Effects of melatonin on exercise-induced oxidative stress in adults with obesity undergoing a multidisciplinary body weight reduction program.

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Background: obesity is characterized by increased oxidative stress, which, in a vicious circle, promotes chronic low-grade inflammation. Melatonin, a well-documented antioxidant, might be useful as a supplement to enhance the cardiometabolic benefits of any body weight reduction program (BWRP).

Objectives/Methods: the present study aimed to evaluate the post-exercise oxidative stress and inflammation in a group of subjects with obesity treated with melatonin (2 mg/die) or placebo, undergoing a 2-week BWRP, with the administration of a single bout of acute exercise at the start and the end of the protocol (G1–G15).

Results: eighteen adults with obesity were enrolled and distributed to the two arms of the study: the melatonin group (F/M: 7/2; age: 27.8 ± 5.6 years; body mass index [BMI]: 43.0 ± 4.9 kg/m^2) and the placebo group (F/M: 6/3; age: 28.8 ± 5.0 years; BMI: 42.8 ± 4.0 kg/m^2). BWRP induced a decrease in BMI and waist circumference (WC) in both groups; plasma glucose, blood glycated hemoglobin (HbA1c), and neutrophil to lymphocyte ratio (NLR) were reduced only in the placebo group. Importantly, plasma biological antioxidant potential (BAP) increased throughout BWRP. Paradoxically, melatonin enhanced post-exercise production of plasma derivatives of reactive oxygen metabolites (d-ROMs) and erythrocytic glutathionyl-Hb (HbSSG) (at G1 and G15). Finally, differently from the placebo group, melatonin-treated subjects did not exhibit the BWRP-induced decrease in plasma levels of interleukin-6 (IL-6), before and after exercise, at the end of two weeks (G15).

Conclusions: melatonin is presumably an antioxidant with “conditional” prooxidant actions. The use of melatonin as a supplement in subjects with obesity might be deleterious due to the abolishment of BWRP-induced cardiometabolic benefits.