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Human Physiology in Space (2)

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## A 5-DAY “DRY” IMMERSION: INFLUENCE ON THE REPRODUCTIVE SYSTEM OF WOMEN

**Abstract**

The deep space exploration opens up new prospects for the development of mankind. At the same time, maintaining the health of various body systems during space flight and subsequent adaptation to the Earth's gravity continues to be an urgent task. In this context, little attention has been paid to the health of the reproductive system, since a change in its condition does not pose a critical threat to life. Despite the gender shift towards men, more than 65 women have already made one or more space flights, and for them the state of the reproductive system is of fundamental importance, at least because healthy aging of the female body depends on hormonal balance. The purpose of this work was to study the effect of a 5-day “dry” immersion on the state of the reproductive system of female testers. Written informed consent was obtained from each subject prior to participation in the study. The study design and procedures were approved by the Biomedicine Ethics Committee of the SSC RF IBMP RAS (#615/MSK/06/06/22) and conformed to the Declaration of Helsinki. Before and after immersion on the 4th day of the menstrual cycle, the content of anti-Müllerian hormone, inhibin B, follicle-stimulating hormone, luteinizing hormone, and progesterone in the blood was determined. On the 4th and 9th days of the menstrual cycle, before and after immersion, the structure of the organs of the reproductive system was assessed using ultrasound. Experimental data showed an increase in the content of inhibin B by 35% ( $p < 0.05$ ), a decrease in luteinizing hormone by 12% ( $p < 0.05$ ) and progesterone by 52% ( $p < 0.05$ ) after immersion. At the same time, the size of the uterus and the thickness of the endometrium did not change. The volume of the ovaries on the 9th day of the menstrual cycle was reduced by 22% ( $p < 0.05$ ), while the average diameter of the antral follicles and the dominant follicle was after immersion higher by 14% and 22% ( $p < 0.05$ ), respectively. The duration of the menstrual cycle has not changed. The

obtained results may indicate that the stay in the 5-day “dry” immersion, on the one hand, probably stimulates the growth of the dominant follicle, but, on the other hand, can cause functional insufficiency of the corpus lutea. This work was supported by the program of fundamental research of the SSC RF – IBMP RAS 65.4. and UNU “Transgenbank”.