

Global Geographical Determinants of Human Physiology

Human Geography And Biology · Answer Key · 20 Questions

1. Which physiological adaptation is most commonly observed in indigenous populations living at permanent high altitudes, such as the Tibetan Plateau?

- A) Increased lung surfactant production
- B) Higher resting heart rates
- C) Increased hemoglobin concentration**
- D) Decreased bone density

2. In the context of medical geography, which region is historically associated with the 'Goitre Belt' due to iodine deficiency in the soil?

- A) The Himalayan foothills**
- B) The Amazon Basin
- C) The Sahara Desert
- D) The Scandinavian Fjords

3. Which latitude-related factor is the primary environmental driver for the variation in baseline Vitamin D synthesis among global populations?

- A) Atmospheric pressure
- B) Ultraviolet B (UVB) radiation intensity**
- C) Mean annual humidity
- D) Geomagnetic field strength

4. What is the 'Bergmann's Rule' in the context of human physical geography and biology?

- A) Populations near the equator have longer limbs
- B) Body mass tends to be greater in colder climates to conserve heat**
- C) Skin pigmentation decreases with altitude
- D) Lung capacity is inversely proportional to temperature

5. Which specific environmental condition in arid desert regions is a primary driver for the evolution of higher kidney concentrating capacity in humans?

- A) High sodium content in local water sources
- B) Low relative humidity and high evapotranspiration**
- C) Extreme diurnal temperature variation
- D) Presence of specific endemic mineral dust

6. The 'Allen's Rule' posits that humans in warmer climates tend to have which physical characteristic?

- A) Higher metabolic rates
- B) Increased subcutaneous fat
- C) Longer appendages to increase surface area for cooling**
- D) Increased erythrocyte production

7. Which vector-borne disease is primarily geographically constrained by the 'isotherm of 10°C', the minimum temperature required for parasite development?

- A) Malaria**
- B) Lyme disease
- C) Dengue fever
- D) Yellow fever

8. What is the primary physiological challenge faced by populations residing in the high-altitude Andean Altiplano regarding blood chemistry?

- A) Hypocapnia due to chronic hyperventilation**
- B) Metabolic alkalosis from dietary intake
- C) Respiratory acidosis due to high CO₂ levels
- D) Excessive potassium retention

9. Which global region historically demonstrates the highest prevalence of sickle cell trait, an evolutionary adaptation to endemic malaria?

- A) Sub-Saharan Africa**
- B) Southern Europe
- C) Southeast Asia
- D) Patagonia

10. What is the primary biological reason that populations near the equator have evolved higher concentrations of melanin in the epidermis?

- A) To facilitate vitamin D absorption
- B) To protect against folate degradation from UV radiation**
- C) To assist in thermal regulation during exercise
- D) To increase resistance to skin infections

11. Which geographical phenomenon is linked to the high prevalence of 'Kashin-Beck disease', a form of osteoarthropathy?

- A) Low selenium levels in the soil**
- B) High fluoride content in groundwater
- C) Extreme solar radiation
- D) High concentration of volcanic ash

12. The 'Thrifty Gene Hypothesis' is often discussed in the context of which group of people who historically faced famine and have high rates of metabolic syndrome in modern environments?

- A) Arctic Inuit
- B) Pima Indians of Arizona**
- C) Swiss Alpine villagers
- D) Coastal Japanese populations

13. What impact does prolonged exposure to high-altitude low-oxygen environments have on the human heart?

- A) Atrophy of the left ventricle
- B) Right ventricular hypertrophy**
- C) Atrial fibrillation due to cold
- D) Stiffening of the aorta

14. In tropical geography, which factor most significantly contributes to the high prevalence of helminthic infections?

- A) Lack of access to processed foods
- B) High soil moisture and optimal ambient temperatures**
- C) High altitude preventing pathogen migration
- D) Proximity to tectonic plate boundaries

15. Which element, when present in high concentrations in groundwater due to local geological conditions, causes 'arsenicosis'?

- A) Calcium
- B) Magnesium
- C) Arsenic**
- D) Potassium

16. What is the primary limiting factor for human habitation in the 'Afrotropical' realm regarding endocrine health?

- A) Endemic goitre due to iodine-poor volcanic soil**
- B) Extreme Vitamin D toxicity
- C) Low baseline cortisol production
- D) Excessive iron absorption from local flora

17. How does the 'Sun-Angle' in high-latitude regions impact the human circadian rhythm during winter months?

- A) It increases serotonin production
- B) It leads to Seasonal Affective Disorder (SAD)**
- C) It forces a shift to nocturnal sleep patterns
- D) It accelerates melatonin degradation

18. Which environmental geography factor is directly linked to the 'Hygiene Hypothesis' regarding immune system development in urban versus rural populations?

A) Exposure to microbial diversity in rural soil

- B) Proximity to heavy industrial zones
- C) Concentration of nitrogen dioxide in the air
- D) Average annual precipitation

19. The high prevalence of lactose persistence in Northern European populations is geographically correlated with what historical practice?

A) Extensive coastal fishing

B) Historical dairy cattle domestication

- C) Rice cultivation in flooded paddies
- D) High-altitude transhumance

20. What physiological phenomenon occurs when populations move rapidly from sea level to altitudes above 4,000 meters?

A) Peripheral vasodilation

B) Pulmonary vasoconstriction

- C) Decreased resting heart rate
- D) Increased blood viscosity due to hemodilution