

Human Biology in the Natural World

Human Biology · Answer Key · 20 Questions

1. Which specific immunoglobulin is uniquely associated with the human immunological response to helminthic parasite infections, reflecting an evolutionary defense against macroparasites?

- A) IgA
- B) IgE**
- C) IgD
- D) IgM

2. The human 'diving reflex' is a vestigial physiological response shared with aquatic mammals; which nerve is primarily responsible for triggering bradycardia upon facial immersion in cold water?

- A) Vagus nerve
- B) Trigeminal nerve**
- C) Phrenic nerve
- D) Glossopharyngeal nerve

3. Humans possess a gene variant, SLC24A5, which is associated with skin pigmentation; in which ancestral ecological context did the loss of melanin production provide a selective advantage regarding vitamin D synthesis?

- A) Equatorial rainforests
- B) High-latitude regions**
- C) Arid desert environments
- D) High-altitude mountain ranges

4. Which human anatomical structure is considered a biological remnant of the 'caudal appendage' found in many other vertebrates?

- A) Coccyx**
- B) Appendix
- C) Hyoid bone
- D) Sphenoid bone

5. The human microbiome is heavily influenced by the environment; which microbial phylum typically dominates the human gut and is essential for breaking down complex plant polysaccharides?

- A) Proteobacteria
- B) Actinobacteria
- C) Bacteroidetes**
- D) Cyanobacteria

6. Regarding thermoregulation, which human physiological response is an evolutionary adaptation for heat dissipation that is absent in most other primate species?

A) High density of eccrine sweat glands

- B) Piloerection
- C) Peripheral vasoconstriction
- D) Non-shivering thermogenesis

7. The human jaw has undergone significant evolutionary reduction compared to other hominids; which specific muscle group has atrophied in size, allowing for increased cranial capacity?

A) Masseter

B) Temporalis

- C) Buccinator
- D) Pterygoid

8. Which protein, found in human skin, acts as a primary barrier against environmental UV radiation and is produced by specialized cells called melanocytes?

A) Keratin

B) Collagen

C) Eumelanin

D) Elastin

9. Human binocular vision is a hallmark of our primate evolution; which specific anatomical feature allows for the crossing of optic nerve fibers to facilitate depth perception?

A) Optic chiasm

- B) Superior colliculus
- C) Lateral geniculate nucleus
- D) Occipital lobe

10. Humans are capable of processing lactase into adulthood due to a genetic mutation linked to the domestication of which type of livestock?

A) Camels

B) Cattle

- C) Goats
- D) Sheep

11. What is the primary evolutionary benefit of the human 'bipedal' pelvis shape in relation to environmental locomotion?

- A) Enhanced balance during arboreal climbing
- B) Increased efficiency for long-distance persistence hunting**
- C) Reduction in birth canal size
- D) Expansion of the thoracic cavity

12. Which human hormonal response to environmental stressors, such as predators or extreme weather, is mediated by the hypothalamic-pituitary-adrenal (HPA) axis?

- A) Cortisol secretion**
- B) Insulin release
- C) Thyroxine regulation
- D) Melatonin synthesis

13. The 'FOXP2' gene is often cited in evolutionary biology for its role in the development of which human-specific environmental interaction capacity?

- A) Bipedalism
- B) Fine motor control
- C) Language and speech**
- D) Thermoregulation

14. Which type of human adipose tissue is responsible for non-shivering thermogenesis, a trait shared with hibernating animals to maintain core body temperature?

- A) White adipose tissue
- B) Brown adipose tissue**
- C) Visceral fat
- D) Subcutaneous fat

15. The human appendix, while often considered vestigial, is now hypothesized to function as a reservoir for which environmental interaction?

- A) Commensal gut bacteria**
- B) Endocrine hormone storage
- C) Lymphocyte maturation
- D) Bile salt processing

16. Which human sensory organ contains the greatest concentration of chemoreceptors evolved to detect environmental toxins?

- A) Olfactory epithelium**
- B) Taste buds of the tongue
- C) Vomeronasal organ
- D) Dermal nerve endings

17. Human salt-retention mechanisms are an evolutionary adaptation to environments where sodium availability was historically limited; which organ is primarily responsible for this regulation?

- A) Liver
- B) Kidney**
- C) Pancreas
- D) Spleen

18. The human circadian rhythm is entrained by environmental light-dark cycles via the secretion of which hormone from the pineal gland?

- A) Cortisol
- B) Melatonin**
- C) Serotonin
- D) Adrenaline

19. Which anatomical feature of the human foot is a direct adaptation to bipedalism, providing energy return during walking?

- A) Longitudinal arch**
- B) Hallux opposition
- C) Calcaneal spurs
- D) Metatarsal fusion

20. Humans are trichromatic, a trait that evolved to assist in which specific environmental task?

- A) Navigating in darkness
- B) Identifying ripe fruit and young leaves**
- C) Detecting camouflaged predators
- D) Recognizing facial expressions