The future of health care may be in the stars

Boryung Pharmaceutical, in collaboration with Axiom Space and Starburst Aerospace, has launched the first annual Care in Space Challenge, aimed at finding health care in space solutions from aerospace health care startups and other innovators. Selected participants will pitch their ideas in July before sharing solutions with investors in December.

Temps de lecture : minute

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Ideas will be verified by aerospace experts from Israeli and US companies, and universities including Harvard, MIT and Stanford, which will also provide support and mentoring throughout the challenge. (*Korea Biomedical Review*)

Why does this matter?

Commercial space has arrived, and while space tourism is out of *reach* for most of us, at least for the time being, more people will be travelling and working beyond the boundaries of Earth in the not so distant future.

Axiom, for example, is already in the process of constructing the world's first *commercial* space station where research activities can take place. It's slated to launch in 2024, when NASA will also put astronauts back on the Moon as part of its *Artemis programme*. The agency aims establish a base camp there to inform its eventual mission to Mars. It's also planning one or more private space stations to replace the International Space

Station (ISS) when it’s decommissioned in 2030.

Health issues

There’s some well-known *implications* for astronauts working in microgravity, such as radiation exposure, bone and muscle loss, kidney stones, heart and liver problems, immune system dysfunction and *mental health* problems. Another emerging issue is that microgravity can cause bacteria to become *more* resistant to antibiotics, increasing their lethality. Such conditions also promote bacterial biofilm formation, which aside from health implications, can cause equipment to malfunction.

Longer and deeper space missions will require innovative health care solutions ranging from diagnostics and even surgery. While this is essential for space travellers, how will it help solve the problems of the majority of us left looking up at the stars?

Benefits

The truth is that space activities have *already* advanced health care in ways we may not have thought of. With some of the impacts of microgravity reflecting conditions linked to ageing or sedentary lifestyles, research with astronauts has helped inform scientists about Type 2 diabetes, cardiovascular issues, balance problems and osteoarthritis.

Robotics used on the ISS have helped advance neurosurgery and the detection and treatment of breast cancer. Heart pumps to keep patients needing a transplant alive while they wait for a donor became possible thanks to knowledge about rocket engines. A life-saving treatment to stop bleeding after childbirth is based on antigravity suits worn by astronauts worn when they return to earth. Technologies such as smart vests that remotely track astronauts’ health metrics and tools that quickly analyse blood, saliva and urine samples could help improve patient care,

especially in remote areas.

Drug development

The pharmaceutical and biotech industries are also *interested* in understanding if microgravity can help them to improve or develop drugs with the likes of Sanofi, Merck, Eli Lilly and AstraZeneca, alongside smaller players, having sent experiments to the ISS.

For example, such conditions can improve crystallisation of proteins, making them less difficult to study and potentially easier to administer to patients. It's also being investigated how drugs can be produced in space, which will be a key factor for long missions.

There are, however, logistical and financial challenges for drug research in space, which could be partly alleviated by commercial operations. SpacePharma has developed *miniature laboratories* that can contain several experiments, which helps cut costs, and are remotely controlled. They can be taken to the ISS, be used on spacecraft and even be installed on a satellite.

Lateral thought

There's around 8,000 tonnes of *space junk* orbiting the planet, comprised of defunct satellites, spent rocket parts and hardware fragments, and collision warnings are frequently issued. Tracking all of them is impossible – an estimated one billion pieces are too small to detect and they have the potential to chip windows, damage solar cells, break satellite cameras, or take them out entirely, and puncture space suits. Work is being done to attempt to clear up some of this mess, but there's currently a lack of policy to make companies responsible for tidying it up themselves.

Nicola Watts is Health Care Specialist at *Curation* where this article was originally published

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