

## Olive Oil May Help with Cell Damage and Liver Health

By Greg Arnold, DC, CSCS, November 10, 2010, abstracted from "Effects of olive oil and its fractions on oxidative stress and the liver's fatty acid composition in 2,4-Dichlorophenoxyacetic acid- treated rats" printed online in *Nutrition & Metabolism*

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As the cornerstone of the Mediterranean Diet, olive oil has been found to help maintain cell health (1), digestive health (2), and bone health (3). These health benefits have been attributed to olive oil's high levels of antioxidants called polyphenols (4), which may produce "a protective effect" and help reduce cardiovascular disease risk factors (5).

Now a new study in rats (6) suggests that olive oil may help with liver health and protect against cell damage. In the study, 80 rats weighing 250-300 grams were fed one of 8 different diets for 4 weeks. These included a standard diet (control group), a standard diet plus a chlorine-based pesticide called 2,4-D (7) to induce oxidative cell damage, and extra virgin olive oil which provided 0.17 mg per day of polyphenols. Four of the eight groups received the 2,4-D either alone, with olive oil, the water-based fraction or the oil-based fraction.

In addition, the researchers also used certain components of olive oil separately, the water-based ("hydrophilic") fraction or the oil-based ("lipophilic") fractions using a common extraction technique (8) to see if certain olive oil components protected the liver more than others.

- Standard diet (control group)
- Standard diet plus 5 mg per kg of bodyweight of 2,4-D (5 mg per kg of bodyweight))
- Standard diet plus 2,4-D plus extra virgin olive oil
- Standard diet, 2,4-D and olive oil hydrophilic fraction
- Standard diet, 2,4-D plus olive oil lipophilic fraction
- Standard diet and only extra virgin olive oil
- Standard diet and only olive oil hydrophilic fraction
- Standard diet and only lipophilic fraction.

By the end of 4 weeks, the researchers found "significant liver damage" in the rats given the standard diet plus the 2,4-D (2nd group) in the form of increased blood levels of the liver enzymes AST (30% increase), ALT (42 % increase), and ALP (30% increase) as well as decreases in liver antioxidant enzyme activities that included superoxide dismutase (29% decrease), catalase (38% decrease), glutathione peroxidase (60% decrease), and glutathione reductase (26% decrease).

In the 2,4-D and olive oil group, however, all antioxidant enzymes returned to control group levels except for Superoxide Dismutase, which actually increased by 29% over the control group levels. Regarding the liver enzymes, the 2,4-D and olive oil group had significantly lower levels compared to the 2,4-D group (AST - 30% lower, same as control group levels, ALT - 34% lower (still 8% above control levels), ALP - 22% lower (8% above control levels)).

When looking at the lipophilic vs, hydrophilic fractions and liver damage, both fractions helped limit liver enzyme damage and retain them comparable to control group levels, but the hydrophilic fraction had a much prominent effect on antioxidant status, with 47% higher superoxide dismutase levels, 23% higher catalase levels, 45% higher glutathione peroxidase levels, and 53% higher glutathione reductase levels.



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For the researchers, "The results of the present study showed that extra virgin olive oil and its extracts protect against oxidative damage of [liver] tissue...by maintaining serum marker enzymes and [liver] antioxidant enzymes at or near normal concentrations."

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