## NROSCI/BIOSC 1070 and MSNBIO 2070 FINAL EXAM December 13, 2019

1) Mutations in the CYP19A1 gene cause aromatase deficiency. The gene is on Chromosome 15, and is expressed in an autosomal recessive pattern (the defective gene must be inherited from both parents to be expressed). Indicate below the manifestations for a male or female who has inherited the defective gene from both parents. (1 point each; 8 points total).

Male:

Sexual Organ Development in Adolescence			
Normal		Inhibited (remains like child)	
<u>Growth</u>			
Taller than Normal	Normal	Shorter than Normal	
<u>Fertility</u>			
Infertile or Less Fertile		Normal Fertility	
Female:			
Breast Development in Adolescence			
Normal		Inhibited	
<u>Fertility</u>			
Infertile or Less Fertile		Normal Fertility	
Acne during Adolescence			
Similar as Normal		More than Normal	
Growth			
Taller than Normal	Normal	Shorter than Normal	
Facial Hair			
Similar as Normal		More than Normal	

2) In each panel below, indicate when in the menstrual cycle each hormone is in peak (highest) concentration in plasma. *(2 points each; 10 points total).* 

Endometrial cycle	Menses	Proliferative phase	Secretory phase
b)	Progesterone		
Endometrial			
cycle	Menses	Proliferative phase	Secretory phase
c)	Inhibi	n	
Endometrial	Managa	Des l'écreties also es	2 combined and
cycle	Menses	Proliferative phase	Secretory phase
d)	LH		
Endometrial	Managa	Dralifarativa phase	Cooretery phase
cycle	Menses	Proliferative phase	Secretory phase
e)	FSH		
Endometrial	Monage	Proliferative phase	Coorotony phago
cycle	wenses	Promerative phase	Secretory phase

a) Estradiol

**3)** A patient has tumor that secretes excessive amounts of parathyroid hormome. What changes in the following physiologic responses would be expected in this patient? *(2 points each; 8 points total)* 

a)	Q-T Interval of ECG		
Shorter 1	than Normal	Normal	Longer than Normal
b)	Neural Activity		
Higher th	nan Normal	Normal	Less than Normal
c)	Water Loss in Urine		
Higher th	nan Normal	Normal	Less than Normal
d)	Phosphate Reabsorption in Proximal Tubule		
Higher th	nan Normal	Normal	Less than Normal

**4)** An individual who has recently moved to high altitude is experiencing lightheadedness and a slow heart rate. When a physician attempted to check their blood pressure, the arm on which the cuff was placed began to spasm. Describe why high-altitude exposure resulted in these signs and symptoms. *(10 points).* 

5) Agonists for glucocorticoid receptors are often used to treat ulcerative colitis. Briefly describe why such drugs are used to treat this condition. *(10 points).* 

6) Contraceptives taken by women are typically either a combination of estrogen and progestin or progestin alone. Indicate below the physiologic changes associated with each type of contraceptive. *(2 points each; 10 points total).* 

a)	Inhibits ovulation		
Progesti	n Only	Estrogen + Progestin	Both Types
b)	Thickens cervical mucus		
Progesti	n Only	Estrogen + Progestin	Both Types
c)	Associated with r mood changes	negative side effects such as weig	ht gain, nausea, and
Progesti	n Only	Estrogen + Progestin	Both Types
d)	Lightens menstru	al bleeding by keeping the endom	etrium thin
Progesti	n Only	Estrogen + Progestin	Both Types
e)	The contents of r	nost emergency contraceptives su	ich as Plan B

Progestin Only Estrogen + Progestin

- 7) For each of the following, indicate the most important factor that causes its release. *(3 points each; 15 points total).* 
  - a) Gastrin

b) Pepsin

c) Cholecystokinin

d) Bile

e) Secretin

8) A patient develops a tumor of d-cells in the stomach, which secrete excessive amounts of somatostatin. How would this hormone effect stomach physiology? *(10 points).* 

**9)** PITT pharmaceuticals develops a new drug that completely inhibits the COX-1 enzyme, without any effects on the COX-2 enzyme. What would be the beneficial effects of the drug, and what negative side effects would likely occur? **(9 points)**.

**10)** A patient develops a tumor that secretes large amounts of glucagon (glucagonoma). How would the tumor affect the following aspects of the patient's physiology? (*2 points each; 10 points total*).

a)	Blood Glucose Levels		
Lower t	han Normal	Normal	Higher than Normal
b)	Body Weight		
Lower t	han Normal	Normal	Higher than Normal
c)	Prevalence of Ketoacid	osis	
Lower t	han Normal	Normal	Higher than Normal
d)	Urine Volume		
Lower t	han Normal	Normal	Higher than Normal
e)	Muscle Mass		
Lower t	han Normal	Normal	Higher than Normal

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