C**



- **Class switching involves:**

- a. Changing the hypervariable region of antibodies.
- b. Changing the constant region of antibodies only.
- c. Changing the variable region of antibodies only.
- d. Changing the B cells that produces the antibodies.
- e. Changing both the variable and constant regions of antibodies.

**ANS:B**

**- One of the following is NOT true in regard to flavin adenine dinucleotide (FAD):**

- a. It is needed for the function of lactate dehydrogenase.
- b. It forms a radical during reactions.
- c. It binds covalently to enzymes.
- d. It accepts two electrons sequentially.
- e. It works with oxidoreductase enzymes.

**ANS:A**

To which class of enzyme does an enzyme that catalyzes this reaction ( $A+B+ATP \rightarrow A-B + ADP + Pi$ ) belong?

- a. Oxidoreductase
- b. Hydrolase
- c. Ligase
- d. Lyase
- e. Transferase

ANS:C

**This technique is NOT dependent on size of molecules.**

- a. Polyacrylamide gel electrophoresis
- b. Dialysis
- c. Two-dimensional gel electrophoresis
- d. Isoelectric focusing
- e. Gel filtration chromatography

**ANS:D**

♥ What does sarin do?

- a) Form covalent bond with acetylcholinesterase
  - b) Form non-covalent bond with acetylcholinesterase
  - c) Form covalent bond with serine protease
  - d) Makes a covalent bond with cyclooxygenase
- ANS: A



The enzyme pyruvate decarboxylase belongs to which family?

- a) Oxidoreductases
- b) Transferases
- c) Ligases
- d) Lyases
- e) Hydrolases

ANS:D



♥ What is the coenzyme required for the function of aminotransferases?

- a) Pyridoxal phosphate
- b) biotin
- c) TPP
- d) CoA

**ANS:A**





We want to make an affinity chromatography to separate "avidin", which of these molecules can be bound to the beads?

- a) Biotin
- b) Egg yolk (the yellow part)
- c) Glucose
- d) Pyridoxal

**ANS:A**



Mass spectrometry separates proteins depending on:

- a) Mass only
- b) Charge only
- c) Mass and charge
- d) Mass, charge and shape

**ANS:C**

- The secondary structures that make up domains are stabilized by
- a. Proline residues
- b. Disulfide bonds
- c. Hydrogen bonds
- d. R groups
- E. Prosthetic groups

**ANS:C**

- A defect in chaperones will result in abnormal
- a. Enzymatic function
- b. Protein localization in cells
- c. Protein folding
- d. Protein denaturation
- e. Protein modification

ANS: C

Abzymes are produced when this is injected into animals. Select one:

- A) Transition state molecules
- B) Transition state analogs
- C) Active sites of the enzyme
- D) Products
- E) Substrates

ANS:B

The hinge region of immunoglobulins is located in?

- A) variable region of the light chain
- B) Constant region of the heavy chain
- C) Constant region of the light chain
- D) Hypervariable region
- E) Variable region of the heavy chain

**ANS:B**



To purify the protein, avidin, from a mixed solution using affinity chromatography, this molecule can be linked to the beads of?

- A) None of the materials can be used.
- B) Glucose.
- C) Biotin.
- D) Histidine.
- E) Lysine.

**ANS:C**

) The enzyme pyruvate decarboxylase depends on the following vitamin as a cofactor:

- a) Vitamin B1 (thiamine)
- b) Vitamin B5 (pantothenic acid)
- c) Vitamin b3 (niacin)
- d) Vitamin b2 (flavin)
- e) Biotin

**ANS:A**

One of the following is a suicide inhibitor:

- a. Aspirin
- b. Parathion
- c. Sarin
- d. Malathion
- e. Penicillin

Penicillin + allopurinol +  
methotrexate

All of these are suicide  
inhibitors.

ANS:E

The enzyme glycogen phosphorylase may be referred to as:

- a. 3.4.23.1
- b. 7.1.1.2
- c. 5.3.1.1
- d. 1.1.1.1
- e. 2.4.1.1

ANS:E

The following residue of collagen is important in intracellular signaling

- a. Hydroxyproline
- b. Glycine
- c. Hydroxylysine
- d. Allysine
- e. Proline

ANS:C

Elastin fibers tend to aggregate back together after stretching due to

- a. The lysine crosslinks
- b. The hydroxyproline residues
- c. Their hydrophobic nature
- d. The attached carbohydrates
- e. The proline residues

ANS:C



The antibody recognizes the \_\_\_\_ of the antigen.

- A) idiotypes.
- B) Allotypes.
- C) Isotopes.
- D) Epitopes.
- E) Isotypes.

ANS:D

The following enzyme is a lyase:

- A) Pyruvate mutase.
- B) Pyruvate decarboxylase.
- C) Pyruvate carboxylase.
- D) Pyruvate dehydrogenase.
- E) Pyruvate kinase.

**ANS:B**

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