Federal Aviation Administration

Aerospace Medicine & Advanced Medical Technologies

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We are living in a Technology Driven World

The wave of the future is coming and there is no fighting it.
Anne Morrow Lindbergh

Examples of Exponential Technological Innovations in Medicine

Personal Biomedical Devices

Induced Pluripotent Stem Cells
&
Regenerative Medicine

Body-Worn Medical Sensors & Body Networks

Genomics, Gene Therapy,
Microbiomics

Neurotechnology

Nanomedicine

Medical Robotics

Artificial Replacement Tissues & Organs

Digital Medicine

Cloning

Micro-Electro-Mechanical Systems
MEMS

Networked Health Care

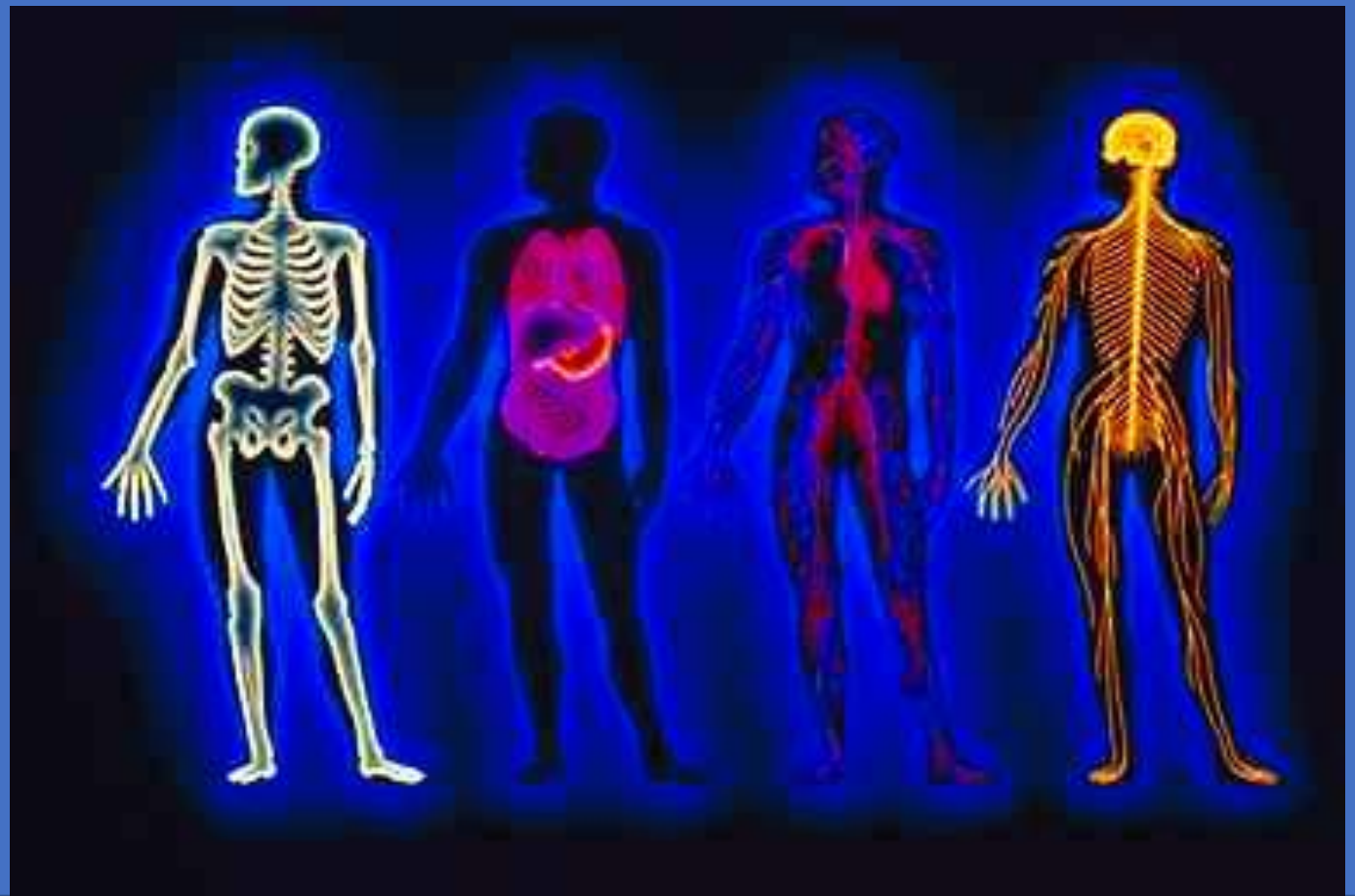
Virtual Medical Imaging

Advanced medical technologies represent important tools for space medicine specialists to mitigate the medical risks of manned commercial space flight including:

- *Pre-existing medical conditions*
- *Inflight acceleration (vehicle flight profile)*
- *Impact deceleration (hard landing or crash)*
- *Decreased gravity*
- *Decreased barometric pressure (cabin pressure, pressure suits)*
- *Ionizing and non-ionizing radiation*
- *Temperature extremes*
- *Breathable air composition and quality*
- *Noise & vibration*

Furthermore, advanced medical technologies could be used to support and even augment human performance capabilities in space

The Weak Link is the Human Being



Practical Implications of Advanced Medical Technologies for Space Crews

Space crews are directly responsible for the safety of space flight operations, and the main challenge for space medicine practitioners is to ensure the medical fitness and performance readiness of generally “normal” individuals who work in “abnormal” space environments

Clinical Aerospace Medicine & Medical Certification/Clearance Issues

- Clinical aerospace medicine issues impacting health monitoring, prevention, screening, diagnosis, treatment and rehabilitation.

- The vast majority of medical personnel around the world are not likely to be very familiar with these advanced medical technologies and may not have enough experience to assess their usefulness and recognize their limitations

- Space medical certification/licensing issues (fitness for flight) - Advanced medical technologies have an impact on the initial selection of space crew applicants and the continued flight activities of career space crews

- Space crews are a highly mobile population who can travel to other countries where advanced medical technologies may be readily available to patients while in the US are not approved by the FDA


Human-Machine-Environment Interactions