Why the Pegan Diet Makes Sense

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Abstract

In 1985, S. Boyd Eaton and Melvin Konner published a landmark paper in the *New England Journal of Medicine*. The title was "Paleolithic Nutrition: A Consideration of Its Nature and Current Implications," and this work postulated that an increase in the prevalence of chronic disease among modern humans is the result of a dietary composition that is incompatible with both our genetic ancestry and natural metabolic function. Over the intervening decades, numerous theories about optimal dietary approaches have been put forth and much debate has ensued. Among researchers and the public, we have witnessed vocal advocates emerge in support of the paleolithic philosophy of encouraging mild ketosis, while others passionately argue for plant-based vegetarianism. There is now evidence that neither extreme provides superior health benefits in isolation. According to numerous clinical studies, a hybrid approach may convey a positive and multifactorial influence on the intestinal microbiome, the metabolome, proteomics, and overall health outcomes. A Mediterranean-style diet has been widely studied, and a new concept—Pegan, which is a contraction of the words *paleo* and *vegan*—is now gaining worldwide attention.

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It is a rare event when a medical article for the ages is published. In 1985, a landmark paper of this caliber appeared in the *New England Journal of Medicine*, and nutrition research has never been quite the same. The authors were S. Boyd Eaton, MD, and Melvin Konner, PhD, who were both faculty members of Emory University. The title of this work was the following: "Paleolithic Nutrition: A Consideration of Its Nature and Current Implications." The introduction outlined a compelling concept: "Physicians and nutritionists are increasingly convinced that the dietary habits adopted by Western society over the past 100 years make an important etiologic contribution to coronary heart disease, hypertension, diabetes, and some types of cancer. These conditions have emerged as dominant health problems only in the past century and are virtually unknown among the few surviving hunter-gatherer populations whose way of life and eating habits most closely resemble those of preagricultural human beings."[1]

By 1988, the authors had published a best-selling consumer book called *The Paleolithic Prescription: A Program of Diet and Exercise and a Design for Living.* This was the book that introduced and popularized the concept of following dietary and lifestyle concepts that were consistent with the genetic architecture of our paleolithic ancestors. The core assumption was that our genes had not changed significantly over the millennia, therefore humans were best suited to a diet comprised mostly of fruits and vegetables, low in refined grains and sugars, low in saturated fats, low in dairy, and plentiful in animal protein.[2]

The work of Eaton and Konner provided an evolutionary explanation for the rising prevalence of diet-related diseases we witnessed in the 1970s and 80s. They were actually adding a new layer to important foundational research that had taken place a decade earlier. In 1972, a prominent British physiologist named John Yudkin, PhD, authored a best-selling book titled *Pure, White, and Deadly: How Sugar is Killing Us and What We Can Do to Stop It,* which described health problems associated with excess consumption of sugar and refined starch. This book was re-released in 2013, and the new edition features a foreword by noted researcher Robert Lustig, MD.[3] On the heels of John Yudkin came Thomas L. Cleave, MD, who was a respected surgeon and a preventive medicine-focused physician. In 1975, Dr. Cleave published a book called *The Saccharine Disease*, which described his research findings that demonstrated how consuming excessive refined white flour and sugar could result in negative health effects.[4,5] It has been reported that Cleave's view of nutrition was heavily influenced by Charles Darwin's concept of evolution.

Although this sounds like a play on words, it is a fact that the paleolithic diet concept developed by Eaton and Konner evolved over time. In 2002, Loren Cordain, PhD, a professor at Colorado State University published a book called *The Paleo Diet,* which promoted a dietary approach that was low in starchy vegetables and grains, and high in animal protein.[6] This low carbohydrate diet achieved metabolic influence by reducing post-prandial surges of insulin and inducing production of ketones like beta-hydroxybutyrate (BHB) through the metabolism of fat. Cordain's work overlapped with a ketogenic diet concept that was popularized by Robert Atkins, MD, a cardiologist who became known for his best-selling book *Dr. Atkins' Diet Revolution: The High Calorie Way to Stay Thin Forever,* which advocated for the dietary restriction of carbohydrates to induce weight loss and reduce appetite.[7,8]

Why all of this interest in the origins of humankind and—more specifically—what our early ancestors ate? Original arguments in support of the paleolithic diet were based on the fact that the human genome (which regulates metabolism) has not changed appreciably since paleolithic times. Because starchy vegetables and grains were not common during that ancient era, a hypothesis was put forth that humans have a limited capacity to metabolize these food sources and therefore they should be limited in the diet. A flaw in this this theory—as Eaton and Konner pointed out in their original article—is that hunter-gatherers living today have the ability to metabolize a wide variety of different dietary carbohydrate levels. The Hadza tribe of northern Tanzania, the Bushmen of the Kalahari, and the indigenous Tasaday people of the Philippines all consume carbohydrate-rich plants. Eskimos, by comparison, get less than 10% of their calories from vegetables.

Within our present genome, we have genes that code for the metabolism of fats, proteins, and carbohydrates from starches and sugars. In individuals who have an increased number of genes that code for the metabolism of carbohydrate, the risk to obesity when consuming a carbohydrate-rich diet has been demonstrated to be lower (a fact that also nicely illustrates the personalized nature of the diet-gene connection).[9] It is interesting to note that although our paleolithic ancestors did not consume dairy products, they did consume breast milk. This means at least some of the population had genes that code for the production of lactase, the enzyme that metabolizes lactose, which is a sugar that is found both in human breast milk and cow's milk. Today, we know that genes for lactase production can vary widely. An intolerance to lactose-containing milk affects many people, but definitely not everyone.

Beyond the diverse inherited genetic differences that influence the metabolism of carbohydrates and various other nutrients, epigenetics can also have a significant impact. That is, diet, environment, and lifestyle can all influence the expression of genes that control metabolism, and this can result in altered metabolic function.[10] The key here is that these epigenetic factors can modulate the expression patterns of even the "paleolithic genes," which can then result in different metabolic responses to our present-day diet.

The Pegan Diet: Paleo Meets Vegan

In recent years, this anthropological evaluation of our diet has fueled countless heated debates about the best path to health: Paleo or Vegan? Back in 1985, Eaton and Konner pointed out the following: "Except for Eskimos and other high-latitude peoples, hunter-gatherers typically use many species of wild plants for food. Roots, beans, nuts, tubers, and fruits are the most common major dietary constituents, but others, ranging from flowers to edible gums, are occasionally consumed."[1] In fact, hunter-gatherer diets are principally high fiber (sourced from vegetable origins), with the remaining calories taking the form of wild animal meats. This is a reasonably low fat diet, and the fats consumed are mostly unsaturated and high in omega-3 fatty acids. Nutritionally, this diet is high in potassium, vitamin C, trace minerals, and B vitamins, and low in sodium. It breaks down to approximately 66% vegetables and 33% meat—a ratio that would place this diet somewhere between the paleo/keto approach and a vegan diet. Is it time to consider a hybrid philosophy? Key thought leaders are moving in this direction. Mark Hyman, MD, has coined a new term—"Pegan"—and in 2021 he released a new book titled *The Pegan Diet: 21 Practical Principles for Reclaiming Your Health in a Nutritionally Confusing World*.[11]

In this book, Dr. Hyman discusses concepts that paleo and plant-based diets share in common within the context of eating in the 21st century. He discusses the importance not only of what we eat, but how and when we eat. Because it turns out that it's not just food categories, but the origins of the food and production methods used. In terms of timing, it is now recognized that a 12-hour window between the last meal of the day and our first meal the following day can play an important role in producing a modest increase in the ketones in our blood (for example, beta-hydroxybutyrate), and this can in turn help tune up our metabolism.[12]

The difference in health outcomes between a plant-based, low-fat diet versus an animal-based, ketogenic diet was recently evaluated in an elegant in-patient study at the National Institutes of Health Clinical Center. This was a four-week trial involving 20 participants with a body mass index of 27.8 or greater. The protocol was tightly controlled. These individuals consumed two types of diets—one low carbohydrate/high fat, the other high carbohydrate/low fat—during alternating two-week periods. The daily calorie intake was ad libitum and included snacks as desired.

It's important to note that these were "real world" diets. They included access to highly processed foods, as well as minimally processed foods. The intake of all foods

was rigorously captured. The metabolic parameters included lipid levels and particle number, glycemic response measured by continuous glucose monitoring, inflammatory markers, and body composition. The results of this study were published in the February 2021 issue of *Nature Medicine.* One of the important findings was that the two diets had individual metabolic strengths and weaknesses. Notably, the restriction of refined grain-derived starch and sugars in conjunction with adequate protein intake and increased intake of a variety of minimally processed plant foods resulted in a portfolio of health benefits that included appetite control, lowered blood fats, improved blood sugar and insulin control, and reduced inflammatory markers.[13] This is especially interesting because neither of the diets could singularly deliver this combination of outcomes, but a composite diet plan seemingly produces a "best of both worlds" scenario. Although this was not a study specifically designed to test the Pegan Diet strategy, the data and conclusions indicate that this approach may be a very valid option for many people.

I believe nature designed human metabolism to be responsive to a wide range of diet types. In comparison to animals, the length of the human digestive tract is longer than herbivores and shorter than carnivores. We also have canine teeth for tearing meat (like carnivores) and molars for grinding vegetables (like herbivores). What humans have not developed over evolutionary time is the physiology that would be needed to optimally metabolize ultra-processed foods that contain high levels of specific partitioned ingredients.

For context, let's look at a nutritional snapshot from an era that was neither ancient nor modern. It's fascinating work from Paul Clayton, PhD, and Judith Rowbotham, PhD, who published a three-part series of articles in 2008 that tracked dietary habits and health patterns in the United Kingdom during the mid-Victorian years (their research spans 1850-1880). It turns out that even middle-class Victorians consumed relatively healthy diets at the start of that time period, but over the course of 30 years—as industrialization took root and the food supply was impacted—intake of fresh vegetables and fruits decreased, and the processing of grains into white flour became commonplace.[14-16] As a result of these shifts, the levels of vitamins and minerals in the diet were significantly reduced, but possibly even more significant (for health) was the reduced intake of important phytochemicals from vegetable and grain products.[17]

Today, we know far more about phytochemicals than we did in the 19th century. For example, more than 8000 phytochemicals have now been identified in plant foods. It is also now recognized that phytochemicals are involved in regulating metabolism through their roles as agents that modulate genetic expression and intercellular communication processes.[18] This modern context helps us understand that the concerning health trends that emerged during the 20th century were not only the result of changes in fat intake and a marked increase starch and sugar consumption, but also because of reduced phytonutrient content. This second issue is now considered to be a critical concern on a global scale.[19]

The Potential Influence of a Pegan-Mediterranean Diet on Cardiometabolic Disease Risk

The Pegan Diet concept, as developed by Dr. Hyman, represents a hybrid between a low carbohydrate/high fat paleo-ketogenic diet and a low fat/higher carbohydrate plant-based diet. An example of this type of dietary composition is the Mediterranean diet. The Mediterranean diet, which has been subjected to numerous clinical studies that have demonstrated its health benefits, is composed of minimally processed foods, including vegetables that are low in starch, whole fruits, nuts, seeds, legumes, fish, poultry, spices, extra virgin olive oil, and cheese and red meat in moderation.[20] It allows whole grains and starchy vegetables (like potatoes), also in moderation. When this approach is combined with a time-restricted feeding schedule, the result can be a modest increase in serum ketones and a favorable influence on glycemic response, serum lipids, and blood inflammatory biomarkers.[21,22]

Recently, the positive health impacts of this Pegan-type of hybrid diet plan has been linked—in part—to the favorable influence it has on the composition of the intestinal microbiome. In a large collaborative study, the impact of this dietary approach on 1098 individuals was evaluated using deep phenotyping through metagenomic sequencing, as well as fasting- and post-prandial cardiometabolic blood biomarkers. The results, which were published in *Nature Medicine* in 2021, demonstrated that application of this Mediterranean/Pegan-type diet had a favorable influence on intestinal microbiome composition and was associated with healthy cardiometabolic biomarkers.[23] A companion article examined the favorable impact of a Mediterranean/Pegan-style diet on cardiometabolic health in 307 participants enrolled in the Health Professionals Follow-up Study. This work showed that the protective effect of this type of diet was linked to its favorable impact on the composition of the gut microbiome associated with a low level of *Prevotella copri*.[24] The authors of this study said the following: "Our findings advance the concept of precision nutrition and have the potential to inform more effective and precise dietary approaches for the prevention of cardiometabolic disease mediated through alterations in the gut microbiome."

Concluding Thoughts

The "diet wars" have been consuming us for decades. Each time a new approach starts to trend, proponents and advocates tout that the path to optimal health has been revealed. But what has really been revealed over the last decade are scientific truths about the flexibility of human

metabolism and the genetic variability of response to varied diet composition. It is now recognized that how a diet impacts metabolism is related to many factors—far beyond the limited macronutrient scope of carbohydrate, fat, and protein.[25] We now understand that the landscape of metabolism is influenced by panoramic and dynamic factors: the unique chemical and physical composition of macronutrients; the presence of various non-digestible prebiotic polysaccharides; the amount and structure of essential vitamins and minerals; the presence of specific phytonutrients and conditionally essential nutrients; the timing of eating; and the presence or absence of xenobiotic residues that can alter the composition of the intestinal microbiome.[26]

The field of personalized nutrition is being forged through our understanding of how each of these dietary variables influence metabolism and their relationship to genetic individuality. Recent studies tell us that the impact of the diet on health outcomes is largely a result of non-inherited factors. Our paleolithic ancestors shaped us, but we are not them. The world we live in is different, and so are the epigenetic influences that continue to shape us and our progeny. But we can learn much from our past and from the elegant work of researchers like Eaton and Konner. It is a legacy that will help guide the advancements of precision personalized nutrition in the future.

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