

Name (1 point!): \_\_\_\_\_

Score: \_\_\_\_\_/100

Grade: \_\_\_\_\_

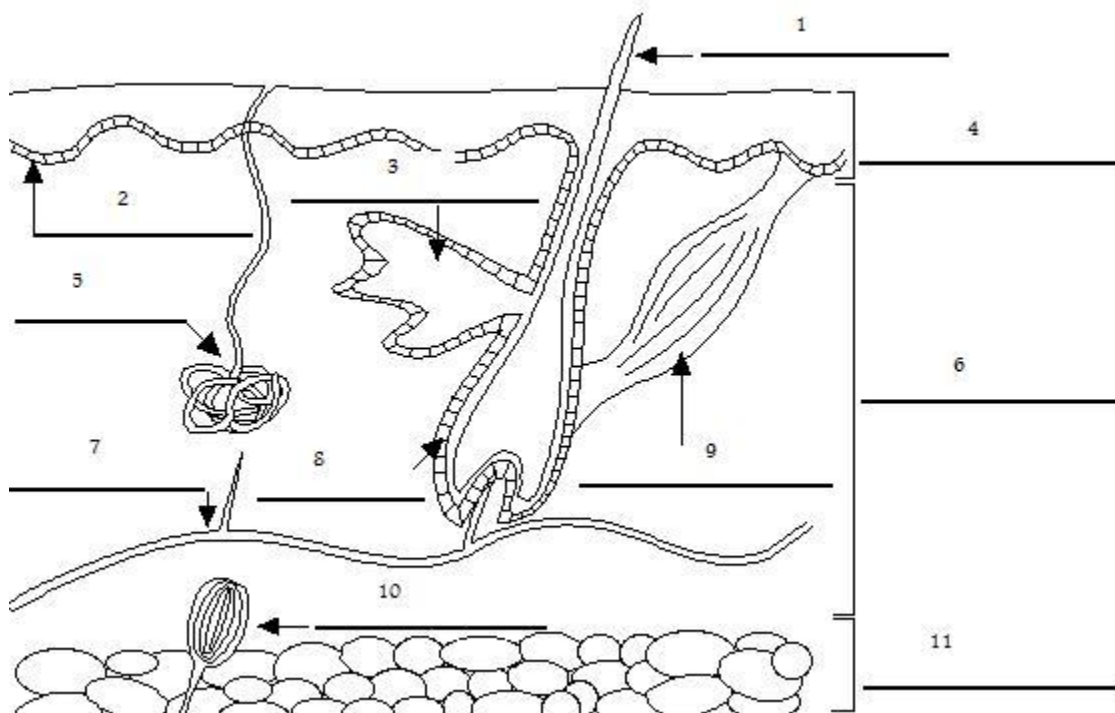
## Anatomy and Physiology

Written by Edward Li

This is a long-ish test, so pace yourself. In free responses, I would really appreciate if you underlined key terms you use. Good luck!

### **Integumentary System (33 points)**

Diagram 1 point each, fill in the corresponding blanks.



1) \_\_\_\_\_

7) \_\_\_\_\_

2) \_\_\_\_\_

8) \_\_\_\_\_

3) \_\_\_\_\_

9) \_\_\_\_\_

4) \_\_\_\_\_

10) \_\_\_\_\_

5) \_\_\_\_\_

11) \_\_\_\_\_

6) \_\_\_\_\_

Multiple Choice 1 point each, circle the letter of the best response.

12) Vitamin D increases \_\_\_\_\_ absorption in the body.

- A) calcium    B) sodium    C) oxygen    D) water    E) none of the left

13) A child put his hand on a grill and suffered burns on his hand. The skin was inflamed with blisters, but subcutaneous layer was not burned. Further study shows that deeper tissue, such as muscle or bone was not involved. What degree were his burns?

- A) 1st    B) 2nd    C) 3rd    D) 4th    E) none of the left

14) Albinism is an inherited trait where a person cannot produce

- A) hemoglobin    B) bilirubin    C) keratin    D) melanin    E) carotene

15) Melanocytes synthesize melanin in \_\_\_\_\_.

- A) keratinocytes  
B) hemoglobin  
C) neurons  
D) freckles  
E) melanosomes

16) \_\_\_\_\_ corpuscles sense vibration changes deep in the skin.

- A) Pacinian  
B) Meissner's  
C) Wernicke's  
D) Merkel  
E) Rickett's

17) Which of the following is not a layer associated with skin?

- A) Merkel layer  
B) epidermis  
C) dermis  
D) subQ layer  
E) stratum spinosum

- 18) Specialized dendrites of neurons that are part of the hair follicle are called \_\_\_\_\_.
- A) arrector pili
  - B) medulla
  - C) cortex
  - D) matrix
  - E) hair root plexus
- 19) \_\_\_\_\_ cells arise from red bone marrow and migrate to the epidermis.
- A) Langerhans
  - B) Merkel
  - C) stratum corneum
  - D) keratinocytes
  - E) stratum basale
- 20) What is the function of the hypodermis?
- A) contains receptors
  - B) skin strength and elasticity
  - C) insulation
  - D) replace dead skin cells
  - E) sensation of touch
- 21) Which of the following is NOT a true statement? Basal cell carcinoma...
- A) ...is the most common form of skin cancer.
  - B) ...occurs more often with increased sun exposure.
  - C) ...originates from melanocytes in the stratum basale.
  - D) ...tends to grow slowly.
  - E) ...is most common in Caucasians.

Free Response

22) Identify and describe the three stages of the hair growth cycle. Descriptions should only be one sentence long. (6 points)

1.

2.

3.

23) Arrange the following in order from most numerous to least numerous and state each cell's function:

melanocytes, Merkel cells, keratinocytes, Langerhans cells (6 points)

1.

2.

3.

4.

**Immune System (33 points)**

Multiple Choice 1 point each, circle the letter of the best response.

- 1) Innate immunity...
  - A) is based on recognition of antigens that are specific to different pathogens.
  - B) is found only in vertebrate animals.
  - C) depends on a newly infected animal's previous exposure to the same pathogen.
  - D) is activated immediately upon infection.
  - E) utilizes highly specific antigen receptors on B cells.
  
- 2) A systemic inflammatory response that is often life-threatening is
  - A) aches and dull pain.
  - B) increased white blood cell count.
  - C) mild fever.
  - D) septic shock.
  - E) high blood pressure.
  
- 3) Which of the following is not part of the lymphatic system?
  - A) liver
  - B) thymus
  - C) spleen
  - D) tonsils
  - E) lymph nodes
  
- 4) A patient who can produce antibodies against some bacterial pathogens, but not against viral infections, probably has a disorder in his...
  - A) plasma cells.
  - B) macrophages.
  - C) T cells.
  - D) natural killer cells.
  - E) B cells.
  
- 5) The cells and signaling molecules that initiate inflammatory responses are
  - A) the phagocytes and the chemokines.
  - B) the dendritic cells and the interferons.
  - C) the lymphocytes and the interferons.
  - D) the mast cells and the histamines.
  - E) the phagocytes and the lysozymes.

6) A patient complaining of watery, itchy eyes and sneezing after being given a flower bouquet as a birthday gift should first be treated with

- A) diphenhydramine
- B) a vaccine
- C) monoclonal antibodies
- D) complement
- E) sterile pollen

7) The primary function of humoral immunity is

- A) to defend against fungi and protozoa.
- B) to protect the body against cells that become cancerous.
- C) to defend against bacteria and viruses that have already infected cells.
- D) to reject transplanted tissues.
- E) to protect the body against extracellular pathogens.

8) Red and white pulp in the \_\_\_\_\_ help to

\_\_\_\_\_.

- A) spleen; purify blood
- B) thymus; mature T cells
- C) spleen; mature T cells
- D) bone marrow; purify blood
- E) bone marrow; differentiate blood cells

9) Which is not an autoimmune disorder?

- A) asthma
- B) Addison's disease
- C) Graves disease
- D) system lupus erythematosus
- E) Type I diabetes

10) Antivirals work by \_\_\_\_\_.

- A) destroying the virus
- B) boosting antiviral bacteria
- C) boosting the immune system
- D) destroying nutrients for the virus
- E) inhibiting viral replication

Fill-ins 1 point per blank.

11) Helper T-cells are also known as \_\_\_\_\_ T-cells, named after a protein in their plasma membrane. In similar fashion, cytotoxic T-cells are also known as \_\_\_\_\_ T-cells.

12) Pieces of an antigen that trigger an immune response are known as \_\_\_\_\_.

13) \_\_\_\_\_ are located in the membranes of macrophages and bind molecule fragments characteristic of a set of pathogens (ex. double-stranded RNA).

14) Immune cells responsible for defending against multicellular invaders are known as \_\_\_\_\_.

15) The \_\_\_\_\_ consists of a set of small proteins that destroy pathogens in an enzyme cascade.

16) \_\_\_\_\_ is a disease where the immune system attacks histone proteins.

17) \_\_\_\_\_ is a rare disease where a baby is born with very few or no T-lymphocytes.

18) HIV attacks \_\_\_\_\_ cells.

19) \_\_\_\_\_ are protein-shredding enzymes released by cytotoxic T-cells that induce apoptosis.

20) \_\_\_\_\_ is a disease where beta cells in the pancreas are targeted by cytotoxic T-cells.

Free Response

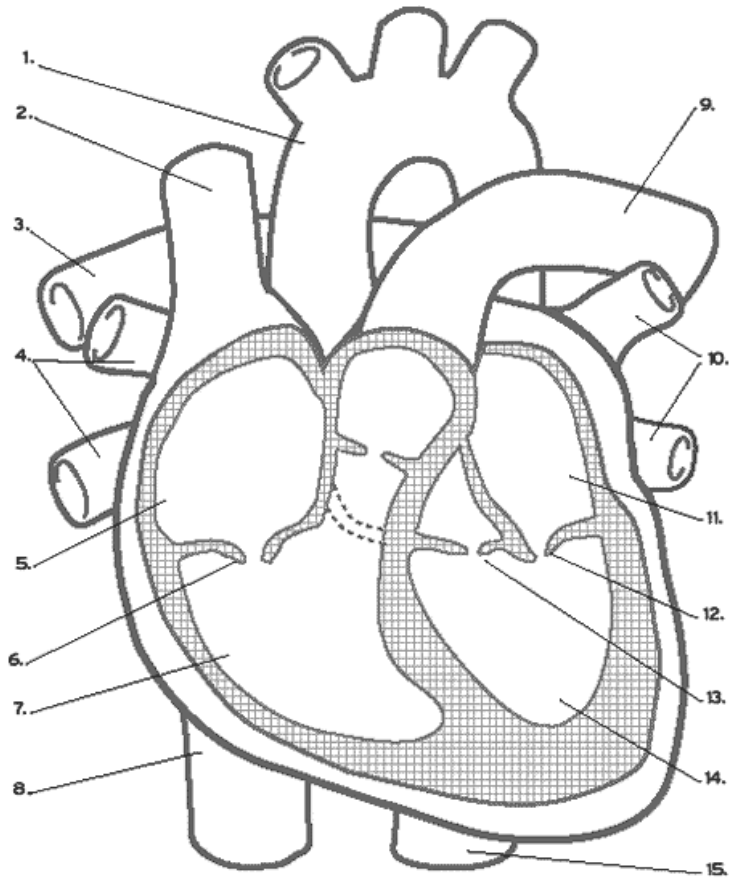
21) Identify 3 ways antibodies combat antigens. Give a short description for each. (6 points)

22) Describe the process of antigen presentation of exogenous (outside of body cell) antigens. Be sure to identify key cells and molecules. (6 points)



**Cardiovascular System (33 points)**

Diagram 1 point each, fill in the corresponding blanks.



1) \_\_\_\_\_

9) \_\_\_\_\_

2) \_\_\_\_\_

10) \_\_\_\_\_

3) \_\_\_\_\_

11) \_\_\_\_\_

4) \_\_\_\_\_

12) \_\_\_\_\_

5) \_\_\_\_\_

13) \_\_\_\_\_

6) \_\_\_\_\_

14) \_\_\_\_\_

7) \_\_\_\_\_

15) \_\_\_\_\_

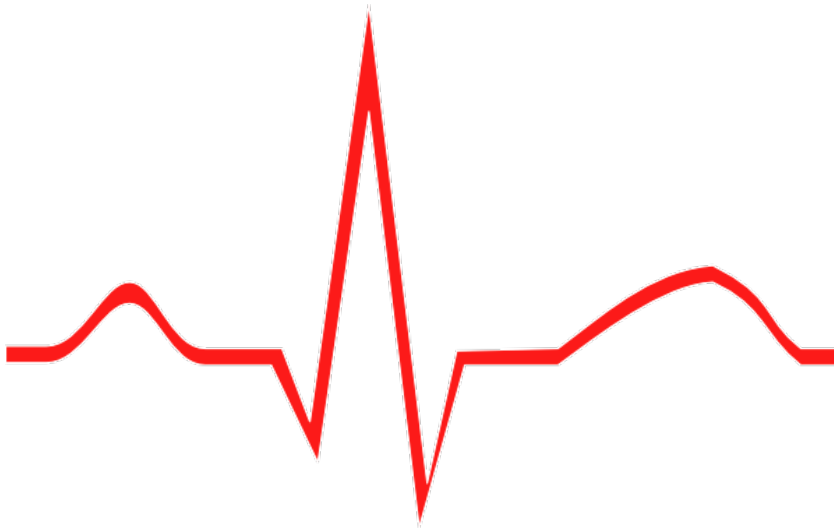
8) \_\_\_\_\_

Fill ins 1 point per blank.

- 16) The protein in red blood cells that binds oxygen is \_\_\_\_\_.
- 17) Name 2 protein solutes of blood plasma.  
\_\_\_\_\_
- 18) \_\_\_\_\_ is the disorder where an Rh<sup>-</sup> mother is pregnant with an Rh<sup>+</sup> fetus.
- 19) The outermost layer of the heart wall is called the \_\_\_\_\_.
- 20) The pacemaker is also called the \_\_\_\_\_ node.
- 21) The cardiovascular condition involving consistently high blood pressure is called \_\_\_\_\_.
- 22) \_\_\_\_\_ are blood vessels that return blood to the heart.

Free Response

- 23) An electrocardiogram (ECG) records electrical changes during cardiac cycles. Label the three phases and briefly describe what is happening during each. (6 points)



- 24) Blood pressure is usually given as two numbers. For example, 135/90. What does each number measure? Briefly explain what these two terms mean. (4 points)