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Common cooking spice shows promise in combating diabetes and obesity

Shown to reverse inflammation associated with obesity and improves blood sugar control

SAN FRANCISCO (June 20, 2008) · Turmeric, an Asian spice found in many curries, has a long history of use in reducing inflammation, healing wounds and relieving pain, but can it prevent diabetes? Since inflammation plays a big role in many diseases and is believed to be involved in onset of both obesity and Type 2 diabetes, Drew Tortoriello, M.D., an endocrinologist and research scientist at the Naomi Berrie Diabetes Center at Columbia University Medical Center, and his colleagues were curious what effect the herb might have on diabetic mice.

Dr. Tortoriello, working with pediatric resident Stuart Weisberg, M.D., Ph.D., and Rudolph Leibel, M.D., fellow endocrinologist and the co-director of the Naomi Berrie Diabetes Center, discovered that turmeric-treated mice were less susceptible to developing Type 2 diabetes, based on their blood glucose levels, and glucose and insulin tolerance tests. They also discovered that turmeric-fed obese mice showed significantly reduced inflammation in fat tissue and liver compared to controls. They speculate that curcumin, the anti-inflammatory, anti-oxidant ingredient in turmeric, lessens insulin resistance and prevents Type 2 diabetes in these mouse models by dampening the inflammatory response provoked by obesity.

Their findings are the subject of a soon-to-be published paper in *Endocrinology* and were presented at ENDO 2008, the Endocrine Society's annual meeting in San Francisco this week.

Turmeric (*Curcuma longa*) has no known dose-limiting toxicities in doses of up to at least 12 grams daily in humans. The researchers tested high-doses of a dietary curcumin in two distinct mouse models of obesity and Type 2 diabetes: high-fat-diet-fed male mice and leptin-deficient obese female mice, with lean wild-type mice that were fed low-fat diets used as controls.

The inflammation associated with obesity was shown several years ago by researchers in the Naomi Berrie Diabetes Center to be due in part to the presence of immune cells called macrophages in fat tissues throughout the body. These cells produce "cytokine" molecules that can cause inflammation in organs such as the heart, and islets of the pancreas, while also increasing insulin resistance in muscle and liver. Researchers hypothesized that by suppressing the number and activity of these cells, with turmeric or a drug with similar actions, it may be possible to reduce some of the adverse consequences of obesity.

Curcumin administration was also associated with a small but significant decline in body weight and fat content, despite level or higher calorie consumption, suggesting that curcumin beneficially influences body composition.

"It's too early to tell whether increasing dietary curcumin [through turmeric] intake in obese people with diabetes will show a similar benefit," Dr. Tortoriello said. "Although the daily intake of curcumin one might have to consume as a primary diabetes treatment is likely impractical, it is entirely possible that lower dosages of curcumin could nicely complement our traditional therapies as a natural and safe treatment."

For now, the conclusion that Dr. Tortoriello and his colleagues have reached is that turmeric and its active anti-oxidant ingredient, curcumin reverses many of the inflammatory and metabolic problems associated with obesity and improves blood-sugar control in mouse models of Type 2 diabetes.

In addition to exploring novel methods of curcumin administration to increase its absorption, they are also interested in identifying novel anti-inflammatory processes invoked by curcumin and in adapting those processes in the development of more potent curcumin analogues.

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The only comprehensive, multidisciplinary diabetes center in New York City, the Naomi Berrie Diabetes Center at Columbia University Medical Center integrates clinical care, research and education and is recognized nationally and internationally for excellence and innovation in the field of diabetes and its associated disorders. The clinical program of the Berrie Center cares for more than 12,000 adults and children with diabetes from diverse socioeconomic and ethnic

backgrounds and includes one of the largest pediatric diabetes programs, one of the largest number of patients with adolescent-onset Type 2 diabetes, and one of the largest insulin pump programs in the country. Since opening in 1998, the Berrie Center has been a leader in the recruitment of minority research subjects into diabetes clinical trials. The center's research efforts, led by more than 50 Columbia University scientists, focus on the causes and cures of Type 1 and Type 2 diabetes, obesity, and the prevention of complications from the disease. Columbia professors Robin Goland, M.D. and Rudolph Leibel, M.D., are co-directors of the center.

Columbia University Medical Center provides international leadership in basic, pre-clinical and clinical research, in medical and health sciences education, and in patient care. The medical center trains future leaders and includes the dedicated work of many physicians, scientists, public health professionals, dentists, and nurses at the College of Physicians & Surgeons, the Mailman School of Public Health, the College of Dental Medicine, the School of Nursing, the biomedical departments of the Graduate School of Arts and Sciences, and allied research centers and institutions. Established in 1767, Columbia's College of Physicians & Surgeons was the first institution in the country to grant the M.D. degree. Among the most selective medical schools in the country, the school is home to the largest medical research enterprise in New York State and one of the largest in the country. For more information, please visit www.cumc.columbia.edu.
