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A case report of niacin in the treatment of restless legs syndrome

A woman, age 87 years, with no other remarkable medical history other than allergies, has suffered from restless legs syndrome (RLS) of many decades duration. She would awaken at night approximately every 45 min or so, and would need to get out of bed and walk around in order to relieve her symptoms. At times she found that drinking coffee would give some relief. Her physician had prescribed Mirapex (pramipexole dihydrochloride), the leading medication for this disorder, and while it gave her some relief, especially initially, it led to severe morning fatigue and grogginess. Furthermore, over time, her RLS worsened; the symptoms began to start much earlier in the day, often by early evening, and the medication became increasingly ineffective. For much of the day, she was effectively incapacitated, as well as extremely fatigued during the rest of the day.

On the recommendation of this writer, who read about the possible effectiveness of niacin for the treatment of this disorder[1], she began to take niacin, approximately 400 mg a day in divided doses. Within three to four days, while continuing her regular medications, her RLS symptoms disappeared, and have been completely absent since then.

References in the literature to niacin for the treatment of restless legs are sparse, a search on PubMed for example for "niacin restless legs" returning no results.

Niacin deficiency causes pellagra, and it is of interest to note that in pellagra neurological symptoms are prominent, symptoms such as peripheral neuritis, restlessness, and insomnia, suggesting a possible link between niacin and RLS. The two main forms of niacin, nicotinic acid and nicotinamide, differ in their pharmacological effects; while nicotinamide is often preferred for supplementation due to its lack of side effects such as flushing, it is not clear whether one form is more effective. The subject of this report ingested nicotinic acid, but reported no flushing.

Since it appears that no systematic study of niacin for the treatment of RLS has ever been undertaken, and since currently-used medications for RLS are expensive and have significant side effects, and since RLS severely impacts the lives of its sufferers, controlled studies of the effect of niacin on RLS may be warranted.

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[1] Doctor Yourself, http://www.doctoryourself.com/leg.html. Accessed 21 May, 2009.

Are the astrocytes involved in magnetite-based memory?

We have recently suggested that memory is stored in clusters of magnetite crystals and ferritin on the inside of the membranes of the neurons and that the dendrites function as a reading frame [1]. In accordance with the close connection between neurons and astrocytes (see below), we suggest that also the astrocytes may also be involved in the magnetic-based storage of memory.

Biogenetic magnetite is present as nanoparticles in all parts of the brain. With advancing age Fe(II) become extensively distributed and accumulates numerously in oligodendrocytes and astrocytes. They are likely to accumulate by normal biological processes in astrocytes [2]. This seems due to their phagocytic activities as have been shown by experiments by injecting transfected mouse embryonic stem cells labelled with superparamagnetic iron oxide nanoparticles. Small dense clusters of the former injected particles were thus observed in the cell cytoplasm of the astrocytes [3].

Increasing knowledge about the astrocytes indicate that they have several functions in supporting the neurons. Live imaging studies reveal also a dynamic and cooperative interplay between astrocytes and neurons at synapses that is guided by a variety of molecular cues and that astrocytes are well equipped and uniquely positioned to engage in a dynamic two-way dialogue with neurons. It has been estimated that a single astrocyte can associate with multiple neurons, and over 100,000 synapses. Astrocytes are placed in a central position to actively signal with neurons to coordinate developing neural circuits. It has been suggested that astrocytes may provide instructive signals to control the formation and development of synapses [4]. Glucose is partially metabolized by astrocytes and intermediates are released for neuronal use. Upon injury to nerve cells within the central nervous system, astrocytes become phagocytic to ingest the injured nerve cells. It has been hypothesized that magnetic interaction between neurons and astrocytes can explain neurocomputation, including memory processing in the human neocortex [5]. The possible magnetic-based storage of memory in neurons and astrocytes indicates promising avenues for future research.

References

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