

MCM Practice Questions Answer Key: Lecture Day 1

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Lecture 4: Enzymes and Isoenzymes II

Question 1: B

MODY 2 is a genetic disorder affecting the action of Glucokinase. This information is not relevant to correctly answer this question though. The question is asking what enzyme catalyzes the first step of glycolysis and has a high K_m for glucose. The first fact should immediately rule out (C) and (D). (C) is the final step in gluconeogenesis. (D) is an enzyme found mainly in pseudomonas. Both (A) and (B) are enzymes that catalyze the first step of glycolysis. However, the second piece of information- high K_m - rules out (A) as hexokinase has a high affinity for glucose.

Question 2: B

Statins are competitive inhibitors of HMG-CoA reductase. This would make line (B) the correct answer. (A) would be noncompetitive inhibition, (C) and (D) are not lines we would see with any known type of inhibitor.

Question 3: D

Answers (A) and (B) are enzymes that are used to assess liver health. They are transaminases that catalyze movement of amino groups between amino acids and metabolic intermediates. Myosin (C) is a protein found in muscles, aiding in muscular contraction. The correct answer is Troponin (D), when a patient has a myocardial infarct, cardiac myocytes die from ischemic shock releasing troponin. Important for clinicals is if someone comes in with chest pain, take an EKG and measure blood troponin level (lovingly called heart tropes).

Question 4: A

The cholera toxin affects the G_s (A) protein, keeping it in the active conformation, leading to dehydration. (B) is affected by the Pertussis toxin, leading to hypoglycemia. (C) and (D) are not types of G-protein units.

Question 5: A

Calmodulin (B) while being a subunit of Glycogen phosphorylase Kinase [GPK] (A), is incorrect for that very reason. By virtue of being the subunit of the larger protein complex of GPK, Calmodulin is not the allosteric activator of glycogen phosphorylase. Calsequestrin (C) is a calcium binding protein in the

sarcoplasmic reticulum of muscle cells. Phosphofructokinase is the enzyme that catalyzes the second irreversible step of glycolysis.

Question 6: A

SREBP (A) is the protein that binds excess sterols. When it is bound to sterols, SREBP is prevented from migrating to the DNA binding domain pertaining to the gene that encodes HMG-CoA reductase. (B) is the enzyme that binds to SREBP when sterol concentration are low in order to help it migrate from the ER to the golgi for activation. Ubiquitin (C) is a marker protein that is used to tag other proteins for proteasomal degradation. SRE (D) is the area of DNA that encodes the gene for HMG-CoA reductase. It is where SREBP will relocate to to promote transcription in periods of low sterol concentration.