Brave new Bacon

Will genetic science allow us to trade our flax seed meal for sausage patties?

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March 28, 2006

In a brief paper published online in the March 26 issue of the journal *Nature Biotechnology*, a group of researchers led by Jing X Kang of Harvard Medical School announced that they had solved two of the major problems facing the world's food supply—the fact that bacon is not good for you and heart-healthy fish may be poisoned with mercury and other pollutants.

They achieved their solution by inserting a mixture of humanized worm DNA known as fat-1, chicken and viral parts into pig DNA to allow the pigs to produce enzymes that would break down their normally high levels of omega-6 fatty acids into omega-3 fatty acids, something normal pigs can't do.

Many researchers believe that consuming foods (such as oily fish like salmon) high in omega-3 fatty acids can prevent heart disease. While the data from studies following large groups of people and analyzing their fish and omega-3 intake levels are inconclusive, controlled trials comparing omega-3 supplements to placebo has found that the fatty acid can significantly reduce the risk of death from heart disease.

Following a review of all available evidence, the American Heart Association (AHA) suggested in 2002 that we, "include at least two servings of fish per week (particularly fatty fish) [in our diets]. In addition, the data support inclusion of vegetable oils (eg, soybean, canola, walnut, flaxseed) and food sources (eg, walnuts, flaxseeds) high in {alpha}-linolenic acid in a healthy diet for the general population."

However, the AHA cautions, "The fish recommendation must be balanced with concerns about environmental pollutants, in particular PCB and methylmercury, described in state and federal advisories. Consumption of a variety of fish is recommended to minimize any potentially adverse effects due to environmental pollutants and, at the

same time, achieve desired CVD health outcomes."

Based on growing evidence that the consumption of omega-3 fatty acids may reduce heart disease balanced with lack of convincing evidence, in 2004 the U.S. Food and Drug Administration (FDA) extended a qualified health claim for foods containing omega-3 fatty acids, which allows marketers of these foods to claim, "Supportive but not conclusive research shows that consumption of EPA and DHA omega-3 fatty acids may reduce the risk of coronary heart disease."

Ohhhh . . . what trouble approved marketing language can cause.

In their paper, the omega-3 fatty acid pig DNA mixers comment on the reasoning behind their successful creation of pigs with health omega-3 profiles, "The demand for n-3 fatty acids has increased considerably in recent years as evidence of their beneficial effects has grown."

OK, so market demand is driving the creation of a confusing new type of animal, mostly pig, part humanized worm. The market controls everything else.

Something odd, though, the researchers noted that it is possible to increase omega-3 fatty acid content of pigs without altering their DNA by shifting their feed to include flax and fish meal. The problem with these healthy pigs is that their flesh isn't as appealing. It rots faster and the fat is soft and looks nasty. The researchers comment, "Pork quality can be affected by high intake of polyunsaturated fatty acids (PUFA) in the diet because it decreases the oleic acid content, increases the iodine value (hence oxidizability) and causes undesirable softening and yellowing of the carcass fat."

There is something more than aesthetics driving the clone scientists' rejection of naturally health pigs: fish that could be fed to the pigs is running low and is often contaminated with pollutants.

They conclude, "In view of the decline in marine fish stocks and the potential contamination of fish products with mercury and other chemicals, alternative, land-based dietary sources of n-3 fatty acids are needed. Generation of fat-1 transgenic livestock that produce n-3 fatty acids may be an economical and sustainable strategy to address this need."

This announcement will likely increase the attention paid to genetically-modified (GMO) foods, which have caused an uproar among environmental activists and significant trade issues with European and African countries that do not want to accept GMO foods. Corn is one thing, but pigs?

In an email to the New York Times yesterday, FDA spokesperson

Michael Herndon commented that no genetically modified animals had been approved for human consumption and continued to note that the agency would be monitoring animal experiments very closely.

Is this what cloning has come to? I had hoped for more dramatic results. Instead, I will wait for my package of Clono-Bacon, which will tell me in excited lettering and bold colored packaging that, "Supportive but not conclusive research shows that consumption of Clono-Bacon may reduce the risk of coronary heart disease."

Thanks.

References:

"Generation of cloned transgenic pigs rich in omega-3 fatty acids," Nature Biotechnology. March 26, 2006.

"AHA Scientific Statement: Fish Consumption, Fish Oil, Omega-3 Fatty Acids, and Cardiovascular Disease," Circulation. 2002;106:2747

"FDA Announces Qualified Health Claims for Omega-3 Fatty Acids," U.S. Food and Drug Administration. September 8, 2004.

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