

Could antioxidants make us more, not less, prone to diabetes? Study says yes

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We've all heard about the damage that reactive oxygen species (ROS) - aka free radicals - can do to our bodies and the sales pitches for antioxidant vitamins, skin creams or "superfoods" that can stop them. In fact, there is considerable scientific evidence that chronic ROS production within cells can contribute to human diseases, including insulin resistance and type 2 diabetes.

But a new report in the October 7th [Cell Metabolism](#) adds to evidence that it might not be as simple as all that. The researchers show that low levels of ROS - and [hydrogen peroxide](#) in particular -- might actually protect us from diabetes, by improving our ability to respond to insulin signals.

"Our studies indicate that 'physiological' low levels of ROS may promote the insulin response and attenuate [insulin resistance](#) early in the progression of type 2 diabetes, prior to overt obesity and hyperglycemia," said Tony Tiganis of Monash University in Australia. "In a way, we think there is a delicate balance and that too much of a good thing - surprise, surprise - might be bad."

Tiganis' team found that mice with a deficiency that prevented them from eliminating physiological ROS didn't become insulin resistant on a high-fat diet as they otherwise would have. They showed that those health benefits could be attributed to insulin-induced signals and the uptake of glucose into their muscles. When those animals were given an antioxidant, those benefits were lost, leaving the mice with more signs of

diabetes.

Tiganis said whether antioxidants are ultimately good for people will probably depend on their state of health or disease. "In the case of early [type 2 diabetes](#) and the development of insulin resistance, our studies suggest that antioxidants would be bad for you." Under some conditions, treatments designed to selectively increase ROS in muscle - if they can be devised - might even help, he says.

It's not the first time studies have suggested that antioxidants can be a negative, Tiganis adds. Studies in worms have suggested that antioxidants can shorten lifespan, as have some epidemiological studies in humans. Other recent reports indicate that [antioxidants](#) may negate the longer-term benefits of exercise training by lowering the activity of certain genes involved in ROS defense.

Tiganis said it will ultimately be important to work out at what stage ROS go from being good to bad. He suspects it probably depends on the levels and/or the source of their generation. (ROS are generated both on the surfaces of cells and within cells by mitochondria, which convert nutrients such as glucose into energy, he explained.)

Although any health implications of the new findings would require further study, the findings lead Tiganis to suspect it is best not to take daily antioxidant vitamins, especially if you are otherwise healthy. "Do exercise," he says, as this is a natural source of ROS that may promote insulin action.

Source: Cell Press ([news](#) : [web](#))

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