84284 - Signaling Pathways in Health and Disease (I.C.) **14 CFU**

Exam Questions

Academic Year [2024/2025]

Exam method:

Students who regularly attended the course of Cell Signaling will be evaluated through a four-hour FINAL EXAM, a cumulative written test with both multiple-choice and open-ended response formats that include topics from all the teaching modules of the integrated course of Signaling Pathways in Health and Disease: Cell Signaling, Metabolic Biochemistry and Physiology. Final Grade Fractions: Cell Signaling, 9/32 pts; Metabolic Biochemistry 14/32 pts; Physiology, 9/32 pts

84285 - Cell Signaling - 4 CFU

Maria Luisa Genova

Exam questions:

1.True about Ras

a) It is allosteric modulator that enhances activity of GTPase enzyme
b) It is a substrate phosphorylated by SOS
c) It is deactivated through phosphorylation by ERK, which is linked to KSR1
d) ?

2. What is the second messenger produced by phospholipase C due to hormonal stimulation of GPCR?

a) Guanosine-5'-monophosphate
b) Inositol-1,4,5-triphosphate
c) Phosphatidylinositol-4.5-biphosphate
d) Protein kinase C

Which is true of heterotrimeric G proteins?

a) combine with membrane GPCRs
b) Activated by CGDP
c) Cancel size GTP when stimulated by GAP
d) Catalyst the reaction ATP —> cAMP + PPi

Which of the following statements best describe insulin molecule?

a) transported by GLUT4
b) Secreted by pancreatic Beta-cells in response to blood glucose levels
c) Stored into mitochondrial granules
d) Composed of seven polypeptides kept together by disulfide bonds

Thyroglobulin is

a) Phosphorylated domain of tyrosine kinase receptors
b) Transmembrane receptor of thyroid hormones
c) Enzyme that combines tyrosine residues with iodine
d) Protein subjected to iodination as a precursor of thyroid hormones

84286 - Metabolic Biochemistry - 6 CFU

Michele Di Foggia, Emanuele Domenico Giordano

Exam questions:

1. Caffeine inhibits cAMP phosphodiesterase, upon its administration one can expect:
   a) -

2. Regarding muscle glycogen, choose correct:
   a) -

3. In uncontrolled type 1 diabetes, we observe
   a) -

4. Concerning pyruvate dehydrogenase, choose correct:
   a) - is a multienzyme complex

5. Which of the options describe primary purpose of beta-oxidation in fatty acid catabolism
   a) For fatty acids to be directly converted into glucose
   b) NADH, FADH2, ATP production
   c) The synthesis of triglycerides

6. Which molecule is immediate product of fatty acid synthase in fatty acid biosynthesis pathway
   a) Acetyl-CoA
   b) Malonyl-CoA

7. Which molecule serves as a starting material for de novo purine nucleotide biosynthesis
   a) Ribose-5-phosphate

8. Which is the final product of purine nucleotide catabolism in humans.
   a) urea
   b) Ammonia
   c) Uric acid
   d) Cytosine
   e) Hypoxanthine

9. Which molecule directly enters urea cycle to donate nitrogen atom.
   a) ornithine
   b) Aspartate
   c) Glutamine
   d) Alanine

10. Write coenzymes and prosthetic groups involved with the molecules. If they are derived from vitamins, write the vitamin.
   - alpha-ketoglutarate dehydrogenase complex
   - Pyruvate carboxylase

- HMG-CoA reductase
- Serine hydroxymethyl transferase
- Transaldolase
- Glucose-6-phosphate dehydrogenase
- Arginase
- Citrate lyase

11. Complete reactions

Fructose-1,6-bisphosphate + ___ —> fructose-6-P + ___

…

12. Write reactions for palmitate biosynthesis from aspartate. How many aspartate molecules are required. Include ATP balance and cellular compartmentalization.

76149 - Physiology - 4 CFU

Davide Martelli

Exam questions:

- Nerve agent mechanism (options were: ACE inhibition, acetylcholine receptor antagonist, prevent presynaptic release)
- IPSPs are caused by: opening of K+ channels
- Nociceptor primary receptor type: c fibers
- Plasma calculation of a 70kg person
- Nerst equation
- Ficks Equation
- Acth and cortic. Production
-