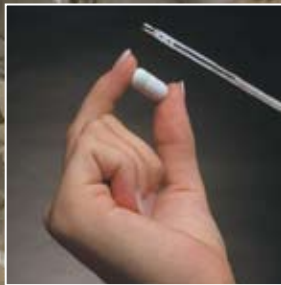




Health and Medicine Spinoffs



As NASA continues its mission to carry human presence deeper into space and expand our knowledge of the universe, the Agency's efforts also reach into another territory—the inner space of the human body. NASA partnerships are exploring the use of carbon nanotubes to diagnose and treat brain tumors, perfecting fiber optic probes for detecting cataracts that cloud vision, and developing software for recognizing and managing depression. From experiments on the International Space Station to aeronautics research, NASA programs are also resulting in spinoffs that improve fitness, treat disease, and save lives. These resulting medical technologies are among the more than 1,600 NASA spinoffs recorded since 1976.



Thermometer Pill Helps Athletes Beat the Heat

An ingestible thermometer pill was designed to monitor the body temperature of astronauts during space flight. The pill and accompanying data recorder now help Olympians and professional and collegiate athletes avoid dangerous heat-related illnesses during intense workouts.



LEDs Alleviate Pain, Speed Rehabilitation

Tiny light-emitting diode (LED) chips used to grow plants on the International Space Station are now used for wound healing and chronic pain alleviation on Earth and have been successfully applied in cases of pediatric brain tumors and the prevention of oral mucositis in bone marrow transplant patients.



Noninvasive Test Detects Cardiovascular Disease

A NASA team adapted Agency-invented software, originally designed to handle imagery gathered by space probes, to assess ultrasound images of arteries for plaque buildup. The software is now part of a diagnostic system for accurately predicting heart health.



Robotics Offer New Surgical Capabilities

Surgeons are using sensitive, dexterous robotic arm and hand technology—developed with NASA funding for use conducting repairs on the International Space Station—to insert titanium implants during a minimally invasive knee surgery procedure that eliminates the need for traumatic joint replacement.



Circulation-Enhancing Device Improves CPR

NASA research into blood pressure—a concern for astronauts adjusting to Earth's gravity after space flight—supported the development of a device that boosts blood flow to the brain during CPR, increasing the number of cardiac arrest patients delivered alive to hospitals by as much as 50 percent.



CCDs Enable Clearer, More Efficient Biopsies

Charge coupled devices (CCDs) used on the Hubble Space Telescope to convert a distant star's light directly into digital images—have been adapted to improve imaging and optics here on Earth. Many NASA-driven enhancements to the manufacture of CCDs have been applied to digital mammography biopsy techniques, using CCDs to image breast tissue more clearly and efficiently.



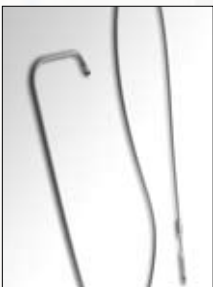
Rocket Engine Technology Keeps Hearts Pumping

Supercomputer simulation of fluid flow through rocket engines, combined with cutting-edge medical industry collaboration, resulted in a lifesaving heart pump for patients awaiting heart transplants. The MicroMed DeBakey VAD pumps blood throughout the body to keep critically ill patients alive until a donor heart is available and has been successfully implanted in over 445 patients.



Corrosive Space Gas Scrubs Surgical Implants

Atomic Oxygen, the gas that corrodes spacecraft in orbit, can be used to decontaminate orthopedic surgical implants prior to surgery, texture blood to allow the rapid measurement of glucose and other analytes, and roughen surfaces to improve cell adhesion, which is important for the development of new drugs.



Polymer Coating Aids Heart Failure Treatment

A unique, flexible thermoplastic resin developed by NASA scientists researching advanced composites for high-speed aircraft now coats leads for cardiac resynchronization therapy devices, providing physicians greater ability to deliver the leads through difficult-to-access veins and resulting in a 96.4 percent placement success rate.



Inline Filter Purifies Dental Water

The microbial check valve, one of the filtration devices designed as part of the Water Recovery System now onboard the International Space Station, is in widespread use in dental offices, where it prevents back contamination, reducing harmful bacteria in dental water and exposure to patients and staff.

For more information about NASA spinoffs, please visit spinoff.nasa.gov.