

LEGACY OF BIOMEDICAL RESEARCH DURING THE SPACE SHUTTLE PROGRAM

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The Space Shuttle Program provided many opportunities to study the role of spaceflight on human life for over 30 years and represented the longest and largest US human spaceflight program. Outcomes of the research were understanding the effect of spaceflight on human physiology and performance, countermeasures, operational protocols, and hardware. The Shuttle flights were relatively short, < 16 days and routinely had 4 to 6 crewmembers for a total of 135 flights. Biomedical research was conducted on the Space Shuttle using various vehicle resources. Specially constructed pressurized laboratories called Spacelab and SPACEHAB housed many laboratory instruments to accomplish experiments in the Shuttle's large payload bay. In addition to these laboratory flights, nearly every mission had dedicated human life science research experiments conducted in the Shuttle middeck. Most Shuttle astronauts participated in some life sciences research experiments either as test subjects or test operators. While middeck experiments resulted in a low sample per mission compared to many Earth-based studies, this participation allowed investigators to have repetition of tests over the years on successive Shuttle flights. In addition, as a prelude to the International Space Station (ISS), NASA used the Space Shuttle as a platform for assessing future ISS hardware systems and procedures. The purpose of this panel is to provide an understanding of science integration activities required to implement Shuttle research, review biomedical research, characterize countermeasures developed for Shuttle and ISS as well as discuss lessons learned that may support commercial crew endeavors. Panel topics include research integration, cardiovascular physiology, neurosciences, skeletal muscle, and exercise physiology.

Learning Objective: The panel provides an overview from the Space Shuttle Program regarding research integration, scientific results, lessons learned from biomedical research and countermeasure development.

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