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Genetically modified carrots provide more calcium

HOUSTON -- (January 15, 2008) -- Genetically modifying carrots to express increased levels of a gene that enables the transport of calcium across membranes of plant cells can make the vegetables a better source of calcium, said researchers at Baylor College of Medicine in Houston and the Vegetable and Fruit Improvement Center at Texas A&M University. Their report appears today in the Proceedings of the National Academy of Sciences.

"Slightly altering the gene (sCAX1) to make it a more active transporter allows for increased bioavailable calcium in the carrots," said Dr. Kendal Hirschi, professor of pediatrics-nutrition and principal investigator of the study conducted at the USDA/ARS Children's Nutrition Research Center at BCM in cooperation with Texas Children's Hospital.

Greater calcium absorption

In an initial study in mice, researchers found that those who were fed the carrots with the altered gene could get the same amount of calcium as those who ate twice the amount of normal carrots. In a study in 30 human adults, those who ate the modified carrots absorbed 41 percent more calcium than did those who ate the unmodified carrots.

"These carrots were grown in carefully monitored and controlled environments," said Hirschi. "Much more research needs to be conducted before this would be available to consumers."

Hirschi emphasizes that there is no magic food that will solve all nutritional problems, and that proper food and exercise are still necessary. However, further developments in this area of research could allow for more nutrients in fruits and vegetables and lead to improved health.

Osteoporosis, one of the world's most prevalent nutritional disorders, is a disease that reduces bone mineral density in the body. Doctors usually prescribe more calcium and better calcium uptake as one solution to treat the disease. Increasing levels of calcium absorption from foods would have a significant global impact on this disease.

Vegetable-based diets

With physicians and nutrition experts recommending a vegetable-based diet for health, increasing the calcium that can be absorbed from plant-based food will become increasingly important, Hirschi said.

Others who participated in the study included Jay Morris, Keli M. Hawthorne, Tim Hotze and Dr. Steven A. Abrams, all of BCM.

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This study is available on line at www.pnas.org.