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Life Extension Update Exclusive

Calorie restriction mechanism proposed

A report published in the March 2007 issue of *PLoS Medicine* described the findings of a clinical trial conducted by researchers at the Pennington Biomedical Research Center in Baton Rouge, Louisiana which showed that calorie restriction lowered whole body oxygen consumption, reduced oxidative damage to DNA, and increased mitochondrial DNA in muscle cells. Mitochondria are the energy-producing organs of the cells which are the major consumers of cellular oxygen and the primary production site of free radicals.

Anthony Civitarese, Eric Ravussin, and colleagues enrolled 36 healthy overweight, nonobese men and women aged 25 to 50 and determined their individual energy requirements over a two week period. Metabolic testing was conducted during a five day inpatient stay before and after the treatment period. Participants were randomized to six months of a control diet designed to maintain weight, a diet restricted to 25 percent of the subjects' calorie requirements, or a diet whose calories were restricted by 12.5 percent combined with an exercise program designed to increase energy expenditure by an additional 12.5 percent.

The team discovered that a six month decrease in calories of 25% achieved by diet or by diet and exercise reduced 24 hour whole body energy expenditure (calories burned), indicating improved mitochondrial function, confirmed by an increased expression of genes involved in mitochondrial biogenesis and increasing mitochondrial mass. Additionally, calorie restriction was found to reduce skeletal muscle DNA damage, a marker of oxidative stress. The researchers also found an increase in SIRT1 gene expression in the skeletal muscle of calorie restricted participants, suggesting that the gene may contribute to improved metabolism and increased longevity in humans as it has been found to do in simpler organisms.

"We show, to our knowledge for the first time, that in overweight nonobese humans, short-term calorie restriction lowers whole-body energy expenditure (metabolic adaptation), in parallel with an induction in mitochondrial biogenesis . . . and a decrease in DNA damage," the authors write. "We therefore propose that calorie restriction induces biogenesis of "efficient" mitochondria in human skeletal muscle as an adaptive mechanism, which in turn lowers oxidative stress."

Health Concern

Caloric restriction

How long we live may not be determined by what we eat so much as how much we eat. Of all the potential anti-aging approaches, none have so far shown the promise of caloric restriction. Over the past 75 years, many studies have shown that caloric restriction extends life span in a wide variety of species, from invertebrates to rodents, to mammals. So far, no long-term studies have been completed in primates or conducted in humans because of the sheer length of any proposed study (perhaps a century or more for human studies!).

Two approaches are currently being explored to make the benefits of CRON more accessible. The first is the most direct: reducing calories by 30 percent to 40 percent. This requires a careful diet that is rich in nutrients, complex carbohydrates, soluble fiber, and lean protein. Soluble fiber has been shown to decrease hunger, although hunger cannot realistically be eliminated completely during a dedicated CRON diet. Consuming fiber before meals can reduce the rapid absorption of simple carbohydrates and help decrease the post-meal surge in insulin (Anderson JW et al 1993).

The second approach is the development of drugs that alter body biochemistry to mimic the benefits of CRON.

Increased life span in yeast can be induced by adding resveratrol, an antioxidant found in red wine, to their growth medium. These results have been replicated in both worms (*Caenorhabditis elegans*) and pomace flies (*Drosophila melanogaster*) (Wood JG et al 2004), suggesting that the action of resveratrol may be equivalent to that of caloric restriction.

http://www.lef.org/protocols/lifestyle_longevity/caloric_restriction_01.htm

Featured Products

Resveratrol Capsules

Findings from published scientific literature indicates that resveratrol may be the most effective plant extract for maintaining optimal health.

Red wine contains resveratrol, but the quantity varies depending on where the grapes are grown, the time of harvest, and other factors. After years of research, a standardized resveratrol extract is now available as a dietary supplement. This whole grape extract contains a spectrum of polyphenols that are naturally contained in red wine such as proanthocyanidins, anthocyanins, flavonoids, etc.

<http://www.lef.org/newshop/items/item00655.html>



Enhanced Fiber Food Powder

Enhanced Fiber Food Powder provides natural, bulk-producing soluble fiber. These fibers help maintain healthy bowel function and help to maintain cholesterol levels that are already within the normal range. Enhanced Fiber Food Powder helps clean the walls of the intestines and enhances the elimination of unwanted fecal byproducts.

By taking these soluble fibers before meals, one can often achieve earlier satiety, thereby reducing one's calorie intake.

<http://www.lef.org/newshop/items/item00907.html>



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<http://www.lef.org/lpages/os2>

If you have questions or comments concerning this issue or past issues of Life Extension Update, send them to ddye@lifeextension.com or call 954 202 7716.

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