NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

CHAPTER 1: THE HUMAN BODY – AN ORIENTATION

**An Overview of Anatomy and Physiology**

1. Indicate whether the following terms or phrases relate to the study of Anatomy or Physiology, or Both.

 A. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Measuring an organ’s size, shape, and weight

 B. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Can be studied in dead specimens

 C. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Often studied in living specimens

 D. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Chemistry principles

 E. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Measuring the acid content of the stomach

 F. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Observing a heart in action

 G. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Dynamic

 H. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Dissection

 I. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Experimentation

 J. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Directional terms

 K. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Static

**Levels of Structural Organization**

2. The structures of the body are organized into successively larger and more complex structures. Fill in the answer blanks with the correct terms for these increasingly larger structures.

 Chemicals 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 🡪 Organism

3. Using the key choices, identify the organ systems to which the following organs or functions belong. Insert the correct letter or term in the answer blanks.

Key Choices:

A. Cardiovascular D. Integumentary G. Reproductive J. Skeletal

B. Digestive E. Muscular H. Respiratory K. Urinary

C. Endocrine F. Nervous I. Lymphatic/Immune

 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Rids the body of nitrogen-containing wastes

 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Is affected by the removal of the thyroid gland

 3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Provides support/levers on which the muscular system can act

 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Includes the heart

 5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Protects organs from drying out and mechanical damage

 6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Protects the body; destroys bacteria and tumor cells

 7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Breaks down foodstuffs into particles that can be absorbed

 8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Removes carbon dioxide from the blood

 9. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Delivers oxygen and nutrients to the body tissues

 10. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Moves the limbs; allows facial expression

 11. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Conserves body water or eliminates excesses

 12. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Provides for conception and childbearing

 13. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Controls the body with chemicals called hormones

 14. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Is damaged when you cut your finger or get a severe sunburn

4. Using key choices from Question 3, choose the organ system to which each of the following sets of organs belongs. Enter the correct letter in the answer blanks.

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Blood vessels, spleen, lymphatic tissue

2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Pancreas, pituitary gland, adrenal gland

3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Kidneys, bladder, ureters

4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Testes, vas deferens, urethra

5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Esophagus, large intestine, rectum

6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Femur, vertebral column, skull

7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Brain, nerves, sensory receptors

5. Figures 1 to 6 represent the various body organ systems. First identify and name each organ system by filling in the blank directly under the illustration. Then select a different color for each organ and use it to color the coding circles and corresponding structures in the illustrations.

**Maintaining Life**

6. Using the Key Choices, identify the survival needs that correspond to the following descriptions. Insert the correct letter or term in the answer blanks:

Key Choices:

A. Appropriate body temperature C. Nutrients E. Water

B. Atmospheric pressure D. Oxygen

 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Include carbohydrates, proteins, fats, and minerals

 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Essential for normal operation of the respiratory system and breathing

 3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Single substance accounting for over 60% of body weight

 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Required for the release of energy from foodstuffs

 5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Provides the basis for body fluids of all types

 6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ When too high or too low, physiological activities cease, primarily because molecules are destroyed or become nonfunctional

7. Using the Key Choices, match the terms pertaining to functional characteristics of organisms with the appropriate descriptions.

Key Choices:

A. Digestion D. Maintenance of boundaries G. Responsiveness

B. Excretion E. Metabolism H. Reproduction

C. Growth F. Movement

 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Keeps the body’s internal environment distinct from the external environment

 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Provides new cells for growth and repair

 3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Occurs when constructive activities occur at a faster rate than destructive activities

 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ The tuna sandwich you have just eaten is broken down to its chemical building blocks

 5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Elimination of carbon dioxide by the lungs and elimination of nitrogenous wastes by the kidneys

 6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Ability to react to stimuli; a major role of the nervous system

 7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Walking, throwing a ball, riding a bicycle

 8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ All chemical reactions occurring in the body

 9. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ At the cellular level, membranes; for the whole organism, the skin

**Homeostasis**

8. Complete the following statements by inserting your answers in the answer blanks.

There are three essential components of all homeostatic control mechanism: control center, receptor, and effector. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ senses changes in the environment and responds by sending information (input) to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ along the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pathway. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ analyzes the input, determines the appropriate response, and activates the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by sending information along the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pathway. When the response causes the initial stimulus to decline, the homeostatic mechanism is referred to as a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ feedback mechanism. When the response enhances the initial stimulus, the mechanism is called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ feedback mechanism. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ feedback mechanisms are much more common in the body.

**The Language of Anatomy**

9. Complete the following statements by filling in the answer blanks with the correct

term – Dorsal or Ventral

The abdominopelvic and thoracic cavities are subdivisions of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ body cavity; the cranial and spinal cavities are parts of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ body cavity. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ body cavity is totally surrounded by bone and provides very good protection to the structures it contains.

10. From the key choices, select the body cavities where the following surgical procedures would occur. Insert the correct letter or term in the answer blanks. Be precise: also select the name of the cavity subdivision if appropriate.

Key Choices:

A. Abdominal C. Dorsal E. Spinal G. Ventral

B. Cranial D. Pelvic F. Thoracic

 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Removal of the uterus, or womb

 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Coronary bypass surgery (heart surgery)

 3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Removal of a serious brain tumor

 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Removal of a “bad” appendix

 5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ A stomach ulcer operation

11. Select different colors for the dorsal and ventral body cavities. Color the coding circles below and the corresponding cavities in part A of Figure 7. Complete the figure by labeling those body cavity subdivisions that have a leader line. Complete part B by labeling each of the abdominal regions indicated by a leader line.

12. Using key choices, identify the body cavities where the following body organs are located. Enter the appropriate letter or term in the answer blanks.

Key Choices:

A. Abdominopelvic B. Cranial C. Spinal D. Thoracic

 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Stomach

 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Small Intestine

 3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Large Intestine

 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Spleen

 5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Liver

 6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Spinal Cord

 7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Bladder

 8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Trachea

 9. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Lungs

 10. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Pituitary gland

 11. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Rectum

 12. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Ovary

13. Refer to the organs listed in Question 10. In the spaces provided, record the numbers of the organs that would be found in each of the abdominal regions named here. Some organs may be found in more than one abdominal region.

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hypogastric region

2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Right lumbar region

3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Umbilical region

4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Epigastric region

5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Left iliac region

14. Complete the following statements by choosing an anatomical term from the key choices. Enter the appropriate letter or term in the answer blanks.

Key Choices:

1. Anterior D. Inferior G. Posterior J. Superior
2. Distal E. Lateral H. Proximal K. Transverse
3. Frontal F. Medial I. Sagittal

In the anatomical position, the face and palms are on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ body surface, the buttocks and shoulder blades are on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ body surface, and the top of the head is the most \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ part of the body. The ears are \_\_\_\_\_\_\_\_\_\_\_\_ to the shoulders and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the nose. The heart is \_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the spine and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the lungs. The elbow is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the fingers but \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the shoulder. In humans, the dorsal surface can also be called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ surface; however, in four-legged animals, the dorsal surface is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ surface.

If an incision cuts the heart in to right and left parts, the section is a \_\_\_\_\_\_\_\_\_\_\_\_\_ section, but if the heart is cut so that anterior and posterior parts result, the section is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_section. You are told to cut an animal along two planes so that the paired kidneys are observable in both sections. The two sections that meet this requirement are the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_sections.

**Case Presentation**

 It was the 5th consecutive day of temperatures above 100 ᴼF in Maryland. Susan was running some errands and decided to stop by her mother’s house. Susan’s mother, Mary, was eighty-four and in pretty good health. She was able to keep up with her housekeeping and still tended a small garden in her backyard. Just that morning, Susan had told her mother not to spend too much time working in the garden today. Susan knew that the heat could be dangerous, especially to the elderly, and her mother’s place didn’t have an air conditioner. When Susan reached her mother’s house, she found her mother unconscious on the couch in the living room. All of the windows in the house were closed. Susan immediately tried to rouse her mother and was able to get her to day a few words, but Mary seemed delirious. Susan grabbed the telephone and called for help. The emergency services operator instructed Susan to apply cold wash cloths to her mother’s forehead and face and if possible to position her mother in front of a fan while using a spray bottle to spray tepid water on her skin.

When the paramedics arrived, Mary was conscious but confused and feeling nauseous. At the hospital the doctor told Susan just how lucky she was to have visited Mary at that moment. He informed Susan that Mary had suffered heat stroke, a form of hyperthermia and that Susan’s quick action at the house had saved her mother’s life. Mary was making rapid progress to recovery but was being given fluids and electrolytes intravenously and was going to stay in the hospital overnight for observation.

**Case Background**

Hyperthermia occurs when the body temperature increases. Heat exhaustion and heatstroke are two common forms of hyperthermia. Symptoms of heat exhaustion include thirst, fatigue, profuse sweat, and giddiness or delirium. Individuals with heat exhaustion generally have a normal or only slightly elevated body temperature and the symptoms are the result of the loss of water and electrolytes. Symptoms of heatstroke include a temperature of 104 ᴼF, absence of sweating, and loss of consciousness. If untreated, heat exhaustion precedes heatstroke, and heat stroke is often fatal. Treatment for hyperthermia consists of reducing the body temperature to normal. Special attention is placed on reducing the temperature of the brain as tissue damage can result if the body temperature rises above 109 ᴼF

Discussion Questions: **[Answer on a separate piece of paper and attach]**

1. Define homeostasis and describe how it relates to hyperthermia

2. Explain why elderly individuals with poor circulation would have a greater risk of suffering heat exhaustion or heatstroke

3. Explain why spraying water on the skin while sitting in front of a fan would lower body temperature

4. When attempting to lower a person’s body temperature in response to hyperthermia one should avoid treatments that induce shivering or vasoconstriction. Why?

**MEDICAL IMAGING**

Recent advances in medical imaging allow medical personnel to visualize internal structures of the body without risking the trauma or other complications associated with extensive exploratory surgery. Complete the chart below:

|  |  |  |
| --- | --- | --- |
| Technique | Description | Use |
| Radiography (X-Ray) |  |  |
| Computed Tomography (CT)/Computed Axial Tomography (CAT) |  |  |
| Magnetic Resonance Imaging (MRI) |  |  |
| Ultrasonography |  |  |
| PET Scan |  |  |

CASE STUDY ANSWERS:

Homeostasis is the maintenance of a stable internal environment. Temperature is one aspect of the internal environment that we regulate via homeostatic mechanisms. Hyperthermia results when the homeostatic mechanism responsible for temperature regulation is not capable of maintaining homeostasis due to extreme external factors

One way that the homeostatic mechanism for temperature regulation functions is by causing vasodilation of dermal blood vessels when the body temperature rises above the thermoregulatory set point. This increases blood flow near the surface of the body and allows the heat from the core of the body that is carried by the blood to leave the body via radiation, convection, and evaporation

Body heat is transferred to the water on the skin by conduction. The air movement that results from the fan increases the rate of evaporation. As the water on the skin evaporates, it carries away the heat that it acquired from the body.

Shivering is initiated by the homeostatic mechanism that regulates body temperature in order to generate heat and raise the body temperature. Vasoconstriction occurs as a result of the same homeostatic mechanism and functions to retain warm blood within the core of the body and decrease heat loss across the skin. Both of these phenomena can occur if treatment for hyperthermia is too intense, and both would hinder the reduction of body temperature.

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