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SESSION G: CONCURRENT POSTERS II
SPACEFLIGHT EXPERIMENT RESULTS I

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EXPOSURE TO MICROGRAVITY ALTERS PROPERTIES OF CULTURED MUSCLE CELLS. R. Gruener, R. Roberts and R. Reistetter, Dept. of Physiology, Univ. of Arizona, Tucson AZ 85724.

Significant morphological and functional changes take place in primary cultures of *Xenopus* myocytes and neurons after rotation in the slow clinostat (i,ii). To test if these cells are sensitive to the actual microgravity of space, we flew primary cultures of myocytes in the presence of polylysine-coated polystyrene beads which, like neurons, induce acetylcholine receptor [AChR] clustering. Cell cultures were mounted in the MDA hardware (ITA technologies; John Cassanto, President), in collaboration with Dr. Marian Lewis (University of Alabama) on STS-52 and -56 flights. Cells were exposed to beads within 24 hrs of orbit entry and were fixed prior to re-entry (exposure to microgravity, before fixation, was 9d for both flights). Data analysis revealed: decreased cell and nuclear surface areas, decreased actin filament linearity, and increased actin filament "cabling". AChR aggregation was decreased in response to bead contact, and in fluorescent bungarotoxin binding area present in bead-associated clusters. Data from these flight experiments show better than 80% (by parameters assayed) concordance with results from the slow clinostat. We interpret these results to provide further evidence for 1) cellular changes in altered gravity, 2) possible involvement of the cytoskeleton in gravi-sensing, and 3) usefulness of the clinostat as an earth-bound simulation paradigm.

i. Gruener, R. & Hoeger, G. Vector-Free Gravity Disrupts Synapse Formation in Cell Culture. *Am. J. Physiol.* 258: C489-C494, 1990.

ii. Gruener, R. & Hoeger, G. Vector-Averaged Gravity Alters Myocyte and Neuron Properties. *Av. Space Env. Med.* 62:1159-1165, 1991.

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DATABASE OF RODENT GROWTH AND FOOD/WATER CONSUMPTION DATA FROM SPACE SHUTTLE MIDDECK LOCKER EXPERIMENTS D.E. Leonard¹ and G.C. Jahns².
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The Space Life Sciences Payloads Office (SLSPO) of NASA Ames Research Center has supported seven life sciences experiments involving the use of rodents housed in the Animal Enclosure Module (AEM) on the Space Shuttle since October of 1990. The AEM, series-reflow hardware developed by the SLSPO, has been demonstrated to successfully house the rodents in a microgravity environment on the shuttle middeck for periods of up to ten days. The AEM is a self-contained unit, with passive thermal control and provision for continuous supply of food and water for the rodents. The AEM, fitted into a flight locker on the shuttle's middeck area, is equipped with fans for air circulation, lighting with adjustable timer, and food and water delivery systems. Water is crew-replenishable inflight; food is not. Rodents are gang-housed in a single cage within the unit. A self-contained temperature recorder that records and stores temperature from within the unit for readout postflight is included. The hardware is equipped with a lexan cover to permit crew observation of rodents; no provision is made for crew to access the rodents inflight. As a result of these flight experiments, as well as numerous ground tests in flight hardware, accurate averages as to rodent growth, food consumption and water consumption have been tabulated. During spaceflight, the rodents demonstrate predictable levels of food and water consumption and exhibit normal growth curves. This information is useful to investigators planning future spaceflight experiments with regards to payload complement, mission duration, food and water stowage, and other parameters. Presented is the detailed information regarding these and other parameters obtained as a result of these flights and ground tests.