

Health risk from eating well-done meat may be underestimated

November 1 2011

Mice are often used to test whether substances in food are harmful to humans. This requires that mice and humans metabolise substances in the same way. Humans have certain enzymes in more parts of the body than mice. The health risk associated with harmful substances in food may therefore be underestimated.

Researchers at the Norwegian Institute of Public Health have adopted a mouse type where human enzymes have been inserted to examine whether people may be more sensitive to certain carcinogenic substances from heat-treated foods. They have obtained a better model to assess [negative health effects](#) in humans from substances in food using these [mice](#).

The results show that the incidence of intestinal tumours increased from 31 per cent to 80 per cent in "human-like" mice who consumed substances from meat crust (i.e. the surface formed during heat-treatment).

Food mutagens

Heat-processing of food can lead to the formation of carcinogenic substances. The formation of carcinogenic substances - so-called food mutagens – usually occurs at high temperatures when frying or grilling.

There are enzymes called sulfotransferases (SULT) in several places in

the human body. These are only found in the livers of normal laboratory mice. SULT-enzymes can make some substances in food less harmful, but they can also transform harmless substances into carcinogenic substances.

Better research

Humans have SULT-enzymes in many organs while normal mice only have them in the liver. Using results from laboratory mice to predict health risk to humans consuming food mutagens can therefore be underestimated. Researchers at the NIPH used laboratory mice with the same amount of SULT-enzymes in the intestines as humans in their experiments.

The mice received the food mutagen often found in highest quantities in the crust of meat and fish. The researchers wanted to study [tumour](#) development in the intestines of the "human-like" mice, and compare this with tumour development in normal mice given the same food mutagen.

The results showed that the incidence of intestinal tumours increased from 31 per cent to 80 per cent in "human-like" mice after consuming substances from the meat crust.

This shows that normal laboratory mice are not a good model for assessing the health risk to humans following ingestion of food mutagens from well-done meat and fish.

More information: Svendsen C, Meinel W, Glatt H, Alexander J, Knutsen HK, Hjertholm H, Rasmussen T, Husøy T. Intestinal carcinogenesis of two food processing contaminants, 2-amino-1-methyl-6-phenylimidazo[4,5-b]pyridine and 5-hydroxymethylfurfural, in transgenic FVB min mice expressing human

sulfotransferases. *Mol Carcinog*. 2011 Oct 17. [doi:10.1002/mc.20869](https://doi.org/10.1002/mc.20869)
[Epub ahead of print]

Provided by Norwegian Institute of Public Health

Citation: Health risk from eating well-done meat may be underestimated (2011, November 1)
retrieved 25 April 2024 from
<https://medicalxpress.com/news/2011-11-health-well-done-meat-underestimated.html>

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