

Talking About Evolution: Caloric Restriction and Insulin

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After sex, politics and religion, the most volatile issue folks can discuss is diet. Because I like simplicity, I look for the most basic, essential nugget that might drive my thinking when it comes to such a difficult subject. What it comes down to for me is the wisdom of nature and how we, as a species, have existed in the natural world for close to 1 million years. What have we been eating all that time? How often and how much? These answers determine my view of a proper diet. It's essentially what our human metabolism has been raised on.

I like to give my patients a visual image that stays with them. Here is that image: If you are in a room, take one wall and use the length of that wall as a timeline of 1 million years, which is close enough to how long we have been humans. At one end is 1 million years ago and at the other end, today. Stand up, point to the middle of the wall and say, "500,000 years ago." Then stand at the three-quarter point on the wall and say, "250,000 years ago." Then repeat by halving the remaining section of wall, saying, "125,000 years, 63,000 years" and so on.

You will now be at the last few inches of the wall. Now say, "Between 40,000 and 10,000 years ago, agriculture developed." Have the patient look at the entire length of the wall, pre-agriculture; then say to them, "This is how long we were hunters, scavengers and gatherers. We ate what we could kill, scavenge and find. We ate animals (which only ate wild foods), nuts, seeds, grubs, tubers, fruits and wild greens as our only sustenance. Our human metabolism has evolved to encounter a certain amount of glucose that fell within a small range. Our access to large amounts of sugar was very limited; at most, some honey from a hive, berries or other fruits that were ripe. Now, flash to the last inch or two of the wall and look at what now is available to humans - things that have previously never been available! I am not including the man-made substances that never existed in nature. The amount of glucose now readily available to us is on the order of 10,100 or even 1,000 times the amount that humans have been wired for on a daily basis!"

On the most basic level, if you are wondering what the best foods are to eat - and how much, and how often - take a cue from what we were designed for: feast and famine, only wild foods, without processing. (Remember that agriculture has only been around a tiny fraction of our evolution.) The further back in time you go, the better the food. We ate fresh, wild, seasonal and local. Our average daily caloric intake was relatively low. We were designed to be lean, in order to maximize efficient movement by keeping loading on joints as low as possible, which maximized circulation efficiency, which brought nutrients to where they were needed and brought waste products away. Foods were high in bulk and low in energy. In other words, food had relatively high amounts of fiber and micronutrients and lower amounts of energy, which satisfied our needs for leanness.

Now let's look at the vital role insulin plays in our metabolism. It's a common misunderstanding to think of insulin purely as a mitigator in glucose metabolism. Insulin plays a part in almost all major aspects of our metabolism. It's vital to fat storage and use, as well as mineral metabolism, especially sodium, calcium and magnesium. It has a fundamental role in endocrine function,

inflammatory response, cholesterol metabolism, immune response and mediation of cell growth and cell death. This is not the entire list. Is it any wonder that when looking at diseases of modern times - chronic, degenerative disease - the common denominator to just about every one is insulin?

Getting back to our evolution, we have multiple hormones that raise blood sugar: cortisol, growth hormone, epinephrine and glucagon, to name a few. We have only one to reduce it: insulin. The reason for this is that we always were in short supply of glucose for essentially a million years. It was only very recently that the situation reversed. Now, we have too much. When we eat high-energy foods, especially carbohydrates, our blood glucose goes up; this highly stressful situation forces the pancreas to secrete insulin, which is called upon to reduce the glucose in the blood by having the cells take it up. The lowering of blood glucose then causes the body to release cortisol and other hormones to raise it again. We are thus on a roller coaster of glucose control, going up and down. Eating is a highly stressful event. We are not metabolically prepared to deal with so much food so often. We are not used to having high-energy foods, such as carbohydrates, in such great quantities.

Let's look more closely at the issue of energy consumption. In rodent studies, it's a foregone conclusion that reduced-calorie diets, or energy restriction, will increase mean and maximal lifespan significantly. Primate studies also are pointing in the same direction. Because primates live longer than rodents, it takes much longer to see results in these kinds of studies. Physiologic studies, however, in primates and humans, parallel the rodent studies. Ronald Neil Kostoff, who did a text mining study, or meta-analysis, of the discipline of energy restriction, writes in the *American Journal of Clinical Nutrition*, October 2001: "As far as I can determine, controlled energy restriction is the only regimen that has been shown in the laboratory to increase life span and therefore may be the foundational requirement for proper diet."

As clinicians and as healers, we sometimes can get lost in the prism of our daily lives. What seems normal and ordinary, when looked at through an evolutionary perspective, now becomes a freak show. Humans have deviated from the natural state so quickly and dramatically that we are metabolically in a chronic state of jet lag. We don't know where we are, what time it is, or whether we are hungry or thirsty. We are in our heads and out of our bodies. We have lost touch with our cellular heritage and it's time to reconnect. I am not saying we must throw out our Pinot Noir, scorn central heating and collect roadkill for dinner. Perhaps, though, we can tone it down a little.

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