



REVIEW ARTICLE

Paleo vs. Keto vs. Animal Based: A Comprehensive Comparative Analysis of the Optimal Human Diet

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There are countless dietitians, nutritionists, and health gurus out there, some of whom are certified and some who are not, with differing views in regards to what a perfect diet looks like; however, there is no one who denies that throughout the course of human existence, animal foods have been hunted and incorporated as an integral part of the evolution and continuation of our species. There is also little discrepancy when it comes to the health implications associated with a high intake of simple or processed carbohydrates in the form of refined sugar and breads, and in particular those made with wheat gluten (due to its lack of nutritional value combined with the prevalence of gluten sensitivity or celiac disease among the general population).

Protein is considered to be by and large the most important macronutrient that is fundamental to the growth and development of the body, as well as creating hormones and enzymes, supplying oxygen to the blood and DNA repair or wound healing. After protein, fat is considered to be the second most important because it is essential for transporting fat soluble vitamins A, D, E and K, balancing hormones and providing energy. Due to the general consensus regarding the lack of any real dietary need for carbohydrates beyond providing short term bursts of energy, three of the most popular and effective diets for weight loss are therefore focused upon a minimal to zero intake of fast burning carbohydrates in the form of all grains (including ancient ones) and refined sugars. The purpose of this paper is

to provide a complete and in-depth comparison and assessment of the differences, benefits and potential deficiencies which could be identified in each of these grain and sugar-free “fad diets” - paleolithic, ketogenic and animal based or “hypercarnivore” - as well as to ultimately pinpoint which of them is best suited not only for short term weight loss and maintenance, but also for overall long term health and sustainability.

To begin with, the paleo diet proposes that the earliest humans who lived through the Paleolithic era were presumed to have access to only raw foods in the form of meat, eggs and plant foods; however, the human body has since clearly evolved to become capable of digesting a combination of raw and cooked foods. That is of course why cooked meat is included in this diet, but not dairy, grains or legumes which did not happen to be discovered or cultivated until much later on. The ketogenic diet, on the other hand, disregards however our early ancestors lived or what they ate altogether, and instead focuses upon the macronutrient composition of our modern day diet as the primary factor of concern regarding weight loss and maintenance (with the goal of ultimately maximizing one’s caloric percentage intake from fat while minimizing carbohydrates, using the logic that one will achieve a state of “ketosis” when they are restricted to consuming fat as basically their sole source of energy to fuel themselves or move their body throughout the day) - which if done correctly, should theoretically cause them to burn off calories and

keep off excess weight effortlessly as a result.

Meanwhile, the animal based diet disregards both the diet of Stone Age humans as well as macronutrient composition (though it leans heavily towards maximizing one's caloric intake of protein and fat, given that hypercarnivores are intended to consume over seventy percent of their calories from animal foods) [1] in favor of incorporating only the foods which have proven to be the most nutrient dense and therefore theoretically useful for humans to consume (with regards to nutrient absorption and quality/bioavailability of protein), which means that the most fibrous or least digestible plant foods (in other words, anything that is not classified as a botanical fruit) have been omitted.

To start off, let us first outline the rules for each diet in terms of exactly which food groups are and are not allowed (Table 1).

When searching for an answer to the question of what is truly the proper or optimal human diet, it goes without saying that we must first examine the human anatomical composition, and compare it with that of other species which exist either as prey or predators within the ecological system. When comparing our teeth and external anatomy with that of predator/hunter animals like cats and dogs, it would appear to be that in spite of possessing so-called "canines" which are semi-sharp and seemingly built for biting down into flesh, the overall structure of our teeth bears a much stronger resemblance to those of herbivorous or so-called "frugivorous" creatures like those of our closest relatives within the primate family.

However, unlike humans, there are very few primates who reside in temperate or non-tropical regions of the world; in fact, the overwhelming majority reside

in four nations which are Indonesia, Madagascar, the Democratic Republic of the Congo and Brazil [2] where the environment is lush and fertile, and thus a variety of fruit and vegetation is easily accessible throughout the year. Meanwhile, the tropics are home to less than half of the world's human population. Moreover, our closest relative of the chimpanzee species - the apex primate which is the most intelligent and evolved non-human animal - are themselves not fully frugivorous, and are known to occasionally engage in hunting in much the same manner as the earliest humans which evolved from them as cave dwellers [3]. Since the chimpanzee diet has remained almost fully frugivorous, however, their digestive tract has retained the length of those of their fellow non-human primates with a short small intestine and a longer large intestine [4], as well as a neutral pH composition within the stomach as compared with the acidic composition of the human stomach [5]. Where, then, does that leave the question of how the internal human anatomy has evolved and adapted in terms of brain size versus intestinal size, and how does that answer correlate to becoming better suited to consuming or capable of digesting certain food groups over others?

In order to fully understand the human evolutionary process, we must of course examine not only external anatomical features but also the internal composition of the human body. Whereas our outer characteristics in the form of our teeth, as well as our general bodily and facial shape and size have remained the most similar to those of primates, it follows that the origin of our intellectual advancement stems from the next most intelligent species - chimpanzees, which are once again the most genetically similar or closely related to us [6]. Since our gut is directly linked to our brains

Table 1: Rules for three weight loss trend diets.

Paleo	Keto	Animal Based
Includes: Fruit, vegetables, meat, eggs, nuts, seeds, raw honey, plant oil, tallow.	Includes: Meat, eggs, dairy, low carb fruit (i.e. wild blueberries and other berries, cherries, peach, melon, plum, olives, avocado, coconut, starfruit, tomato, cucumber, squash, bell pepper, orange, grapefruit, lemon, lime), vegetables (except for potatoes, corn), nuts (except for chestnuts, pistachios), low carb seeds (i.e. pumpkin, sunflower, pine nuts, chia, flax, hemp), black coffee, wine, spirits, tea, light beer, extra virgin olive oil, MCT or extra virgin coconut oil, extra virgin avocado oil, tallow.	Includes: Grass fed or pasture raised meat and organs, bone broth, wild seafood, pasture raised eggs, raw or grass fed dairy, seasonal organic fruit, raw honey, tallow.
Excludes: Dairy, grains (i.e. rice, wheat, oats, barley, rye, millet, buckwheat, quinoa, corn), legumes (i.e. peanuts, peas, beans, lentils), refined sugar, tea, coffee, alcohol.	Excludes: High Carb fruit (i.e. banana, mango, papaya, pineapple, kiwi, dragonfruit, passionfruit, non-wild blueberries, pomegranate, apple, grapes, pear, any kind of dried fruit, plantain), grains, legumes (except for peanuts, snow peas, snap peas and green beans), any added sugar or sweetener (including honey), heavy beer, seed oil.	Excludes: Vegetables, nuts, seeds, legumes, grains, refined sugar, plant oil, tea, coffee, alcohol.

through a cranial nerve, our diet also plays a vital role in our mental state and performance. Throughout history, our own digestive tract has evolved to become very different from that of any herbivorous or frugivorous animal, becoming much more similar length wise to that of an omnivorous or even carnivorous animal with a short large intestine and a longer small intestine [7]; therefore, in order to maintain the level of evolution that we have attained as a species, we must continue to eat in accordance with our internal digestive anatomy as this would in turn maximize our intake of essential nutrients.

Although the paleolithic humans were said to be consumers of vegetables and other plant foods, the vast majority of modern day vegetables and even fruits did not exist during this era, or were at least not close to being in their current form which had been cultivated by humans over millennia. Because of this fact, the vegetables which are considered to contain significant amounts of protein and calcium relative to caloric intake such as kale, broccoli and cauliflower lack the amino acids which are required to form a complete protein, and are therefore not recognized by the body as being digestible. Whole grains, legumes, nuts and seeds are other examples of incomplete proteins which require combining or pairing with a variety of foods in order to form sufficient amino acids for protein synthesis [8].

Moreover, nuts are known to be one of the most common allergens alongside peanuts, dairy, gluten, soy, eggs and shellfish. Unlike with unpasteurized dairy products and raw egg yolks, there is no proven safe method of consuming nuts, peanuts, gluten or soy for those individuals in which these ingredients trigger an allergic reaction. Critics of the paleo diet also argue that it may promote a lack of calcium consumption [9], which may prove to be particularly problematic for those individuals who are still developing. In addition, the most common alternative to cooking without butter or ghee made from dairy would be to use plant oil that includes a wide variety of seed oils (originally intended to be used for diesel) which have been found to produce cell damaging or potentially carcinogenic free radicals when heat is applied [10]. However, heart healthy extra virgin olive oil (a traditional staple of the Mediterranean diet) is considered to be even healthier to consume than whole olives due to being low in oxalates and thus easier to digest (though it is best restricted for use as a dressing rather than being used for cooking since it is still significantly less nutrient dense than butter, ghee or tallow). On the other hand, calcium itself has been known to be a potential iron inhibitor [11], and the simple sugars from lactose found in milk may also trigger inflammation in the same manner as any refined sugar; for example, a single 8 oz serving of milk affects blood sugar levels to the same extent as eating one whole slice of bread or tortilla. On top of that, the casein within dairy products has been found to elicit similar

adverse effects as gluten [12], as well as digestive and respiratory issues.

Although the body has no dietary need for simple carbohydrates in the form of refined sugar and wheat, there is an argument to be made for consuming complex carbohydrates in the form of fruits, rice and starchy vegetables such as potatoes. Firstly, because there are certain minerals and electrolytes which are primarily or solely found in fruit or plant sources - most notably vitamin C which is required for strengthening immunity, boosting iron absorption and metabolizing collagen, and which is found in virtually every botanical fruit but no animal foods with the exception of a small amount that can be derived from liver - then it stands to reason that the imposing of dietary restrictions against a large variety of fruit and potatoes would leave the body at a risk of becoming deficient in key nutrients.

Potatoes are also a great source of magnesium which is crucial for muscle and nerve function, and which very few animal foods contain in significant amounts. They are also a source of potassium and calcium for those who are lactose intolerant or sensitive to casein in dairy; however, such nutrients are also contained within the skin of the potato that also happens to contain anti-nutrients in the form of oxalates, which are potentially damaging to the kidney (although sweet potatoes contain them in lesser amounts, which may explain why a variation of the animal based diet also allows their occasional consumption). In addition, non-sweet potatoes belong to the nightshade family of vegetables (alongside tomatoes, eggplant and bell peppers) which are known to contain a toxin called solanine that is very dangerous to consume in excess quantities [13]. Although certain tropical fruits like banana and avocado are also high in potassium and magnesium, they may not be appropriate to consume year round if one does not reside in a tropical climate, and nor are tropical foods part of their specific ancestral (a branch off of species specific) diet.

On the topic of following an ancestral diet, the decision of whether to include certain foods while on any type of restrictive diet should largely depend on the specific regional diet of one's own ancestors as this would be a tried and true method. Since each individual's unique genetic composition has evolved and adapted over countless generations to become predisposed to certain foods over others, then white rice may be more appropriate to consume for those of East Asian descent for example, while sweet potatoes and sourdough bread may prove to be more gentle on the digestive tract of Europeans. Though we may have no dietary need to consume excessive energy in the form of carbohydrates, the consumption of complex slow-burning carbohydrates from fruit, sweet potatoes and white rice, and even fructose from a natural sweetener like raw honey is vastly preferable to consuming bodily

fuel in the form of a stress-inducing substance such as caffeine (in particular coffee which is derived from a seed) or worse yet, inhibition lowering alcoholic drinks. Particularly concerning are the polyphenols from coffee, tea and cocoa which are known to inhibit the absorption of both iron and calcium.

However, if we look at other plant foods which have been consumed among certain cultures for thousands of years, the concept of following an ancestral diet may yet tell a different story. For example, soy products in the form of tofu, soy milk and sauce, tempeh, edamame and miso which are common staples within the plant-based diet have been consumed in China as far back as over 2000 years ago - and yet soy (particularly in its modern day GMO form of soy protein isolate) is known to be high in a number of anti-nutrients such as phytates, tannins, saponins and phytoestrogen [14]. Garbanzo beans which are a staple in South Asian and Middle Eastern cuisine have even been consumed for much longer, yet are known to be high in lectins and saponins as well. Ancient grains including wheat have been sought out and cultivated throughout the Middle Eastern, North African and European regions of the world for a similar duration in history, and yet even whole wheat is widely considered to be a sort of “junk food” today. One of the main arguments in favor of a plant-based diet states that it is best to refrain from consuming meat if we have the choice not to do so - and yet in the past, humans have consumed these so-called “poverty foods” in the form of legumes, potatoes and grains merely because they had no other choice but to do so; and for this reason, the plant-based diet could arguably be perceived as a form of “voluntary starvation.”

Since both the paleo and keto diets allow for the consumption of nuts, seeds and vegetables, and keto even allows for certain legumes (which are also technically classified as seeds) so long as they are low carb, in spite of the fact that all of these food groups make up the parts of plants (including the leaves, stems, roots and seeds) which are not intended to be consumed in nature - then it follows that the animal based diet would contain the lowest amount of toxins or defense chemicals out of the three discussed here. However, unlike those who follow the ketogenic diet, those who call themselves hypercarnivores are free to

consume as many carbohydrates from fruit, raw honey and dairy (and even in some cases sweet potatoes) as they would like; and as we know, carbohydrates make up the excess energy that will be converted to stored fat and accumulate within the body if not used or “burned off” within a certain window.

Even though all fruits are composed mostly of water and fiber, the level of fructose contained in high carb fruit is sufficient to justify the notion that a combination of the ketogenic and animal based diet is optimal for long term weight loss and maintenance. Not only is an excess consumption of carbohydrates concerning when it comes to weight gain (because of the fact that up to six times as many calories from protein can be burned via digestion as compared with the calories from carbohydrates [15]), but it is also of concern when it comes to spiking blood sugar levels which could potentially lead to the development of diabetes. On this note, any fresh homemade fruit juice made from high carb fruit is not recommended since the body may be unable to manage the amount of sugar contained in it without any of the fiber to balance it out. On the other hand, although the fructose contained in raw honey is also not registered by the body as being any different from that of table sugar, there are at least some other nutrients contained in the honey which distinguishes it from empty carbohydrate sources; therefore, it would be acceptable to consume in small amounts (i.e. no more than a tablespoon full) as an occasional condiment to complement the savory flavor of meat or as a natural sweetener for plain yogurt, for example. As we have also established, pasteurized dairy products are potentially inflammatory for the general population to a similar degree as gluten, which is why the incorporation of raw dairy (or even variations of conventional milk which contain lesser amounts of lactose such as A2 milk, goat’s milk or kefir) within any diet is ideal for attaining the levels of calcium which are required for optimal health [16].

Finally, even though certain botanical fruit such as cucumbers, zucchini and bell peppers contain lectins, these can be removed almost completely simply by either peeling the skin (which would simultaneously remove any pesticides applied to non-organic produce) or cooking them, in the same vein as how most of the enzyme inhibitors and other anti-nutrients from

Table 2: Rules for the optimal human diet (the ketocarnivore).

Includes: Grass fed or pasture raised meat and organs, bone broth, wild seafood, pasture raised eggs, raw or grass fed dairy, low oxalate lectin-free seasonal organic whole fruit or smoothie made from them (i.e. green banana, blueberries, mango, papaya, pineapple, dragon fruit, passion fruit, pomegranate, apple, grapes, pear), juice made from low oxalate, lectin-free and low carb seasonal organic fruit (i.e. wild blueberries, strawberries, blackberries, cranberries, cherries, peach, melon, plum, ripe avocado, coconut, lemon, lime, grapefruit, orange), peeled cucumber, peeled and/or cooked zucchini, squash, green plantain, cooked bell pepper, raw honey, tallow (for cooking), extra virgin olive oil (for dressing).

Excludes: High oxalate or lectin rich fruit (i.e. raspberries, kiwi, olives, figs, dates, dried apricot, goji berries, starfruit, tomato, whole orange, unripe avocado, ripe banana, ripe plantain), any juice made from high carb fruit (banana, mango, papaya, pineapple, dragon fruit, passion fruit, pomegranate, apple, blueberries, grapes, pear), vegetables (except for peeled and cooked sweet potato), nuts, seeds, legumes, grains, refined sugar, tea, coffee, alcohol, seed oil, refined plant oil.

botanical vegetables and legumes could effectively be destroyed through cooking or soaking them thoroughly. It is also advised to purchase the organic variety of any fruit with an edible outer layer (i.e. apples, pears, peaches, plums) whenever possible or affordable, i.e. whenever it is in season or on sale, and to rinse off any residual pesticides which may still be lingering with warm water; and on any other occasion, the skin from conventional versions of such produce should be removed at all times prior to consumption. In conclusion, the following chart outlines this newly optimized set of rules for the best possible diet for weight maintenance and overall long term well-being (Table 2).

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