

Astro-Public Health and Space Medicine

Public Health · Practice Test · 12 Questions

1. What is the primary physiological mechanism by which long-duration microgravity induces bone mineral density loss in astronauts?

- A) Increased osteoclast activity without compensatory osteoblast activity
- B) Hypercalcemia-induced renal failure
- C) Inhibition of parathyroid hormone production
- D) Severe systemic alkalosis

2. Which specific biological radiation effect poses the greatest carcinogenic risk to astronauts during deep space missions?

- A) Infrared thermal damage
- B) HZE particle-induced DNA double-strand breaks
- C) Low-frequency radio wave interference
- D) Ultraviolet photo-keratitis

3. What condition, formerly known as Visual Impairment Intracranial Pressure (VIIP) syndrome, is a major public health concern for astronauts in microgravity?

- A) Spaceflight Associated Neuro-ocular Syndrome (SANS)
- B) Presbyopia-induced retinal detachment
- C) Orbital cellulitis
- D) Intraocular hypertension

4. Which microorganism has demonstrated increased virulence and resistance to antibiotics in spaceflight studies, posing a risk to ISS crew health?

- A) Staphylococcus aureus
- B) Lactobacillus acidophilus
- C) Bifidobacterium bifidum
- D) Streptococcus thermophilus

5. In the context of planetary protection, what is the defined 'Forward Contamination' protocol for spacecraft?

- A) Preventing Earth microbes from contaminating target celestial bodies
- B) Sterilizing returning extraterrestrial soil samples
- C) Quarantining astronauts upon planetary return
- D) Removing orbital debris from Earth's atmosphere

6. What is the primary physiological cause of the 'fluid shift' phenomenon observed in microgravity?

- A) Cephalad shift of bodily fluids due to lack of hydrostatic pressure
- B) Excessive erythropoiesis in the bone marrow
- C) Dehydration-induced hypovolemia
- D) Peripheral vasodilation from solar radiation

7. Which organ system experiences the most rapid and significant muscle atrophy during prolonged exposure to microgravity?

- A) Postural skeletal muscles
- B) Myocardium
- C) Smooth muscle of the esophagus
- D) Diaphragm

8. What role does the 'Vagus Nerve' play in space motion sickness during the initial adaptation to microgravity?

- A) It mediates the vestibular-autonomic conflict triggering nausea
- B) It regulates oxygen saturation in the upper extremities
- C) It suppresses cortisol production in the adrenal glands
- D) It increases insulin sensitivity in the liver

9. What is the physiological consequence of the 'Space Anemia' phenomenon observed in astronauts?

- A) Reduction in red blood cell mass via neocytolysis
- B) Hyperproliferation of leukocytes
- C) Excessive iron absorption in the gut
- D) Decreased production of erythropoietin in the kidneys

10. Which specific hormone response is typically attenuated in microgravity, contributing to altered metabolic regulation?

- A) Insulin-like Growth Factor 1 (IGF-1)
- B) Melatonin secretion
- C) Thyroid-stimulating hormone
- D) Cortisol surge

11. What is the primary concern regarding 'circadian misalignment' on the International Space Station?

- A) Disruption of sleep-wake cycles affecting cognitive performance
- B) Overproduction of vitamin D
- C) Increased risk of solar flare exposure
- D) Synchronization of human biomes with surface microbes

12. What happens to the human intervertebral discs during prolonged microgravity exposure that affects standing height?

- A) They expand due to the absence of axial loading
- B) They dehydrate and compress rapidly
- C) They undergo calcification
- D) They atrophy due to lack of physical movement