

Molecular biology provides clues to health benefits of olive oil

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Health conscious consumers have long known that virgin olive oil is a good choice when it comes to preparing meals and dipping breads. Now, a team of researchers, including one with the Agricultural Research Service (ARS), has found that phenolic components in olive oil actually modify genes that are involved in the inflammatory response.

The researchers knew from other studies that consuming high-phenolic-content virgin olive oil reduces pro-inflammatory, pro-oxidant and pro-blood-clotting biomarkers when compared with consuming low-phenolic-content olive oil. But they wanted to know whether olive oil's beneficial effects could be the result of [gene activity](#).

The study, published recently in *Biomed Central (BMC) Genomics*, was done by a multi-institute group of researchers headed by Francisco Perez-Jimenez with the University of Cordoba, Spain. Among the researchers was ARS computational biologist Laurence Parnell, with the Nutrition and Genomics Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA) at Tufts University in Boston, Mass.

For the study, the researchers fed 20 volunteers—who had metabolic syndrome—with two virgin olive oil-based breakfasts one at a time, after a six-week "washout" period. Metabolic syndrome is a prevalent condition often characterized as having a combination of abdominal obesity, high triglycerides, high blood pressure and poor [blood sugar](#) control, all of which increase risk for [heart disease](#) and diabetes.

One of the experimental breakfasts contained virgin olive oil with high-content phenolic compounds (398 parts per million) and the other breakfast contained olive oil with low-content phenolic compounds (70 parts per million). All volunteers consumed the same low-fat, carbohydrate rich "background" diet during both study phases.

The researchers tracked the expression of more than 15,000 human [genes](#) in blood cells during the after-meal period. The results indicated that 79 genes are turned down and 19 are turned up by the high-phenolic-content olive oil. Many of those genes have been linked to obesity, high blood-fat levels, type 2 diabetes and heart disease. Importantly, several of the turned-down genes are known promoters of inflammation, so those genes may be involved in "cooling off" inflammation that often accompanies metabolic syndrome.

The researchers concluded that the results shed light on a molecular basis for reduced heart disease risk among people living in Mediterranean countries where virgin olive oil is the main source of dietary fats.

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