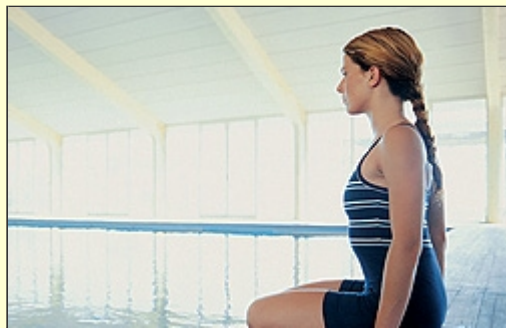


Protein restriction could be an alternative to calorie restriction in humans



According to an article published in the October, 2008 issue of the journal *Aging Cell*, it might not be necessary to adopt the challenging regimen of calorie restriction in order to extend one's life span. Researchers at Washington University School of Medicine in St. Louis have discovered that cutting back on protein may provide the same benefits in humans that have been observed in calorie restricted animals.

Washington University assistant professor of medicine Luigi Fontana, MD, PhD and colleagues report data from two long term studies of humans who practiced calorie restriction with optimal nutrition (CRON), which revealed that, unlike calorie restricted animals, human subjects failed to experience a decline in insulin-like

growth factor-1 (IGF-1). IGF-1, which is produced in the liver, has been shown to decrease by approximately 40 percent in severely calorie restricted animals. These animals live up to 50 percent longer than nonrestricted animals and experience a delay in cancer and other age-related conditions. Mutations in the insulin/IGF-I signaling pathway that reduce its function have been shown to increase maximum lifespan in several species.

"For years, we have been following a cohort of people from the CR (Calorie Restriction) Society who have been on long-term calorie restriction," Dr Fontana stated. "We found no difference in IGF-1 levels between people on calorie restriction and those who are not."

"That was puzzling because it was the first time we hadn't seen agreement between mice and rats on calorie restriction and humans on calorie restriction," Dr Fontana explained. "But we know there are two major influences on IGF-1 levels: calorie intake and protein intake. So we decided to look at the influence of protein."

Dr Fontana and his associates next examined a population of strict vegans who consume no animal products, which results in a lower protein intake than most people, including those who practice calorie restriction. "The vegans had significantly less circulating IGF-1, even if they were heavier and had more body fat than CRONies," Dr Fontana stated. "Protein in the diet seemed to correlate with the lower levels of IGF-1. The strict vegans took in about 10 percent of their total calories from protein, whereas those on calorie restriction tended to get about 23 or 24 percent of calories from protein."

When asked to reduce their protein intake for a few weeks, the researchers found a dramatic decrease in IGF-1 among CR Society members, which suggests that protein restriction could have a greater impact than calorie restriction in humans.

Dr Fontana and colleagues do not suggest that people adopt low protein diets, but rather, that they follow the current recommended daily allowance (RDA) for protein, which is 0.82 grams of protein per kilogram of body weight, an amount that is lower than that consumed by most individuals in Western societies. "It's much easier to restrict protein than to restrict calories," Dr Fontana observed. "If our research is on the right track, maybe humans don't need to be so calorie restricted. Limiting protein intake to .7 or .8 grams per kilogram per day might be more effective. That's just a hypothesis. We have to confirm it in future studies."

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Health Concern

Caloric restriction

Because caloric restriction decreases body weight, especially dangerous abdominal fat, researchers originally thought its ability to prolong life was associated with decreased fat.

However, this hypothesis was questioned after a study showed that genetically obese Zucker rats experienced no change in body fat percentage while on CRON compared to free-feeding controls, even though the restricted animals

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weighed less (Harrison DE et al 1984; Johnson PR et al 1997; Keenan KP 1996). Clearly, there were some other mechanisms at play.

Mounting evidence suggests that CRON acts, at least in part, by improving insulin sensitivity, thereby reducing insulin and glucose levels.

The data suggest that most people consume too many calories for optimal health. Part of the problem may be evolutionary. Stone Age humans consumed few calories from simple carbohydrates and more from complex carbohydrates, which are rich in natural fiber. High-fiber foods tend to be more filling than simple refined sugars and refined carbohydrates such as white flour.

Even if our genes are still living in the Stone Age, we are not. To maximize our longevity, we need to find a way to have the benefits of caloric restriction without being constantly distracted by hunger. One of the persistent problems with people and CRON (calorie restriction with optimal nutrition) is low compliance. Maintaining a dramatically reduced caloric intake over the long-term can be very demanding, especially in a culture surrounded by inexpensive, plentiful, calorie-rich, nutrient-poor food. Realistically, few people are willing to reduce their caloric consumption by 30 percent to 40 percent (Roth GS 2005).

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.

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