بسم الله الرحمن الرحيم

Endocrinology First Exam

First Semester, 2009/2010

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College of Health Professions
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Name: _____
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I. Multiple-choice questions. Choose the single best answer (30 points, 2 points each)

1. The fastest communication system in the body is the
   a. endocrine system using hormones.
   b. nervous system using neurotransmitters.
   c. immune system.
   d. nervous system using neurohormones.
   e. Both (b) and (d) above are true.

2. The specificity of hormones and neurotransmitters depend on
   a. the presence of receptors in the target tissue.
   b. the presence of effectors in the target tissue.
   c. the anatomical relationship is important in the nervous system.
   d. Both (a) and (b) above are correct.
   e. All of the above are correct.

3. Hormone receptors are
   a. plasma membrane receptors for proteins.
   b. intracellular receptors for steroids.
   c. are involved in signal transduction.
   d. Both (a) and (b) above are correct.
   e. All of the above are correct.

4. Hormones that affect calcium metabolism are secreted by the
   a. parathyroid gland.
   b. skin.
   c. thyroid gland.
   d. Both (a) and (b) above are correct.
   e. All of the above are correct.

5. Precursors of hormones include
   a. proteins.
   b. cholesterol.
   c. amino acids.
   d. fatty acids.
   e. All of the above are correct.

6. Eicosanoids
    a. are derived from saturated fatty acids like palmitic acid.
    b. are produced by most cells and act in paracrine or autocrine mechanism.
    c. include prostaglandins, prostacyclins, leukotrienes and thromboxanes.
    d. Both (b) and (c) above are correct.
    e. All of the above are correct.

7. The anterior pituitary hormones include all of the following except
    a. prolactin.
    b. corticotrophin releasing hormone (crh).
    c. growth hormone.
    d. acth.
    e. gonadotropins.

8. Proteins that are transported through Golgi apparatus
    a. are proteins targeted to lysosomes, peptide hormones and plasma membrane proteins.
    b. are modified by addition of carbohydrates.
    c. are packaged in vesicles.
    d. Both (a) and (c) above are correct.
    e. All of the above are correct.

9. The functions of smooth endoplasmic reticulum include
    a. biosynthesis of steroid hormone.
    b. intracellular storage of calcium.
    c. active lipid metabolism.
    d. biotransformations.
    e. All of the above are correct.

10. Transport proteins are required for the transport of all of the following except
    a. most peptide hormones.
    b. all steroid hormones.
    c. thyroid hormones.
    d. sex hormones.
    e. growth hormone.

11. The following hypothalamic hormones are stimulatory hormones except
    a. somatostatin.
    b. TRH.
    c. dopamine.
    d. GnRH.
    e. Both (a) and (c) above are correct.

12. The characteristics of hypothalamic and anterior pituitary hormones include
    a. pulsatile release in lh and fsh.
    b. circadian release in acth.
    c. feed back inhibition by peripheral hormones.
    d. release by stress like acth.
    e. All of the above are correct.

13. Hormones important for fetal development include
    a. thyroid hormones.
    b. growth hormone.
    c. steroid hormones.
    d. All of the above are correct.
    e. None of the above is correct.

14. Endocrine hypofunction could result from
    a. Destruction of the gland.
    b. Autoimmune disease.
    c. Genetic defect of enzymes required for hormone biosynthesis.
    d. Both (a) and (c) above are correct.
    e. All of the above are correct.

15. Endocrine hyperfunction may be a result of
    a. Tumors.
    b. Hyperplasia.
    c. Autoimmune destruction of the gland.
    d. Both (a) and (b) above are correct.
    e. All of the above are correct.

II. Complete the following sentences (you may use abbreviations): (18 points. 1 point each)

1. The neurohormones secreted by the posterior pituitary are oxytocin and vasopressin.
2. The free hormone is the biological active hormone.
3. Somatostatin is released from the hypothalamus, the pancreas and the intestine.
4. Cholesterol is the precursor for sex hormones.
5. Examples of adrenal sex hormones include DHEA and DHEA-sulfate.
6. High glucose levels induce the pancreas to secrete insulin.
7. Vitamin D is activated by hydroxylation in liver and kidney.
8. Gonadotropin releasing hormone stimulates the release of LH and FSH from the anterior pituitary.
9. v-SNAREs are located on the vesicular membrane that bind to t-SNAREs on the plasma membrane to direct the vesicle to exocytosis.
10. Integral membrane proteins contain the signal stop-transfer signal that keep the protein bound to plasma membrane.
11. Example of a disorder due to a defect in hormone sensitivity is type 2 diabetes mellitus.
12. Synergistic effect is when the effect of two hormones is greater than the additive effect.
13. Desensitization is a protective mechanism against prolonged exposure to hormone.

III. True (T) or False (F) (10 points, 1 point each)

T____ 1. GnRH, gonadotropins, leptin and melatonin are believed to be involved in puberty.
T____ 2. The mode of action of prostaglandins is mostly autocrine or paracrine.
T____ 3. The hypothalamus is the most important link between the nervous and endocrine systems.
T____ 4. Hormones of the posterior pituitary are synthesized by the hypothalamus and stored in the posterior pituitary.
F____ 5. The adrenal cortex and adrenal medulla are under the control of ACTH.
F____ 6. Hormones from hypothalamus are only produced in the body by hypothalamus.
T____ 7. Hormones produced by nonendocrine tissues are important as hormones produced by endocrine tissues.

F____ 8. Hormones of the pancreas are secreted through ducts to reach target tissues.
F____ 9. All peptide hormones are transported free in plasma.
F____ 10. The active hormone of the thyroid gland is T_4.

IV. Match the following hormones to the endocrine glands: (12 points. 1 point each)

b____ cortisol
h____ testosterone
d____ TRH
a____ glucagon
d____ dopamine
e____ ACTH
f____ T_3/T_4
f____ calcitonin
c____ epinephrine
b____ aldosterone
e____ prolactin
e____ growth hormone

a. pancreas
b. adrenal cortex
c. adrenal medulla
d. hypothalamus
e. anterior pituitary
f. thyroid
g. parathyroid.
h. gonads

III. Short answers. Answer the following questions <u>briefly</u>:

1. Explain why measuring basal levels of hormones may not be sufficient for diagnosis of hyposecretions of hormones. What other tests do you suggest to diagnose hyposecretion and why? (8 points)
   Ans: Because most hormones are secreted episodically and therefore it is difficult to differentiate between hyposecretion when the hormone level is at the borderline. Other tests include:
   a. Provocative testing to examine if the gland respond to stimulation by injecting a hormone that stimulates the gland under examination.
   b. Measurement of the effect of hormone for example glucose or Ca if the hormone under examination is insulin or parathyroid hormone.
   c. Measuring other hormones connected to the system. For example, measuring ACTH if cortisol is under examination, or TSH if thyroid hormone is under examination.

2. If the hormone level measured in serum is normal or high and the patient is still suffering from the hormone deficiency what do you think could be the reason? (give three reasons) (9 points)
   Ans: The reason could be:
   a. Sensitivity: if there is a problem in hormone receptors.
   b. Mutation of the hormone so that the hormone is biologically inactive but immunologically reactive.
   c. If there is a problem in signal transduction system like the G protein or the effector system like the genes or enzymes.

3. What are the **similarities** and **differences** between the endocrine system and the nervous system? (8 points)
   Ans: Both systems produce chemicals involved in communication like hormones and neurohormones. Both systems produce chemicals that are secreted in the blood and affect the target tissues. They differ in speed (nervous system is faster); specificity in the endocrine system depends on the presence of specific receptors but for the nervous system, the specificity depends on the anatomical relationship of neurons in addition to the presence of receptors. The effect of neurotransmitter that are not secreted in the blood is paracrine whereas that of the endocrine system is endocrine (some hormones have paracrine effect).

4. Why do think measuring hormone levels in urine and saliva is important in certain situations? (5 points)
   Ans: hormones in urine and saliva represent free hormones which is very difficult to measure in serum. Also hormones in urine represent an average amount in 24 hours whereas in serum it represent the time of blood withdrawal. Also, the metabolites in urine are more stable compared to serum hormones.