Cover Page

This Week in NASA History: Hubble Space Telescope Deployed – April 25, 1990

This week in 1990, the Hubble Space Telescope was deployed from the cargo bay of space shuttle Discovery as part of STS-31. NASA's Marshall Space Flight Center was responsible for the design, development, and construction of the Hubble Space Telescope and has played a significant role in the testing of Hubble's successor, the James Webb Space Telescope. Scheduled to launch in October 2018, the Webb telescope will observe the most distant objects in the universe, provide images of the first galaxies formed and see unexplored planets around distant stars.

Image Credit: NASA

Back Cover

This Week in NASA History: Fourth Hubble Servicing Mission Launches – March 1, 2002

This week in 2002, space shuttle Columbia and STS-109 launched from NASA's Kennedy Space Center to begin the fourth Hubble Space Telescope servicing mission. Here Hubble is berthed in Columbia's cargo bay, silhouetted against the airglow of Earth's horizon. During this mission, astronauts replaced Hubble's solar panels and installed the Advanced Camera for Surveys, which took the place of Hubble's Faint Object Camera, the telescope's last original instrument. NASA's Marshall Space Flight Center has been involved in development of many of the agency's optical instruments. Notably, Marshall played a significant role in NASA's Great Observatories, managing the development of Hubble and the Chandra X-ray Observatory, and the Burst and Transient Source Experiment for the Compton Gamma Ray Observatory. Marshall also manages Chandra's flight, current operations and guest science observer program and has played a significant role in the testing of Hubble's successor, the James Webb Space Telescope. Scheduled to launch in October 2018, the Webb telescope will observe the most distant objects in the universe, provide images of the first galaxies formed and see unexplored planets around distant stars.

Image Credit: NASA

Editorial

Dear Reader

All young people should be prepared to think deeply and to think well so that they have the chance to become the innovators, educators, researchers, and leaders who can solve the most pressing challenges facing our world, both today and tomorrow. But, right now, not enough of our youth have access to quality STEM learning opportunities and too few students see these disciplines as springboards for their careers.
According to Marillyn Hewson, "Our children - the elementary, middle and high school students of today - make up a generation that will change our universe forever. This is the generation that will walk on Mars, explore deep space and unlock mysteries that we can't yet imagine". "They won't get there alone. It is our job to prepare, inspire and equip them to build the future - and that's exactly what Generation Beyond is designed to do."
STEM Today will inspire and educate people about Spaceflight and effects of Spaceflight on Astronauts.

Editor
Mr. Abhishek Kumar Sinha

STEM Today, May 2017, No.20

Human Health Countermeasures (HHC)

IM1: We do not know to what extent spaceflight alters various aspects of human immunity during spaceflight missions up to 6 months

At the 2005 inception of the HRP there was little known about the in-flight status of the human immune system. A wealth of knowledge defined immune dysregulation post-flight, including diminished cellular function, dysregulated cytokine production profiles and physiological stress. However, it was generally unknown if these observations reflected the in-flight condition. Several narrow-focus, low 'n' in-flight studies did indicate that immune dysregulation could be an in-flight phenomenon, however proper investigation of the various aspects of immunity and stress (innate/adaptive, humoral/cellular, dysfunction among specific cell types, etc.) was lacking. The reactivation of latent herpesviruses, thought to be a direct consequence of diminished immune function, was well established during short duration spaceflight, but it was unknown if this phenomenon would persist or resolve during long-duration spaceflight. It is generally believed that such dysregulation would not be a significant clinical risk for orbital flight (despite incidence of immune-related health events on orbit), but that persistent dysregulation could pose a crew health risk during exploration class deep-space missions. During the intervening period since HRP inception, Integrated Immune has thoroughly characterized certain aspects of adaptive immunity and viral reactivation during short- and long-duration spaceflight. The new findings confirm that both immune dysregulation and latent herpesvirus reactivation persist during 6-month ISS missions. Other aspects of immunoreguation remain relatively uninvestigated during spaceflight.

☞ Latent virus reactivation in Astronauts at ISS

In this study , viral reactivation and shedding of EBV, VZV, CMV, HSV1, and human herpes virus 6 (HHV6) were measured in 23 astronauts (18 male and 5 female) before, during, and immediately following long duration spaceflight.

Results

Viral reactivation

Twenty-two of 23 astronauts shed one or more target viruses (Table 1). Fifteen astronauts shed VZV, 22 shed EBV, and 14 shed CMV at one or more time points before, during, or after spaceflight (Table 1). One astronaut did not shed any virus during any defined collection time. By contrast, none of the 20 control subjects shed VZV or CMV and only 2 of them shed EBV (Table 1). No astronauts or control subjects shed HSV1, HSV2, or HHV6 at any time throughout the study. Percent shedding among crewmembers with 95% binomial confidence intervals are shown for EBV, VZV, and CMV in Fig. 1. For these three viruses, there was considerable variation of the shedding percentages over the collection time points (Fig. 1) suggesting a possible overall mission effect on the reactivation of these viruses.

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