

# Mice Thrive In High Gravity

► TWO GENERATIONS of white mice have grown up in and adapted to an extraterrestrial gravity environment created on earth.

While some science fiction heroes have been described as having unusual abilities because they came from high gravity home planets, so far the work of Dr. Jiro Oyama has not produced a race of super mice. Dr. Oyama is head of the physiology branch at the National Aeronautics and Space Administration's Ames Research Center, Mountain View, Calif.

On the other hand, if the mice prove to be like a group of rats also subjected to high gravity conditions at Ames, they may be somewhat smaller, tougher, and possibly may have longer life spans than normal "earth mice."

The mice have adapted without difficulty to weighing two-and-a-half times as much as their grandparents. They have no difficulty giving birth to young under high gravity.

"Home planet" for white mice has been a centrifuge which, for more than two years, has produced an environment with two-and-a-half times the earth's gravity.

A mother mouse and four offspring were all born on the whirling centrifuge and spent their lives there.

The "extraterrestrial gravity" environment is produced by a nine-foot diameter centrifuge which simulates the force of gravity through centrifugal force. This force, pushing the mice against the floor of their cages is equivalent to two-and-a-half times the force of gravity of earth.

Dr. Oyama reports that larger animals (white rats) have not been able to reproduce when continuously exposed to 2.5 G, or two-and-a-half times earth gravity.

These larger animals weigh one-half pound "on earth" and two pounds in the 2.5 G environment. This compares with a weight for mice of .06 pounds under normal gravity, and .15 pounds under 2.5 G.

Dr. Oyama has been performing the centrifuge studies with rats and mice as a part of a program of basic gravity studies. This work aims to identify physiological and metabolic effects of long-term exposures to increase or decrease in gravity environment.

By moving animals adapted to high G environments into the lower gravity of earth, scientists can study effects in animals of reductions in gravity. This will be useful to anticipate effects



NASA

**LIFE IN A CENTRIFUGE**—Two generations of mice have grown up and adapted to a high-gravity environment created on earth. Here, Dr. Jiro Oyama holds some of the mice which were born and lived their lives in a centrifuge at the Ames Research Center of the National Aeronautics and Space Administration, Mountain View, Calif.

on men of the lunar gravity environment of about one-sixth earth gravity or 1.16 G which is Mars with about four-tenths earth gravity, or .37 G.

Tentatively, Dr. Oyama has concluded the following:

Life span of rats under increased gravity is not decreased. In fact, data indicate a possibility that the high G may increase the life span of rats.

Increased gravity does not have detrimental effects on rats and mice even over long periods of time.

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## PSYCHOLOGY

### Mice May Navigate By Moon and Stars

► LIKE ANCIENT seafarers, wild mice may use nocturnal light sources—perhaps the moon and stars—as reference points in finding their way about at night.

Dr. J. Lee Kavanau of the University of California at Los Angeles, conducted experiments with wild, white-footed mice, putting them in cages

equipped with wheels for running. Running in the wheels simulates night running in their native habitat.

Dim lights of very low intensity were placed at either end of the cage so that mice running in the wheels could run toward the light if they chose, which they did frequently.

In one experiment lights at one end of the cage were switched off automatically every hour and lights at the other end came on. When this was done the mouse reversed itself, heading toward the light. However, the mice occasionally ran away from the light for short periods of time.

White-footed mice range far and wide from their nests during the night, perhaps covering as much as an acre in their quest for food and water.

These mice can find their way back when taken some distance away from their home environment and released. It seems possible that like some birds they use the moon as a navigational reference point.

Dr. Kavanau simulates dawn, dusk, moonlit and moonless nights by varying light intensity and color.

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