

Drug discovery and development—in space

November 17 2022



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Carrying out scientific experiments in space allows scientists to study and make drugs without gravity, which can lead to surprising results that improve research back on Earth. According to a cover story in *Chemical & Engineering News*, more commercial entities are expanding offerings in low-Earth orbit, which could someday enable more common and

affordable drug discovery and manufacture in space.

The low-gravity environment on the International Space Station (ISS) can speed up the development and discovery of complex molecules used in medicines, writes Assistant Editor Shi En Kim. Misbehaving proteins are the culprit behind many diseases, so scientists will often crystallize a protein to better understand its complex structure. When carried out in space, this process can produce larger and more uniform crystals than those grown on Earth. Protein crystallization experiments in microgravity have been instrumental in the design of some cancer drugs. Additionally, because the effects of space travel on the body resemble those of aging, scientists have taken advantage of the unique environment to study aging treatments, including carrying out preclinical trials of two now-approved osteoporosis drugs. In the future, stem cell therapy research could benefit from observations that stem cells can grow more quickly in space.

Currently, access to the ISS for experiments is limited—and competition to get experiments onboard is fierce. It often takes years to prepare for an experiment, and once scientists have results, it could be another several years before they have access again. The ISS is slated to retire in less than a decade, but the rise of the commercialization of space means that researchers may someday have more opportunities to carry out experiments or manufacture drugs in this environment at potentially lower costs. Private companies, such as SpaceX, Northrup Grumman and Blue Origin, are building commercial stations to replace the ISS, and we could be seeing more experiments being performed in orbit with profound impacts on science back on Earth.

More information: "Pharma goes to space", *Chemical & Engineering News* (2022). [cen.acs.org/pharmaceuticals/dr...-development/100/i40](https://cen.acs.org/pharmaceuticals/drug-development/100/i40)

Provided by American Chemical Society

Citation: Drug discovery and development—in space (2022, November 17) retrieved 24 April 2024 from <https://phys.org/news/2022-11-drug-discovery-developmentin-space.html>

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