THE FUTURE FOR NON-HUMAN PRIMATE MODELS IN SPACE

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Non-human primates have been extensively used in the space program since its inception. A number of species have been used including squirrel monkeys, rhesus monkeys and chimpanzees. In the early years they served as surrogates to establish basic safety and vehicle function characteristics. In more recent flights such as the non-manned Cosmos series launched by the USSR, now Russia, rhesus monkeys have been used to provide a great deal of information about non-human primate responses to micro gravity. A portion of the success of these recent rhesus missions has been due to the generous inclusion, by the originators, of a variety of international scientists. This significant international cooperation has been extremely beneficial to the overall program of studying non-human primates in space.

In the near future there will be several rhesus flights on space laboratory missions as part of a joint CNES, NASA program. They will involve restrained animals with a significant number of studies focused on bone, muscle, neural, metabolic and behavioral experiments. It will be the first time that rhesus monkeys fly on a manned mission. Preliminary consideration is being given to utilizing squirrel monkeys on a space laboratory mission later in this decade to gain initial data and experience on their behavior and function in space as a prelude to more involved studies on the space station in the early part of the next century. It is planned to include squirrel monkeys on Space Station Freedom as part of the centrifuge facility complex. The animals utilized for that program will be unrestrained for the majority of the time but the capability will be present to move them to restrained conditions to complete specific protocols. It will be the first time that long term adaptive responses can be studied in non-human primates in the micro gravity environment. Although specific protocols have not been developed it is anticipated that experiments will focus on bone, and neuromuscular physiology with ancillary experiments in cardiovascular systems, immunology and circadian/behavioral adaptations to chronic weightlessness. In addition, using the centrifuge, data can begin to be collected about the effects of partial gravity as will be encountered on the moon and Mars as well as control data for the microgravity experiments. These latter studies will represent important preliminary information as a prelude to prolonged human exposure to these environments.