

Astrophysical Impacts on Human Physiology

Space Medicine And Human Performance · Answer Key · 8 Questions

1. What is the primary cause of muscle atrophy in astronauts during long-duration spaceflight in microgravity?

- A) Increased caloric intake
- B) Lack of gravitational loading**
- C) Excessive exposure to radiation
- D) Higher atmospheric pressure

2. Which physiological system is most immediately affected by the fluid shift occurring in the headward direction during spaceflight?

- A) Cardiovascular system**
- B) Musculoskeletal system
- C) Endocrine system
- D) Respiratory system

3. What is a common clinical concern for bone health in astronauts caused by the lack of mechanical stress in space?

- A) Increased bone density
- B) Space-induced osteoporosis**
- C) Excessive vitamin D production
- D) Rapid cartilage regeneration

4. What is the effect of ionizing radiation in space on the recovery rate of muscle tissue after exercise?

- A) It accelerates repair
- B) It has no impact
- C) It increases inflammation and slows recovery**
- D) It eliminates the need for protein synthesis

5. Which device is used on the International Space Station to provide resistive exercise to mitigate muscle loss?

- A) Treadmill with Vibration Isolation
- B) Advanced Resistive Exercise Device (ARED)**
- C) Stationary cycle ergometer
- D) Weighted jump rope

6. How does microgravity affect the vestibular system, often leading to space motion sickness?

A) Sensory conflict between vision and inner ear

B) Increase in blood flow to the brain

C) Temporary blindness

D) Over-activation of the pineal gland

7. What measurement is primarily used to monitor spinal elongation, a frequent cause of back pain for astronauts in space?

A) Blood glucose levels

B) Standing height measurements

C) Heart rate variability

D) Joint lubrication frequency

8. Which substance is excreted at higher rates in urine due to bone demineralization in a microgravity environment?

A) Potassium

B) Calcium

C) Iron

D) Sodium