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In this issue

Life Extension Update Exclusive

The mitochondrial oasis

Health Concern

Caloric restriction

Featured Products

Resveratrol 100 milligram capsules

Mitochondrial Energy Optimizer

Life Extension

Final Clearance Sale Extended!

Life Extension Update Exclusive

The mitochondrial oasis

The September 21, 2007 issue of the journal *Cell* published a report by scientists at Harvard, Cornell University, and the National Institutes of Health of Health which reveals new information concerning how calorie restriction influences longevity.

Harvard Medical School associate professor of pathology David Sinclair and his colleagues described how the stress of calorie restriction activates a gene known as NAMPT, which causes NAD (nicotinamide adenine dinucleotide) to accumulate within the mitochondria of cell. This increases the activity of mitochondrial enzymes produced by the genes SIRT3 and SIRT4, strengthening the mitochondria, increasing energy output, and slowing the aging process of the cell, a process also activated by exercise.

SIRT3 and SIRT4 are members of a class of genes known as sirtuins that play a role in longevity. Another member of the sirtuin family, SIRT1, was previously found to increase longevity when stimulated by resveratrol, a compound that occurs in red grapes.

The finding further fuels the suspicion of some researchers that the mitochondria, which are the power plants of the cells, play a vital role in longevity. Cells can survive without other intracellular energy sources as long as mitochondria are intact and functioning. Commenting on his team's "mitochondrial oasis hypothesis", Dr Sinclair explained, "Mitochondria are the guardians of cell survival. If we can keep boosting levels of NAD in the mitochondria, which in turn stimulates buckets more of SIRT3 and SIRT4, then for a period of time the cell really needs nothing else."

"We're not sure yet what particular mechanism is activated by these increased levels of NAD, and as a result SIRT3 and SIRT4," he noted, "but we do see that normal cell-suicide programs are noticeably attenuated. This is the first time ever that SIRT3 and SIRT4 have been linked to cell survival."

"We've reason to believe now that these two genes may be potential drug targets for diseases associated with aging," Dr Sinclair stated. "Theoretically, we can envision a small molecule that can increase levels of NAD, or SIRT3 and SIRT4 directly, in the mitochondria. Such a molecule could be used for many age-related diseases."

Health Concern

Caloric restriction

Caloric restriction is the most effective and well-documented pathway to longevity in animal studies. Both the mean and maximum life spans of yeast, rotifers, water fleas, nematodes, fruit flies, spiders, fish, hamsters, rats, mice, and dogs have been extended significantly by decreasing normal caloric consumption by 30 percent to 40 percent (Weindruch R et al 1988).

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.

Recent studies at the BioMarker Pharmaceuticals laboratory have shown that a nutrient formula from the Life Extension Foundation that contains extracts of grape seed and skin, a whole red grape resveratrol extract, vitamin C, and calcium (from calcium ascorbate) can produce many of the gene expression effects found in mice on CRON. Studies funded by the Life Extension Foundation at the Chinese Academy of Sciences in Beijing have shown that this formula can improve the strength and coordination of pomace flies (*D melanogaster*) afflicted with a motor disorder that is similar to Parkinson's disease in humans. This formula can protect mitochondria (the energy-generating power plants in the cell) isolated from rat livers from damage caused by exposure to carcinogens.

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

Featured Products

Resveratrol 100 milligram capsules

Findings from published scientific literature indicate that resveratrol may be the most effective plant extract for maintaining optimal health.¹ Resveratrol, a constituent of red wine and possessing diverse biochemical and physiological actions, including estrogenic, anti-platelet, and anti-inflammatory properties, has long been suspected to have cardioprotective effects.

<http://www.lef.org/newshop/items/item00970.html>



Mitochondrial Energy Optimizer

Mitochondrial Energy Optimizer incorporates the tremendous advances in our knowledge about the importance of maintaining mitochondrial integrity as we age. Scientists now know that mitochondrial decay in aging is a major driving force behind the aging process.

As the mitochondria burn fatty acids to produce cellular energy, it generates a host of free radicals in the process. That is why a mitochondrial antioxidant like lipoic acid is so critical. This comprehensive formula provides a much more potent form of lipoic acid (called R-lipoic acid) than its predecessor, ChronoForte, along with a more effective form of carnitine, called acetyl-L-carnitine--arginate.

<http://www.lef.org/newshop/items/item00769.html>



Final Clearance Sale Extended!

Due to constant improvements and upgrades to our formulations, we are left with a surplus inventory of our classic formulas. To blow out surplus inventory, we are slashing prices so low that health conscious individuals cannot resist clearing our shelves of avant-garde formulations that commercial companies still do not emulate.

For a limited period of time, we are offering the popular products described in the catalog at prices far below what health food stores pay. This incredible sale expires on September 24, 2007, or while supplies last.

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

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

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