HORMONES IN MILK

PALEO ON THE PLANE

GREENS AT EVERY MEAL

THE ESSENTIAL VITAMIN B-12

LOREN CORDAIN, PH.D.
Because people co-evolved with their environmental food sources, the human genetic make-up was shaped throughout millions of years of relying on relatively homogenous nutrition. Many foods, new to the human genome, were rapidly introduced following the Agricultural Revolution. So many, in fact, that approximately 70% of the typical Western diet now comes from food sources that were rarely, if ever, consumed by our Stone-Age or Paleolithic ancestors. One of the many problems that have been seen to arise along with our change in diet is acne.

By focusing on the foods our Paleolithic ancestors ate for millions of years, the Paleo Diet provides all the necessary micronutrients, including calcium, to fuel health and fitness. The Paleo Diet also avoids the risks of many diseases linked to the consumption of many of the foods more recently assailing the human genome.

HORMONES IN MILK - PART I

Pedro Bastos, MA MS Ph.D.

There is good evidence that until 9,000 years ago in the Middle East and 7,000 years ago in Northern Europe, people did not consume non-human milk or dairy products.

On an evolutionary time scale, non-human milk consumption is a newcomer to the human diet, and most of our genome was selected in the Paleolithic environment in Africa. By using the evolutionary template, and knowing that milk is species specific, we would expect this new habit to have unintended consequences, which go far beyond lactose intolerance. Since only a minor percentage of the world’s population continues to consume milk into adulthood, lactose intolerance is actually very common. Even those people with Adult Lactase Persistence may experience adverse effects by consuming dairy products. This is because

“genes important for early reproductive success are conserved through the process of natural selection, despite potentially detrimental effects subsequent to their early and/or continued expression in later life.”

There are several lines of evidence that raise concerns with milk and dairy intake, but we will only focus on some of the hormonal effects of milk consumption.
From a physiological standpoint, milk is a unique biological secretion of the mammary gland endowed by nature to fulfil the entire nutritional needs of the neonate.

Milk’s main purpose is to be the sole food of infant mammals during the most accelerated growth period in postnatal development when endogenous production of hormones is low.

In addition to proteins, fats, lactose, vitamins and minerals, milk contains various growth-stimulating steroid and peptide hormones as well as catalysts, transporters and stabilizers that ensure their maximum bioactivity.

Here’s a short list of some hormones that are present in cow’s milk (the most widely used milk in the USA and Europe) that could be problematic for humans.

**POTENTIALLY PROBLEMATIC HORMONES**

- Insulin
- Igf-1
- Betacellulin (Btc)
- Estrogens (Particularly Estrone Sulfate)
- Precursors Of Dihydrotestosterone (Dht)

For sources see References: Section I

**HORMONES IN MILK - PART II**

*Pedro Bastos, MA MS Ph.D.*

The existence of hormones in cow’s milk that could be problematic for humans. Before we discuss the potential adverse effects of each of those hormones, it is important to know that in order for any of these milk hormones to potentially cause or promote a certain disease, it must:

1. Survive the pasteurization and processing methods
2. Survive the human digestive processes intact
3. Cross the gut barrier intact

It is normally believed that protein shearing enzymes in the human gut breakdown proteins and hormones before they can get to the small bowel where absorption occurs. This is what happens when you eat protein-containing foods, such as beef or fish, and this is the reason why some diabetics have to take insulin intravenously and not orally.

Nevertheless, we should remember that milk’s main purpose is to accelerate growth in weaning mammals, who have a low endogenous production of hormones. Milk contains not only the necessary hormones to promote growth, but also catalysts, transporters and stabilizers that ensure their maximum bioactivity.

Cow’s milk also contains peptidase inhibitors that could prevent proteolytic breakdown of various peptide hormones and growth factors, such as IGF-1 and the EGF family of hormones (like betacellulin).

The evidence suggests that most of the hormones mentioned last week fulfill, at least, the first two of the above requirements: surviving the pasteurisation and processing methods, and surviving the human digestive processes intact.

**INSULIN:**

Cow’s milk, as well as human milk (and presumably milk from all mammals) contains insulin. We know that bovine insulin (BI) (which differs from human insulin by three amino acids) survives pasteurisation because immunity to this hormone is common in children who consume cow’s milk or infant formulas containing cow’s milk. This not only confirms that BI is present in commercially pasteurised milk, but also in infant formulas, and perhaps other dairy products (although direct evidence is lacking). These studies also provide evidence that BI survives the human digestive processes and crosses the gut barrier intact, although this could be related to the fact that infants have higher intestinal permeability than older children and adults. Nevertheless, various factors may cause the so called “leaky gut” in virtually everyone, so we shouldn’t dismiss bovine insulin altogether.

**IGF-1:**

Cow’s milk contains active IGF-1, but this has been largely dismissed as irrelevant since pasteurisation and fermentation appear to reduce its content. Yet, cow’s milk consumption is associated with higher plasma IGF-1 concentrations in humans (both children and adults). This could be due to the calcium in milk (that has been shown to increase IGF-1 in boys and girls), the effect of milk upon insulinemia (the high elevation of plasma insulin caused by drinking milk could lead to higher plasma IGF-1) or residual IGF-1 in milk.
BETACELLULIN:

Betacellulin (BTC) belongs to the epidermal growth factor family of hormones, and it is found not only in cow’s milk and whey, but also in cheese. It survives both pasteurisation and processing. Although no direct evidence exists yet, bovine milk contains peptidase inhibitors that prevent human gut enzymes from degrading EGF and most likely BTC. Additionally, a low pH, such as may be found in the gut, does not impair or prevent BTC from binding its receptor. Finally, there is a luminally expressed EGF receptor in the gut through which BTC may enter circulation.

STEROID HORMONES:

The major sources of animal-derived estrogens in the human diet are believed to be milk and dairy products, which presumably account for 70-80% of the total estrogens consumed. Furthermore, it has been pointed out that most milk for human consumption is obtained from cows in the latter half of pregnancy when estrogen metabolite levels are greatly elevated. To confirm this, US researchers Daniel Falow and colleagues have measured estrogen metabolites in various milks and have shown that buttermilk contains the highest total amount of estrogen metabolites, followed by skim milk, 2% milk, and whole milk. So, estrogen metabolites appear to survive pasteurisation, but do they survive the other necessary steps? It is highly possible because estrone sulphate, which comprises 45% of the conjugated estrogens in Premarin and Prempro (the most frequently prescribed hormone replacement therapy for menopausal women), has high oral bioactivity, and it is the most prevalent form of estrogen in cow’s milk.

There are also other steroid hormones in commercially pasteurised cow’s milk, such as progesterone, 5α-androstenedione, and 5α-pregnanedione, which are dihydrotestosterone (DHT) precursors. Unfortunately, we aren’t aware of any study that has looked at the absorption of these hormones, so we don’t know if they can survive steps 2 and 3: surviving the human digestive processes intact and crossing the gut barrier intact.

For sources see References: Section II

PALEO ON THE PLANE

Nell Stephenson, BS USC EXSC

It can’t be done, can it? Is it possible to stay Paleo despite a hectic work schedule with too many business trips?

YES, IF you make it a priority and plan. No, you will not find vending machines at the airport with fresh, wild salmon and a side of steamed kale (although I suppose I can dream on! : ). If you really understand how important your nutrition is and acknowledge that it is the foundation for everything regarding your health, perhaps you’ll allocate a bit more time to planning ahead.

1) If you’re outbound and leaving from home, there’s no reason why you can’t prep a healthy meal with some healthy food to take on board. (Keep in mind that you are allowed to bring food through security, just not liquids.) Buy a small, thermal lunch box that
you can keep chilled with a reusable ice pack, and you can pack anything in it that you can eat a few hours later. It may sound like a foreign concept, but it works. You know exactly what you're eating and you won't find yourself stuck with only horrible, non-food vending machine junk. Some easy choices include a mixed green lettuce salad with sliced grilled chicken, avocado and an apple, or perhaps steamed green beans with sliced turkey, a handful of raw walnuts, and an orange.

2) Once you arrive at your destination, throw the ice pack in your hotel mini bar’s freezer and plan on utilizing the thermal pack again on the next leg of your journey. Order extra veggies with your meal to save, along with fish or steak (because chances are, if you're eating anywhere in America, you're going to be served more than one portion!). Keep those chilled in your hotel's minibar, grab an apple from the bowl at the concierge desk in the morning and you're set!

3) If your business trip has taken you to the middle of nowhere and the only “restaurants” around leave a lot to be desired, it's time to be creative. Scour the menu for veggies and lean protein options. If you see spinach as an add-on to an omelet, for example, try nicely asking the server if the chef might be willing to prepare a side of steamed spinach.

Yes, it does take extra planning and being creative, but you can train yourself to find Paleo options wherever you go. If you think you're going to feel silly traveling with a lunch box, I'll offer you an example to prove it works that is very close to home: my husband.

He's a well-dressed executive who travels for business, always looks fantastic and probably would not have bought himself a lunch box to bring his food with him in a million years! So I found the perfect solution: an all-black thermal lunch pack. While he may've felt funny bringing his lunch to work initially, I cannot count how many times he’s come home from work and told me that another colleague commented on how great his healthy lunch looked!

Be open minded to a new approach and your body will thank you for not having left the Paleo Diet to which it's grown so accustomed!

GREENS AT EVERY MEAL

Nell Stephenson, BS USC EXSC

“You're kidding right! You eat chard for breakfast? But, chard isn’t a breakfast food!” This was a comment made to me the other day at the gym where I see my clients. I’d already had three sessions, and by the time 9 a.m. rolled around, as always, I was ready for another feeding! That day, I happened to have steamed chard, seared bison and avocado with an apple for breakfast.

I replied that chard is, in fact, a breakfast food, and any food can be eaten at different times of the day. The woman looked at me in disbelief and left... (hmmm - was she on her way to get her version of breakfast "food" such as a scone and a mocha?).

While it may take some re-thinking and open-mindedness, see if you can begin to think beyond what foods have been traditionally allocated to certain times of the day, and then change that! If you were to start the day with last night's leftover steamed broccoli tossed with raw walnuts, grilled chicken and berries, your energy would soar in comparison to how you'd feel if you'd eaten a bowl of corn flakes!

Any Paleo-friendly food can be eaten for any of your meals throughout the day. Try making a list of what you think are suitable only for certain meals, and then literally, play mix and match! You're far less likely to get bored with what you're eating!
THE ESSENTIAL VITAMIN B-12

Loren Cordain, Ph.D., Professor Emeritus

Vitamin B-12 is an essential nutrient, but humans cannot depend on the absorption of bacterially-produced B-12 from the gut. While some viable B-12 is synthesized in the human colon, the site of absorption is at the ileum. This is “upstream” from the colon at the lower end of the small intestine, so the B-12 synthesized in the colon is unavailable and must come from food.

The B-12 synthesized by bacteria is mainly concentrated in the bodies of predatory organisms in the natural food chain, so meat, milk, eggs, fish, and shellfish all contain B-12. Comparatively, the B-12 in eggs seems to be the most poorly absorbed among these sources.

Some plant foods, such as blue-green algae (cyanobacteria), contain large amounts of B-12, but the B-12 compounds in algae appear to be inactive in mammals. Most of the blue-green algae used for human supplements predominately contain pseudovitamin B-12, which is inactive in humans. Cyanocobalamin, also used in most supplements, is readily converted to the coenzyme forms of cobalamin in the human body.

While the RDA of B-12 for adults is 2.4 mcg/day in the United States and Japan; the daily loss of the vitamin is estimated to be between 2 and 5 mcg/day. Bor et al. reported that a daily B-12 intake of 6 mcg/day appears to be sufficient to maintain a steady-state concentration of plasma B-12 and B-12 related metabolic markers. However, B-12’s bioavailability significantly decreases with increasing intake of vitamin B-12 per meal.

Studies with vegans have shown that despite the physiological recycling and conservation mechanisms that become increasingly efficient as B-12 intake falls below normal daily requirements (so that very little is lost from the body), the likelihood is high that B-12 deficiency will eventually develop. This may only develop after 20 years or more in vegans who do not consume any animal-based products or take B-12 supplements.

Vegans in the early stages of depletion are able to maintain normal serum B-12 levels by drawing from stored reserves in the liver and elsewhere that become depleted gradually. It is this negative metabolic B-12 balance that occurs soon after exogenous B-12 ceases to be consumed in appreciable quantities that points to a human requirement for animal-based B-12 sources. It is probable that vegans with long-term normal B-12 balance are ingesting at least small amounts of B-12, if not from supplements, then from unrecognized animal-based sources. In one study with vegans, this was due to eating unwashed vegetables that had been grown in gardens containing manured soils that contained B-12.

One indication of how previously stored B-12 reserves can mask an ongoing negative B-12 balance can be seen in long-term vegan mothers and their infants. The mothers may maintain blood levels of haptocorrin B-12 in the normal range for years due to increasingly efficient recycling of B-12 as their reserve stores become depleted. In adult vegans with such improved B-12 reabsorption, clinical deficiency may take
20-30 years to manifest. However, the infants of these mothers are born with almost no reserve stores (little or none are available in the mother’s body to pass on to them), and they go into clinical deficiency much more rapidly.7

In summary, the inability of humans to absorb bacterially produced B-12 in the colon, and the evidence that strict vegans will eventually show negative B-12 balance,8,9 even when total serum levels are in the normal range, indicate a long evolutionary history of animal-based foods in human diets. Eat The Paleo Diet, and one should not need any supplemental vitamin B-12.

For sources see References: Section III

WHAT IS A PROTEIN?

Nell Stephenson, BS USC EXSC

With all the hype of the recent high-protein diet trend, many people have gone overboard with regard to the amount and types of protein they’re consuming. While some of the aspects of certain high-protein diets may be valid (such as cutting out processed sugars and starches), many other facets make that style of eating impractical, not to mention unhealthy! I don’t know about you, but if a diet tells me I cannot eat fruit or veggies, that raises some serious red flags!

So what is the deal with protein then? A protein is a naturally occurring complex consisting of amino acids joined by peptide bonds. Their functions in the body include immune response, maintaining cell shape, enzyme response, helping with biological reactions, and they are essential to every cellular process.

Where do we find protein? Meat, game, fish, poultry, eggs... you get the picture! While some plants (fruits and veggies) contain varying amounts of protein, animal protein is a superior, more balanced source for humans.

How much do we need? Recommendations vary, but my best suggestion is to think of everything in balance. Balance the timing of your meals (eat frequently), the size of your meals (small portions), and the macronutrients in your meals (have some fat, some protein and some natural, unprocessed carbohydrate with each meal).

One of the most interesting things I’ve done in the past four years since I’ve been eating a Paleo Diet is to explore a plethora of all kinds of different protein. While you certainly can get by with the old standbys of wild salmon, grass-fed beef flank steak and roast turkey, it’s been so much fun to try ostrich, bison and elk, to name a few.

Make it an adventure and try a new type of protein today!
PRIMAL IN THE KITCHEN

CAJUN BLACKENED TURKEY CUTLETS

1 t. paprika
1 t. onion powder
1 t. garlic powder
1 t. oregano
2 t. cayenne pepper
2 t. white pepper
4 6oz. turkey cutlets, pounded then with meat tenderizer tool
2 Tb. extra virgin olive oil

Combine paprika, onion powder, oregano, and peppers. Place spice mixture in a large plastic bag and add turkey. Close bag and shake well to thoroughly coat turkey.

Heat oil in a cast iron skillet over high flame. Add turkey and cook for ten minutes, turning at the halfway point. Remove from skillet and tent with foil for five minutes.

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Contributing writers from The Paleo Diet Team:

**Pedro Bastos** MA MS Ph.D. candidate in Medical Sciences at Lund University, Sweden; International College of Human Nutrition and Functional Medicine

**Nell Stephenson**, BS USC EXSC, ACSM H/FI, Paleo Nutritional Counselor, co-author of The Paleo Diet Cookbook, author of Paleoista, Gain Energy, Get Lean and Feel Fabulous with the Diet You Were Born to Eat. Paleoista

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