

Q&A

Life Extension; Adding Years to Life and Life to Years

Q What exactly is Life Extension and what do I have to do to achieve it? Will my life have to revolve around gym hours, bizarre diets and endless pill popping?

A The short answer to the second half of that question is NO on all counts, but let's begin with the concept of Life Extension itself.

First and foremost, life extension, while literally meaning to extend one's lifespan, also means to extend one's health span. It is about maintaining the health and vitality associated with youth for as long into one's life as possible. Of course, maintaining such an optimal level of health can lead to longer life, but more on that later.

Diet, exercise, and supplementation will have to become integrated into your life, that much is true. However, the accumulated disruptive effect of these factors does not have to be as extensive as you may think. To date, the only CLINICALLY PROVEN method to extend lifespan in mammals is Calorie Restriction (CR), or Calorie Restriction with Optimum Nutrition (CRON). The latter term says it all in five concise words. Simply eat less food calories than your body thinks it needs, while maintaining optimum levels of essential nutrients. This means selecting food that has the highest nutrients and the fewest calories. If yours is a typical North American diet, you would probably have to eat significantly more fruits and vegetables and significantly fewer cereals and grains. You will also have to cut out sugar, refined carbohydrates and saturated fats as completely as possible. Figure 1 provides a food pyramid of what a typical CRON diet would look like. This is not some bizarre, fad diet. It is a lifestyle choice, and if implemented gradually, on a step-by-step basis (i.e. on the first month drop sugar, the next month drop saturated fat, etc.) it can be a relatively painless choice at that.

As far as exercise is concerned, more is not necessarily better. The types of exercises advocated by life extensionists are actually as modest as they are varied, and they can be seamlessly integrated into most people's lives. One Harvard study found that 30 minutes a day of simple walking at an average pace for 5 days a week cut the risk of stroke by 24%.¹ The same benefits can be obtained from playing with your children or simple exercise after work - nothing extreme here either. Furthermore, such physical activity has been shown to accentuate the effects of a CRON diet.²

As far as supplementation is concerned, antioxidants are a must, as free radical generation has been shown to increase with age.³ Vitamin C, full-spectrum vitamin E, and R(+)-Lipoic acid are optimal nutrients to add to a complete and balanced multivitamin/multimineral formulation to address this one avenue of aging.

Another avenue of aging is the development of advanced glycation endproducts, appropriately known as AGE. This is the process whereupon sugars in your body such as fructose or glucose bind to bodily proteins or lipid molecules without the mediating action of an enzyme, leading to the formation of AGE, which in turn can eventually lead to stiffening and loss of function. AGE are common among diabetics, which is why diabetes has been referred to as a form of 'advanced aging'. Benfotiamine and pyridoxamine, two unique and highly advanced forms of vitamins B1 and B6 which have been shown in clinical studies to inhibit AGE and thus addresses another major front in the battle against aging.

A third fundamental avenue of aging is methylation, a metabolic process so pervasive that it affects everything in your body from nerve transmission to gene expression. However, the methylation process also produces a toxic by-product known as homocysteine. Elevated levels of homocysteine can cause particular damage to cells lining the arterial walls, potentially leading to premature arterial deterioration and/or early heart disease. An efficient methylation (or more accurately, a 're-methylation') system will safely recycle much of the homocysteine it produces, but this is highly dependent on adequate nutrition. Additionally, homocysteine levels have been shown to rise with age.⁴ An exceptionally effective substance known to inhibit homocysteine is trimethylglycine (TMG), also known as betaine.⁵

Finally, there is an exciting new substance that mimics the effects of the CRON diet itself, and this substance is called 3-carboxy-3-oxopropanoic acid.

Designing a supplement regimen that is based on accentuating the CRON diet as well as addressing the three previously identified main avenues of aging thus far, namely free radical production, AGE, and methylation, certainly does not have to be excessively complicated - particularly in light of the examples given.

Q Is there any proof that all this actually works in the real world, not just in the lab? If so, how?

A An excellent question. The body of evidence supporting the CRON diet is overwhelming. For the sake of brevity, we will not delve into the hundreds of studies among laboratory animals (including primates - who share as much as 98.3% of our DNA) whose lifespans were extended using CRON.

If we look at human studies, the evidence supporting the CRON diet is extremely encouraging. You will notice that the word evidence is used as opposed to outright proof, but there is a perfectly valid reason for this. Determining if

CRON could actually extend the lifespans of adult humans would take the better part of a century and cost prohibitive amounts of money, not to mention the fact that the scientists running the experiment would all be dead before the final results could be determined. However, a chronological anomaly in human existence has provided us with a very approximate snapshot of what a human population may look like under the CRON diet: Okinawa.

The 1.3 million citizens of the Japanese island of Okinawa have always led an isolated existence from their mainland compatriots, leading to the development of a distinct dialect, culture...and diet. This isolation was extended with the US military administration of the island that lasted until 1972. The pre-1972 diet of Okinawans depended heavily on local vegetables, with protein limited to poultry and fish (the latter also serving as the primary source of essential fats). Most importantly, the Okinawan diet contained one-sixth fewer calories than that of mainland Japan, mainly due to a lower intake of grains and sugars. In short, the traditional Okinawan diet is very much in line with a conservative CRON diet.⁶ The result is that the island of Okinawa has by far and away the highest percentage of centenarians (people aged 100 years or more) of any geographic entity on the planet. A study in 1990 showed mainland Japan averaging 21.6 centenarians per 100,000 people, a figure considered to be the highest in the developed world; the US averaged 15.0 - and Okinawa averaged an astonishing 133.8!⁷ Furthermore, unlike the now-disproven longevity myths of isolated communities in the Caucasus and Latin America, the aforementioned figures can be verified by astute Japanese census bureau data.

Returning to the lab, human scientific studies of practical durations (weeks and months) have revealed that people on a CRON diet can expect better blood sugar,⁸ insulin,⁹ cholesterol,¹⁰ and blood sugar levels.¹¹ The connection between these improvements and the effects they can have on life extension are simply undeniable.

One human trial revealed that the CRON diet may prevent colon cancer,¹² while another found that it can lower the risk of breast cancer in women,¹³ and yet another revealed an underlying force that may just possibly explain the effects of the CRON diet in a nutshell. This particular study demonstrated that the CRON diet induces key hormonal metabolic changes, forcing the body to take steps to use energy more efficiently and thus utilize nutrients more effectively.¹⁴

Returning to the area of supplementation for a moment, 3-carboxy-3-oxopropanoic acid is designed to influence many of the same genes affected by the hormonal

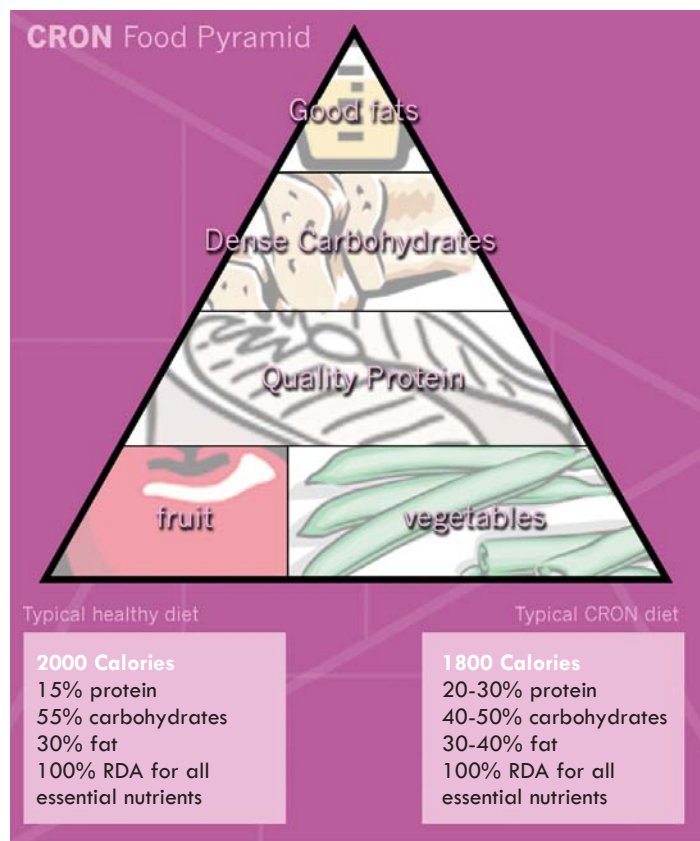


Figure 1. CRON Food Pyramid

metabolic changes induced by the CRON diet. In fact, in a soon-to-be published study conducted with laboratory mice, it was found that 356 different genes were affected in the same way by 3-carboxy-3-oxopropanoic acid as they were by the practice of calorie restriction. Studies with this exciting new compound are ongoing.

The supplemental protocols to counter the three known avenues of aging can also claim exciting study results to their credit. A 2007 study confirmed that there are declines in plasma concentrations of antioxidants such as Vitamin C that are age-dependent,¹⁵ reaffirming the need for antioxidant supplementation in the golden years. As far as AGE (advanced glycation endproducts) are concerned, benfotiamine can boast numerous human studies, particularly with those suffering from diabetic neuropathy, which is the deterioration of the nervous system due to diabetes, with AGE playing a significant role in that deterioration. We have already discussed how diabetes can be referred to as a form of 'advanced aging'. Benfotiamine was shown to improve nerve function in diabetic nephropathy sufferers by as much as 30% in one human study,¹⁶ while alleviating diabetic nerve pain by 50% in another.¹⁷ This was achieved through benfotiamine's inhibition of AGE, and AGE occurs in everyone to varying degrees and has been shown to be clearly associated with the aging process.¹⁸

We have already mentioned the importance of methylation, and how the trimethylglycine (TMG)-led protocol can inhibit the homocysteine that methylation produces. In fact, studies have demonstrated that TMG can lower homocysteine levels by as much as 30%, making TMG the most effective homocysteine-lowering substance known.¹⁹

Finally, we have also mentioned how physical exercise can amplify the effects of the CRON diet and prevent the onset of certain disorders. Yet there are further clinical trials that prove that even modest exercise regimens such as assisted walking can improve mobility and independence among the infirmed elderly.²⁰ From this example, it is not difficult to envision the preventative benefits of lifelong physical activity, and nothing can encapsulate the message of 'adding life to your years and years to your life' more clearly than that.

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