Press Release

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New simulated weightlessness study CNES and MEDES further understanding of the physiological effects of microgravity

Right now and until 29 March 2019, 20 volunteers are taking part in a new study into simulated weightlessness using the innovative method of dry immersion. Led by CNES and conducted at its MEDES space clinic, based at Rangueil Hospital in Toulouse, the study aims to simulate the effects of weightlessness on the human body. It will, in particular, enable us to further our understanding of specific physiological mechanisms and thereby improve conditions for astronauts during manned spaceflights.

The 20 men involved are all aged between 20 and 45, are in good health and were selected following a series of medical and psychological tests. They will each undergo 12 days of study, divided into three phases: 4 days in pre-immersion, 5 days in dry immersion and 3 days in post-immersion observation to assess their return to normality. The study will enable 10 French science teams selected by CNES to further their understanding of the physiological mechanisms affected by weightlessness, notably the redistribution of body fluids due to immersion and the effect this has on the eyes and brain. The efficacy of thigh cuffs for preventing fluid transfer is also being tested in this study. Should they prove effective, these cuffs would have the huge advantage of being extremely easy to put on by astronauts during space flights. The scientific information gathered will also contribute to public health, since the physiological effects of weightlessness are similar to those of extreme inactivity.

The space clinic remains the only place in Europe able to conduct such a study. CNES is playing a key role in this latest study into simulated weightlessness, financing the infrastructure used at MEDES, the round-the-clock medical team (doctors, nurses and orderlies), plus remuneration for the volunteers. CNES also selected the scientific protocols and is subsidizing the dozen or so laboratories involved in the study.

What is dry immersion?
Dry immersion uses a purpose-designed bath of lukewarm water, covered with a special elasticated, waterproof fabric that is attached all the way around the rim. This enables the volunteer to be immersed in the bath without actually touching the water. Water pressure is exerted across the entire surface area of the body, which interprets this as a total absence of support—similar to the effect of microgravity. Decreased movement due to the absence of body weight significantly reduces physical activity, while the immersion itself causes body fluids to be redistributed towards the chest and head.

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