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****Fat substitute shows promise in
treating obesity and diabetes

DALLAS -- There is a new polyester on the scene -- one that you eat. Sucrose polyester is a fat substitute that shows promise in treating obesity and diabetes.

"It works as a substitute for fat because it is not absorbed in the intestines and adds no calories to the diet," says Dr. Scott M. Grundy, director of the Center for Human Nutrition at The University of Texas Health Science Center at Dallas. "It also reduces the absorption of cholesterol and can lower plasma cholesterol."

In liquid form sucrose polyester can be used like cooking oil. In solid form it has the consistency of lard but can be flavored to taste like butter. Sucrose polyester is not available to the public. The substance is undergoing clinical tests to determine its usefulness in treating nutrition-linked diseases.

The November 1986 American Journal of Clinical Nutrition published the results of tests of sucrose polyester on 10 patients at the Veterans Administration Medical Center in San Diego, California. Grundy was one of the investigators, along with Drs. Jeffrey Abrams and Y. Antero Kesaniemi of the University of California-San Diego and Dr. Jack V. Anastasia of the Procter and Gamble Company.

All of the patients in the study weighed at least 24 percent more than the ideal weights for their heights. Four of them were non-diabetic; three were diabetic; the final three had high blood levels of triglycerides in addition to diabetes.

The combination of problems was chosen for study because obesity is a major problem for many diabetics. "In about 80 percent of adult-onset diabetes, overweight is a major factor," says Grundy. "If people with that type of diabetes could lose weight, they would be much better off, and their glucose metabolism would not be so severely deranged. They would be nearer to normal and might not require insulin or other drugs." In addition, obesity stimulates the overproduction of triglycerides in the liver, and diabetes compounds the problem.

The patients in the study spent at least a month on each of three different diets: weight maintenance, caloric restriction plus sucrose polyester and caloric restriction without sucrose polyester.

The diet in the first period established a baseline for comparison with the others. It consisted of a liquid diet with enough calories to maintain the starting weight. Calories in the diet came from 40 percent fats, 45 percent carbohydrates and 15 percent milk protein. The diet was supplemented with cholesterol to reveal any effects of sucrose polyester on cholesterol absorption.

During the second period, the fats in the diet were replaced with sucrose polyester, thereby cutting down on the total calories by 40 percent. Once again cholesterol was supplemented.

Because diabetic patients had poor tolerance of the regimen for the second period, they were restricted to 1000 calories a day, with 400 calories in the form of

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fat. Sucrose polyester was added in the amount of 75 to 90 grams a day. This regimen lasted 37 to 56 days.

During the third period, the restricted caloric level of the second period was maintained, but the 40:45:15 ratio of fat, carbohydrate and protein was resumed. Diabetic patients continued to be restricted to 1000 calories a day. Patients were on this regimen from 30 to 60 days.

Although the total number of patients in each group was small, the results within each group were fairly consistent. The non-diabetic patients lost 11 to 15 pounds during the second period of caloric restriction plus sucrose polyester. In addition, their total cholesterol fell an average of 20 percent, and low density lipoproteins (LDL-cholesterol) fell 26 percent.

The beneficial effect on blood lipid levels probably occurred because of a decrease in saturated fats, a reduction of total calories, and inhibition of cholesterol absorption, Grundy says.

The diabetic patients were unable to tolerate as much sucrose polyester as non-diabetic patients. Large amounts of the fat substitute resulted in abdominal discomfort or diarrhea for most diabetic patients, but smaller amounts were tolerated fairly well.

Caloric restriction plus sucrose polyester resulted in weight loss, lower total cholesterol and lower LDL-cholesterol for diabetic patients, as it did for non-diabetics. Blood lipid levels rose slightly during the third period, but not to the baseline level. As a way of adding food without adding calories, substituting sucrose polyester for some fats will help diabetics reduce weight.

For those diabetic patients who also had abnormally high triglyceride levels, reducing calories (with or without sucrose polyester) caused a marked reduction in blood levels of triglycerides.

This series of tests, says Grundy, confirms the results of an earlier series conducted solely with non-diabetic patients. Besides aiding in weight loss, sucrose polyester blocks the absorption of cholesterol. And while patients didn't relish this fat substitute, they didn't seem to mind it. "None of the patients complained about the taste, and there were no serious side effects," Grundy concludes. "On the plus side, some of the patients said they felt less hungry during the period they were taking it."

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Note: The University of Texas Health Science Center at Dallas comprises Southwestern Medical School, Southwestern Graduate School of Biomedical Sciences and the School of Allied Health Sciences.