

MEAL TIMES, INTERMITTENT FASTING, & CALORIC RESTRICTION



**BODY MASS
INDICES IN
HUNTERS**

**DIET AND
ACNE**

**TOXICITY OF
UNCOOKED
KIDNEY BEANS**

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MEAL TIMES, INTERMITTENT FASTING, CALORIC RESTRICTION AND HEALTH/LONGEVITY



For long-time devotees of The Paleo Diet concept, you are well aware that one of the most powerful elements of this construct is its ability to serve as an organizational template for answering complex diet/health related questions.

For instance, in the dermatology community, diet has long been dismissed as an underlying factor in the development of acne,¹ but unfortunately no alternative hypotheses regarding its fundamental origin have been proffered. Consequently for most dermatologists, the root cause of acne remains unknown.¹ When my research group and I originally began to examine whether or not diet had anything to do with acne, our first and foremost question was, “does it occur in hunter gatherers and other less westernized people?” Once we were relatively certain that acne was a “disease of civilization” and was virtually nil or absent in non-westernized populations,² it then became a

matter of “back engineering” how certain western dietary elements could influence the known proximate causes of acne.^{1,2} Proof that diet causes acne now exists from a dietary intervention involving 47 acne patients in Melbourne, Australia from the laboratory of my colleague Neil Mann. Hence, the insight and ability to answer this formerly contentious diet/health question (does diet cause acne?) came not from years and years of directly studying acne per se, but rather by examining the origins of this disease from an evolutionary perspective.

MEAL TIMING

In a similar manner the timing and number of meals one should eat, as it relates to health and well being, is also controversial and not well understood. Many health care professionals as well as the lay press frequently state that consumption of smaller and more frequent meals is healthier than eating larger and less frequent meals. This advice is offered despite the lack of scientific evidence to justify it.³ Studies examining the effects of meal frequency upon health and well being are inconclusive and have produced mixed results. For instance, some studies show that skipping breakfast is unhealthy⁴ and may promote weight gain.^{5,6} In contrast, other studies have shown daily energy intake to be higher among women who ate breakfast compared to those who didn't.⁷ Similarly, children who reported they never ate breakfast had lower daily caloric intakes than regular breakfast eaters.⁸ Further, children who skipped breakfast lost more weight over a one year period compared to daily breakfast eaters.⁸

These kinds of controversies typify the chaos and disarray that run rampant in the science of human nutrition. By placing the evolutionary template over the meal controversy hullabaloo, you can gain instant insight into the dietary patterns for which our species

is genetically adapted. But before we get into the dietary patterns of huntergatherers, let's see why the number of daily meals you eat can impact your health.

CALORIC RESTRICTION

If there is a single topic that remains relatively non-controversial among scientists, nutritionists and physicians, it is caloric restriction and longevity/health. Numerous review papers from diverse research groups around the world are unanimous in their conclusion: caloric restriction increases lifespan and improves health.⁹⁻¹⁴ Caloric restriction by as little as 30% of daily energy can increase lifespan by up to 40% in shortlived mammals such as rodents. To date, caloric restriction is the only non-genetic intervention known to slow the rate of aging and increase lifespan in a variety of animal species including mice, rats, hamsters, fish, insects, and worms.^{9,10} Studies of caloric restriction in longer lived primates such as the rhesus monkey were started in 1987. These on-going experiments, though not yet complete, parallel the results of rodent studies and are predictive of an increased lifespan.¹⁵

Perhaps of even more importance than longevity are the beneficial health effects that occur with caloric restriction. Caloric restriction improves virtually all indices of cardiovascular health – not just in lab animals but also in humans.¹⁶ In animal models caloric restriction delays or prevents all types of cancers, kidney disease, diabetes, autoimmune diseases and delays the age related decline in wound healing while improving immune function.^{9,12,14} Virtually all mechanisms which protect the body's cells from injury remain at youthful levels for longer during caloric restriction including antioxidants, DNA repair mechanisms, protein turnover, corticosteroids and heat shock proteins.¹⁴

It is still not clear if caloric restriction can extend lifespan in humans, but some of the world's longest lived (and healthiest) people, the Okinawans, consume 20 % less energy than adults on the Japanese mainland.¹¹ The average lifespan for Okinawa men is 78 years and for women 86 years. Additionally, death rates for stroke, cancer and heart disease were only 59%, 69% and 59%, respectively, of those for the rest of Japan.¹¹

INTERMITTENT FASTING

So let's get back to the crux of the matter – can how many meals you eat influence your total caloric intake?

During the fasting month of Ramadan Muslims abstain from food and drink from dawn until sunset. Numerous studies (17-20) demonstrate that this dietary pattern causes a spontaneous reduction in the caloric intake and a slight weight loss. To date, no clinical studies have examined how a single large evening meal influences weight over the long term – say 6 months or longer. The consumption of a single daily meal is a form of intermittent fasting which in animal models causes them to spontaneously reduce their caloric intake by 30 % (3). Additionally, intermittent fasting reduces blood pressure, improves insulin sensitivity, improves kidney function, and increases resistance to disease and cancer (21).



HUNTER-GATHERER PATTERNS

We are currently in the process of compiling meal times and patterns in the worlds historically studied hunter-gatherers. If any single picture is beginning to emerge, it clearly is not three meals per day plus snacking ala the typical U.S. grazing pattern. Here are a few examples:

1. The Ingalik Hunter Gatherers of Interior Alaska: "As has been made clear, the principal meal and sometimes the only one of the day is eaten in the evening."²²
2. The Guayaki (Ache) Hunter Gatherers of Paraguay: "It seems, however, that the evening meal is the most consistent of the day. This

is understandable, since the day is generally spent hunting for food that will be eaten in the evening.”²³

3. The !Kung Hunter Gatherers of Botswana. “Members move out of camp each day individually or in small groups to work through the surrounding range and return in the evening to pool the collected resources for the evening meal.”²⁴

4. Hawaiians, Tahitians, Fijians and other Oceanic peoples (pre-westernization). “Typically, meals, as defined by Westerners, were consumed once or twice a day. . . Oliver (1989) described the main meal, usually freshly cooked, as generally eaten in the late afternoon after the day’s work was over.”²⁵

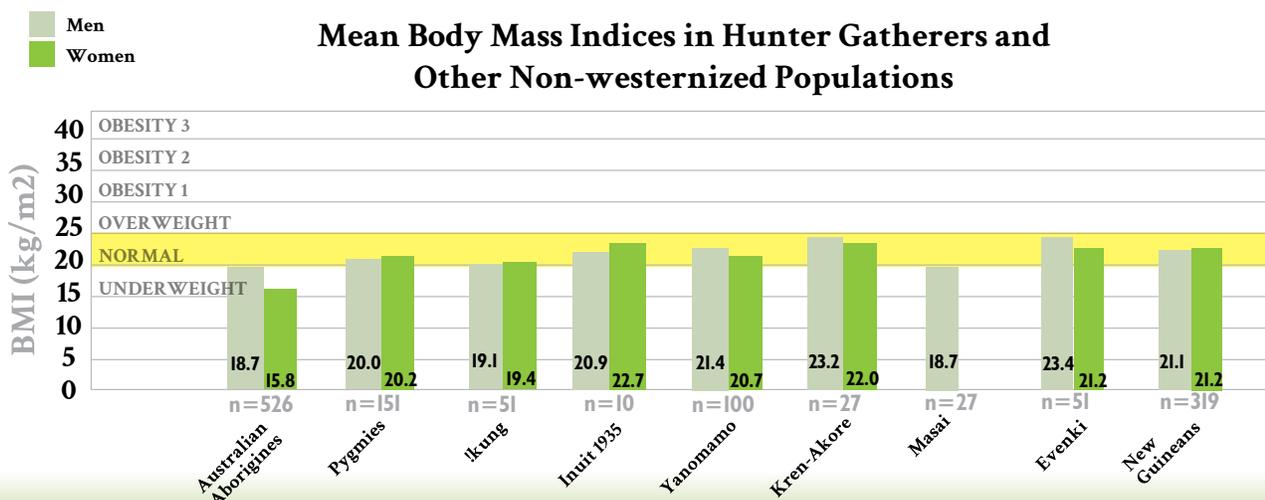
The most consistent daily eating pattern that is beginning to emerge from the ethnographic literature in hunter-gatherers is that of a large single meal which was consumed in the late afternoon or evening. A midday meal or lunch was rarely or never consumed and a small breakfast (consisting of the remainders of the previous evening meal) was sometimes eaten. Some snacking may have occurred during daily gathering, however the bulk of the daily calories were taken in the late afternoon or evening. This pattern of eating could be described as intermittent fasting relative to the typical western pattern, particularly when daily gathering or hunting were unsuccessful or marginal. There is wisdom in the ways of our hunter gatherer ancestors, and perhaps it is time to re-think three squares a day.

BODY MASS INDICES IN HUNTER GATHERERS AND OTHER NON-WESTERNIZED POPULATIONS

Unless you’ve spent the last 5 years in a cave, most of you realize that we are in the midst of an obesity epidemic in the United States. The age adjusted prevalence of obesity (body mass index [BMI] > 30) was 30.6 % for the entire U.S. adult population in 2001-2002 compared to 22.9% in 1988-1994. The prevalence of overweight (BMI >25) also increased during this same period from 55.9 to 65.7 % of the entire U.S. population.^{26, 27}

Listed here on the graph 1A are BMI values that I have compiled from the literature for hunter gatherers and other less westernized populations totaling 1,262 individuals. Note that no single population has a mean BMI that falls into the overweight or obese categories.

Graph 1A





DID YOU KNOW?

THAT SHELLFISH and other marine invertebrate foods may contain significant amounts of carbohydrate? Listed below are some common shellfish and their carbohydrate (CHO) content:

Food (100 g)	CHO (g)	% Kcal from CHO
Abalone	11.9	22
Clams	5.1	13
Crab	1.0	3
Spiny Lobster	3.1	8
Mussels	11.6	23
Octopus	4.4	10
Raw oysters	5.5	37
Scallops	2.4	10
Squid	3.1	13
Shrimp	1.2	3

Virtually all muscle meats from land animals and both fresh and saltwater fish contain zero carbohydrate. An important exception to this general scheme of things are certain organ meats. A 100 gram serving of calves' liver contains 4 grams of carbohydrate and a similar serving of beef kidney contains 2.2 grams of carbohydrate. Carbohydrate in these organs comes from glycogen, a storage form of the simple sugar, glucose.

All mammalian muscle tissues normally store small amounts of carbohydrate as both glucose and glycogen. So why isn't there any carbohydrate

in the steak that you have for dinner? After an animal is slaughtered a process called "rigor mortis" begins which ultimately causes muscles to contract. Muscle stores of glucose and glycogen are used to fuel rigor mortis and are eventually depleted. This phenomenon empties the muscles of their small stores of carbohydrate

THAT UNCOOKED KIDNEY BEANS are toxic to humans, and their consumption causes severe gastroenteritis, vomiting and diarrhea? There are numerous accounts in the medical literature reporting outbreaks of gastroenteritis (inflammation of the gastrointestinal tract), nausea, vomiting and diarrhea associated with eating raw kidney beans.²⁸ Similar to virtually all other legumes, red kidney beans cannot be consumed in their raw state because they contain boat loads of toxic compounds called antinutrients which may have both adverse and toxic effects in both humans and animals. These antinutrients include trypsin inhibitors, lectins, lathrogens, saponins, alkaloids and certain compounds which cause favism and goiters.²⁹ Long soaking and cooking generally eliminates most of these compounds however as we have previously pointed out, small amounts of lectins, and other antinutrients still may remain even after cooking at high heat for 3-6 hours and may adversely affect people with autoimmune diseases.³⁰



PRIMAL IN THE KITCHEN

BUFFALO STEAKS WITH MUSHROOM SAUCE

- 1 1/2 pounds buffalo (bison) steak
- 3 Tb. freshly chopped thyme
- 1/4 t. garlic powder
- Freshly ground black pepper
- 2 t. + 4 Tb. olive oil
- 2 shallots, chopped
- 1/2 lb. fresh mushrooms, sliced
- 1 1/2 cups red wine
- 1 cup beef stock
- 1 Tb. chopped parsley
- 1 Tb. chives
- 1 Tb. flaxseed oil

Cut the steak into 4 pieces and cover with thyme, garlic powder, and pepper. Cook on both sides in 2 teaspoons of the olive oil for 2 to 3 minutes, or until the centers are still pink, stirring frequently. Remove to a platter and keep warm. Cook the shallots and mushrooms in the remaining 4 tablespoons olive oil, turning frequently. Add the wine and cook to reduce until only about one-fourth is left. Add the stock and reduce until about one-half is left. Season with more pepper to taste and cool. Add the parsley, chives, and flaxseed oil. Pour over the steaks before serving.



SUCCESS STORY

Dear Dr. Cordain,

I am a breast cancer survivor. I was first diagnosed with breast cancer on May 25, 2001: T1, Node Negative, Her2 positive and nuclear grade 3. I had a lumpectomy, aggressive chemotherapy and radiation. On March 26, 2004 my breast cancer returned to my L-1 disk in my spine. I had 6 months of weekly chemotherapy and radiation. By December 15, 2004 I was declared in remission.

Herceptin was part of the chemo protocol that I had received in 2004 and have been receiving it every three weeks since the beginning of January 2005. Tumor marker tests are also conducted every other month. Unfortunately, my tumor markers started rising and by the end of May tests the upward trend was disturbing.

I share this news with my pharmacist who is also a certified nutritionist on May 28th. He recommended that I immediately eliminate sugar and grains from my diet. I found your book, *The Paleo Diet*, and started to eliminate sugar, grains and dairy from my diet that day.

The results have been astonishing to say the least. On May 24, 2005 my CA 27 29 marker was 43 and as of October 24, 2005 is 24. My CA 15 3 marker was 28.6 on May 24, 2005 and is now 22.9. I am 100% convinced that it is a result of being a very compliant follower of the Paleo Diet. Cancer likes sugar. Sugar is not my friend and is an enemy to my health.

I am very thankful to a very astute and pharmacist/certified nutritionist who is on top of the current diets and the effects on one's health. We are what we eat. I do not miss any of the sweets that I craved so and love the fact that I have finally lost the 25 chemo/radiation weight



that I could not lose no matter how much exercise or dieting I did since 2002. Fresh fruits, fresh vegetables and lean meats and fish are the mainstay of my current good health.

I continue to emphasize to my incredible team of physicians at Duke that the wonderful lower tumor marker results are a result of my new diet. Thank you for your book and I will continue to spread the message to my support group and other women I meet who have breast cancer. Mind, body and soul-keeping each healthy is essential to survive this terrible disease. The diet recommended to me on May 28, 2005 empowered me to continue doing everything possible to win this battle.

Sincerely,

Debbie

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