HARVARD GAZETTE ARCHIVES

Heart-healthy beef may be in future

Researchers at Harvard-affiliated Massachusetts General Hospital (MGH) have successfully engineered a singularly heart-healthy mouse, an advance that could lead to the development of meat, milk, and eggs that are as good for your heart as fish is. With the help of a gene from the C. elegans roundworm, the researchers developed a strain of mice that converts omega-6 fatty acids - which mammals produce abundantly but which do not have great health benefits - into omega-3 fatty acids, which reduce the incidence and effects of cardiovascular disease.

The American Heart Association currently recommends consumption of two or more weekly servings of fish, particularly fatty fish like trout and salmon, which are naturally high in omega-3s.

"Correction of the usually omega-3-deficient Western diet has become a key step toward reducing the risk of several modern diseases," says lead author Jing X. Kang of the MGH Department of Medicine. "The current approach to increasing omega-3s in animal food products is to feed livestock with fish meal or other marine products, which is time-consuming, costly, and limited by the availability of those feeds."

The transgenic mice - those with the C. elegans gene fat-1, which codes for an enzyme that converts omega-6 acids to omega-3s - appeared perfectly healthy and were raised, along with normal mice, on a diet low in omega-3s. Tissues from the transgenic mice were found to be high in omega-3 fatty acids, while the tissues from normal mice had fats primarily consisting of omega-6s, as do most mammals. The ability to transmit fat-1 into mammals without losing its effectiveness or causing any apparent harm to the transgenic animals raises the possibility of developing farm animals that naturally produce omega-3 rich food products.

"The obvious follow-up to our finding would be to create livestock animals transgenic for fat-1 and see if their tissues also contain omega-3s," says Kang, who is an associate professor of medicine at Harvard Medical School. "This mouse model also will be useful in studies to further investigate the impact of the omega-3-omega-6 ratio on disease prevention and treatment. Another possibility to explore would be gene therapy to introduce fat-1 directly into human tissue."