

[section taken from Art De Vany's "Evolutionary Fitness Essay"]

Feeding

Evolutionary Fitness eating is simple, but it isn't everything. One must consider food intake in the context of activity patterns. You are an open energy system--- energy flows through your metabolic pathways out into the environment around you. You must attain a rate of energy flow or flux that is more characteristic of ancestral patterns so that appetite becomes a reliable clue to food intake. A higher rate of flux will also be a key to directing nutrients to muscle, bone, brain, and organ tissue rather than to fat. Here are some keys to Evolutionary eating that are balanced against the practical reality that we live in the 21 century rather than in 40,000 BC. I do not try to eat like a Paleolithic ancestor, but I do use the insights of the scientific literature on the Paleolithic diet to guide my food choices and eating patterns. I also pay close attention to the scientific literature on nutrition and exercise; but I use evolutionary reasoning to interpret this literature because it is full of contradictions.

Homo sapiens is an omnivore; your diet must contain an ample variety of fresh plant foods and lots of amino acids and essential lipids. The only universal characteristic of ancestral and living hunter-gatherer diets is the almost complete absence of grains and simple carbohydrates. There were no simple carbohydrates like sugar and pasta in the evolutionary past. The Ice Ages were times of protein plenty and scarce fat and carbohydrate. Fruits were tough and fibrous, not the refined, sweet stuff we have today. The closest thing to a simple carbohydrate was honey that was rare and guarded by wild bees. There were no grain or cereal sources of carbohydrates in the ancestral diet. Hunter-gatherer diets contain an enormous variety of plant foods and are high in protein (the median is about 35 per cent of calories from protein). Human metabolism cannot handle protein levels above 35 per cent over a long term. Cofactors, in the form of fat or carbohydrate, are required in order to utilize protein. So, variety and quality are the key objectives of the Evolutionary Fitness Diet.

Live at high-energy flux and eat randomly, varying food intake to the scale of activities. This includes the odd brief fast, as though hunting is lean. The body regulates food intake naturally when you live at the high-energy flux of an evolutionary trainer. It is when we are sedentary and live at low energy flux that our appetite mechanisms fail to match energy intake to expenditure (the evidence shows that infants regulate energy intake precisely and children only lose this ability when they become sedentary).

Animals confined to feeding pens or cages eat more than they expend in energy. That is how cattle are fattened for slaughter. Humans who live at low energy flux because they are sedentary and inactive will over eat, just like cattle in a feeding pen. Even though they are free to move about and are not caged, their metabolism is trapped in a feeding pen mode. It's another one of those evolutionary paradoxes. When we are inactive, we trigger an eating response and eat more than we expend in energy. The basis of this may lie in an adaptation that would let our ancestors recover from the intense activities of the hunt by eating beyond their energy requirements when they rest in order to rebuild tissue and energy stores. The ability to eat beyond energy needs would be essential to the survival of any organism that lived in the world of our ancestors with its variable energy expenditure and intake.

The answer is clear: live as though you are a free-ranging, adaptive human being, not like some animal being fattened in a pen for the kill. It is hopeless to try to attain the precisely balanced intake and expenditure of calories preached by diet promoters. And it is impossible to do if you are sedentary for you trigger this evolved over eating adaptation.

Our ancestors were better nourished than all but a few of us because they ate low calorie, nutritionally dense foods, all fresh and uncontaminated, and they ate in large quantities to fulfill their high energy needs. Dieters who face calorically rich foods with low nutrient content and who eat in small quantities face a real risk of malnutrition. If they are sedentary the risk is even higher because they must restrict food intake so severely.

I am more concerned with energy expenditure than intake, for it is energy expenditure that determines energy

flux and appetite. High-energy flux brings our appetite control mechanisms into the ancestral range where they were evolved to operate.

Live as though you are in the world that existed before the invention of agriculture. There was no grain or cereal or manufactured food in the ancestral environment. Our ancestors ate fresh fruits and vegetables and meat. They got no milk beyond the age of 4. They ate no cereals and consumed no vegetable oils. Their diets were not particularly low on fats; indeed, for a few million years prehuman hominids may have lived on the fatty bone marrow and brains of scavenged kills more than on fresh meat.

Even when they became premier big game hunters, humans preferred the fatty cuts of meat because the wild animals they hunted were very lean. Modern meat contains around 33% fat as opposed to 4% fat in wild game. And, there is a higher proportion of saturated to unsaturated fat in grain-fattened modern meat. Consequently, even a diet moderate in fat, say 40%, is high in saturated fat when it is composed of modern meats. In addition, most individuals who eat moderate or high amounts of fat get it from fast foods and bakery products and eat few vegetables or fruits. The fat in modern grain-fed animals and in fried foods and baked goods is heavily weighted in Omega 6 fatty acids relative to Omega 3 acids and contains large amounts of hydrogenated fatty acids. Taken together, this imbalance of Omega 6 to Omega 3 fatty acids and the novel fat molecules that result from hydrogenation can play havoc with cell membrane health and function. Remember, your brain, nervous system and vascular system are comprised primarily of membranes; any dysfunction in these critical areas can be devastating.

A preference for fat was adaptive in the ancestral habitat, but is maladaptive in a modern world awash in abundant sources of fat. Nonetheless, fat intake is essential. Our brains use glucose for energy (and hence our preference for sweets) but are made of lipids. Some of these essential brain lipids can be gotten only from animal fat. The problem is to balance fat requirements against its over-abundance in the American diet and to achieve the desired fatty acid profile that is more heavily weighted to saturated fats in the American diet than in the Paleolithic diet. A similar point can be made for minerals: calcium, potassium, and magnesium are too low relative to sodium in the American diet and are far from the Paleolithic ratios.

Seeds did not become a major component of the diet until about 14,000 years ago. Vegetable oils are a completely novel substance in the evolution of human eating. The processed oils now recommended so heavily by nutritionists are no more than a few decades old. Processing and hydrogenation alter the shape of the fatty acids and these altered shapes play havoc in the cell membrane function. They are readily oxidized to form free radical chain reactions that damage body tissue. Fat imposes a load on the body's antioxidant defenses. People who eat modern sources of fat and few vegetables tend to be deficient in antioxidants that may put them at risk to cardiovascular disease and cancer (oxidative stress appears to play a role in both diseases).

The intolerance that many people show to grains, eggs, milk and seafood is explained by how recently they entered the human diet. Many of us are poorly adapted to these foods, particularly if we are from a culture that began to rely on agriculture or dairying recently. We are not adapted because gene frequencies have not settled to the range where such individuals become rare in the population. That will happen only after enough time has passed for the lactose- and grain intolerant among us to leave fewer children to carry our genes into the future than those who can eat the stuff.

The other trigger to food intolerance is through the mechanism of molecular mimicry. Milk and grains contain proteins that were foreign to human metabolism until some 10,000 years ago. The space of proteins is vast, on the order of 20^{200} proteins can be formed from the 20 amino acids. The immune system must recognize self from non-self and proteins that are foreign from those that are not. Some of the proteins in milk and grains mimic those found in pathogens and trigger an immune response. Others increase the permeability of the human gut and thus permit undigested protein remnants to pass into the intestines and blood stream where they may trigger an immune response. The rising incidence of autoimmune diseases such as lupus, multiple sclerosis, and arthritis is another indicator that there is a mismatch between a human metabolism of ancient origin and modern food.

Epidemic carbohydrate intolerance is another clue that we are not yet adapted to a post-agricultural, post-industrial, information age diet. Epidemiological evidence suggests that the populations most at risk are those groups that adopted agriculture recently: These groups include the Eskimo, Pima, Navajo, Mexican-Americans, African-Americans, Asian Americans, and Northern Europeans. To emphasize once more, a universal in the omnivorous human eating record as reflected in hunter-gatherer diets and in the ancestral diet is the absence of simple- and grain- or cereal-based carbohydrate. The conventional wisdom and diet advice of the experts that you should eat grain- or cereal-based carbohydrate flies in the face of the evolutionary record. You should get your carbohydrate from fresh vegetables, which are also the major source of minerals, flavonoids, and phytochemicals in your diet.

Stay cool and exposure your skin to fresh air and sunlight. Don't be warm and cozy all the time. End your shower with a cool rinse over your legs. Wear as little as you can tolerate for your workouts. If you can't stay warm working out, you aren't going at it at a high enough pace. (Carrying a trendy water bottle slows you down too and ties up equipment for others.) Expose your skin to fresh air by wearing shorts in cold weather to hike. Bare your arms to the air and the sun, but be sensible about the amount and intensity of the exposure.

Vitamin D deficiencies are common, particularly in cold climates. Children are particularly vulnerable, as are African-Americans (dark skin produces less Vitamin D than a light skin) and the elderly. The new practice of wearing sun blocks and covering the skin increases the likelihood of Vitamin D deficiency, with a consequent risk for bone density. Life is full of these trade-offs--preserve your skin, risk your skeleton. You can change the terms of the trade-off by eating the Evolutionary Fitness diet that is high in calcium from dark, leafy vegetables and bones.

Eat when hungry. For me, that is at about 3 times a day, often more, but sometimes less. Eating once a day degrades lean body mass and reduces your metabolism. Your lean body disintegrates and your fat mass increases. Nobody who wants to be lean and healthy should eat only once a day. On the other hand, eating should not be too regular. Energy intake must be varied and there should be long intervals between your evening meal and breakfast. Compress your caloric intake into a 6 or 8-hour window every now and then. This mimics the Paleolithic alteration between feast and famine days. But, there are even more important reasons to do this.

Research (and my experience) suggest that a compressed eating window, with no reduction in caloric content, can provide the low body fat and life extension benefits of caloric deprivation, the only known intervention shown reliably to extend life. Why caloric deprivation extends life is not known, but one reason may be that the calorie-deprived rats are compared to ad libitum fed rats and both are caged. In other words, the other rats with which the calorie-restricted are compared are pigging out. Another reason may be that caloric deprivation activates a moderate adrenal response and helps to retain an adaptive response to stress. But, that can be achieved by eating in a narrow time window, with a relatively long fast over night. The night fast also promotes growth hormone, a known factor in staying lean and retaining muscle, neural, and cardiovascular mass.

Three square meals a day will make you fat. Foods eaten every day can become toxic. Variety and quality are the essentials of a healthy diet. Take antioxidants. Our food sources of minerals and antioxidants are not as rich as those of the ancient past. Free radical oxidation of body tissues is one of the primary aging mechanisms. Scavenge these free radicals with antioxidants and with the natural phytochemical antioxidants abundant in fresh vegetables and fruits.

The beauty of the 40,000 BC eating model is that you eat no canned, frozen, packaged, or manufactured food. Your diet consists of fresh fruits and vegetables, eaten raw whenever possible, and lean meat. I do not eat raw meat because I no longer trust our food supply. The model offers a conservative strategy for ridding your diet of empty calories while it guides your food choices to highly nutritious foods. You don't have to read labels because nothing you buy to eat comes with a label (nature doesn't do this). Some latitude is necessary (I do not believe in rigid rules for anything anyway), but the 40,000 BC model is always guiding your choices.