

**NROSCI/BIOSC 1070 and MSNBIO 2070
FINAL EXAM
December 12, 2016**

Total POINTS: 100	20% of grade in class
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- 1) A patient reports to the emergency room during a panic attack that is associated with three hours of hyperventilation. A blood draw is taken, and the analysis includes the ionized Ca^{2+} levels in the plasma. Would you expect ionized Ca^{2+} levels to be normal, high (hypercalcemia) or low (hypocalcemia) in the patient? Provide a brief explanation for your answer. **(5 points)**.

2) Another patient reports to the emergency room, and it is found that they have both elevated levels of parathyroid hormone and hypercalcemia.

a) What is the most likely cause of this condition? **(5 points)**.

b) Would heart rate likely be higher or lower than normal in this patient? Provide a brief explanation for your answer. **(5 points)**.

- 3) A woman has been pregnant for 43 weeks, and her obstetrician decides to induce labor. What two drugs are most likely to be administered for this purpose? **(5 points)**.
- 4) GnRH antagonists have been proposed as hormonal contraceptives for men. Although effective, such drugs also produce a number of undesirable side effects. Discuss the nature of these side effects, and how they can be abolished by combining the GnRH antagonist with another drug (name the drug that must be combined with the GnRH antagonist). **(5 points)**.

5) A young man received radiation exposure in a series of medical treatments. Several years later, he comes to you (his physician) for an evaluation because he is about to marry and wants to know if he is fertile. The blood work you do reveals normal levels of testosterone and markedly elevated FSH. Answer the following questions about this individual, providing a brief explanation for each answer.

a) What is the most likely reason that FSH levels are elevated in this individual? **(5 points)**.

b) Is the man fertile? If not, could any treatment restore fertility? Provide a brief explanation for your answer. **(5 points)**.

6) The diagrams below indicate the phases of the ovarian cycle. Indicate (with an arrow or circle) when each of the following occur during the cycle. (2 points each; 10 points total).

a) LH levels are highest:



b) Estrogen levels are highest:



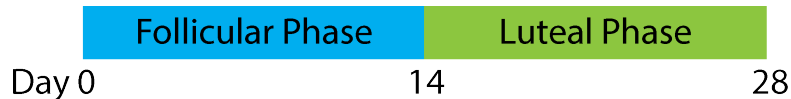
c) Progesterone levels are highest:



d) Estrogen levels are lowest:



e) FSH levels are lowest:



- 7) A premature infant is born without adequate quantities of surfactant in the alveoli. What drug can be given to promote surfactant secretion in the infant? **(3 points)**.
- 8) A woman in the third trimester of pregnancy has a fever of 102°F. Her physician advises that she take Tylenol to treat the fever, but to avoid the use of aspirin. Why was Tylenol favored as a treatment for fever in this case? **(4 points)**.
- 9) Is pulse pressure larger or smaller in an average 80 year-old than in an average 20 year-old? If pulse pressure changes with aging, why does this occur? **(3 points)**.

- 10) Blockers of L-type calcium channels are commonly used to treat heart arrhythmias and high blood pressure. One of the most common side effects of these drugs is constipation. Briefly describe the mechanism through which L-type calcium channel blockers lead to constipation. **(5 points)**.
- 11) Gastroenterologists make common use of the secretin stimulation test. During this test, secretin is injected intravenously and the presence of fluids in the gastrointestinal tract is monitored. What diseases are diagnosed with the use of the secretin stimulation test? **(5 points)**.

12) The amount of insulin secreted into the bloodstream is larger when a certain quantity of glucose is administered orally than when it is provided intravenously. Why does oral consumption of glucose lead to a larger insulin release? **(5 points)**.

13) Treatment of a patient with the glucocorticoid analog dexamethasone does not result in extensive water retention, while treatment with cortisone often does. What are the differences in the actions of these drugs, such that cortisone results in more water retention than dexamethasone? **(5 points)**.

14) Lack of iodine in the diet of an expecting mother can result in serious birth defects.

a) Describe the most prominent birth defect that results from an iodine deficiency. **(5 points)**.

b) An expectant mother with iodine deficiency likely has a highly-evident indicator of their condition, which can be identified during a physical examination. Describe this indicator of iodine deficiency. **(5 points)**.

- 15) Cushing's disease results from an ACTH-secreting tumor.
- a) Patients with Cushing's disease often have muscle weakness. Describe why Cushing's disease causes muscle wasting. **(5 points)**.
- b) Patients with Cushing's disease often have increased urination. Why does this occur? **(4 points)**.

- 16)** Several hormones that circulate in the blood have been implicated in the control of satiety. List three of these hormones, and whether an increase in the hormone results in an increase or decrease in hunger. **(6 points)**.