OCCAM'S RAZOR APPLIED TO FIND THE CAUSE OF SPORADIC PARKINSON'S DISEASE: VITAMIN B2 DEFICIENCY EXPLAINS ALL MAJOR SYSTEMIC AND NEUROCHEMICAL CHANGES SO FAR REPORTED

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Altered riboflavin (Rb) status despite a normal daily intake has been consistently found in patients with sporadic Parkinson's disease (PD). Rb administration (30 mg TID) and elimination of dietary red meat progressively improved motor capacity (MC) [Braz J Med Biol Res 2003; 36(10):1409-1417]. This review was aimed at identifying systemic and neurochemical PD changes possibly affected by Rb status. FMN and/or FAD act as co-factors or prosthetic groups in several enzymes and enzyme complexes like cytochrome P450 reductase [required for hemin catabolism by heme-oxygenase and for cytochrome P450 activity, enabling D3 and 25(OH)D3 hydroxilation and xenobiotic catabolism], glutathione reductase, MAO, NADH-FMN oxidoreductase (ferriductase – involved in the release of iron from ferritin), mitochondrial Complexes I and II, piruvate dehydrogenase, α-ketoglutarate dehydrogenase. Like eumelanin, the synthesis of neuromelanin may require vitamin B2, and neuromelanin may release stored FAD in dopaminergic neurons according to vitamin B2 availability. Accumulation of hydrogen peroxide and iron release is expected, leading to enhancement of Fenton reaction, 6(OH)DA production and lipid peroxidation, particularly in dopaminergic cells. The involvement of vitamin B2 in enzyme pathways related to the major metabolic changes reported in PD patients strongly supports (in accordance with the Principle of Parsimony) a fundamental role for riboflavin in PD pathophysiology and treatment. Financial support: FAPESP.