Leptin, Superoxide Dismutase, and Weight Loss: Initial Leptin Predicts Weight Loss

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Abstract

Objective: Our goal was to study how plasma leptin concentration, superoxide dismutase (SOD) activity, and weight loss are related in obese adults.

Research Methods and Procedures: Serum leptin concentration, SOD activities, general biochemical data, and body composition measurements were obtained for 62 overweight and obese subjects before and after an 8-week body weight reduction (BWR) regimen. The subjects were on dietary control, performed moderate aerobic and strength training exercises, and attended educational lectures.

Results: The measurement results indicated that the following criteria were significantly reduced: body weight [84.4 17.0 vs. 79.3 16.1 (standard error) kg, $p < 0.001$] ; BMI (31.5 4.3 vs. 29.4 4.2 kg/m2, $p < 0.001$), and fat mass (33.3 10.0 vs. 29.8 10.4 kg, $p < 0.001$). Plasma leptin levels also significantly decreased from 31.5 17.6 to 26.5 17.2 ng/mL ($p < 0.001$). Additionally, SOD activity was significantly increased from 261.4 66.0 to 302.7 30.9 U/mL ($p < 0.001$). Based on linear regression analysis results, a 3.78- to 8.13-kg reduction in weight can be expected after the 8-week BWR regimen when initial leptin concentration was 5 to 30 ng/mL.

Discussion: We found that an 8-week exercise and diet program was effective in reducing weight and fat mass and, notably, had further beneficial effects on leptin resistance and SOD activity. Additionally, this study demonstrated that initial plasma leptin concentration may be used as a predictor for weight loss outcome.