Space sleep study to shed light on aging

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Credit: Vera Kratochvil/public domain

University of Surrey and European Space Agency launch sleep study to tackle health problems shared by astronauts and the elderly

Ground-breaking study will use simulated micro-gravity to replicate the conditions faced by astronauts in space

Wearable technology, melatonin levels and blood samples will provide key to how sleep patterns impact health

The University of Surrey is participating in a project organised by the European Space Agency during which teams of European scientists will look at the effect of bed rest on the human body using a continuous bed rest protocol to simulate the effects of micro gravity in space.

In collaboration with the European Space Agency and funded by the Biotechnology and Biological Sciences Research Council, University of Surrey scientists will conduct a pioneering sleep study to investigate the health complaints shared by both astronauts and the elderly, such as bone and muscle loss, poor immune systems and increased inflammation.

Young, healthy male volunteers will spend two weeks living 'normally' in the lab. They will then undergo 60 days of continuous bed rest, with beds tilted backwards by six degrees to simulate micro gravity. The experiment will end with a two-week recovery period. Half the volunteers will form the control group, while the other half will be given an anti-oxidant drug cocktail designed to supress inflammation.

During the experiment, Surrey scientists will measure changes to the participants' sleep/wake patterns using Actiwatches, by monitoring brain activity with electroencephalography (EEG) and by tracking levels of melatonin—the hormone that helps regulate the body clock. Regular blood samples will also be taken to monitor how genes change in response to the simulated micro gravity. By investigating how the conditions disrupt sleep and body clocks, the study will help identify the genetic processes that contribute to the health problems experienced by both the elderly and astronauts in space.

Lead researcher, Dr Simon Archer from the University of Surrey, said "This study will not only provide valuable insight into how health problems experienced by astronauts in space can be avoided, but it will also bring us one step closer to understanding the mechanisms associated with the ageing process.

"Our research will provide more details about some of the molecular processes that are affected by micro gravity simulation, and how these relate to low muscle and bone mass, supressed immune function and increased inflammation. It will give the European Space Agency more molecular data on whether drug interventions can reduce these harmful effects."

Dr Thu Jennifer Ngo-Anh, Head of Human Research at the European Space Agency, said: "Organising month-long scientific studies is a huge task and aside from coordinating the researchers from all over Europe, choosing the test-subjects is extremely important as the success of the study depends upon their commitment."

David Parker, Chief Executive of the UK Space Agency, added: "We are delighted to see Dr Simon Archer and his team involved in this project. This is a great example of how research using space facilities can deliver real benefits here on Earth—and how world-leading experts from the UK are making a positive contribution to international space exploration." "The UK Space Agency supports research in space environments, managing national contributions to the European Space Agency's programmes for Life and Physical Sciences and the International Space Station. This enables cutting-edge research and technology development in a wide range of areas—including physics, materials, space science and biomedicine, as demonstrated by Dr Archer's new study."

Provided by University of Surrey