

Scientists develop tool to probe role of oxidative stress in aging, disease

February 15 2008

Oxygen, although essential for human life, can turn into an aggressive chemical that is outright toxic to important molecules inside our cells. This "oxidative stress" is associated with many diseases, such as Alzheimer's, heart disease and cancer, and has been suggested to be the culprit underlying aging.

In an article published online Feb. 14 in the journal *Proceedings of the National Academy of Sciences*, University of Michigan researchers led by associate professor Ursula Jakob report on a new method that allows them to observe how oxidative stress affects the major building blocks of a cell, the proteins. The new technique, called OxICAT, makes it possible to quantify the oxidation state of thousands of different proteins in a single experiment.

Jakob was intrigued to find many proteins that are not permanently damaged by reactive oxygen species but actually use amino acids known as cysteines to sense oxidative stress.

"In my lab, we have been working for a long time on proteins that use cysteine as a reactive oxygen sensor," Jakob said. "With this new technique, we discovered scores of novel proteins that are sensitive towards reactive oxygen species. Interestingly, we found that many of the proteins that we identified are important for the cells to survive oxidative stress conditions." Jakob and her team now are using this powerful technique to gain fundamental insights into the molecular mechanism of aging and the role that oxidative stress plays in this

process.

"Because oxidative stress plays such a prominent role in all these diseases, we want to understand why some cells and organisms can cope with the dangers of oxidative stress, while others die," said Lars Leichert, a postdoctoral research fellow in Jakob's lab and first author of the study. Such insights might lead to the development of more powerful and effective anti-oxidant strategies.

Source: University of Michigan

Citation: Scientists develop tool to probe role of oxidative stress in aging, disease (2008, February 15) retrieved 13 May 2024 from <https://medicalxpress.com/news/2008-02-scientists-tool-probe-role-oxidative.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.