Insomnia & Hyperactivity

by Ray Peat, Ph.D.
Ray Peat's Newsletter

Sometime after my teens, I became a light sleeper. I found that if I stayed up too late it was hard for me to go to sleep, and then when I slept it was restless and dream-disturbed sleep. I suspected that my hormonal state was in some way analogous to that of new mothers, who wake at the slightest sound from their infant. A friend of mine had an episode of psychosis after her child was born, and I began to think about the frequent association of post-partum hypothyroidism with emotional or perceptual problems. Although I tended to be hypermetabolic, and had been puzzled for years about the co-existence of signs of both hyper- and hypothyroidism, I finally tried taking thyroid. Immediately, I was able to sleep easily and deeply, and my need for food decreased. It was obvious that thyroid was having a quieting effect on my whole metabolism. I slept more efficiently, woke up refreshed, and had abundant energy during the daylight hours, and began looking for chores to do around the house, just for fun. Before taking thyroid, the first thing I did every morning was to drink two or three cups of coffee, but a few days after taking thyroid I noticed I didn't think about coffee very often, and I drank about 90% less, without feeling any withdrawal symptoms.

Since the 1960s, a stimulant, Ritalin (methylphenidate) has often been prescribed for hyperactive kids, because it made them able to quietly pay attention. This effect was called "paradoxical," but – for scientific physiology – there was nothing paradoxical about it. The frontal lobes of the brain, the most highly evolved part, give us the ability to plan and to understand complex things that require prolonged attention. Without this higher part of the brain which has a very high energy requirement, people and animals become hyperactive and unable to concentrate. Ritalin (or coffee) makes anyone, even the brightest students, more attentive and focussed. Caffeine and Ritalin temporarily raise the energy level of the brain. Thyroid hormones are essential for providing the energy to keep the brain at a high energy level all the time. If these hormones are deficient, our nerves need stimulants to function normally, and our bodies ordinarily produce large amounts of adrenalin to keep us going. The result is that we get tired and tense at the same time.

An old and useful test of thyroid function uses the Achilles tendon reflex, to observe the relaxation speed of the calf muscle. In hypothyroid states, the muscle is slow to relax, because the cells are slow to replace the energy used by the contraction-twitch. Because of the slow energy production, the muscles tend to fatigue easily, and to swell and feel sore with moderate exercise. In children, painful, swollen and tense muscles sometimes make it hard to go to sleep after an active day.

In the heart, slow replacement of energy can be seen in the EKG, as a delayed and depressed T wave; if this is combined with stress and excitement, it can cause a rhythm disturbance.

The brain is just like muscle, in having to restore its energy to relax. Many people have noticed that eating a lot of carbohydrate and/or salt makes them sleepy. Both salt and carbohydrate tend to lower adrenalin, and carbohydrate can also increase the activity of thyroid hormone, while restoring energy to the tissues.

In the last 20 years, I have seen almost everyone's insomnia disappear when they correct their hypothyroidism, sometimes just with dietary changes, but more often with a thyroid supplement. Many times, people have told me that they get to sleep within a few minutes when they take a minimal dose of thyroid at bedtime. By increasing the rate of energy production, relaxation and sleep are made possible.

In 1973 (in my book, *Mind and Tissue*) I reviewed old studies of cellular inhibition, which distinguished between the naturally quiet resting state of energized cells, and the state of protective inhibition, which prevents injury or death from overstimulation and fatigue. In our "establishment physiology," there has been no coherent theory of cellular inhibition, which means that cellular activity could hardly be understood correctly, either. Most of the facts are known, but they have seldom been put together in meaningful patterns, which would let us see that a few simple principles govern a great range of disturbing phenomena: seizures, shock, hypertension, fibrillation, cramps, restless legs, coma, insomnia, obsessive thinking, migraine, hyperactivity, even cell death and aging. ➤

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Coherent theories have been rejected because they don't suit the dogma of the establishment physiologists, who like to explain things in terms of hypothetical "membrane pumps." A few fetish ideas dominate physiology, just as the gene and virus fetishes have governed cancer research. For more than a century, most physiologists have "explained" muscle soreness as being "caused by lactic acid," while generally ignoring the great swelling of muscles that results from intense exercise. When cells don't have enough energy – whether from inadequate fuel, overwork, lack of oxygen, or poisoning – they take up water. Too much water tends to excite the cells, and can even stimulate cell division. The hyperactive state of a muscle cell, cramping, causes energy to be spent. What is too often overlooked is that the cell needs more energy to get back into its resting state, and that an abundance of glucose or other fuel, oxygen, and thyroid are needed for the cell to produce energy fast enough to become quietly relaxed. Albert Szent-Györgyi demonstrated that rigor mortis, the stiffening of the body that occurs after death, is just an energy deficiency, like a final cramp: he injected ATP (the tissue "energy molecule") into a stiff animal, and its tissues' softness was restored. The idea of "membrane pumps" keeps many people from seeing the implications of experiments like that. Intravenous injection of ATP cures shock, restoring normal circulation and tissue function, but again, the idea of membranes and their pumps has kept mainline science on its relatively sterile track.

The reluctance to see something as simple as the swelling of a muscle when its energy is depleted, has led into other unnecessary confusions. For example, the water that the muscle takes up comes from the blood. The blood gets thicker, and is harder to pump. The loss of water from the blood makes it seem that hormones have increased, when actually they may have decreased. If the tissues could be re-energized, they would release some of their water back to the blood.

For many years, a few physicians have known about the quieting effects of thyroid, and have prescribed it for hyperactive kids, as well as for lethargic ones, and for otherwise healthy kids with "growing pains." Since the mid-1950s, there has been a terrible increase in the incidence of hyperactivity in children, as discussed by Tom Brewer, largely because of prenatal injury. The increased use of unsaturated vegetable oils (proven to cause brain damage in rats) has certainly played a role. The more unsaturated an oil is, the more strongly it interferes with thyroid secretion, the transport of thyroid hormone in the blood, and the response of the tissue thyroid receptors. Hypothyroidism, both prenatally and during childhood, severely limits development of the brain.

It is a simple fact that nerve cells must have an abundance of energy if they are to be able to relax. Every physician knows about the convulsions produced by extreme hypoglycemia, and some know that a lack of oxygen can produce convulsion, but few realize that a high energy state is needed for stable nervous relaxation. Otherwise, no one would hesitate to use thyroid hormone (and its energy-associated co-factor, magnesium) for insomnia, hyperactivity, and the whole range of energy-related problems. (Incidentally, thyroxine alone can be counter-productive, by competing with the respiration-promoting triiodothyronine, and by suppressing TSH secretion even when T3 is deficient. Similarly, a normal or high level of thyroxine in the blood doesn't mean that the person isn't hypothyroid, since T3 is the active hormone. Most of our T3 is produced in the liver.)

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Reference

S.M. Talaat, et al., The effect of ATP administration in irreversible shock, *Physiologist* 6:284, Aug. 1963.

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Quoting Thomas Jefferson 200 Years Ago

"If we run into such debts as that we must be taxed in our meat and in our drink, in our necessaries and our comforts, in our labors and our amusements, for our callings and our creeds, as the people of England are, our people, like them, must come to labor sixteen hours in the twenty-four, [and] give the earnings of fifteen of these to the government for their debts and daily expenses; and the sixteenth being insufficient to afford us bread, we must live, as they now do, on oatmeal and potatoes; have no time to think, no means of calling the mismanagers to account; but be glad to obtain subsistence by hiring ourselves to rivet their chains on the necks of our fellow sufferers.... And this is the tendency of all human governments. A departure from principle in one instance becomes a precedent for a second, that second for a third, and so on till the bulk of the society is reduced to be mere automatons of misery, to have no sensibilities left but for sinning and suffering.... And the fore horse of this frightful team is public debt. Taxation follows that, and in its train wretchedness and oppression."