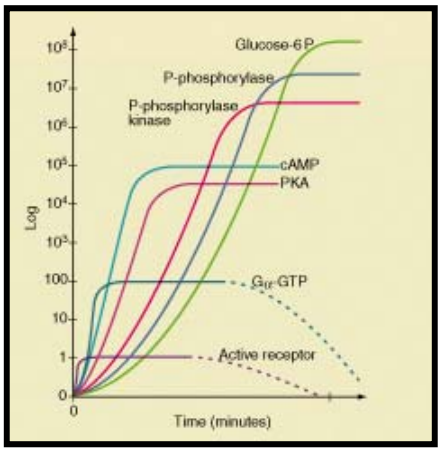
Cell Physiology Exam 3
Fall 2009

1. Asthma attack is characterized by the obstruction of bronchi in response to histamine secreted by mast cells in the bronchi. Which type of signaling does it represent?
    - Paracrine
2. Glucagon, a peptide hormone that increases blood glucose levels
    - Binds to the receptor and activate a signal transduction cascade
3. Testosterone binds to receptors in….
    - Nucleus
4. G proteins use a cycle of _____and _____ to switch a protein on and off.
    - GTP binding, hydrolysis
5. Which enzyme makes cAMP from ATP?
    - Adenylyl cyclase
6. Cholera toxin permanently activates Gs protein and increases cAMP levels in the cells. What will happen?
    - Increase blood glucose levels
    - Increase in transcription
7. Low levels of cAMP phosphodiesterase will result in
    - Prolonged stress response
8. Adapter proteins
    - Operate via direct protein-protein contact



Based on the graph on the right answer following question

9. Which mechanisms provide amplification of adrenaline action in the cell
    - Phosphorylation cascades
    - Activation of G proteins

10. A person has an anaphylactic reaction and uses his epi-pen. Upon arrival in the E.R. the patient has an increased blood glucose level, what type of the receptor is responsible for the change in blood glucose level?
    - G protein Coupled Receptor

Which of the following cascades utilizes cAMP as a second messenger?

11. Increased transport of glucose into muscle cells – no, that's RTK (receptor tyrosine kinase)
12. Stress Response –yes β adrenergic receptor
13. Activation of light receptive neurons – no, that's cGMP
14. Release of glucose from liver into a blood stream – yes, both adrenergic and glucagon receptors use cAMP

15. General Adaptation Syndrome (GAS) is divided into 3 specific phases
    - Alarm phase, resistance phase, exhaustion phase
16. Gluconeogenesis is a dominant process during
    - resistance phase of stress response

17. Inhibition of β adrenergic receptors by drugs called β blockers causes
    - Decrease of heart rate
18. In muscle cells, glycogen breakdown is activated by
    - Ca^{2+}
    - protein kinase A
19. In _____ cells glucose-6-phosphate from breakdown of glycogen is converted to glucose and exits to blood
    - Liver
20. Each odorant sensitive neuron in the olfactory epithelium expresses
    - one type of smell receptor
21. In unstimulated rod cells, the intracellular concentration of
    - cGMP is high
22. A flash of light causes
    - Hyperpolarization of rods and cones
23. During flash of light the intracellular concentration of cGMP in rods
    - Will decrease
24. Light adaptation process includes
    - Phosphorylation of rhodopsin
    - Binding of arrestin
25. In the visual pathway high levels of glutamate will cause
    - inhibition of bipolar cells
26. Viagra is a drug that inhibits cGMP phosphodiesterase. One of the side effects of Viagra might be impaired vision. This effect is due to
    - Depolarization of rods and cones
27. Insulin is a hormone secreted by
    - Pancreatic β cells
28. Pancreatic β cells need to be _____ in order to secrete insulin.
    - Depolarized
29. The sulfonylurea receptor can be used to increase secretion of insulin from pancreatic β cells
    - Only when pancreatic cells are capable of secreting insulin
30. Which tissues have the ability (metabolic pathways) to store glucose "for later use"
    - Muscle
31. Which is *NOT* a physiological role of insulin?
    - Enhances transport of glucose into the cells (insertion of GLUT4 into the membrane)
    - Activates glycogen synthase
    - Activates glucokinase
32. Damage to insulin receptors will cause
    - Increase of blood glucose levels
33. In which step of actin polymerization subunits are added and lost at the same rate?
    - Steady state
34. Which portion of myosin interacts with actin filaments?
    - The head domain
35. A head domain of myosin molecule
    - Binds actin and hydrolyses ATP
    - Is responsible for generating force
    - Is the most conserved region in myosin

36. During contraction of striated muscles
    - Myosin pulls actin filaments together
    - ”Walking” of myosin causes sarcomere to shorten
    - Myosin ”walks” toward the barbed end of actin
37. Which protein motif do you expect to find in Ca^{2+} sensitive proteins such as tropomyosin?
    - Helix-loop-helix (that is Ca binding motif)
38. The functional unit of a muscle cell is
    - Sarcomere
39. Recovery of calcium back to intracellular stores after skeletal muscle contraction is accomplished by
    - A pump
40. Anticancer drug vinculin blocks polymerization of microtubules. Which processes in the cell are affected?
    - Formation of mitotic spindle