

MCM Practice Questions: Lecture Day 3

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Lecture 7 & 8: Receptors and Signaling 1 & 2

1) A patient comes into the physicians office complaining of sleep difficulty, mood swings, and tiredness. The physician determines there is an excess of a signaling molecule characterized by having a long half life in circulation. What kind of signaling is this molecule most likely participating in?

- (A) Contact signaling
- (B) Paracrine signaling
- (C) Autocrine signaling
- (D) Endocrine signaling

2) The general cell response to signaling involves Proliferation, Migration, Differentiation, Metabolic changes, or Death. When a patient has a tumor grow, what 2 responses tend to be altered?

- (A) Proliferation and Migration
- (B) Differentiation and Metabolic changes
- (C) Differentiation and Death
- (D) Proliferation and Death

3) When Alexei Navalny was poisoned in 2020, he was given novichok, which is a type of nerve agent. What is the mechanism of action of this toxin?

- (A) Decrease of nicotinic ACh receptors
- (B) Increase of nicotinic ACh receptors
- (C) Inhibition of acetylcholine esterase
- (D) Upregulation of acetylcholine esterase

4) When testosterone, a steroid hormone, is released, where in or on the cell will it bind?

- (A) Cytoplasm
- (B) Cell surface receptor
- (C) Endoplasmic Reticulum
- (D) Nucleus

5) Thiazolidinediones are drugs that activate intranuclear fatty acid receptors. What kind(s) of receptor signaling is being manipulated?

- (A) Type I
- (B) Type II
- (C) Type III
- (D) Type I and II
- (E) Type I and III

6) What is the intracellular receptor that Nitric Oxide binds to?

- (A) Adenylate cyclase
- (B) PKA
- (C) IP3
- (D) Guanylate cyclase
- (E) cAMP

7) Which of the following choices *IS* a GPCR receptor?

- (A) Nicotinic ACh receptor
- (B) Insulin receptor
- (C) IL-1 receptor
- (D) Growth Factor Receptors
- (E) Rhodopsin Receptor

8) In your eyes, the two phototransducing cell types are the rods and cones. When a photon hits the receptor rhodopsin, it activates its GPCR called transducin which in turn activates an enzyme names phosphodiesterase. What is the action of phosphodiesterase in context of phototransduction?

- (A) hydrolysis of cAMP to AMP
- (B) activation of phospholipase c
- (C) inactivation of Rb
- (D) hydrolysis of cGMP to GMP

9) What is the mechanism of action the Pertussis Toxin has on GPCRs?

- (A) Activates Gi to increase cAMP
- (B) Inactivates Gi to increase cAMP
- (C) Activates Gi to decrease cAMP
- (D) Inactivates Gi to decrease cAMP

10) When the body enters a state of hypoglycemia, glycogenolysis is initiated via the action of glucagon. Glucagon binds to a GPCR and activates adenylyl cyclase and PKA. PKA then phosphorylates an enzyme, inactivating it. What enzyme is this?

- (A) Glycogen Phosphorylase
- (B) Phosphorylase Kinase
- (C) Glycogen Synthase
- (D) Glucokinase

11) What kind of receptors do a majority of cytokines use?

- (A) GPCR
- (B) Enzyme Linked
- (C) Ion-channel
- (D) JAK-STAT

12) A 45 year old man comes for a yearly checkup. He was diagnosed with Graves Disease (a form of hyperthyroidism) last year and has been on medication to control it. Under normal circumstances, the product of the thyroid gland, thyroid hormone, acts as its own inhibitor in a negative feedback loop. What is the reason this patient's feedback loop is not working?

- (A) Autoantibodies
- (B) Iodine deficiency
- (C) Poor Diet
- (D) Vitamin Deficiency