

# Liver mitochondria improve, increase after chronic alcohol feeding in mice

December 21 2012, by Alison Trinidad

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(Medical Xpress)—Scientists at the Keck School of Medicine of the University of Southern California (USC) have found evidence that liver mitochondria in mice adapt to become better metabolizers of alcohol and increase in number after chronic exposure, which may raise the potential for free radical damage associated with aging and cancer over time.

The liver is a vital organ, playing a major role in metabolism and detoxification in the body. [Overconsumption](#) of alcohol has long been tied to [liver diseases](#) such as fatty liver, alcoholic hepatitis and cirrhosis, but how the substance damages the organ is not fully understood. USC research published in the Dec. 7, 2012, issue of the [Journal of Biological Chemistry](#), a peer-reviewed scientific journal, suggests that mitochondria play an important role in the liver's response to the [metabolic stress](#) caused by alcohol intake. If scientists observe the same results in human mitochondria, it could help pinpoint targets for therapy.

"The liver has to adapt quickly to various toxins and drugs to meet the demands we place on the body," said Derick Han, Ph.D., assistant professor of research medicine at the Keck School of Medicine of USC and first author of the study. "We've found that mitochondrial plasticity—the mitochondria's ability to change—is probably central to the liver's response to alcohol intake. This gives us a better understanding of how the liver works and how it adapts to stress."

Mitochondria are cellular organelles that generate most of the cell's

energy; they have been implicated in certain neurological disorders and have been tied to aging. The metabolism of oxygen by the mitochondria normally generates reactive [oxygen species](#), or [free radicals](#), which in excess can be highly damaging to cells.

"In the short term, it looks like mitochondria adapt to metabolize alcohol better, but as they increase in number and use more oxygen to help metabolize that alcohol, it could be harmful to the body," Han said.

Han and his team of scientists fed alcohol to mice over four weeks, isolated the liver mitochondria and measured levels of respiration and changes in the mitochondrial structure. They found significant increases in oxygen consumption by mice fed the alcohol in comparison to control mitochondria as early as one week after feeding. Changes were greater and more extensive with higher [alcohol intake](#).

**More information:** [www.jbc.org/content/287/50/42165.abstract](http://www.jbc.org/content/287/50/42165.abstract)

Provided by University of Southern California

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