# Genetically Engineered Tomatoes Decrease Plaque Build-up in Mice

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- For the first time, researchers have genetically engineered tomato plants to produce a peptide that mimics the actions of good cholesterol when eaten.
- Mice that ate the freeze-dried, ground tomatoes had less inflammation and reduced plaque build-up in their arteries.

For the first time, genetically engineered tomato plants produced a peptide that mimics the actions of good cholesterol when eaten, researchers reported at the American Heart Association's Scientific Sessions 2012.

In the study, mice that ate the freeze-dried, ground tomatoes had less inflammation and reduced atherosclerosis (plaque build-up in the arteries).

"We have found a new and practical way to make a peptide that acts like the main protein in good cholesterol, but is many times more effective and can be delivered by eating the plant," said Alan M. Fogelman, M.D., senior author of the study and executive chair of the Department of Medicine and director of the Atherosclerosis Research Unit in the David Geffen School of Medicine at UCLA.

Researchers genetically engineered the tomatoes to produce 6F, a small peptide that mimics the action of ApoA-1, the chief protein in high density lipoprotein (HDL or "good" cholesterol). They fed the tomatoes to mice that lack the ability to remove low density lipoprotein (LDL or "bad" cholesterol) from their blood and readily develop inflammation and atherosclerosis when consuming a high-fat diet.

After the mice ate the tomatoes as 2.2 percent of their Western-style high-fat, calorie-packed diet, those given the peptide-enhanced tomatoes had significantly:

- Lower blood levels of inflammation
- Higher paraoxonase activity, an anti-oxidant enzyme associated with good cholesterol and related to a lower risk of heart disease
- Higher levels of good cholesterol
- Decreased lysophosphatidic acid, a tumor promoter that accelerates plaque build-up in arteries in animal models
- Less atherosclerotic plaque

"To our knowledge this is the first example of a drug with these properties that has been produced in an edible plant and is biologically active when fed without any isolation or purification of the drug," Fogelman said.

Co-authors are Arnab Chattopadhyay, Ph.D.; Mohamad Navab, Ph.D.; Greg Hough, B.S.; David Meriwether, B.S.; Gao Feng, Ph.D.; Victor Grijalva, B.S.; James R. Springstead, Ph.D.; Mayakonda N. Palgunachari, Ph.D.; Ryan Namiri-Kalantari, B.S.; G.M. Anantharamaya, Ph.D.; Robin Farias-Eisner, M.D., Ph.D.; and Srinivasa T. Reddy, Ph.D. Author disclosures are on the abstract.

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