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Anti-Inflammatory Effects of Resveratrol May Help Obesity

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The 2004 National Health and Nutrition Examination Survey (NHANES) found that over 66% of Americans are overweight or obese and 32% of Americans are obese. The prevalence of obesity increased from 5.0% to 12.4% for children between 2 and 5 years old, increased from 6.5% to 17.0% for children between 6 and 11 years old, and increased from 5.0% to 17.6% for children between 12 and 19 years old (1). The CDC defines overweight as someone having a Body Mass index (BMI) between 25 and 29.9 kg/m2, and obese as having a BMI greater than 30 kg/m2 (2).

A significant contributor to the obesity epidemic is increased calorie consumption, with Americans consuming 24% more calories per day in the year 2000 (2,700 calories/day) compared to the 1970's (3). The resulting increase in overweight and obese Americans causes an estimated 365,000 deaths per year (4) at a cost of $75 billion (5). Obesity is a risk factor for heart disease (6), with a healthcare system cost of $448 billion per year (7), Type 2 diabetes (8), with a healthcare cost of $174 billion for diagnosed diabetes in 2007 (9), and even dementia (10), which costs our healthcare system over $100 billion per year (11).

Just as increased caloric consumption has resulted in premature death for many Americans, research has shown calorie restriction to increase lifespan in mice (12). Specifically, decreasing calorie consumption in mice by 60% increased lifespan by 50% (13). In humans, calorie restriction can improve blood sugar levels, blood pressure, and cholesterol levels (14).

A gene found to be significantly affected by calorie restriction is sir2 (15). Studies in mice show calorie restriction to increase sir2 activity and result in accelerated fat-burning and leanness (16). Now a new study (17) has suggested that resveratrol, whose strong anti-inflammatory properties has included increasing sir2 activity (18), may help with obesity.

In the study, researchers obtained abdominal fat tissue from 7 patients between the ages of 41 and 55, each of whom had a BMI between 21 and 29 kg/m2. They then exposed the tissue to an inflammatory interleukin protein called IL1-Beta for 24 hours before exposing the tissue to resveratrol in amounts of 50 microMolar for 24 hours, as this dosage has been used in previous research (19, 20). Inflammation was simulated as it is thought to play a role in the onset of metabolic syndrome (21).

IL1-Beta exposure for 24 hours increased activity of another inflammatory interleukin protein called IL-6 by 160% compared to control cells while the ensuing 24 hours of resveratrol exposure was able to reduce IL-6 activity by 35%. IL1-Beta also increased levels of 3 other inflammatory proteins compared to placebo (Interleukin-8 [IL-8] increased by 620%, Monocyte Chemotactic Protein [MCP-1] increased by 80%, and Plasminogen Activator Inhibitor-1 [PAI-1] increased by 30%), with resveratrol exposure decreasing IL-8 levels by 20%, decreasing MCP-1 levels by 70% (nearly back to control level activity), and decreasing PAI-1 by 40%, actually dropping 10% below control levels.

For the researchers, "Resveratrol [may] possess beneficial effects and might improve the metabolic profile in human obesity."

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