

Immunology and Celestial Frontiers

Immunology · Answer Key · 10 Questions

1. Which immune system component was observed in studies on astronauts to show altered gene expression during long-term spaceflight?

- A) Eosinophils
- B) T-lymphocytes**
- C) Platelets
- D) Basophils

2. Microgravity environments, such as those found on the International Space Station, have been shown to inhibit the activation of which immune signaling molecule?

- A) Nuclear Factor-kappa B (NF- κ B)**
- B) Albumin
- C) Hemoglobin
- D) Thyroxine

3. The study of 'Spaceflight-Associated Immune Dysregulation' focuses on the reactivation of which virus that stays latent in human hosts on Earth?

- A) Epstein-Barr virus**
- B) Rhinovirus
- C) Influenza A
- D) Rotavirus

4. What physiological stressor common to the vacuum of space and cosmic radiation exposure is known to elevate serum cortisol, thereby suppressing immune cell function?

- A) Weightlessness
- B) Atmospheric pressure
- C) Ionizing radiation**
- D) Solar wind

5. In the context of astrobiology and immunology, what term describes the potential for biological contamination of other planets by terrestrial immune-compromised microorganisms?

- A) Panspermia
- B) Planetary protection**
- C) Biological shielding
- D) Exo-immunology

6. Which type of immune cell has demonstrated reduced motility and decreased ability to form immunological synapses in simulated microgravity conditions?

A) Natural Killer cells

B) Red blood cells

C) Mast cells

D) Osteoclasts

7. What is the primary immunological concern for human space explorers traveling beyond Earth's magnetosphere, which shields us from high-energy particles?

A) Increased antibody production

B) Chronic systemic inflammation

C) Overactive bone marrow

D) Enhanced cytokine release

8. Research on mice aboard the Space Shuttle indicated that microgravity negatively impacts the production of which primary antibody isotype?

A) IgG

B) IgE

C) IgM

D) IgA

9. What cellular organelle, essential for immune response regulation, has shown structural changes under the microgravity conditions of space?

A) Nucleus

B) Lysosome

C) Mitochondria

D) Ribosome

10. The 'Sun-Earth-Moon' orbital dynamics influence circadian rhythms; what hormonal regulator of the immune system is significantly disrupted by the artificial light cycles in space stations?

A) Melatonin

B) Insulin

C) Glucagon

D) Estrogen