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EVENTS

Calorie Restriction And Exercise Breakthrough In Hormone Replacement

Report from the 1996 Meeting of the Gerontological Society in Washington, D.C.
By Stephen R. Spindler, Ph.D.,
Prof. Of Biochemistry,
University Of California, Riverside

Dietary calorie restriction is a nutritional regimen that extends maximum life span up to 50%, reduces cancer incidence, delays the onset of the diseases of old age (such as the loss of kidney function), and postpones the onset of many genetic diseases. One of the most intriguing debates in gerontology today is whether some or all of the effects of calorie restriction found in rats, mice and worms, will extend to humans.

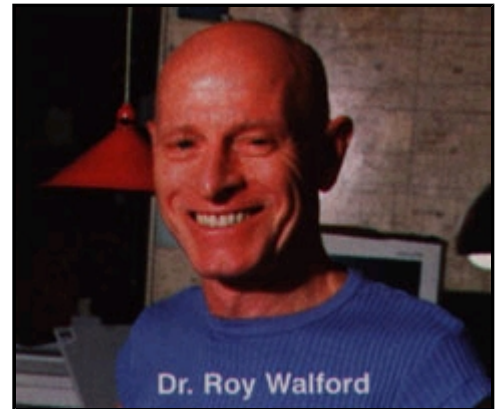
For this dietary regimen to work effectively, scientists have known that dietary calories must be reduced without depriving the animal of the nutrients required for good health, such as protein, fats, vitamins and minerals. However, many scientists had thought that humans, with their long lives (compared to rats and mice), were already as long lived as they could ever get.

However, at the 1996 meeting of the Gerontological Society of America (GSA) in Washington D.C., investigators from around the United States presented data suggesting that the answer to the question "Can humans benefit from calorie restriction?" might be "yes".

Dr. Roy L. Walford of UCLA Medical Center, spoke to a standing room only audience about the data he had gathered during the two years he and 7 others (4 men and 4 women) lived in Biosphere II-a huge glass terrarium located in the Arizona desert outside Tucson. Built by Texas billionaire Edward Bass, the huge facility had a myriad of technical and ecological problems.

BIOSPHERE EXPERIMENT

Because of chronic agricultural failures, one of the world's leading researchers in Gerontology and calorie restriction (Walford) was unexpectedly thrust into the first and only controlled human experiment in long term dietary restriction. This bit of serendipity allowed Dr. Walford to draw on his background in medicine and nutrition to insure that everyone in the enclosure ate a diet rich in all the nutrients required for good health, while they were limited in total calories by the repeated crop failures.



More importantly, from the point of view of those interested in whether calorie restriction will work in humans as well as in animals, Dr. Walford was able to monitor the physiology of the "Biospherians". He found that, as their weight dropped, so did their blood pressure (systolic and diastolic), blood cholesterol levels, and blood glucose concentrations-the same changes found in mice, rats and monkeys. All these changes are associated with good health and longevity.

There were also positive changes in blood cell populations in the Biospherians very similar to those found in the calorie restricted rodents. The results are the first direct evidence that the physiological changes found in calorie restricted animals may occur in humans as well.

CALORIE RESTRICTION IN MONKEYS

There were a good number of presentations by investigators from around the country engaged in non-human primate (monkey) studies of calorie restriction. The data from these studies indicate that the same kind of physiological changes produced in

calorie restricted mice and rats also occur in primates. These data fit nicely with the data from Biosphere II.

MILD CALORIE RESTRICTION AND MODERATE EXERCISE

While there is a dedicated group of people currently practicing calorie restriction in the hope of extending their lifespan, some for many years, a 20-to-30% reduction in daily calorie intake is not for everyone. There was good news at this year's conference for those who refuse to restrict themselves. Drs. Roger McCarter, B.P. Yu and their colleagues at the University of Texas Health Science Center at San Antonio, reported that aerobically-exercising rats fed just 10% less than rats who could eat all they wanted, lived significantly longer than their obese litter mates.

What the San Antonio researchers did that was new was to give the rats an opportunity to exercise by placing an exercise wheel in their cages. Not surprisingly, the fully fed rats were not interested in exercising at all. Their only activity on the wheel was sleeping. But the 10% calorie restricted group apparently had a lot more energy, and ran on the wheel voluntarily. The researchers found that moderate exercise combined with the 10% calorie restriction, markedly increased their mean and maximum life span over what would be expected for calorie restriction alone.

So the moral of this study seems to be that a combination of mild dietary restriction and moderate aerobic exercise may have a cumulative effect on life span. But anyone who wishes to incorporate these results into their own life should proceed with caution. First, the results have thus far only been found in rats. Second, anyone practicing calorie restriction should be sure to balance their dietary intake among many nutritious foods and use dietary supplements to ensure that they have adequate nutrition.

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