

# The Muffin Study: Mono- vs. polyunsaturated fats in patients with metabolic syndrome

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It's hard to think of the typical muffin, often loaded with saturated fat and a high calorie count, as a healthy food option. But a batch of muffins, made with a special recipe formulated by the U.S. Department of Agriculture (USDA), yielded unexpected health benefits during a first-of-its-kind clinical study at the University of Maryland School of Medicine.

The study looked at a way to substitute animal-based saturated fats for plant-based unsaturated fats in muffins made for patients with the metabolic syndrome, a group of risk factors that affect about a third of adults in the United States, increasing their chance of cardiovascular disease and type 2 diabetes.

The researchers tested the two varieties of unsaturated fats: monounsaturated fats (MUFA) and polyunsaturated fats (PUFA). Compared to MUFA, patients in the PUFA group lost more weight, had lower [blood pressure](#) and triglyceride levels, and increased dilation of blood vessels (a healthy response). Twenty-five percent of PUFA participants converted from metabolic syndrome to metabolically normal vs. 10 percent of MUFA subjects.

"The results surprised us, because, based on other studies elsewhere, we hypothesized that MUFA would be superior to PUFA for weight loss and improvement in heart-related parameters," says lead author Michael

Miller, MD, professor of cardiovascular medicine at the University of Maryland School of Medicine and preventive cardiologist at the University of Maryland Medical Center. "The muffins were from a USDA recipe developed specifically for this study, and both varieties tasted really good."

Miller adds that while more research is needed after this small study with 39 participants, "The bottom line from our research is that PUFA may be the substitute of choice for [saturated fat](#), especially in men and women who are overweight, have hypertension, diabetes, or the metabolic syndrome."

Miller says the response in this study, published in the *Journal of Clinical Lipidology*, may confirm other research findings about polyunsaturated fats: "Recent data suggest that PUFA (but not MUFA) activates signaling in the brain to reduce appetite, so this may be one reason for the bigger weight drop between the groups."

## Study Design

A total of 39 adult men and women with metabolic syndrome completed the study, designed to measure several cardiovascular risk-associated parameters. Each participant's weight was stabilized on an American Heart Association Step 1 diet for one-two months prior to the six-month period of the study. Participants were also encouraged to exercise by walking at least three days a week for 30-45 minutes during the study.

Participants were randomized to either a low calorie MUFA-enriched or PUFA-enriched diet for six months, aimed at reducing calorie consumption by 300 per day. The relative percentage of carbohydrates, fat and protein were kept constant, but the saturated fat content was reduced in both groups from 30 percent to 25 percent of total fat intake and replaced with either MUFA or PUFA.

Participants consumed three MUFA (high-oleic sunflower oil) or PUFA (safflower oil) enriched muffins daily. The 3.5-ounce muffins each contained 275 calories. All muffins were prepared in the metabolic kitchen of the USDA in Beltsville, Md., and kept frozen in a canister until use. Participants met with a registered dietitian weekly for the first four months and then biweekly to collect a fresh supply of [muffins](#) and reinforce individual dietary and weight loss recommendations.

A person meets the criteria of the [metabolic syndrome](#) if they have three or more of the following metabolic abnormalities: blood pressure at 130/85 mm Hg or above; fasting glucose of 100 mg/dL or higher; waist circumference 40 inches or more in men and 35 inches in women; [triglyceride levels](#) at 150 mg/dL or more, and high-density lipoprotein cholesterol (HDL-C) greater than 40 mg/dL in men and 50 in women.

This study was supported by a VA Merit Grant Award to the Baltimore VA Geriatric Research, Education and Clinical Center and as part of an NHLBI-funded Nutrition Obesity Research Center award.

Miller and his team are considering evaluating other healthy PUFA fats, including plant- and marine-derived omega-3s.

**More information:** Michael Miller et al, Poly is more effective than monounsaturated fat for dietary management in the metabolic syndrome: The muffin study, *Journal of Clinical Lipidology* (2016). [DOI: 10.1016/j.jacl.2016.04.011](#)

Provided by University of Maryland

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