Section

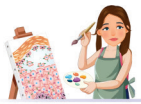
1

# Chapterwise MCQs

Chapter

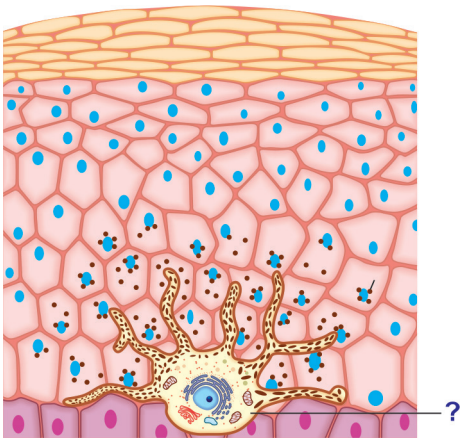
1A

# Structure and Function of Skin



## Image Based Questions

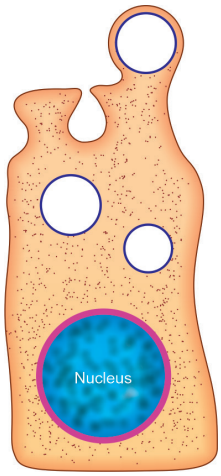
**1. Name the cell marked in the figure.**



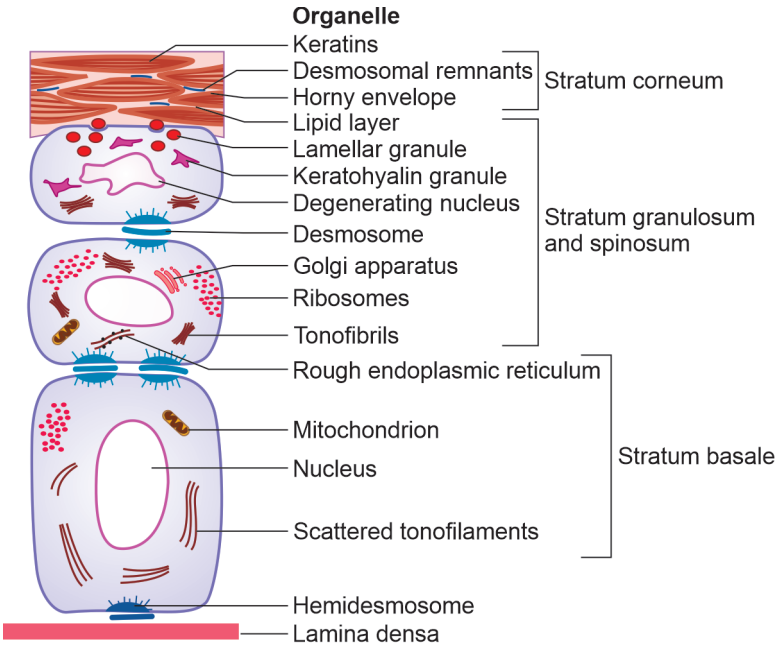

A. Keratinocyte
B. Melanocyte
C. Langerhans cell
D. Langhans cell

**2. The image depicts a gland which is known to be androgen sensitive, name it.**

A. Merkel gland
B. Eccrine gland
C. Sebaceous gland
D. Apocrine gland

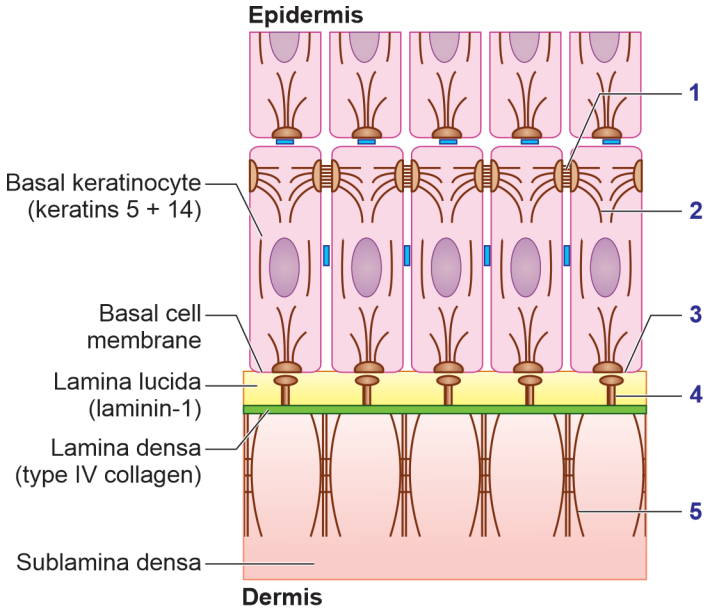


**3. This diagram of the skin shows different cells of the skin. Name the keratin pairs in the various layers.**

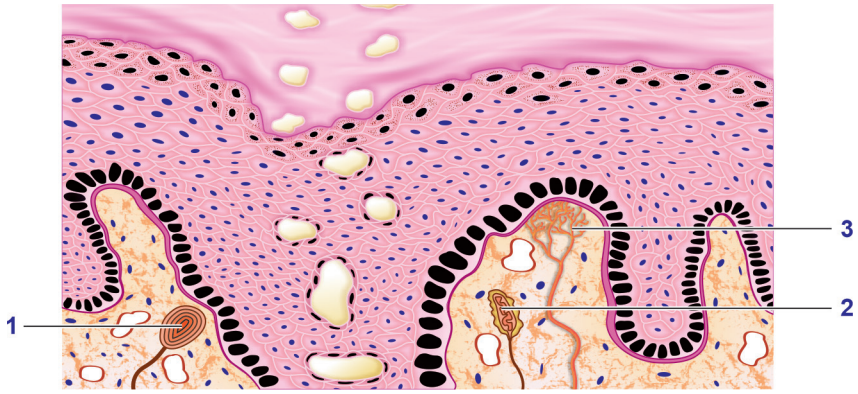



A. Stratum corneum
B. Stratum granulosum and spinosum
C. Stratum basale

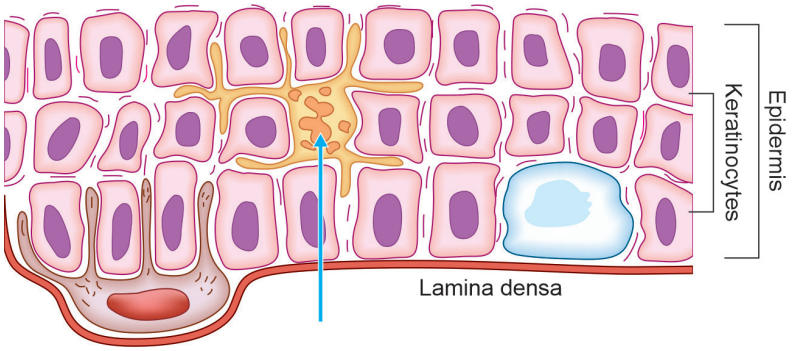
**4. This diagram of the skin shows the various sublayers of the BMZ. Name the structures with arrows on the right.**



**5. Name the various neural cells and their function.**

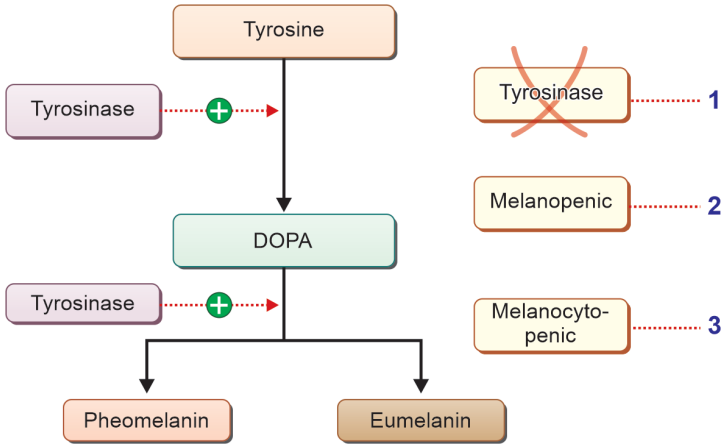



**6. In the diagram which cell is part of innate immunity and lacks desmosomes and tonofibrils?**




A. Keratinocyte
B. Melanocyte
C. Langerhans cell
D. Merkel cell

**7. The diagram below is a simplified depiction of the pigmentation pathway. There can be defects in the pathway causing various disorders. Name a disorder which represents the defects indicated on the right.**



# Clinical Case Scenarios

**1. A 5-year-old child presents with intensely itchy, dry, and inflamed skin, particularly in the creases of his elbows and knees. Genetic testing reveals a mutation affecting a protein crucial for skin barrier function, leading to a diagnosis of atopic dermatitis.**

**Based on the scenario, which of the following layers of the skin is most likely to be directly affected by the genetic defect, contributing to the child's atopic dermatitis?**

A. Stratum granulosum
B. Stratum spinosum
C. Stratum basale
D. Dermal papillae

**2. A newborn presents with extensive blistering on minimal contact. Genetic testing reveals a mutation affecting proteins within the basement membrane zone (BMZ) of the skin.**

**Which of the following conditions is most likely associated with this patient's presentation and genetic finding?**

A. Ehlers-Danlos syndrome
B. Psoriasis
C. Vitiligo
D. Epidermolysis bullosa

**3. A 35-year-old male presents with progressively worsening skin laxity and arterial aneurysms. Lab tests reveal a genetic defect leading to impaired copper absorption and utilization.**

**Based on the patient's condition, which of the following structures is most likely to be directly affected by the copper metabolism disorder?**

A. Bone matrix
B. Hair follicles
C. Dermal melanocytes
D. Elastic fibers

**4. A dermatologist is examining a biopsy from a patient presenting with excessive underarm odour. Microscopic analysis reveals glands where the secretory product contains cellular debris.**

**Which type of gland is most likely responsible for this patient's condition?**

A. Merocrine glands
B. Holocrine glands
C. Apocrine glands
D. Sebaceous glands

**5. A 35-year-old male working in a meatpacking plant complains of extreme sensitivity to cold. His fingers turn white in cold environments, and laser Doppler flowmetry shows his digital blood flow changes dramatically (500-fold) between a warm room and the cold storage area.**

**Which of the following cells are primarily responsible for the observed changes in digital blood flow in this patient?**

A. Contractile glomus cells
B. Endothelial cells lining arterioles
C. Unmyelinated sensory neurons
D. Specialized pericytes in capillaries

## Best of 4 MCQs

**1. The skin develops from which two primary germ layers?**

A. Ectoderm and endoderm
B. Ectoderm and mesoderm
C. Endoderm and mesoderm
D. Epidermis and dermis

**2. How do melanocytes primarily protect the skin?**

A. By synthesizing melanin to shield from UV radiation
B. By facilitating the absorption of vitamin D
C. By initiating an immune response to pathogens
D. By producing keratin to create a waterproof barrier

**3. Which component of the basement membrane zone (BMZ) is MOST critical to consider in order to prevent easy blistering, given its role in maintaining structural integrity?**

A. The bullous pemphigoid antigens (BPAg), because damage to these proteins leads to epidermolysis bullosa, a family of diseases featuring easy blistering.
B. Collagen VII, because while it is an anchoring fibril, the hemidesmosomes are more directly involved in maintaining the skin's structural integrity.
C. The lamina lucida, because it is a component of the BMZ, but damage to the bullous pemphigoid antigens is more directly associated with blistering.
D. The alpha 6 beta 4 integrin, because it contributes to the barrier function but is not directly involved in blistering diseases.

**4. Which statement accurately describes the role of desmosome in cell structure and function?**

A. Desmoglein (Dsg) 1 is expressed in the stratum basale
B. Dsg 3 is seen in mucosal epithelium and causes pemphigus foliaceous
C. Staphylococcal scalded skin syndrome is caused by damage to Dsg 1
D. Desmosomes facilitate rapid cell division through microtubule organization

**5. Which epidermal layer primarily anchors the epidermis to the dermis?**

A. Stratum corneum
B. Stratum granulosum
C. Stratum basale
D. Stratum spinosum

**6. Which statement accurately differentiates the primary functions of eccrine and apocrine sweat glands?**

A. Eccrine glands produce pheromones; apocrine glands regulate electrolyte balance.
B. Eccrine glands excrete sebum; apocrine glands facilitate vitamin D synthesis.
C. Eccrine glands initiate immune responses; apocrine glands control pigmentation.
D. Eccrine glands regulate temperature; apocrine glands produce odoriferous secretions.

**7. Which epidermal layer is characterized by the presence of both keratohyalin granules and Odland bodies?**

A. Stratum granulosum
B. Stratum lucidum
C. Stratum spinosum
D. Stratum corneum

**8. How do the functions of C fibers and A fibers differ in cutaneous innervation?**

A. C fibers are myelinated and transmit signals faster than A fibers, carrying only sharp pain.
B. C fibers transmit pain, itch, touch, heat, and cold sensations, while A fibers have a higher conduction velocity.
C. C fibers and A fibers have the same conduction velocity and transmit identical sensory information.
D. A fibers only transmit pressure and proprioception signals, with slower conduction speeds.

**9. Which epidermal layer is exclusively found in the thick skin of the palms and soles?**

A. Stratum granulosum
B. Stratum corneum
C. Stratum lucidum
D. Stratum spinosum

**10. When assessing the effectiveness of a topical treatment designed to reduce sweating, which type of autonomic fiber should be the PRIMARY target?**

A. Cholinergic sympathetic fibers
B. Parasympathetic fibers, primarily involved in rest-and-digest functions, not sweat production
C. Adrenergic sympathetic fibers, responsible for vasoconstriction and increased heart rate
D. Somatic sensory nerves, transmitting sensory information about the periphery to the CNS

**11. Which of the following accurately describes the process of hair growth?**

A. Linear progression solely determined by genetics
B. Continuous growth influenced by regular trimming
C. Seasonal spurts triggered by external temperature
D. Cyclical phases: Growth, transition, and resting

**12. A 45-year-old male presents to a dermatologist after undergoing a poorly performed laser hair removal procedure. Upon examination, the dermatologist notes significant damage to the bulge region of the hair follicles in the treated area.**
**What is the most likely long-term result of this damage?**

A. Temporary hair thinning
B. Permanent hair loss (scarring alopecia)
C. Changes in hair texture (e.g. coarser hair)
D. Increased hair growth rate

**13. Which cells function as mechanoreceptors and mediate touch?**

A. Merkel cells
B. Melanocytes
C. Keratinocytes
D. Langerhans cells

**14. A 68-year-old patient with diabetes presents with onychomycosis affecting several toenails. The physician decides to prescribe a fungistatic agent. The patient is concerned about the duration of treatment.**

**How long should the patient be advised to continue the fungistatic treatment to ensure adequate nail penetration and fungal eradication?**

A. 6 months
B. 3 months
C. 1 month
D. 12 months

**15. Which of the following accurately describes the roles of eumelanin and pheomelanin in determining skin color?**

A. Skin color is solely determined by the number of melanocytes, regardless of the type of melanin they produce.
B. Melanocytes produce only eumelanin, which is converted to pheomelanin in individuals with lighter skin tones.
C. Eumelanin (brown-black) and pheomelanin (red-yellow) are the two major forms of melanin that determine skin color.
D. Pheomelanin (brown-black) protects the skin from UV radiation, while eumelanin (red-yellow) provides no such protection.

**16. Skin color is determined by**

A. Number of melanocytes
B. Nature and distribution of melanosomes
C. Place of stay
D. Variations in seasons

**17. Which of the following disorder is due to a C-KIT mutation?**

A. Albinism
B. Ash leaf macules
C. Vitiligo
D. Piebaldism

# ANSWERS

## Image Based Questions

**1.** B

**2.** D

**3.** A. Stratum corneum
**Keratins 1 and 10**
B. Stratum granulosum and spinosum
**Keratins 1 and 10**
**Keratins 4 and 13**
C. Stratum basale
**Keratins 5 and 14**

**4.** 1. Desmosome, 2. Keratin intermediate filament, 3. Hemidesmosome, 4. Anchoring filament, 5. Anchoring fibril.

**5.** 1. Pacinian corpuscles—deep mechanoreceptors with a 'cut onion' pattern, sensitive to pressure.
2. Meissner's corpuscles—superficial mechanoreceptors, most common on the digits, sensitive to touch.
3. Free nerve endings are widespread, found extending into the epidermis and around hair follicles. Known as nociceptors, they sense pain, motion, touch, heat, and cold.

**6.** C

**7.** 1. Albinism: Defect in tyrosinase; 2 Ash leaf macule: There is reduced melanin in this disorder; 3 Piebaldism and vitiligo: These disorders have reduced or even absent melanocytes.

## Clinical Case Scenarios

**1.** A
The stratum granulosum is directly affected in atopic dermatitis due to its role in keratinization and the presence of profilaggrin and lipids. A defect in these components, caused by genetic mutations, leads to the skin barrier dysfunction characteristic of the disease.

**2.** D

**3.** D
Elastic fibers are directly affected by copper metabolism disorders like Menkes syndrome. Copper is essential for the proper function of lysyl oxidase, an enzyme crucial for the cross-linking of elastin and collagen. Impaired copper absorption leads to defective elastic fiber formation, resulting in skin laxity and arterial aneurysms.

**4.** C
Apocrine secretions are odourless, however due to biotransformation, mainly by Corynebacteria results in liberation of medium and short chain fatty acids, 16-androstene steroids, thioalcohols.

**5.** A
Contractile glomus cells are specialized smooth muscle cells in glomus bodies that shunt blood away from the cutaneous surface in response to cold, leading to the observed dramatic changes in digital blood flow. This thermoregulatory response is exaggerated in the patient. They are known as Sucquet-Hoyer canals.

## Best of 4 MCQs

**1.** B

**2.** A

Melanocytes produce melanin, a pigment that absorbs and scatters **UV radiation**, thereby protecting the skin from sun damage. Think of **melanin** as a natural sunscreen produced by your body.

**3.** A

The hemidesmosomes are made up of bullous pemphigoid antigens 1 (a 230 kDa plakin) and 2 (180 kDa collagen XVII) (1 is more important than 2; 230 >180 kDa).

**4.** C

**5.** C

**6.** D

**7.** A

**8.** C

C fibers are slow polymodal unmyelinated fibers that can sense and transmit pain, itch, touch, heat, cold, and movement. A fibers are myelinated and have a higher conduction velocity.

**9.** C

**10.** A

**11.** D

**12.** B

The bulge region of the hair follicle contains stem cells responsible for hair regeneration. Damage to this area, as described in the scenario, leads to scarring alopecia, resulting in permanent hair loss. Scarring alopecia is characterized by the destruction of hair follicles and their replacement with scar tissue.

**13.** A

**14.** D

**15.** C

**16.** B

**17.** D