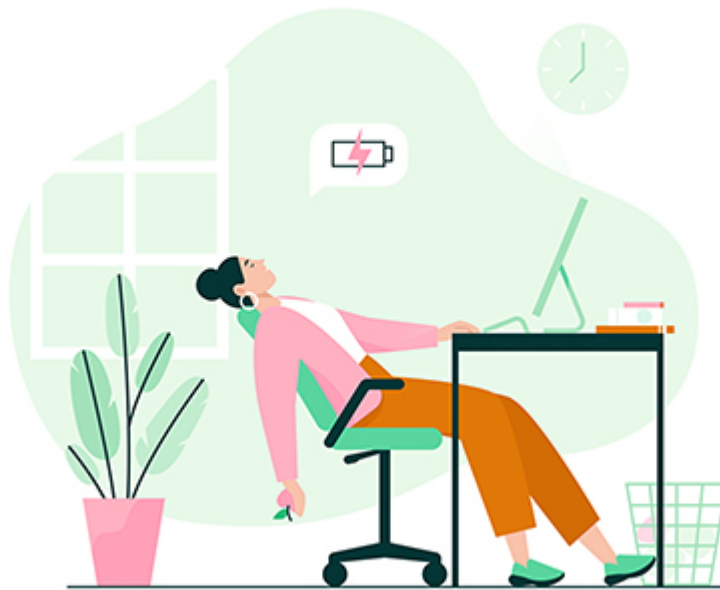


# The many faces of fatigue



Nearly 30 years ago (1993) I wrote a book about fatigue—**Tired All the Time: How to Regain Your Lost Energy**. In it, I advanced the theory that every tired individual has their own distinct “fatigue wheel”—a pie-chart of sorts with each wedge representing the contribution of one or another source of fatigue.

I enumerated lots of causes, from allergy, toxicity, infection, nutritional deficiency, to hormones. Everyone is different. One person might experience a total energy reboot from B12 shots; another with iron-rich foods. Alternatively, someone might be suffering from chronic sinus infections which sap brain energy (functional MRI studies now verify that sinusitis patients have “brownouts” in crucial regions of their brains). Others might have an undiagnosed tick-borne infection that requires medical attention.

Some fatigue sufferers respond to thyroid medication—the natural forms work best. Certain men do well with testosterone; post-menopausal women may get relief with bio-identical hormone replacement therapy; both sexes may respond to DHEA or pregnenolone.

Insulin resistance, as I forecasted in the 90s, has come up big as an underlying cause of fatigue. It’s estimated that 60% of adult Americans suffer from some degree of metabolic syndrome—characterized by abnormal blood sugars, bad lipid ratios,

overweight, and inordinate sugar cravings—if not outright diabetes.

The relationship between insulin resistance and fatigue is straightforward. To paraphrase, it's a matter of glucose, glucose everywhere, but not a molecule for energy production. Fuel-dependent cells in the muscles and brain may be bathed in sugar, but a metabolic blockade prevents its ingress to the mitochondria. In the brain, this phenomenon has earned the sobriquet **"Type 3 diabetes"**. This inefficiency of energy utilization results in a vicious cycle of progressive weight gain and lethargy.

Environmental chemicals make this worse. They poison the delicate metabolic processes that convert dietary fuel into energy, thus undermining our thermodynamic efficiency. Studies have shown how this subverts efforts at fat mobilization in people trying to lose weight.

New insights about the human genome have provided us with awareness about inherited proclivities affecting energy metabolism; they can be disclosed with new sophisticated **genetic tests** and analyses.

Superimposed on this, lots of us are suffering from burnout—the result of chronic stress, sleep deprivation, and a deficit of true relaxation. This is reflected in depletion of cortisol, which signals the overworked adrenals have become exhausted.

Depression is often cited as a "psychosomatic" cause of fatigue, i.e., "it's all in your head". Talk therapy can be beneficial. But a more sophisticated understanding of low mood goes beyond making it simply a matter of "wrong thinking". It's a very physical condition that's reflected in low neurotransmitter levels and high levels of brain inflammation. And, new insights are revealing how anxiety and depression are related to a **disordered microbiome**. Availability of certain nutrients may have a profound impact on brain efficiency.

I envisioned the key role of mitochondria in *Tired All the Time*, but nearly three decades of scientific progress have improved our understanding of how these cellular powerhouses work—and what can be done to resuscitate them. I also talked about this on a recent podcast with Dr. Garth Nicolson, Research Advisor for our friends at NTFactor®.

With age, compounded by the stress of disease, toxicity, inflammation, free radicals, nutrient deficiency, or insulin resistance, mitochondria decline in function. There's a reason why the Tom Brady's of the world are considered outliers. Most pro athletes are over-the-hill by the time they're 40. **The average age** at which chemists did the work that won them the Nobel prize was 46.5, compared to 42 for physicists and 45.1 for physiologists. Yet *you're* supposed to be razor sharp until you're allowed to retire at 65?

While I'm not sure I'd sign up, at the age of 68, for another round of the multi-year marathon of memorization and all-nighters that accompanied the medical training I underwent in my 20s and 30s, I'm personally engaged in a science fair project of sorts to see how long I can preserve peak mental efficiency, productivity, and athletic proficiency.

To that end, I've utilized a variety of energy-supporting supplements, including NTFactor®, nicotinamide riboside, ubiquinol, Maca, DHEA, ashwagandha, and rhodiola. The novel supplements PEA (palmitoylethanolamide) and CBD (cannabidiol) have also become part of my regimen, along with the usual alphabet vitamins and minerals.

I also credit a low-carb diet, a version of the *Salad and Salmon Diet* I introduced in the 90s, replete with protein, healthy fats, non-starchy vegetables, and fiber.

I'm also an inveterate exerciser, and I've learned to titrate my workouts to include running, cycling, swimming, strength training, boxing, and yoga, along with plenty of walking. The trick is to diversify your exercise portfolio so you have lots of options to avert biomechanical stress and boredom. It may seem counter-intuitive, but rather than depleting energy, exertion *begets* energy. (But only if judiciously applied, especially when you're older).

Oh, and sleep. Allocating sufficient time for refreshing sleep is something I cultivate. It's truly medicinal, restorative, and reparative. And if you lie there and can't sleep, it's a sure sign something is broken.

I still think that the model I advanced in *Tired All the Time* remains applicable. It's certainly proven a valuable way of thinking about my patients over the years, most of whom manifest fatigue, to some degree or another. I approach each patient as a puzzle, fleshing out the spokes of their unique individual "fatigue wheel" as I gather evidence with appropriate tests, and then undertake trials of therapy based on what I find. The results have been rewarding.

What's *your* fatigue wheel?