Skoltech scientists unveil a new cardiac monitoring gadget

March 5 2019

Credit: Skolkovo Institute of Science and Technology

A team of Skoltech researchers has created a device that can monitor a cosmonaut's cardiovascular system during pre-flight training, space mission and after-flight rehabilitation. The results of their study were published in the international journal *Acta Astronautica*.

With the advancement of digital technology, wearable and smart electronics are becoming commonplace for simple health measurements like step counting. Sophisticated wearable medical devices capable of capturing and transmitting more subtle data about health should be exceptionally accurate and user-friendly.

Skoltech scientists working on a high-precision AI-based cardiovascular monitoring device and the methods for processing and analyzing its outputs within their new sense2beat startup report that it can take ECG measurements and transmit them over a wireless communication link. The device provides constant ECG monitoring to diagnose a variety of cardiac arrhythmias that are difficult to capture during a short test with a stationary cardiograph.

"Our solution can benefit both cosmonauts and ordinary people," says sense2beat founder and Ph.D. student at the Skoltech Space Center Natalia Glazkova. "Cardiovascular diseases remain the No. 1 cause of death in Russia and globally. Nearly one-third of stroke patients are diagnosed with atrial fibrillation. Our device performs extended seven-day monitoring, thus raising the chances of detecting the problem at an early phase. We believe that this cardiac data collection and analysis tool will benefit healthcare in general and personalized health services in particular, while enhancing the efficiency of preventive tools and ultimately helping to significantly improve the quality of life and life expectancy."

"Our device is a much-needed solution for human space missions where the cosmonaut's body is subjected to severe overloads, and the heart's

response to such exposure is still poorly explored. In addition, our research contributes to the development of preventive medicine that serves to detect the first symptoms and prevent a disease wherever possible. We tried to create an elegant and handy device that would be easy to carry around. A modern gadget should be highly ergonomic for people who want to use it in their daily life," says Professor Tatyana Podladchikova of the Skoltech Space Center.

The Skoltech researchers continue to work on improving their new device. Currently, their research efforts are focused on enhancing the accuracy of the Big Data processing methods and denoising the signal received by the mobile device. These tasks are of high relevance for designing new wearable biomedical devices, ensuring reliable automated

More information: Natalia Glazkova et al. Non-invasive wearable ECG-patch system for astronauts and patients on Earth, *Acta Astronautica* (2019). DOI: 10.1016/j.actaastro.2019.01.036

Provided by Skolkovo Institute of Science and Technology