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## **Do You Frequently Get Tired After a Meal? You Need a Nutritional Adjustment!, Part 5 of 6**

By David Seaman, DC, MS, DABCN

The Diet-Induced Pro-Inflammatory State -

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When I began practice back in 1987, the study of candida and its relation to food allergies was all the rage. Accordingly, most of us who utilized nutrition as a component of chiropractic practice were taught that the majority of our patients' symptoms were caused by candida, food allergies, or liver or bowel toxicity. I embraced many of these concepts until the early 90s, when I began to learn more about inflammation and nociception. The more I learned about inflammation in particular, the more it became clear that candida, allergies and toxicity cannot be involved in most patients we see on a daily basis, contrary to what many continue to believe.

To a surprising degree, many still strongly defend the notion that food allergies, yeast, and toxic livers are the problem. Simply put, no data support this notion. Today, as most of you probably know, liver toxicity is the most popular of the purported causes of most symptoms; shockingly enough, absolutely no data suggest that patients walking into a chiropractor's office are suffering from the variety of liver toxicities promoted by many nutritional companies and specialty laboratories.

Fatigue and sleepiness are two symptoms routinely associated with liver toxicity. We hear terms such as "sluggish liver," which supposedly can be correlated to feeling sluggish and tired. And, if you get tired immediately after a meal - watch out - you definitely have candida growing out of control, severe food allergies, or a brutally toxic liver. At least this is what many teach. However, as this article explores, there is also a viable physiological explanation for postmeal fatigue.

### **Why Do We Get Tired After a Meal?**

I don't know if anyone has the complete answer to this question; however, rest assured that in the great majority of cases, postmeal fatigue has absolutely nothing to do with food allergies, candida, or a toxic liver. The most plausible explanation involves cytokine-induction of sleep.

In part IV of this series [[www.chiroweb.com/archives/21/02/22.html](http://www.chiroweb.com/archives/21/02/22.html)], I discussed how cytokines induce the acute-phase response, which includes signs and symptoms such as general hyperalgesia and allodynia; fever; depression; memory loss; reduced social interactions; malaise; feeling sleepy; and increased sleep. Although it is known that cytokines drive these symptoms, many still argue that a toxic liver is at fault. In fact, it is known that eating too much food generally makes us tired, in that overeating increases cytokine production, which induces fatigue or sleep.

### **Background on Cytokines and Sleep**

IL-1 and TNF are two of the pro-inflammatory cytokines discussed in Part IV. It is known that injections of either IL-1 or TNF into experimental animals increase sleep. For example, when rabbits are given IL-1 at the onset of darkness, they sleep three extra hours during the first 12 hours after injection. These cytokines promote sleep whether administered directly into the brain, or following intraperitoneal or intravenous injections. It turns out that IL-1 and TNF promote sleep in every species tested thus far, including rats; mice; monkeys; cats; and rabbits.<sup>1</sup> In humans, it is thought that IL-1 and TNF promote sleep, although the details are not as clear. Research also suggests that IL-6 promotes sleep in humans.<sup>2</sup> So, when we think of sleepiness, we need to consider cytokines.

### **"Pigging Out" and Sleep**

I have known that overeating promotes sleep since my first reading of "Jack and the Beanstalk." When you "pig out," you go to sleep; it's that simple. In research terms, Hansen, et al., state it clearly: "Food intake is one of the determining factors of the daily amount of sleep; an excess of sleep occurs when there is

increased feeding."<sup>2</sup>

Hansen, et al., discovered that IL-1 levels rise in rats that "pigged out" on cafeteria food, compared with those that ate regular chow.<sup>4</sup> Consider the title of another paper written by the team: "Cafeteria Diet-Induced Sleep Is Blocked by Subdiaphragmatic Vagotomy." Both articles were published in the *American Journal of Physiology*, one of the most prestigious physiology journals in the world. What is the cafeteria diet? Bread, chocolate and shortbread cookies!<sup>3</sup>

The researchers found that both vagotomized and control rats pigged-out on the sweets (which is what rats do when presented with these foods); however, **only** the control rats slept after overeating.

The vagus nerve has an enormous sensory component, and it innervates the liver, spleen, and intestines, so it is extremely sensitive to cytokine production in these organs. As it turns out, bread, chocolate and cookies stimulate IL-1 production, which is known to activate vagal sensory fibers that end in the *nucleus tractus solitarius*, which ultimately results in increased CNS production of IL-1, which is known to produce acute-phase symptoms, such as sleep. When the researchers cut the vagus, they eliminated the sleep-inducing signals from the cytokines produced after over consumption of bread, chocolate, and cookies.

## **Conclusion**

At present, over 50 percent of adults in the U.S. are overweight or obese. We know we are a nation of overeaters, so it should not be a surprise that postmeal fatigue is a common symptom. The most likely explanation for postmeal fatigue involves the cytokine mechanisms described above. Get your patients to eat less, and see how quickly their postmeal fatigue disappears. As pro-inflammatory cytokines drive sleep and the acute-phase response, it is important to adopt the anti-inflammatory diet and supplement recommendations described in the first four articles in this series.

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