CSB325 ENDOCRINE PHYSIOLOGY
Midterm Examination
October 23, 2012

One hour

Please answer all questions on the scantron sheets provided. There are 50 multiple choice questions in this examination. Each question is worth 1 mark.

Both the question sheet and the scantron sheet must be returned at the end of the examination. There are 10 pages in this examination. Check to ensure that all are present.

1. The hypothalamus is a part of the

a) hindbrain
b) forebrain
c) midbrain
d) cerebellum
e) none of the above

2. If the purpose of the blood brain barrier is to restrict the large molecules of the vascular system into the brain, how do the small hormones like calcitonin enter the brain?

a) Hormones of the endocrine system are small and pass easily through the blood brain barrier via passive diffusion.
b) Hormones do not need to communicate with the brain because the brain has its own autocrine feedback loop on nerves that communicate with the various endocrine organs.
c) The endocrine organs signal the pars distalis, which then communicates to the brain via the hypothalamus
d) All of the above
e) None of the above

3. Protocells may have developed in the prebiotic Earth, in part, by

a) Formation of hydrophilic membranes that later became more hydrophobic
b) Partitioning of hydrophilic and hydrophobic molecules creating a primitive membrane
c) The initial formation of sugars in the atmosphere which aggregated to form a protein-based membrane
d) The initial formation of sugars in the atmosphere which aggregated to form a carbohydrate-based membrane
e) Partitioning of hydrophilic and hydrophobic amino acids creating a primitive amino acid based membrane

4. Requirements for the evolution of multicellular metazoans require

a) An ability to separate self from non-self and so the first cells were repelled by each other by antagonistic protein systems
b) An ability to adhere and be physically connected to other cells
c) An ability to be photosynthetic in order to have sufficient energy to interact between cells
d) a and c, only
e) a and b, only

5. G protein coupled receptors

a) are made of seven protein subunits
b) bind GTP
c) can activate Galpha
d) phosphorylate Galpha
e) inactivate Galpha

6. Which hormone is responsible for directly increasing plasma sodium concentrations?

a) Cortisol
b) Renin
c) Aldosterone
d) Bradykinin
e) ACE

7. Steroid hormones

a) do not cross the blood-brain barrier and plasma membrane
b) are secondary messengers
c) are structurally related to peptide hormones
d) all of the above
e) none of the above

8. Secretion of a signaling molecule from the neural cell of Hydra and its binding to the epithelial cell is an example of

a) juxtacrine secretion
b) intracrine secretion
c) exocrine secretion
d) endocrine secretion
e) paracrine secretion

9. Cerebrospinal fluid is found

a) around the spinal cord
b) in ventricles of the brain
c) where ever the blood brain barrier is found
d) in circumventricular organs
e) all of the above

10. Dehydration induces:

a) angiotensinogen release
b) ANP release
c) inhibition of renin
d) proteolytic processing of angiotensin I into angiotensin II
e) none of the above

11. Gases thought to be present in the prebiotic Earth include

a) Oxygen, hydrogen sulfide, carbon monoxide
b) Urea, glyceraldehyde, carbon dioxide
c) Ammonia, urea and uric acid
d) Nitrogen, methane, urea
e) All of the above

12. A distinguishing feature of the Teleosts pituitary gland, relative to the Tetrapods is:

a) the presence of a ventral lobe connected to the pars distalis by an epithelial stalk and a vastly reduced portal system
b) the loss of the epithelial stalk but the retention of a ventral lobe of the pars distalis located above the buccal cavity
c) a vastly reduced portal system and a proliferation of neurosecretory nerve terminals in the neurohypophysis
d) an expanded neurohypophysis, and a lobular pituitary gland featuring a more developed portal system
e) the presence of a highly interdigitated pars nervosa and the reduction of a portal system

13. the four principle layers of a blood-brain barrier include

a) Endothelial layer, advential layer, basement membrane and hydrophilic membrane
b) Glial cell layer, advential layer, basement membrane and mesenchyme layer
c) Endothelial layer, advential layer, basement membrane and glial cell layer
d) Endothelial layer, mesenchyme layer, basement membrane and glial cell layer
e) Endothelial layer, mesenchyme layer, basement membrane and hydrophilic membrane

14. Deficiency in vasopressin could result in:

a) antidiuresis and decrease in plasma sodium concentration
b) diuresis and increase in plasma sodium concentration
c) ANP release
d) decreased plasma sodium concentration
e) none of the above

15. Phospholipase C

a) is activated by inositol phospholipids
b) activates protein kinase C
c) binds G protein coupled receptors
d) binds IP3
e) releases cGMP

16. Chondrichthyan (sharks, holocephalans) pituitary glands have a

a) neurointermediate lobe, portal system and buccal or ventral lobe
b) combined neurointermediate lobe and pars distalis, portal system
c) neurointermediate lobe and a portal system
d) direct neural connection between hypothalamus and anterior pituitary
e) b and d

17. Glutamate-activated cationic channels possess how many subunits?

a) 3
b) 4
c) 5
d) 6
e) 7

18. Secretion of a signaling molecule from the dorsal cell layer of Tricoplex into the mesenchyme layer is an example of:

a) paracrine secretion
b) intracrine secretion
c) exocrine secretion
d) endocrine secretion
e) autocrine secretion

19. The number of potential response to a cellular stimulus can vary between tissues due to

a) processing of the prohormone
b) expression of receptors
c) number of chromosomes present
d) expression of amidation sites
e) a and b, only

20. Examples of prebiotic nitrogenous compounds are:

a) urea
b) fatty acids
c) amino acids
d) formaldehyde
e) a and c, only

21. Which hormones are released by the anterior lobe of the pituitary gland?

a) Oxytocin, somatostatin and growth hormone
b) Prolactin, oxytocin and vasopressin
c) Thyroxine stimulating hormone, prolactin and growth hormone
d) Somatolactin, oxytocin and somatostatin
e) Luteinizing hormone, follicle stimulating hormone and gonadotropin releasing hormone

22. Energy sources available in the prebiotic earth available for the synthesis of chemicals include

a) sunlight
b) lightning
c) volcanic activity
d) all of the above
e) none of the above

23. The tissue of the anterior lobe of the pituitary gland is derived from

a) rathke's pouch
b) pars nervosa
c) anterior tip of the neural ridge
d) anterior horn of the lateral ventricle
e) a and c, only

24. Intracrine signaling refers to the communication of a signaling molecule

a) between cells
b) between organelles
c) between animals
d) between tissues
e) between organs

25. Physiological requirements for the evolution of multicellularity include

a) Adhesion: cells need to be physically connected or attached
b) Nutrient, ion, water and oxygen transport to inner cells
c) Coordination of function and the development of signaling systems
d) All of the above
e) None of the above

26. If N-acetyl transferase (NAT) is not produced because of the gene mutation, then we might predict that the following hormones would not be present:

a) dopamine and epinephrine
b) dopamine and melatonin
c) dopamine, epinephrine and norepinephrine
d) epinephrine and norepinephrine
e) none of the above

27. The receptor 'notch' and its ligand 'delta' is an example of

a) Exocrine signaling
b) Intracrine signaling
c) Endocrine signaling
d) Paracrine signaling
e) Juxtacrine signaling

28. The release of vasopressin from the posterior lobe of the pituitary gland is an example of

a) Neuroendocrine secretion
b) Neurotransmission
c) Paracrine secretion
d) Intracrine secretion
e) None of the above

29. An SHC-SOS-Ras signal transduction pathway is characteristic of what receptor system?

a) Tyrosine kinases
b) Serine/threonine kinases
c) Secretin family G-protein coupled receptors
d) Metabotrophic glutamate receptors
e) Aspartate receptors

30. The enzyme responsible for the conversion of glutamic acid to gamma amino butyric acid (GABA) is

a) N-acetyltransferase
b) Glutamic acid decarboxylase
c) GABA transferase
d) GABA decarboxylase
e) Glutamic acid N-acetylkinase

31. The most primitive type of nervous system includes

a) Dorsal nerve cord
b) Ventral nerve cord
c) Nerve net
d) Ventral nerve ring
e) None of the above

32. Which classes of ligands bind to nuclear receptors

a) Steroids
b) Retinoic acid-based hormones
c) Thyroid hormones
d) a and c, only
e) a, b and c, only

33. Heterodimerization and homodimerization among G-protein coupled receptors

a) Is a mechanism to induce different signal transduction responses
b) Does not occur
c) Only occurs in primitive species such as the Radiata
d) Is a distinguishing feature of the shark pituitary gland
e) None of the above

40. Glutamate binds to

a) Ion channel receptors
b) G-protein coupled receptors
c) Nuclear receptors
d) a and b, only
e) b and c, only

41. A signal peptide is a characteristic of a

a) Prohormone
b) Proprehormone
c) Propeptide
d) Preprohormone
e) Proprohormone

42. Exocrine secreted chemicals include

a) CRF release into the pituitary portal system
b) Bicarbonate release from pancreas into intestine
c) Pheromonal release into the external environment
d) All of the above
e) b and c, only

43. The signal transduction response resulting from a ligand binding to its receptor can be modified by

a) Heterodimerization of the receptor with a different type of receptor
b) Binding of the receptor with a receptor modifying protein
c) Interaction of the receptor with different types of G proteins
d) All of the above
e) b and c, only

44. Examples of G-protein couple receptors include

a) insulin, activin and vasopressin receptors
b) serotonin, melatonin and dopamine receptors
c) insulin, IGF-2 and vasopressin receptors
d) dopamine, serotonin and activin receptors
e) vasopressin, serotonin and dopamine receptors

45. Angiotensin-II _____ in the plasma as the result of _____ plasma sodium.

a) decreases; increased
b) does not change; decreased
c) increases; increased
d) increases; decreased
e) decreases; decreased

46. What kind of receptors does glutamate signal through?

a) Ion channels and metabotropic receptors
b) Ionotropic and metabotropic receptors
c) NMDA, AMPA and kainate receptors
d) All of the above
e) None of the above

47. One difference between kainate receptors and NMDA receptors is that

a) Kainate receptors all Na ions to pass whereas NMDA receptors do not
b) Kainate receptors all K ions to pass whereas NMDA receptors do not
c) Kainate receptors all Ca ions to pass whereas NMDA receptors do not
d) NMDA receptors all Na ions to pass whereas kainate receptors do not
e) NMDA receptors all Ca ions to pass whereas kainate receptors do not

48. What is a distinctive feature of the hagfish pituitary gland?

a) It does not possess a pituitary gland
b) It utilizes diffusion as the primary means of communication from the hypothalamus
c) It possesses a buccal lobe
d) It utilizes direct synaptic connections from the hypothalamus
e) It does not release any recognizable hormones

49. The area postrema is located in the

a) Adrenal gland
b) Brain stem
c) Urophysis
d) Neurohypophysis
e) Diencephalon

50. In the Radiata, which includes jellyfish and hydra,

a) G protein receptors are highly represented in comparison to other receptor systems
b) There are no recognizable kinase based receptor systems
c) Only the Wnt/frizzled pathway is present
d) Steroid receptor systems are the primary method of ligand receptor signaling mechanism
e) None of the above