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Well-defined quantity of antioxidants in diet can improve insulin resistance

A diet rich in natural antioxidants improves insulin sensitivity in insulin-resistant obese adults and enhances the effect of the insulin-sensitizing drug metformin, a preliminary study from Italy finds. The results will be presented Monday at The Endocrine Society's 92nd Annual Meeting in San Diego.

"The beneficial effects of antioxidants are known, but we have revealed for the first time one of their biological bases of action—improving hormonal action in obese subjects with the metabolic syndrome," said principal author Antonio Mancini, MD, an endocrinology researcher at Catholic University of the Sacred Heart in Rome.

The metabolic syndrome is a cluster of metabolic risk factors for developing diabetes, heart disease and stroke. People with this syndrome cannot efficiently use insulin, the hormone that regulates glucose (sugar) in the blood.

Some evidence exists that oxidative stress may play a role in the metabolic syndrome, according to Mancini. Oxidative stress, a biochemical mechanism which can lead to damage to blood particles and to cells, results from an imbalance between an excessive amount of oxidants and decreased antioxidant defenses. Oxidative stress also plays a part in aging.

Antioxidants, which are found naturally in fruits, vegetables, legumes and nuts, include vitamins E and C, selenium and carotenoids, such as beta-carotene. Past research shows that antioxidants can prevent oxidative damage to cells and in some cases also help repair damage.

Mancini and his colleagues studied the effects of dietary antioxidants on insulin resistance, with partial financial support from MIUR, the Italian Department for University and Research. The study included 16 men and 13 women, ages 18 to 66 years, who were obese and insulin-resistant, but were not yet diabetic. The researchers randomly assigned the subjects to one of four treatment groups. All groups ate a low-calorie, Mediterranean-type diet averaging 1,500 calories daily, containing only 25 percent from protein foods, with the rest made up of low-glycemic-index carbohydrates (carbs that do not raise blood

sugar levels quickly or greatly, such as whole grains). Group A only ate this kind of diet, and group B ate the same diet plus took the drug metformin. For groups C and D, the researchers prescribed a diet enriched in antioxidant, with a calculated intake, 800 to 1,000 milligrams a day, coming from fruits and vegetables, but group D also took metformin.

Despite similar weight loss in all the groups, only the two groups receiving the antioxidant diet (groups C and D) had a significant decrease in insulin resistance, the authors reported. Group D had the best improvement in insulin resistance on some measures of insulin response to an oral glucose tolerance test, according to the abstract.

Subjects reported no adverse effects from the antioxidant diet, Mancini said. When asked about the risk of adding more antioxidants to a diet, he stated, "We think that a total antioxidant level of 800 to 1,000 milligrams a day is safe and probably not close to the maximum tolerable level."

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