Oxidative stress in experimental menopause rat model: the effects of vitamin A supplementation upon antioxidant status

Feistauer, L.B.H.¹, Behr, G.A.¹, Schnorr, C.E.¹, Moreira, J.C.F.¹

¹Centro de Estudos em Estresse Oxidativo - Lab32, Departamento de Bioquímica, ICBS, UFRGS, Porto Alegre, RS, Brasil.

Introduction: Menopause has been reported to be associated with increased oxidative stress and metabolic disorders among women worldwide. Disarrangements in the redox state similar to those observed in menopausal women can be obtained experimentally through rat bilateral ovariectomy. The search for alternative treatments to improve life quality in postmenopausal woman is really important. The aim of the study was to investigate the effects of retinol palmitate (a vitamin A) supplementation (500 or 1500 IU/kg/day, during 30 days) on brain and blood/plasma redox profiles, and behavioral parameters. Material and Methods: The open-field test and the elevated plus maze test were performed to evaluate locomotor/exploratory activity and anxiety-like behavior. Rats were euthanized by decapitation, and the uterus, blood/plasma and the central nervous system structures (hypothalamus, frontal cortex, and hippocampus) were collected. The antioxidant enzymes (SOD, CAT and GPx), total antioxidant potential (TRAP), total SH content, lipid damage (TBARS), and protein damage (carbonyl) parameters were measured. Results and Discussion: In a first analysis, vitamin A supplementation was capable to ameliorate antioxidant status in OVX rats, restoring both enzymatic and non-enzymatic defenses, and decreasing protein oxidative damage levels in plasma. However, in a second analysis, vitamin A supplementation decreased locomotor/exploratory behavior and total hippocampal SH content in sham-operated rats, increased hippocampal SOD/CAT ratio and decreased TRAP in the hippocampus on both sham and OVX groups, and increased cortical TBARS levels in OVX rats. Conclusions: Even though vitamin A supplementation can act as an antioxidant in plasma, it can also induce a pro-oxidant status in determined brain regions of OVX rats. This is the first research in the literature showing that relatively low vitamin A doses have completely different effects depending on the studied tissue, suggesting that some caution need to be taking when regarding the use of vitamin A supplementation during menopause. Acknowledgments: CNPq and Capes (Proc. No. BEX 5383/10-2). Keywords: Blood; Behavior; Central nervous system; Menopause; Ovariectomy; Redox profile; Vitamin A