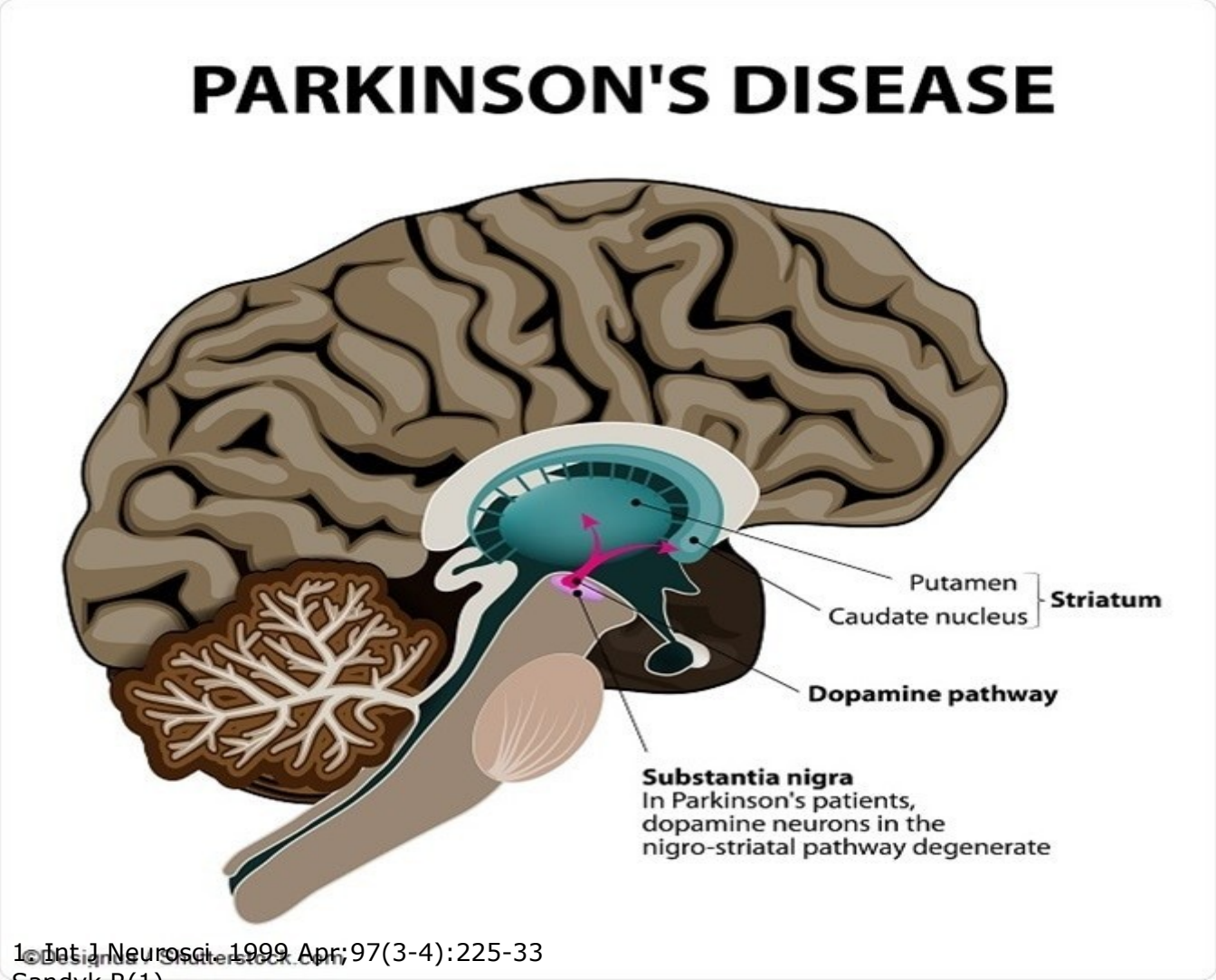
Medical PEMF Studies

PARKINSONS

Treatment with AC pulsed electromagnetic fields improves olfactory function in Parkinson's disease.



1. Int J Neurosci. 1999 Apr;97(3-4):225-33
Sandyk R(1).

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Olfactory dysfunction is a common symptom of Parkinson's disease (PD). It may manifest in the early stages of the disease and infrequently may even antedate the onset of motor symptoms. The cause of olfactory dysfunction in PD remains unknown. Pathological changes characteristic of PD (i.e., Lewy bodies) have been demonstrated in the olfactory bulb which contains a large population of dopaminergic neurons involved in olfactory information processing. Since dopaminergic drugs do not affect olfactory threshold in PD patients, it has been suggested that olfactory dysfunction in these patients is not dependent on dopamine deficiency. I present two fully medicated Parkinsonian patients with long standing history of olfactory dysfunction in whom recovery of smell occurred during therapeutic transcranial application of AC pulsed electromagnetic fields (EMFs) in the picotesla flux density. In both patients improvement of smell during administration of EMFs occurred in conjunction with recurrent episodes of yawning. The temporal association between recovery of smell and yawning behavior is remarkable since yawning is mediated by activation of a subpopulation of striatal and limbic postsynaptic dopamine D2 receptors induced by increased synaptic dopamine release. A high density of dopamine D2 receptors is present in the olfactory bulb and tract. Degeneration of olfactory dopaminergic neurons may lead to upregulation (i.e., supersensitivity) of postsynaptic dopamine D2 receptors. Presumably, small amounts of dopamine released into the synapses of the olfactory bulb during magnetic stimulation may cause activation of these supersensitive receptors resulting in enhanced sense of smell. Interestingly, in both patients enhancement of smell perception occurred only during administration of EMFs of 7 Hz frequency implying that the release of dopamine and activation of dopamine D2 receptors in the olfactory bulb was partly frequency dependent. In fact, weak magnetic fields have been found to cause interaction with biological systems only within narrow frequency ranges (i.e., frequency windows) and the existence of such frequency ranges has been explained on the basis of the cyclotron resonance model.

PMID: 10372649 [PubMed - indexed for MEDLINE]