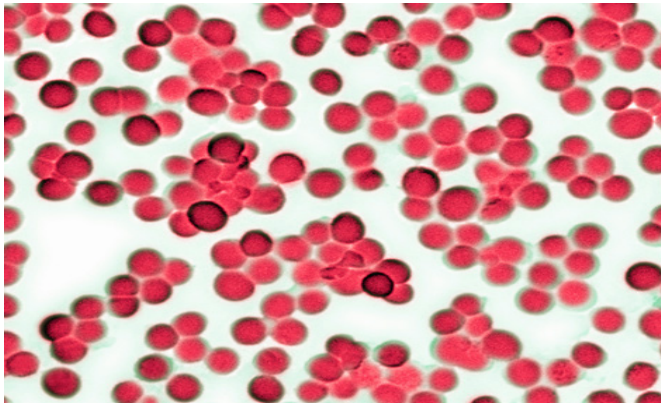


## Vaccines in Space: Taking Biotech to Microgravity Labs

By Joe Pappalardo

Published on: June 8, 2009



Scanning electron micrograph (SEM) of staphylococcus aureus bacteria.

Last week, International Space Station crews conducted a trailblazing microgravity vaccine experiment on behalf of a company to thwart drug-resistant infections. The trick: growing superdiseases in space. Soon after, the CEO of the company behind the experiment told attendees at a conference in New York City what he envisions for the future of space-age biotech.

Last month the public watched as astronauts on the space shuttle *Atlantis* conducted risky spacewalks to fix the Hubble Space Telescope. But there was another, quieter task that the astronauts pursued—a commercial drug experiment aimed at finding a vaccine against a deadly staph infection besetting hospitals.

Previous NASA spaceflight experiments have shown that microbes grow better in space, but the cause is still being debated. One popular theory is that nutrients can be absorbed more efficiently through cell walls and from multiple directions without the presence of gravity. Another, more obscure, theory: There is a latent genetic code in the microbes that is expressed in microgravity.

Thomas Pickens (son of the billionaire energy entrepreneur, [T. Boone Pickens](#)) doesn't care all that much why this phenomena occurs?—he just wants to cash in on it. As the president and CEO of Astrotech, Pickens established a subsidiary to develop vaccines using the fruits of space research like last month's experiment. "We found it commercially viable to send microbes to space," he says. "They just jump off the charts in terms of growth."

Pickens's new venture, [AstroGenetix](#), is the only company that uses NASA launches to develop commercial vaccines. This relationship grew from the parent company's long involvement in designing NASA microgravity experiments. Pickens reasoned that the researchers at his company were in a prime position to take advantage of NASA's unique laboratory in space,

instead of just creating [hardware](#) for the experiments. To make the arrangement official, they forged an agreement similar to ones governing the use of U.S. national labs by commercial companies.

Since the space station is under construction, these experiments have to be easy to conduct. "This is like doing biotech engineering during the construction of a skyscraper," Pickens says. To make it easy on the astronauts, researchers at AstroGenetix placed the staph cultures in a fortified can; all the astronauts had to do was crank a handle to expose the cultures to nutrients inside. When it is time to come home, the astronauts turn the handle again to kill the cultures and bring the grown staph cells back to Earth for DNA testing. The rapid growth makes it easy to isolate the genes that make the microbes more virulent. Microbes that are stripped of these genes could be used as a basis for vaccines. There are multiple layers of protection to keep the samples from contaminating the environment of the ISS, Pickens says.

Large pharmaceutical companies shy away from space because of the heavy government involvement, Pickens says. That didn't put off Astrotech, because they were already experienced at [working with NASA](#). "Big pharma will let biotech take the risk, and then, when there is a breakthrough, come in and buy it," he says. "I expect competitors to follow."