39152

BIOL*1080 – Biological Concepts of Health- Instructor Dr. K. Meckling

ALTERNATE MIDTERM EXAMINATION –

[redacted]

Answer all of the following questions by filling circling your response.

1. According to Robert Sapolsky baboons and humans share which emergent property(ies)?
   a. Religion
   b. Culture ✓
   c. Protein Arrays
   d. All of the above.

2. The similarity in DNA sequences of humans, flies and worms is described as?
   a. Discordance
   b. Divergence
   c. Homology
   d. Specificity

3. In a typical online Life Expectancy calculator, which characteristic is not considered?
   a. Circadian rhythms
   b. Blood pressure
   c. Smoking behaviour
   d. Alcohol consumption

4. The healthspan of a population is typically shorter than the lifespan because?
   a. Individuals that die accidentally are not considered in the lifespan.
   b. The lifespan includes potential periods of significant dependency. ✓
   c. People who acquire bacterial or viral infections are not included in the population.
   d. Everyone is not born healthy.

5. A fasting blood sample can be taken to measure which of the following biomarkers?
   a. Height.
   b. Glucose levels.
   c. Osteoporosis.
   d. Bone density.

6. For something to be useful as a biomarker it has which of the following characteristics?
   a. It changes with age.
   b. It is easily measured with precision.
   c. It cannot vary with time of day.
   d. All of the above.

7. Calcium homeostasis is controlled by?
   a. Acetylcholine.
   b. 1,25 dihydroxyvitamin D_3.
   c. Blood phosphate concentrations.
   d. All of the above.

8. Which of the following is not a modifiable risk factor for osteoporosis?
   a. Diet.
   b. Exercise.
   c. Genetics.
   d. UV light exposure.

9. 25-OH vitamin D_3 levels vary with season in Canadian girls. This probably indicates that?
   a. Bone density is not a good biomarker of bone health.
   b. Intake of vitamin D rich foods varies seasonally.
   c. Foods are fortified with vitamin D in equatorial countries.
   d. At some times of the year UV light intensity is insufficient to maintain skin synthesis of vitamin D_3.

10. Baboons are a good model to study health as it applies to human beings because?
   a. They have a similar genetic code.
   b. They have similar physiological responses to various interventions.
   c. They have a similar life expectancy.
   d. All of the above.

11. The advantage(s) of *in vitro* systems for studies in biomedicine is (are)?
   a. Direct demonstration of cause and effect is possible.
   b. They avoid issues of animal ethics.
   c. They can generate a lot of data in a very short time-frame.
   d. All of the above.

12. Clinical trials in human subjects are difficult because?
   a. There is too much genetic heterogeneity in human populations.
   b. You cannot run placebo-controlled trials.
   c. Human beings live too long.
   d. You cannot demonstrate cause and effect.

13. Considering health of the adult human from the "systems biology approach" which apply?
   a. The entire population of the earth is considered "the biological system."
   b. The Control and Communication Network is the logic unit.
   c. The central nervous, peripheral nervous and immune systems work independently.
   d. All of the above.

ch of the following is not typically described as one of the seven dimensions of health?

a. Environmental
b. Occupational
c. Aging
d. Mental

15. Compromised function of the Control and Communication Network leads to?

a. Disease
b. Homeostasis
c. Evolution
d. Redundancy

16. That each component of the network has multiple functions and may exert the same coordinate control by different mechanisms in different situations is called?

a. Synergy
b. Amplification
c. Redundancy
d. Homology

17. When does a cell in a multicellular organism communicate?

a. When it proliferates.
b. When it differentiates.
c. When it is cancerous.
d. All of the above.

18. If two cells want to communicate with each other, the most significant barrier to overcome is?

a. The extracellular matrix.
b. The electrochemical gradient.
c. The plasma membrane.
d. The action potential.

19. Neurotransmitters, cytokines and hormones share which feature?

a. They are all proteins. ×
b. They are all chemical messengers.
c. They are all controlled through action potentials.
d. They are all water soluble.

20. When atrocytes in the brain loosen connections to cause failure of the blood brain barrier this represents a failure in which type of cell-cell communication?

a. Gap junction.
b. Tight junction.
c. Epithelial.
d. Hormonal×

7

21. The ability of a target cell to respond to a specific chemical signal depends on?
    a. Whether the chemical signal is water or lipid soluble.
    b. Whether the chemical signal was produced by an action potential.
    c. Whether the target cell is in the central or peripheral nervous system.
    (d) Whether the target cell has the specific receptor for that chemical.

22. Lipid soluble signalling molecules....
    a. Usually require carriers for transport in the blood.
    b. Can diffuse directly across the lipid bilayer.
    c. Cannot be stored in vesicles for rapid release.
    (d) All of the above.

23. A chemical binding to a receptor is converted into a change in cell function through?
    a. Amplification.
    (b) Signal transduction.
    c. Phosphorylation.
    d. Replication.

24. Calcium, cyclic AMP, and diacylglycerol are all examples of?
    a. Water soluble hormones.
    b. Fat soluble cytokines.
    (c) Second messengers.
    d. Protein kinases.

25. One way to increase the sensitivity of a cell to a particular hormone is?
    (a) By increasing the number of receptors for that hormone on the target cell surface.
    b. By decreasing the number of receptors for that hormone on the target cell surface.
    c. By increasing the concentration of the hormone at the target site.
    d. By decreasing the concentration of the hormone at the target site.

26. The one disadvantage of lipid soluble signalling molecules, is that there is little opportunity for?
    a. Signal amplification.
    b. Desensitization.
    c. Antagonism.
    (d) Synergism.

27. In the pancreas, insulin release from the beta cell inhibits the secretion of glucagon from the alpha cell. This is an example of _____ signalling.
    a. Autocrine.
    (b) Paracrine.
    c. Neurocrine.
    d. Exocrine.

e fastest way to send a signal over a long distance is to use?

a. The endocrine system.
b. The exocrine system.
c. The nervous system.
d. The immune system.

29. Control of liver glucose synthesis in response to exercise involves which communication pathway(s)?

a. Autocrine.
b. Neural.
c. Exocrine.
d. All of the above.

30. Which of the following is (are) part(s) of the Central Nervous System?

a. The spinal cord.
b. Motor neurons.
c. The adrenal gland.
d. All of the above.

31. Information from the visual system is communicated to the Central Nervous System via?

a. Motor neurons. - away
b. Endocrine hormones.
c. Afferent neurons. } - to
d. Efferent neurons. } - away

32. The direction of information flow in a neuron is?

a. From cell body to dendrites to nerve terminals to axon.
b. From nerve terminals to cell body to axon to dendrites.
c. From dendrites to axon to cell body to nerve terminals.
d. From dendrites to cell body to axon to nerve terminals.

33. Which of the following is (are) true about action potentials? - change in electric potential between the inside + outside of cell when nerves signal

a. They can travel only in one direction.
b. They occur only in myelinated axons.
c. They result from defects in the Central Nervous System.
d. All of the above.

34. Which of the following statements is true?

a. Neurons can have multiple axons.
b. Neurons can have multiple dendrites.
c. Neurons can have multiple cell bodies.
d. A single neuron can secrete more than one type of neurotransmitter.

35. Which of the following does not provide support to neurons in the Peripheral Nervous System?
   a. Oligodendrocytes
   b. Microglial cells
   c. Astrocytes
   d. Schwann cells

36. Dopamine differs from other neurotransmitters in that....
   a. It does not require specific receptors for activity.
   b. It acts only in the Peripheral Nervous System.
   c. It acts primarily in the Central Nervous System.
   d. It must be consumed in the diet.

37. Drugs like heroine or morphine impact the pleasure network by?
   a. Mimicking the neurotransmitter dopamine.
   b. Increasing the half-life of dopamine in the synapse.
   c. Decreasing the production of the neurotransmitter GABA.
   d. Antagonizing the action of norepinephrine.

38. Somatic sensory inputs monitoring the internal environment sending information into the CNS are unique in that unlike other sensors such as pain and heat receptors?
   a. They communicate via endocrine pathways.
   b. They communicate to the CNS via efferent neurons.
   c. They use only the neurotransmitter dopamine.
   d. They are not consciously perceived by the CNS.

39. The common feature of the special senses of hearing, taste, smell and vision is that sensory information is always converted into?
   a. an action potential.
   b. the second messenger cAMP.
   c. mechanical stress.
   d. emotion.

40. In the example where you are proceeding into an intersection in a car, and quickly stop before hitting the truck, which parts of the CCS will participate in the interpretation and response?
   a. The exocrine pancreas, hypothalamus, CNS, and motor neurons.
   b. The pituitary, the hypothalamus, and afferent PNS neurons.
   c. Afferent neurons, the CNS, efferent somatic and autonomic nerve tracts.
   d. Adrenal medulla, exocrine pancreas, PNS and motor neurons.

rise in blood glucose typically leads to the release of insulin from the pancreas into the blood and stimulates glucose transport in sensitive tissues. These insulin sensitive tissues are?

a. brain, skeletal muscle and liver.
b. skeletal muscle, adipose tissue and liver.
c. cardiac muscle, brain and liver.
d. brain, pancreas and skeletal muscle.

42. The way that the insulin signal is terminated is through breakdown of the hormone in target cells and the liver. In the case of corticotropin releasing hormone from the hypothalamus, the signal for release is terminated by?

a. Negative feedback control of CRH release by the adrenal product, cortisol.
b. Positive feedback control of CRH release by the anterior pituitary product, ACTH.
c. Breakdown of CRH receptors in target cells.
d. Overexpression of CRH receptors in the anterior pituitary.

43. When the effects of a set of hormones on a biological phenomena is greater than the sum of the individual responses to each hormone, this is described as?

a. Antagonism → inhibits
b. Synergism
c. Permissiveness
d. Agonism → permits

44. Vascular smooth muscle cells, endothelial cells, fibroblasts, spindle cells and motor neurons all provide structural, nervous and nutritional support for which tissue?

a. The pancreas.
b. The brain.
c. Skeletal muscle.
d. Capillaries.

45. The proteins that provide the connection for signal transduction between the extracellular matrix and intracellular scaffold proteins in cells are called?

a. connexins.
b. collagens.
c. actins.
d. integrins.

46. Macrophages are a type of white blood cell that are critical in?

a. Resident immune function.
b. Phagocytosing invading bacteria and viruses.
c. Presenting antigen to migratory T cells.
d. All of the above.

47. When a patrolling natural killer cell comes across a tumor cell in a tissue, it usually initiates a programmed cell death described as?

a. Apoptosis.
b. Necrosis.
c. Phagocytosis.
d. Endocytosis.

48. When a macrophage or dendritic cell phagocytose a foreign molecule, they recruit other immune cells to the infectious site through?

a. neurons of the somatic sensory pathway.
b. secretion of cytokines and eicosanoids that are chemotractants.
c. secretion of antibodies that coat the foreign particles for easy digestion.
d. release of complement to rupture the invading bacteria.

49. Antigen receptors are found on lymphocytes that can participate in mounting an immune response to a foreign agent. The antigen receptor on a B-cell is?

a. The B-cell receptor.
b. A beta adrenergic receptor.
c. The major histocompatibility molecule (MHC).
d. The antibody.

50. The purpose of immunization is to create _____ in T and B-cell populations to decrease the future risk of succumbing to infection.

a. molecular memory.
b. antigen presenting cells.
c. recognition of self versus non-self cell surface markers.
d. complement.

51. Following tissue injury resident macrophages will phagocytose microbes and foreign matter and secrete chemicals that will?

a. induce the clotting cascade to heal the wound.
b. increase the permeability of the endothelium so migratory immune cells can move it to help.
c. cause immunosuppression.
d. promote graft rejection.

52. Autoimmune diseases like Lupus, type I diabetes and rhematoid arthritis demonstrate?

a. The central role for environmental contamination in disease risk.
b. Active immunosuppression.
c. A failure of immunization protocols.
d. Failure of the immune system to distinguish between self and non-self antigens.