

HEALTH SCIENCE
BETHEL REGIONAL 2007

SCHOOL _____

STUDENTS _____

Instructions: Write your answers neatly on these pages. There are 18 questions in all. Good luck!

1. Circle the correct words in *italics*:

Negative / Positive feedback mechanisms are used for most hormonal regulation. For

example, a low level of Ca^{2+} circulating through the parathyroid gland causes a(n)

increase / decrease in release of parathyroid hormone (PTH) and in blood level of

Ca^{2+} .

2. Match the anterior pituitary hormone with the description. Write the letters corresponding to the correct hormone on the lines below.

ACTH
FSH
hGH
LH
MSH
PRL
TSH

- a. _____ stimulates ovaries to secrete estrogens and develop future eggs; stimulates sperm production in testes
- b. _____ in females, stimulates ovaries to release secondary oocytes and to form corpus luteum, which then releases both estrogens and progesterone
- c. _____ in males, stimulates testes to secrete testosterone
- d. _____ stimulates secretion of thyroid hormones
- e. _____ stimulates secretion of hormones from the adrenal cortex
- f. _____ excessive amounts cause skin to darken
- g. _____ stimulates milk production by mammary glands in breast
- h. _____ stress (including physical trauma or

interlukin-1) triggers
release of this hormone

3. Circle the correct words in *italics*.

- a. T3 and T4 production decreases when blood levels of iodine are abnormally *high / low*.
- b. Like other releasing hormones, thyroid-releasing hormone (TRH) is made by the *anterior pituitary / hypothalamus*. High levels of TRH stimulate *high / low* levels of thyroid-stimulating hormone (TSH).
- c. TSH is a *releasing / tropic / target* hormone. TSH *stimulates / inhibits* thyroid production of T3 and T4.
- d. *Warm environment / high altitude / pregnancy / aging* are factors that are likely to increase anterior pituitary secretion of TSH, and therefore increase thyroid hormone.

4. Contrast the two regions of the adrenal gland by matching structures to descriptions.

Adrenal cortex
Adrenal medulla

- a. _____ outer portion of the adrenal gland
- b. _____ secretes _____ steroid hormones such as aldosterone,

cortisol, progesterone and
testosterone

c. _____ regulated by ACTH from
the anterior pituitary

d. _____ secretes epinephrine and
norepinephrine

5. Match the disorder with the hormone imbalance.

Acromegaly	Diabetes insipidus	Myxedema
Addison's disease	Diabetes mellitus	
Pheochromocytoma		
Cretinism	Goiter	Pituitary
dwarfism		
Cushing's syndrome	Graves' disease	Tetany

- a. _____ deficiency of hGH in child;
slow bone growth
- b. _____ excess of hGH in adult;
enlargement of hands, feet,
jawbones
- c. _____ deficiency of ADH; production
of enormous quantities of insipid
(nonsugary) urine
- d. _____ deficiency of effective
insulin; hyperglycemia and
glycosuria (sugary urine)
- e. _____ deficiency of thyroid
hormones in child; short stature
and mental retardation
- f. _____ deficiency of thyroid
hormones in adult; edematous
facial tissues

- g. _____ overactive thyroid with protruding eyes and high metabolic rate
- h. _____ enlarged thyroid gland
- i. _____ result of deficiency of PTH; decreased calcium in blood and fluids around muscles, resulting in abnormal muscle contractions
- j. _____ deficiency of adrenocorticoids; increased K^+ and decreased Na^+ , resulting in low blood pressure and dehydration
- k. _____ oversecretion of adrenal cortex; "moon face" and "buffalo hump"
- l. _____ due to a benign tumor resulting in hypersecretion of epinephrine and norepinephrine

6. Match the nervous system to the description.

<p>Afferent Autonomic nervous system system Central nervous system Efferent</p>	<p>Enteric nervous system Peripheral nervous Somatic nervous system</p>
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- a. _____ brain and spinal cord
- b. _____ sensory nerves
- c. _____ carry information from CNS to skeletal muscles
- d. _____ consists of sympathetic and parasympathetic divisions
- e. _____ nerves that convey impulses to smooth muscle, cardiac muscle, and glands; involuntary

f. _____ cranial nerves, spinal
nerves, ganglia, and sensory
receptors

g. _____ "brain of the gut"

7. Circle the correct words in *italics*.

a. Multiple sclerosis (MS) involves destruction of
schwann cells / myelin surrounding axons.

b. MS is more common in *men / women*.

c. An autoimmune disorder, MS may be triggered by
virus / bacteria.

d. MS *is / is not* progressive and *does / does not*
involve remissions and relapses.

8. Answer questions concerning clinical case studies.

a. Paula has a sneezing disorder that is attributed
to a problem with the part of her brain that
controls sneezing. Which brain part is it?

b. Infant Olivia lacks a normal startle reflex.
With which part of the brain is this reflex most
associated?

c. Jonathan has a problem with his reticular activating system (RAS). What function is most likely to be affected?

d. Mr. Benson is diagnosed as having ataxia after he fell backwards down 10 steps. What part of his brain is likely to have been injured in this fall?

List three or more simple tests (requiring no equipment) that might have been used to identify his ataxia.

9. Match the brain structure with the descriptions.

Hypothalamus
Medulla

Midbrain
Pineal gland

Pons
Thalamus

a. _____ the principal regulator of visceral activities because it acts as a liaison between cerebral cortex and autonomic nerves that control viscera

- b. _____ the site of the cerebral peduncles, which contain major sensory and motor tracts within the brain
- c. _____ cranial nerves III-IV attach to this brain part
- d. _____ cranial nerves V-VIII attach to this brain part
- e. _____ cranial nerves VIII-XII attach to this brain part
- f. _____ feelings of hunger, fullness, and thirst stimulate centers here so that you can respond accordingly
- g. _____ almost all sensations are relayed through here, and these contribute to maintenance of consciousness
- h. _____ regulation of heart, blood pressure, and respiration occurs by centers located here
- i. _____ serves as the body's thermostat, regulating body temperature
- j. _____ its name means "bridge"; it connects the medulla and midbrain
- k. _____ neuroendocrine structure since it helps to regulate the pituitary
- l. _____ site of the substantia nigra and red nucleus, both involved with muscle coordination
- m. _____ help to regulate the body's "biological clock" (2 answers!)

10. Fill in the blanks and circle the correct words in *italics*.

a. A hematocrit consists of the percentage of centrifuged blood made of

_____ blood cells.

b. A normal value for a hemtocrit is **15%** / **45%** / **70%**.

c. A hematocrit of 15 indicates **mild / severe** anemia.

d. A hematocrit of **14% / 45% / 60%** indicates polycythemia.

11. Match the name of the components of plasma with their descriptions.

Albumins

Electrolytes

Fibrinogen

Globulins

Glucose, amino acids, and fats

Hormones and enzymes

Water

- A. _____ Makes up about 92% of plasma
- B. _____ Regulatory substances carried
in blood
- C. _____ Cations and anions carried in
plasma
- D. _____ Constitute about 54% of
plasma protein
- E. _____ A protein used in clotting
- F. _____ Antibody proteins
- G. _____ Food substances carried in
plasma

12. What is the average life of a red blood cell?

13. Match the WBC names with descriptions.

Basophils

Eosinophils

Lymphocytes

Monocytes

Neutrophils

A. _____ Constitute the largest percentage of WBC

B. _____ Largest of the leukocytes, they are 12-20 um in diameter

C. _____ Involved in immunity; some develop into plasma cells that produce antibodies

D. _____ Involved in allergic response; release histamine, heparin and serotonin

E. _____ Involved in allergic reactions; combat histamines and provide protection against parasitic worms

F. _____ Form wandering macrophages that clean up sites of infection

G. _____ Important in phagocytosis (2 answers!)

H. _____ Classified as agranular leukocytes (2 answers!)

I. _____ Includes three types of cells: B, T and natural killer

14. Circle the correct words in *italics*.

Mrs. Doud arrives at a health clinic with a suspected acute infection. During

infection, it is likely that Mrs. Doud's leukocyte count will *in-* / *de-* crease. A count

of *4000* / *8000* / *15000* leukocytes / uL blood is most likely. This condition is

known as *leukocytosis / leucopenia*.

15. Match the correct term with the description.

Embolus Pulmonary thrombosis
Thrombus Thrombosis

- A. _____ a blood clot
- B. _____ a blood clot in an unbroken vessel, such as in an atherosclerosed vessel
- C. _____ a "clot-on-the-run" dislodges from the site at which it formed (usually a deep vein of the leg); also fat from broken bone, bubble of air, or amniotic fluid traveling through blood, possible to lung (pulmonary) vessels
- D. _____ a blood clot (or fat or air) that travels from veins to heart to blood vessels in lungs
16. Fill in the blanks and circle the correct words in *italics*.

Type O blood is known as the universal *donor / recipient* with regard to the ABO

group because type O blood lacks _____ of the ABO group.

Type AB blood is known as the universal *donor / recipient*.

The *Rh + / Rh -* group is more common. *Rh + / Rh -* blood has Rh antigens on

the surfaces of RBCs. Under normal circumstances plasma of *Rh + blood / Rh -*

blood / both Rh groups / neither Rh group contains anti-Rh antibodies.

Rh + / Rh - people can develop antibodies when they are exposed to **Rh + / Rh -**

blood. The most common example of this occurs in fetal-maternal incompatibility

when a mother who is **Rh + / Rh -** has a baby who is **Rh + / Rh -** and some of

the baby's blood enters the mother's bloodstream. The mother develops anti-Rh

antibodies, which may cross the placenta in future pregnancies and hemolyze the

RBCs of **Rh + / Rh -** babies. Such a condition is known as _____.

17. Circle the correct words in **italics**.

Amy (35 years old) has a red blood count of 7 million / uL. She has the condition known as

anemia / polycythemia. Amy has a hematocrit done. It is more likely to be **under 32 / over 46**.

Her blood is **more / less** viscous than normal, which is likely to cause **high / low** blood pressure.

18. Fill in the blanks and circle the correct words in **italics**.

Ms. Smith has congestive heart failure (CHF). Her weakened heart becomes overstretched

much like a balloon that has been expanded 5000 times. Now her heart myofibers are

stretched beyond the optimum length according to the Frank-Starling's law. As a result, the

force of her heart is _____ - creased and its stroke volume _____ - creases. Ms. Smith has

right sided heart failure, so her blood is likely to back up, distending vessels in **lungs / systemic**

regions such as neck and ankles; thus _____
edema results, with signs such

as swollen hands and feet. If Ms. Smith had left sided heart failure, a sign or symptom would

be _____.