

# Genetically altered salmon? It doesn't stop there

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In this Monday, Oct. 31, 2005 picture, a harvester works through a field of genetically modified corn on the dairy farm owned by Al Lafranchi, near Santa Rosa, Calif. Lafranchi started growing the genetically modified corn six years ago, which he says is more resistant to weeds and provides cleaner feed for his dairy cows. For thousands of years, humans have practiced selective breeding. That concept was refined to develop plant hybridization and artificial insemination. Now comes an Atlantic salmon that is genetically engineered to grow twice as fast as a regular salmon. If U.S. regulators approve it, the fish would be the first such scientifically altered animal to reach the dinner plate.(AP Photo/Rich Pedroncelli)

(AP) -- We've always played with our food - even before we knew about genes or how to change them.

For thousands of years, humans have practiced selective breeding - pairing the beefiest bull with the healthiest heifers to start a new herd. That concept was refined to develop plant hybridization and [artificial insemination](#). Today we've got tastier corn on sturdier stalks, bigger turkeys and meatier cattle.

Now comes an Atlantic salmon that is genetically engineered to grow twice as fast as a regular salmon. If U.S. regulators approve it, the fish would be the first such scientifically altered animal to reach the dinner plate.

Scientists have already determined that it's safe to eat. They are weighing other factors, including environmental risks, after two days of intense hearings.

Whatever the decision on salmon, it's only the start of things to come. In labs and on experimental farms are:

- Vaccines and other pharmaceuticals grown in bananas and other plants.
- Trademarked "Enviropigs" whose manure doesn't pollute as much.
- Cows that don't produce methane in their flatulence.

And in the far-off future, there may be foods built from scratch - the scratch being DNA.

Sometimes when science tinkers with food, it works. Decades ago, Norman Borlaug's "Green Revolution" of scientifically precise hybrids led to bigger [crop yields](#) that have dramatically reduced hunger.

Sometimes it flops. Anyone remember the Flavr Savr tomato? Probably not. It didn't taste good. "There was no flavor there to save," one expert quipped. But you might remember 10 years ago when genetically modified corn meant for animal feed wound up in taco shells?

To the biotech world, precise tinkering with the genes in plants and animals is a proven way to reduce disease, protect from insects and increase the food supply to curb world hunger.

To skeptics, [genetic changes](#) put the natural world and the food supply at risk. Modified organisms can escape into the wild or mingle with native species, potentially changing them, with unknown effects.

Over the last 15 years, genetically engineered plants have been grown on more than 2 billion acres in more than 20 countries. Consumers eat genetically engineered plant products in large quantities in the U.S., often in unlabeled products such as oils and processed foods.

The same crops are viewed more suspiciously in Europe and other countries, including India. China, meanwhile, is working to develop genetically modified rice that would be less prone to insect damage.

In fact, some experts say the natural food of our forebears is for the most part long gone. That's mostly due to breeding and other now-commonplace practices.

Old-fashioned breeding has led to turkeys that "can't have sex anymore because we've been breeding them for big chests," says Martina Newell McGloughlin, director of the University of California's Biotechnology Research and Education Program.

"All of the animals, plants and microbes we use in our food system, our agricultural system, are genetically modified in one way or another," says

Bruce Chassy at the University of Illinois at Urbana-Champaign. "That, or they're wild."

The modifications are mostly from [selective breeding](#) and hybridization, the traditional ways of changing plants and animals. But these methods used for thousands of years are compared by genetic engineers to using a sledgehammer. They say their techniques are like using a scalpel.

"Genetic engineering is more precise and predictable, yet it is regulated up the wazoo," McGloughlin says. "Yet there is no regulation at all on the traditional breeding system."

She finds fears over genetically engineered food and the regulations that accompany them hard to stomach.

More than four-fifths of the soybean, corn and cotton acreage in the United States last year used genetically engineered crops, according to a 2010 National Academies of Sciences study.

David Ervin of Portland State University in Oregon, who chaired the committee that wrote the report, said it found no large-scale environmental risks associated with the current genetically engineered corn, cotton and soybeans in the United States. As for future crops, "you just have to be very cautious," depending on the nature of the plants, he says.

The report, which didn't consider health impacts of eating genetically engineered crops, did recommend large-scale studies of ecological effects of such crops, Ervin said.

Marion Nestle, a New York University professor and expert on food studies and public health, says that in processed food, "if it's got beet sugar, soybean or sugar, it's got an 85 to 95 percent chance of being

genetically modified."

Nestle fears unintended consequences in the food supply and environment. She previously served on Food and Drug Administration advisory boards, and she opposes the genetically engineered [salmon](#). In the 1990s, she voted against allowing genetically engineered plants.

Animals are a bigger problem in trying to prevent mixing with nongenetically modified populations, she says. "Millions (of farmed fish) escape, not one or two, but millions."

L. LaReesa Wolfenbarger, a professor of biology at the University of Nebraska who was on the National Academies study team, finds a distinct difference between old-fashioned breeding and genetic modification. What is happening recently is that we are mixing genes of plants and animals that in normal evolution or nature don't mix, she says.

Or as Margaret Mellon, director of the Food and Environment Program at the Union of Concerned Scientists, puts it: You can't breed a cow with a starfish.

Such DNA-mixing is not necessarily bad, but it's something to be careful with, Wolfenbarger and Mellon say.

"These are things that we can look at as long as we also have the ability to kind of brainstorm and figure out what the unintended consequences are," Wolfenbarger says. She contends that so far, at least with plants, science has had a good handle on preventing problems.

Not so, says NYU's Nestle.

Back in the 1990s, she recalled, opponents of genetically engineered crops were "laughed out of the room ... and they turned out to be right."

Just as critics warned, the pollen of genetically modified crops is drifting into natural areas. Weeds and insects have become resistant to the anti-pest modifications, she said.

But scientists who work on genetic modifications insist time has proven them correct.

James Murray, a professor of animal sciences at the University of California at Davis, says the fears surrounding genetically engineered foods sound similar to concerns about microwave ovens, which some people initially thought would give off dangerous radiation or blow up pacemakers.

Murray is working on genetically modified goats as a way to produce milk that can fight devastating diarrhea in poor nations.

With the world population predicted to surpass 9 billion before 2050, genetically engineered food is the only hope to avoid starvation, he says.

That many people cannot be fed "using agriculture as it is right now," Murray says. "What is the cost to humanity if we do not use this technology?"

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