

Oxidative stress in patients with multiple sclerosis.

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It is well known that brain and nervous system cells are prone to oxidative damage because of their relatively low content of antioxidants, especially enzymatic ones, and of the high levels of both membrane polyunsaturated fatty acids (PUFA) and iron easily released from injured cells. We have investigated the oxidative stress in the blood (plasma, erythrocytes and lymphocytes) of 28 patients affected with multiple sclerosis (MS) and of 30 healthy age matched controls, by performing a multiparameter analysis of non-enzymatic and enzymatic antioxidants-- Vitamin E (Vit. E), ubiquinone (UBI), reduced and oxidized glutathione (GSH, GS-SG), superoxide dismutase (SOD), glutathione peroxidase (GPX), catalase (CAT) and fatty acid patterns of phospholipids (PL-FA). PL-FA and Vit. E were assayed by GC-MS; UBI and GSH/GS-SG by HPLC; SOD, GPX and CAT by spectrophotometry. In comparison to controls, patients with MS showed significantly reduced levels of plasma UBI (0.21 +/- 0.10 vs. 0.78 +/- 0.08 mg/ml, $p < 0.001$), plasma Vit. E (7.4 +/- 2.1 vs. 11.4 +/- 1.8 mg/ml, $p < 0.01$), lymphocyte UBI (8.1 +/- 4.0 vs. 30.3 +/- 7.2 ng/ml blood, $p < 0.001$) and erythrocyte GPX (22.6 +/- 5.7 vs. 36.3 +/- 6.4 U/g Hb, $p < 0.001$). This blood antioxidant deficiency was associated with plasma levels of PL-PUFA--especially C20:3 n-6 and C20:4 n-6--significantly higher than controls. In conclusion, the blood of patients with MS shows the signs of a significant oxidative stress. The possibility of counteracting it by antioxidant administration plus an appropriate diet, might represent a promising way of inhibiting the progression of the disease. Antioxidant supplements should include not only GSH repleting agents, but also Vit. E, ubiquinol, and selenium.



