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Pursuing healthier bacon through genetic engineering

By Paul Elias, The Associated Press

SAN FRANCISCO — A microscopic worm may possess the vital genetic spice to make heart-friendly bacon.



Dr. Jing X. Kang, M.D., Ph.D., found a gene in worms that he spliced into pig embryos. The result could produce healthier bacon.

By Steven Senne, AP

A team of geneticists announced Sunday they've mixed genetic material from the roundworm pigs to produce swine with significant amounts of omega-3 fatty acids, which are normally found in other oily fish and believed to stave off heart disease.

Six of the 10 cloned piglets they've produced showed increased levels of the coveted molecule, which researchers hope they can improve the technique in pork and do the same in chickens and cows.

"We all can use more omega-3 in our diet," said Dr. Jing Kang, the Harvard Medical School researcher who modified the omega-3-making worm gene so it turned on in the pigs. Kang is one of 17 authors appearing in an online edition of the journal *Nature Biotechnology*.

The researchers also said their creations can be used to better understand human disease.

The cloned, genetically engineered pigs are the latest advance in the agricultural biotechnology industry struggling to move beyond making esoteric products such as soy that's resistant to weed-killers and repelling corn.

Hoping to create healthier, cheaper and tastier products that consumers crave, Monsanto Inc. and its biotech farming competitors like DuPont are developing omega-3-producing crops that yield cooking oils. Kang said 30 academic laboratories are now working with his omega-3 gene, pursuing similar projects.

"Consumers have responded pretty positively when asked their opinion of food modified to improve quality and food safety," said Christine Bruhn, director of the University of California, Davis' Center for Consumer Research. "Just as long as the taste isn't altered negatively."

Earlier experiments have succeeded in manipulating animals' fat content but most never made it to market.

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because of taste problems, though omega-3-enriched eggs produced by feeding chickens flax or fish meal are popular.

While boosting Omega-3s doesn't decrease the fat content in pigs, the fatty acids are also important for brain development and may reduce the risk of Alzheimer's disease. A lack of omega-3 has been linked to depression and the American Heart Association recommends two or more weekly servings of fatty fish like trout and salmon, which are naturally high in omega-3s.

"There's a lot of potentially beneficial products that could come from this technology," said Irin Kim, top livestock cloner and chief scientific officer of Austin-based ViaGen Inc., which is awaiting FDA approval to clone valuable beef-producing cattle.

ViaGen only clones and doesn't genetically engineer animals, a highly controversial step in the

development of genetically engineered crops like corn to be pest-resistant, and people are wary of genetically engineered soy beans in all manner of processed food. But biotech companies run by bioethicists call the "yuck factor" when they begin tinkering with animals.

Federal regulators — and even the researchers themselves — cautioned that meat and dairy products containing omega-3s will probably not be sold in supermarkets anytime soon. The Food and Drug Administration never approved food derived from genetically engineered animals and there are high hurdles. Unlike crops, the FDA treats genetically engineered animals as medicine and requires extensive approval.

"We understand that this research is in the very early stages," FDA spokeswoman Rae Jones said. "The technology will not likely reach meat counters for many years."

The FDA is still considering Waltham, Mass.-based Aqua Bounty Technologies' application to genetically engineer salmon to grow faster, the only such request pending with the agency. Aqua Bounty's federal application process about nine years ago and there is no indication when the FDA will

approve. In the meantime, the researchers of the latest project said they will use their genetically engineered salmon to study human disease, especially heart conditions.

"The paper isn't about cloning," said Randall Prather, a University of Missouri researcher and *Nature Biotechnology* reporter. "We have created a model to study the human condition."

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