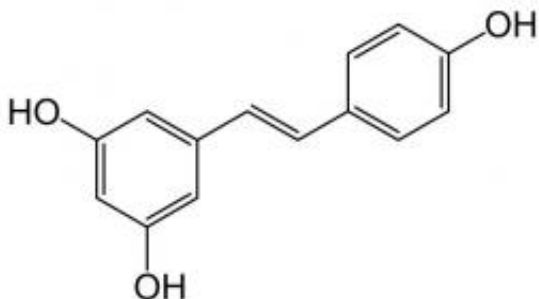


Calorie restriction with resveratrol key to kick-starting cell health

July 17 2014, by Morgan Sherburne



Skeletal formula of trans-resveratrol. Image: Wikipedia

(Medical Xpress)—When it comes to staying healthy, it's a cell-eat-cell world. As cells age, damaged proteins and lipids accumulate within them. Impaired cell parts can send free radicals into the body, and dysfunctional proteins and lipids may break down DNA within cells, causing them to become toxic. Cells usually clean up their own damage through a "housekeeping" process called autophagy. But as the body ages and in people with certain diseases, cells' ability to do this housekeeping becomes less efficient. That means it may be harder for people to recover from cardiac events such as heart attack or other illnesses.

University of Florida researchers have found that combining [calorie restriction](#) with a supplement of resveratrol, an antioxidant found in the skin of red grapes, dark chocolate and blueberries, could kick-start this housekeeping process, helping heart cells recover from damage,

according to a study in rats published in the journal *Free Radical Biology and Medicine*.

"The damaged proteins and lipids remain inside cells, eventually making them toxic," said lead author Debapriya Dutta, who earned her doctorate from the University of Florida and is now a postdoctoral researcher at the University of Illinois at Urbana-Champaign. "We wanted to see whether an increase in autophagy would remove such damaged cellular components and make the cells healthy again."

In an earlier study published in the journal *Autophagy*, Dutta and UF researcher Christiaan Leeuwenburgh, showed that increasing the housekeeping process protected [cardiac cells](#) from cell death. In their current study, the researchers wanted to test interventions that could improve autophagy in the heart. They further investigated whether the improved process helped protect rats' [heart cells](#) against induced stress.

To study this, the researchers restricted the calorie intake of one group of 26-month-old rats—approximately equivalent to a 65-year-old human—by 20 percent over a period of six weeks. Another group received only the resveratrol supplement. A third group received both the calorie-restricted diets and the resveratrol.

"Only the group with caloric restriction plus a higher dose of resveratrol induced autophagy," said Leeuwenburgh, who is also chief of the division of the biology of aging in the University of Florida Institute on Aging.

The researchers think the combination of resveratrol and calorie restriction promotes the role of a protein called mTOR, which regulates cell growth, proliferation and survival, though the researchers say they need to further investigate exactly why the combination of interventions was more effective than either just calorie restriction or just resveratrol.

Leeuwenburgh compares cells unable to clean themselves of damaged parts to smoldering houses.

"If you're older and you have a sudden stress condition, the smoking homes become fires," Leeuwenburgh said. "A little bit of smoke is okay, but if they're not removed quickly, the smoke will turn into a fire, and the cell will start releasing proteins that will cause the breakdown of other apparently functional proteins and DNA in the cell, leading to cell demise and ultimately, organ dysfunction."

That also means cells may not be able to react as well to the onset of diseases, especially in older adults. Aggregations of plaque within neurons contribute to Alzheimer's disease, for example. But the plaque could be alleviated by spurring autophagy, which could help clean out the plaque, the researchers said. Increasing the cleaning process could also help [cells](#) protect themselves against inflammatory diseases and cancer.

"These kinds of diseases aren't solely due to a lack of autophagy. There are so many factors that come into play," said Dutta, who was the paper's lead author. "But if you increased autophagy for many of these pathologies, it can help the body fight the disease."

Dutta said the next steps are to test [autophagy](#)-enhancing treatments in different disease models, eventually starting clinical trials including the combination of weight loss and [resveratrol](#), exercise and other natural compounds such as papaya.

Provided by University of Florida

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