Worm gene eyed for heart-healthy bacon

The Boston Globe

Modified pigs would be high in omega-3's

By Denise Gellene, Los Angeles Times | March 27, 2006

LOS ANGELES -- If a new kind of pork makes it to the dinner table, healthy eaters worried about fat and heart disease might finally be free to, well, pig out.

Dr. Jing Kang of Harvard Medical School and other scientists have used a gene from the roundworm C. elegans to produce pigs rich in omega-3 fatty acids, a kind of healthy fat abundant in fish but not naturally found in meat.

The omega-3 fatty acids are believed to offer some protection against heart attacks, and federal nutrition guidelines recommend that adults include them in their daily diets.

But "some people are not going to eat fish no matter what," said Penny Kris-Etherton, a professor of nutrition at Pennsylvania State University who was not involved in the research. "This is a way people who don't like fish can benefit."

There are some questions looming over the potential feast of greasy bacon, chorizo, and Chinese pork stew. Because the research is in its early stages, the health value of omega-3 in pork has yet to be demonstrated. In addition, no one has sampled the pigs to see whether they taste like pork.

Kang is confident the levels of omega-3 fatty acids in the new pigs aren't high enough to ruin the flavor. "There should be no difference," he said, adding that, as far as he can tell, the pigs "don't smell fishy."

The team was made up of scientists from Harvard, the University of Missouri, and the University of Pittsburg. The roundworm naturally produces omega-3 fatty acids.

The researchers began by harvesting more than 1,600 eggs from female pigs. They removed the genetic material from the eggs and replaced it with new DNA that had the worm gene inserted.

The manipulated embryos were then implanted into 14 surrogate mothers. Ten male piglets were born.

DNA analysis of the piglets showed that six had the worm gene, according to the study, which was published online yesterday in the journal Nature Biotechnology.

Kang said the cloned pigs produced one-fifth the amount of omega-3 fatty acids found in salmon, considered the best source of the healthy fat. But he said successive generations bred the old-fashioned way

probably would produce higher amounts of omega-3.

Right now, the pigs have one copy of the worm gene, but through selective breeding, their progeny could acquire two.

"I am confident we can go much higher," said Kang, whose research was funded by the National Institutes of Health and the American Cancer Society.

Through breeding and diet changes, farmers have dramatically lowered the fat content of pork during the past 30 years. But leaner meat is drier and less flavorful.

To improve the taste and texture of pork, farmers are trying to increase the amount of fat in pigs without drastically raising the saturated fat.

It's been a struggle. In one failed experiment, pigs were given feed enriched with omega-3 fatty acids. But the resulting meat was unappetizingly mushy and had yellowish fat.

Genetic engineering could offer a solution, said Mark Boggess, director of animal sciences at the National Pork Board. But he cautioned against overexuberance.

Higher omega-3 fatty acids "would probably have some bearing on the melting point and consistency of the fat and how firm it is at room temperature," he noted. "It would definitely have to be evaluated very carefully."

Getting the pigs to market also could be a challenge. The Food and Drug Administration has not allowed any genetically altered animals to enter the food chain, despite scientific studies showing the animals are safe.

Before clearing meat for consumption, the FDA requires detailed biological information, including controlled studies comparing modified animals to normal ones.

"They treat them like they are a new drug," said Matthew Wheeler, a University of Illinois professor who has been working on genetically engineered animals for 13 years.

Kang is looking at new culinary possibilities. "Pig was the first," he said. "But transgenic chickens, cows, and fish are on the way, too."

Monsanto Co. and DuPont are developing omega-3-producing crops that yield healthier cooking oils.

Material from the Associated Press was included in this report. ■

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