

In this holy month of Ramadan, as the Muslims fast, this would be more relevant than ever. Scientists call it calorie restriction. The Sept 21 issue of the journal Cell published a report by scientists at Harvard, Cornell University, and the National Institutes of Health. This reveals new information which infers how calorie restriction leads to longevity.

Harvard Medical School's associate professor of pathology David Sinclair and his colleagues show that calorie restriction stress activates a gene known as NAMPT. This causes NAD (nicotinamide adenine dinucleotide) to accumulate within the mitochondria (the energy centre) of the 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 (and hence red wine).

The finding further fuels the suspicion of some researchers that the mitochondria, which is the power plant of the cell, plays 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 are not quite sure how this happens."

However, scientists in the team did see normal cell-suicide programmes reduced. 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. There is a long history to this."

Fasting is an element that we see in every major religion.

Indeed, calorie restriction is the most effective and well-documented pathway to longevity in animal studies.

Both the average and total life spans of yeast, rotifers, water fleas, nematodes, fruit flies, spiders, fish, hamsters, rats, mice, and dogs have been extended significantly by decreasing normal calorie consumption by 30 per cent to 40 per cent.

It is important to note that we are looking at double digit percent increase of life spans. This means adding potentially tens of years to the human lifespan.

Fasting must have been common in our evolution where our ancestors had to go through phases of feast and famine in order to survive.

This is what animals in the wild do even today. We know that these animals would be healthier than the overfed pets in our living rooms.

The goal of calorie restriction is to achieve a longer and healthier life by:

- eating fewer calories
- consuming adequate vitamins, minerals, and other essential nutrients

In other words, calorie restriction does not mean nutrient restriction. You eat foods that are very dense in terms of nutrients but really low in calories. This means cutting out all those empty calories.

Sugars and flours generally contain very little nutrition for their calorie content.

They also have high glycemic indices,

which means that your body absorbs them quickly, leaving you wanting more a short time later.

Eat both green leafy (salad) and other vegetables. Vegetables both green leafy vegetables and non-leafy vegetables contain the highest content of a wide variety of nutrients for their calorie content. By volume (and often by calories) vegetables are the major component of many calorie restricted but not nutrient deficient diets.

Carefully select your protein and fat sources. Both protein and fat are required macronutrients, but they can have a significant influence on a person's risk factors for a wide variety of diseases.

Make sure your protein intake is sufficient, but not overly abundant.

Make sure your proteins are complete and balanced. A complete protein contains all the essential amino acids, while a balanced protein contains all those amino acids in ratios that are most useful to human biophysiology.

Select monounsaturated fats, avoid saturated fats, and consume some Omega-3 fats. Foods containing monounsaturated fats include olive oil, almonds, hazelnuts, and avocados. Most of your fat intake should be from these foods. A very small amount of fat should be in the form of Omega-3 fatty acids, which are found in fatty fish (e.g. salmon) and flax oil.

Here is a word of caution. Fatty foods, even healthy choices, are high in calories so be sure that you carefully track your intake so as to stay within your calorie goal.

Calorie restriction can continue beyond the fasting time to buka puasa. It could even continue beyond the fasting month and be a way of a long and healthy life.

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