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LIFE SCIENCE SPACE RESEARCH IN CZECHOSLOVAKIA AND SLOVAK REPUBLIC

Abstract

Space research activities in the field of space biology and medicine have been conducted mostly under international cooperation in the INTERCOSMOS program with participation of scientists from eastern Europe and USA, France and Germany. In more than 45 experiments with biosatellites of Cosmos series and in 9 space flights of human subjects, the effects of microgravity on animal and human organism, the degree of stress loads, the effects of ionizing radiation and the function of vestibular system after exposure to weightlessness were studied. Several original results were observed : –The studies of the effects of ionizing radiation in intact and regenerating rat liver showed increased genome instability. The gamma radiation also significantly affected the extent of cell proliferation in rat brain. –In the studies of the effects of microgravity on the ontogenesis of Japanese quails by using a special equipments INCUBATOR1 and 2 placed on station MIR it was demonstrated that embryonal development of the quail is normal in the conditions of microgravity. –The significant activation of sympathoadrenal and adrenocortical systems was noted in rats after the space flights of 7 to 20 days. The artificial gravity on the board of biosatellite eliminated the stress response of adrenocortical system. – The devices PLASMA 01, and 02 or 03 specially designed for collecting and processing of blood samples during space flight were used on the space stations SALYUT and MIR for evaluation of stress loads in astronauts during space flights. It was demonstrated that there is only slight activation of sympathoadrenal function during short and long stay in microgravity, but marked increase of plasma stress hormone levels was noted during post flight period. –The studies of the response of neuroendocrine system to stressogenic affects of workload, insulin induced hypoglycemia, oral glucose tolerance test and mental stress (project ENDOTEST) during space flight showed that the response of plasma hormone levels to workload and metabolic load are altered by the stay in real microgravity. – The vestibular proprioceptive interaction for body orientation in astronauts after space flight was studied by using a special apparatus VESTIBULOGRAPH. The successful process of adaptation of vestibular system functions to microgravity was observed in the project SENSOASYMETRIA performed before, during and after space flight. These results were published in more than 650 papers in scientific journals.