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## Basic Physiology & Tissue Types

**Study Guide — Tissues**

High-school/pre-med-level questions on basic physiology concepts, homeostasis, and the four main tissue types.

**28 items — Study Guide with Answers**

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**1** Physiology is best defined as the study of:

- A The names of body parts
- B How body structures work and carry out life functions ✓**
- C The microscopic appearance of tissues
- D How diseases change normal tissues
- E The evolutionary history of living things

► **Explanation:** Anatomy is about structure; physiology focuses on how those structures function (e.g. how the heart pumps blood).



**2** Which sequence correctly lists levels of organisation in the human body from **SIMPLEST to MOST COMPLEX?**

- A Cell → tissue → organ → organism → organ system
- B Tissue → cell → organ → organ system → organism
- C Cell → tissue → organ → organ system → organism ✓**
- D Organ → tissue → cell → organ system → organism
- E Organism → organ system → organ → tissue → cell

► **Explanation:** Cells group to form tissues, tissues form organs, organs work together in organ systems, and all systems together form the organism.



**3** Homeostasis refers to:

- A Keeping all body conditions completely constant at all times





**B The body's ability to maintain a relatively stable internal environment within narrow limits ✓**

- C** The production of heat in muscles during exercise
- D** The change of body temperature with the external environment
- E** The body's ability to prevent any change at all

► **Explanation:** Homeostasis keeps internal conditions (like temperature, pH, blood glucose) within acceptable ranges, not perfectly constant.

**4 Which of the following is an example of a variable that is normally kept under homeostatic control in humans?**



- A** Eye colour
- B Blood glucose concentration ✓**
- C** Length of the bones
- D** Genetic sequence of DNA
- E** Number of ribs

► **Explanation:** Blood glucose is controlled by hormones like insulin and glucagon to stay in a narrow range around a set point.

**5 In a typical negative feedback loop maintaining homeostasis, which sequence is correct?**



- A** Stimulus → effector → control centre → receptor
- B Receptor → control centre → effector → response ✓**
- C** Control centre → receptor → stimulus → effector
- D** Effector → response → receptor → control centre





E Response → stimulus → effector → receptor

► **Explanation:** The receptor detects change, sends information to the control centre, which signals effectors to produce a response that opposes the change.

6 Which situation is the **BEST** example of negative feedback in human physiology?



- A During childbirth, stretching of the cervix causes more oxytocin release, which increases contractions
- B Blood glucose rises after a meal, insulin is released, and blood glucose falls back toward normal ✓**
- C Blood clotting where activated platelets activate more platelets
- D The surge of LH that triggers ovulation
- E The rapid, self-amplifying depolarisation during an action potential

► **Explanation:** In negative feedback, the response reverses the original change (insulin lowers high blood glucose back toward normal).

7 Which situation is the **BEST** example of positive feedback in the body?



- A Regulation of body temperature around 37 °C
- B Maintenance of blood pressure during standing
- C Increasing uterine contractions during childbirth due to oxytocin release ✓**
- D Control of blood pH around 7.4
- E Regulation of resting heart rate

► **Explanation:** Positive feedback amplifies a change (contractions cause oxytocin release, which causes stronger contractions) until a specific endpoint (birth).





8 The 'internal environment' in classic physiology refers mainly to:



- A The air inside the lungs
- B The extracellular fluid (including plasma and interstitial fluid) that bathes the cells
- C The contents of the digestive tract
- D The inside of red blood cells
- E The cytoplasm of each cell

► **Explanation:** Homeostasis mainly maintains the composition of extracellular fluid, which surrounds cells and acts as their 'internal environment'.

9 Which statement about tissues is CORRECT?



- A A tissue is a group of different organs working together
- B A tissue is a group of similar cells and their products performing a specific function
- C A tissue is the same as an organ system
- D A tissue contains only one type of molecule
- E Tissues exist only in plants, not animals

► **Explanation:** Cells with similar structure and function (plus the material around them) form tissues, such as muscle tissue or nervous tissue.

10 Which list correctly names the FOUR basic types of tissues in the human body?





- A Muscle, cartilage, blood, bone
- B Epithelial, connective, muscle, nervous ✓**
- C Epithelial, bone, cartilage, blood
- D Connective, skeletal, cardiac, smooth
- E Loose, dense, adipose, cartilage

► **Explanation:** The four main tissue types are epithelial (covering/lining), connective (support), muscle (movement), and nervous (control).

**11** Which main tissue type forms the lining of the digestive tract and the skin surface?



- A Connective tissue
- B Epithelial tissue ✓**
- C Muscle tissue
- D Nervous tissue
- E Adipose tissue

► **Explanation:** Epithelial tissue covers body surfaces, lines cavities and organs, and forms glands.

**12** Which statement about epithelial tissue is TRUE?



- A It has abundant blood vessels running between the cells
- B Its cells are widely separated by large amounts of extracellular matrix
- C It consists of tightly packed cells with little extracellular matrix and is usually avascular ✓**
- D It cannot regenerate once damaged





- E It is found only inside bones

► **Explanation:** Epithelial cells are closely packed, form continuous sheets, have very little matrix, and are avascular (nutrients diffuse from underlying connective tissue).

**13** Simple squamous epithelium is especially well suited for:



- A Protection against abrasion (e.g. skin)
- B Rapid diffusion and filtration (e.g. air sacs of lungs) ✓**
- C Stretching and recoil (e.g. bladder)
- D Producing strong contractions
- E Storing fat

► **Explanation:** A single layer of flat cells allows substances like gases to cross quickly, as in alveoli and capillary walls.

**14** Which epithelial type is MOST appropriate for protecting areas subject to friction, such as the outer layer of the skin (epidermis)?



- A Simple squamous epithelium
- B Simple cuboidal epithelium
- C Stratified squamous epithelium ✓**
- D Simple columnar epithelium
- E Transitional epithelium

► **Explanation:** Multiple layers of squamous cells provide protection; cells at the surface can be lost and replaced.





15 Which main tissue type is characterised by an abundance of extracellular matrix and relatively fewer, widely spaced cells?



- A Epithelial tissue
- B **Connective tissue** ✓
- C Muscle tissue
- D Nervous tissue
- E Glandular tissue only

► **Explanation:** Connective tissues (e.g. bone, cartilage, adipose, blood) have cells scattered in a matrix of fibres and ground substance.

16 Which of the following is classified as a **CONNECTIVE** tissue?



- A Smooth muscle
- B Stratified squamous epithelium
- C **Blood** ✓
- D Nervous tissue in the brain
- E Cardiac muscle

► **Explanation:** Blood is considered a fluid connective tissue because it has cells (formed elements) in a liquid extracellular matrix (plasma).

17 Adipose tissue (body fat) is best classified as:



- A Epithelial tissue specialised for absorption





- B Muscle tissue specialised for contraction
- C **A type of connective tissue specialised for energy storage, insulation and cushioning**
- D Nervous tissue specialised for conduction
- E A type of cartilage

► **Explanation:** Adipose tissue is a connective tissue where adipocytes store triglycerides and help insulate and protect organs.

**18** Which main tissue type is primarily responsible for producing body movements and generating heat?



- A Epithelial tissue
- B Connective tissue
- C **Muscle tissue** ✓
- D Nervous tissue
- E Adipose tissue

► **Explanation:** Muscle tissue contracts to move the skeleton, pump blood, and move contents of organs; it also produces heat as a by-product.

**19** Which statement correctly matches the **THREE** types of muscle tissue with a feature of each?



- A Skeletal: involuntary; cardiac: voluntary; smooth: striated
- B **Skeletal: striated and voluntary; cardiac: striated and involuntary; smooth: non-striated and involuntary** ✓
- C Skeletal: non-striated; cardiac: non-striated; smooth: striated
- D Skeletal and cardiac: involuntary; smooth: voluntary





- E** All muscle types are voluntary

► **Explanation:** Skeletal muscle is voluntary and striated; cardiac muscle is striated but involuntary; smooth muscle is involuntary and lacks striations.

**20** Cardiac muscle tissue is found:



- A** In the walls of the stomach and intestines only
- B** Attached to bones throughout the body
- C** Only in the wall of the heart ✓
- D** In the walls of all blood vessels
- E** In all glands that secrete hormones

► **Explanation:** Cardiac muscle is a specialised muscle tissue found only in the myocardium (heart wall).

**21** Which main tissue type is specialised for rapid communication and control using electrical impulses?



- A** Epithelial tissue
- B** Connective tissue
- C** Muscle tissue
- D** Nervous tissue ✓
- E** Adipose tissue

► **Explanation:** Nervous tissue (neurons and supporting glial cells) transmits electrical and chemical signals to coordinate body functions.





22 The main functional cells of nervous tissue that generate and conduct nerve impulses are called:



- A Erythrocytes
- B **Neurons** ✓
- C Chondrocytes
- D Osteocytes
- E Adipocytes

► **Explanation:** Neurons are the excitable cells that send signals; neuroglia support and protect them.

23 Which organ is correctly matched with the MAIN tissue that carries out its primary function?



- A Heart – epithelial tissue
- B Brain – smooth muscle tissue
- C Bone – nervous tissue
- D **Skeletal muscle – muscle tissue** ✓
- E Skin – nervous tissue

► **Explanation:** All organs contain multiple tissue types, but skeletal muscle's primary function (movement) is performed by muscle tissue.

24 Which epithelial tissue type lines most of the digestive tract (stomach and intestines), where absorption and secretion are important?



- A Simple squamous epithelium





- B Simple columnar epithelium ✓**
- C Stratified squamous epithelium
- D Transitional epithelium
- E Pseudostratified ciliated epithelium

► **Explanation:** Tall columnar cells with microvilli and goblet cells are ideal for absorption and secretion in the gut.

**25** Which main tissue type forms ligaments and tendons that connect bones to other bones and muscles to bones?



- A Epithelial tissue
- B Dense connective tissue ✓**
- C Smooth muscle tissue
- D Nervous tissue
- E Cartilage epithelium

► **Explanation:** Ligaments and tendons are dense connective tissues rich in collagen fibres, providing strong attachment and support.

**26** Cartilage is a type of connective tissue that is:



- A Highly vascular and heals very quickly
- B Avascular with chondrocytes embedded in a firm but flexible matrix ✓**
- C Composed only of muscle cells
- D The same as bone tissue
- E Made only of elastic fibres and no cells





► **Explanation:** Cartilage cells (chondrocytes) sit in lacunae within a firm matrix; because cartilage is avascular, it heals slowly.

27 Which statement correctly links each tissue type with one MAIN role?



- A Epithelial – movement; muscle – absorption; nervous – support
- B Connective – communication; nervous – storage; epithelial – contraction
- C Epithelial – covering/lining; connective – support; muscle – movement; nervous – control ✓**
- D Epithelial – support; connective – contraction; muscle – covering
- E All four tissues – exactly the same main role

► **Explanation:** These four tissues have characteristic key roles: cover/line, support, move, and control/communicate.

28 Which of the following is NOT a correct example of a tissue–location pair?



- A Smooth muscle – wall of the intestine
- B Skeletal muscle – biceps brachii
- C Nervous tissue – spinal cord
- D Simple squamous epithelium – alveoli of the lungs
- E Stratified squamous epithelium – inside of long bones ✓**

► **Explanation:** Stratified squamous epithelium lines surfaces like the mouth, esophagus and skin; long bones are mostly bone (connective) and bone marrow.

