

Biotechnology, Animal Products, and Food Safety



C. Chad Carr

University of Florida

Food Safety Concerns And Actions: U.S. Consumers

Consumers "**extremely/very concerned about**" and "**actively trying to avoid**" these substances:

Pesticide residues on produce	79%	42%
Hormones in meat/poultry	69%	38%
Mercury in fish	69%	43%
Antibiotics in meat/poultry	67%	35%
Genetically modified organisms (GMOs)	59%	30%
Nitrates/nitrites in produce/meat/poultry	41%	22%

SOURCE: J. Brad Morgan(2008); Packaged Facts (2006); Food Technology, March 2006.

TRADE WARS GENETICALLY MODIFIED FOOD

WHO'S AFRAID OF FRANKENFOOD?

...stly just Europeans. But thanks to a little
ty and a lot of agitprop, that's changing

OLDEN

TIME, NOVEMBER 26, 1999

...mbers of Congress intro-
s requiring labeling of all
seeded-food.

...ns, whose concerns about
ve been on the rise ever
"disease" (even though it
do with genetic engineer-
have seemed indifferent to
t that they have much
soybeans, about a third of
d substantial quantities of
wn in the U.S. come from
been genetically altered.
g.m.s are in the offing, in-
etteuce, broccoli and cas-
s market for them. Some

...OF LEADING Greenpeace invaded
ech compa-maker Kellogg's head-
artburn last ters, calling its use of
t because of scally engineered ge-
e. Rather, it "monstrous experit-
was that long-simmering Eu- One of the Greenpac

after what British tabloids call "Frankenfoods."

In Chicago the Food and Drug Administration, acknowledging growing public concern, held the first of three public forums on g.m. foods. FrankenTony showed up, along with a covey of kids dressed as monarch butterflies, feigning death before a mock cornstalk—an allusion to the discovery by scientists last spring that, at least in the lab, pollen from g.m. corn can kill the butterfly's caterpillars. Not to be left out, Secretary of Agriculture Dan Glickman was said to be considering the appointment of a panel of experts to advise him on the pros and cons of biotech. And in the surest sign of shifting political winds, a bipartisan

Beware Of The Coming Food Apocalypse!



They're Playing God And Shoving It Down Your Throat!

by Greg Clota

Kellogg's Genetically Modified FROSTED FAKES OF "CORN"



PROTEST

Greenpeace's clever posters twist Tony the Tiger by the tail

skittish U.S. farmers now say they may plant fewer g.m. seeds next spring.

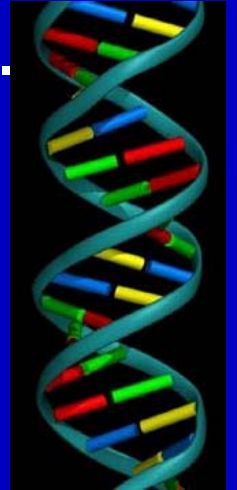
If foodmakers can no longer count on the public's unquestioning acceptance of their products, it's not just because of activist theatrics and shrill agitprop. To be sure, it was Greenpeace that pressured Gerber to drop genetically altered soybeans and corn from its baby foods and played a key role in forcing Monsanto to halt research on its self-sterilizing "terminator" seeds. But more measured voices have expressed doubts as well. Says Rebecca Goldberg of the Environmental Defense Fund (EDF): "As a biologist, I find it hard to oppose genetically engineered crops or foods per se. [But] I also think that there are some genuine food-safety and ecological issues that have to be dealt with."

Not that any direct threat to health from genetically modified foods has been found, except by a lone British researcher who claimed—somewhat dubiously—that g.m. potatoes damaged his lab rats. On the contrary, as scientists



Genetic Engineering with Recombinant DNA

- Genetically Modified Organism (GMO)
- Direct manipulation of an organism's genes.
- Since a protein sequence is specified by a segment of DNA called a gene, novel versions of that protein can be produced by changing the DNA sequence of the gene

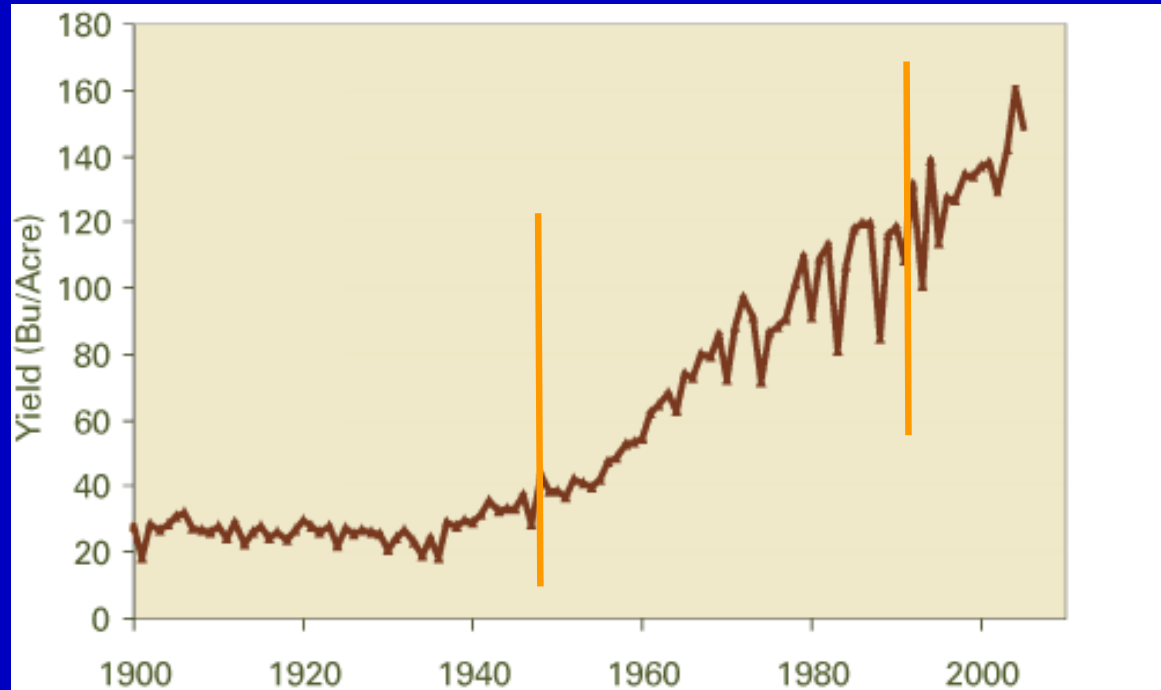


Genetically Engineered



Benefits of Genetic Engineering

Corn

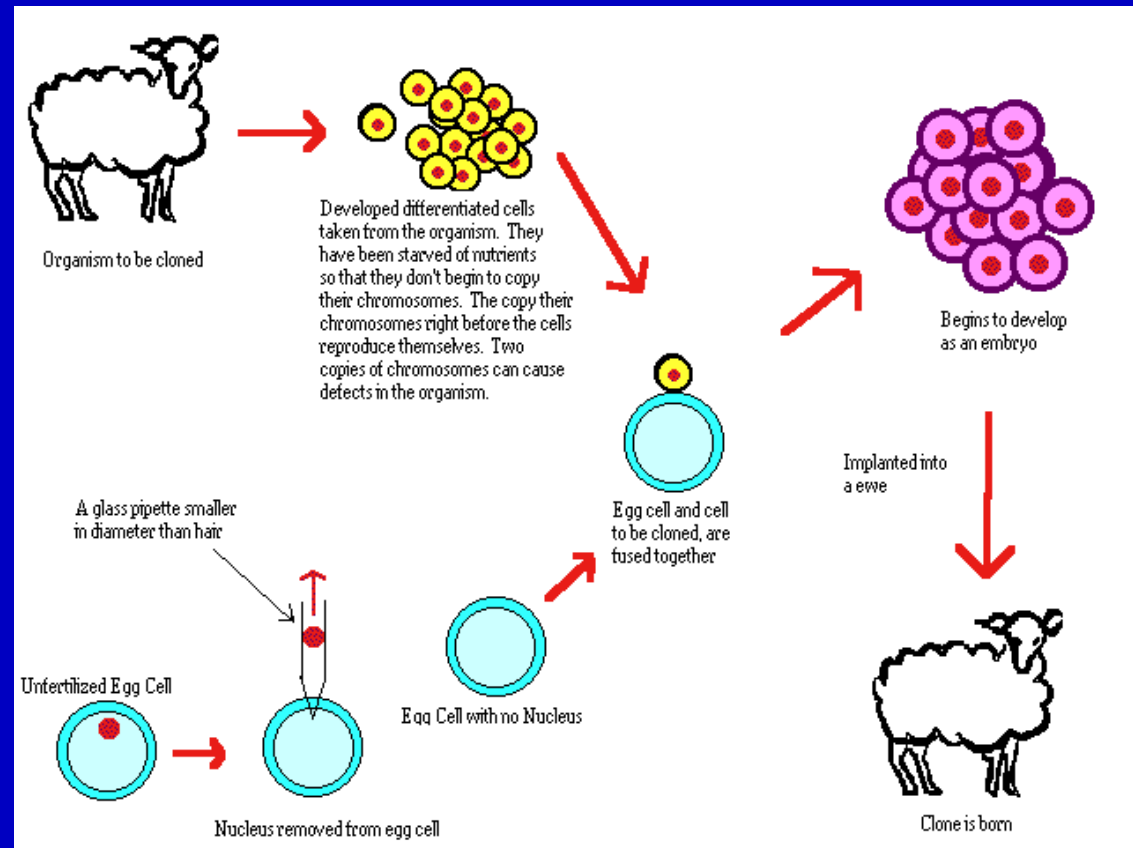
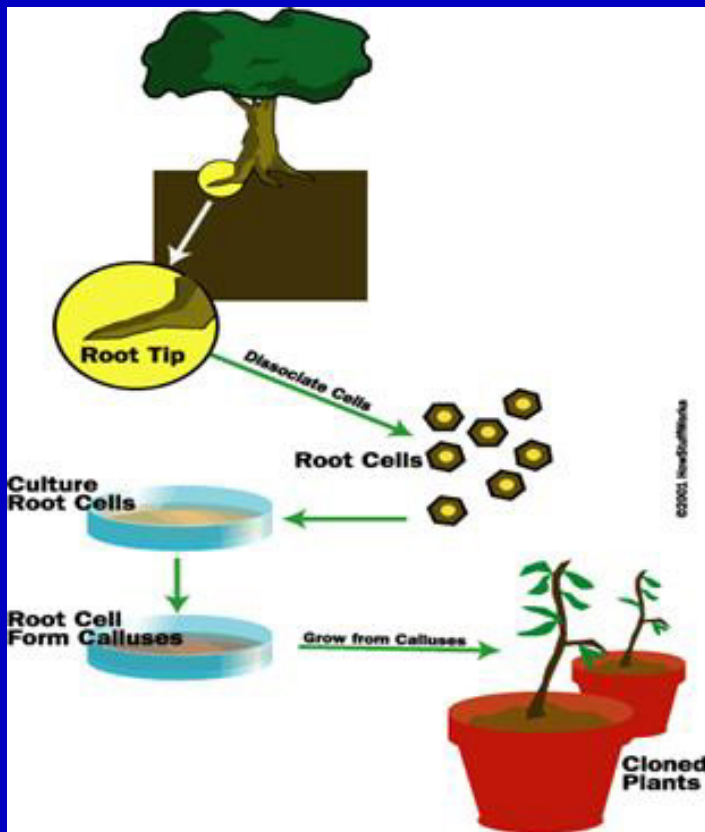


Cloning

- Somatic Cell Nuclear Transfer
- A genetic copy of the donor
- Dolly
- Benefits
 - Biotechnology
 - Preservation of Elite Seedstock



Cloning



Cloned Adult Animal



Benefits of Cloning



Are GM Foods Safe To Eat?

- Nutrient content and composition of GM crops **are not different** from conventional crops.
- Nutrient content and composition of meat, milk and eggs **are not different** between those fed GM vs. CON crops.
- **No foreign DNA or proteins** are found in meat, milk and eggs from animals fed GM crops.,
- Meat, milk and eggs from animals fed GM crops are **as safe or safer** than (e.g., fewer pesticide residues) those fed CON crops.



Scientific Evidence Regarding Genetic Engineering

- EPA decided to allow farmers to continue growing GM corn, expressing confidence that it **does not pose risks** to human health or the environment.
- FSA-France conducted a \$64 million study and concluded that "not only do GM foods **pose no danger** to humans, they are **safer** than normal foods."
- GAO concluded "GM foods pose **no greater health risks** than conventional foods; consumers who ate bioengineered foods were not at higher risk of allergies or toxic reactions."



Food Products From Livestock That Eat Biotech Crops



- CAST examined regulatory assessments on GM crops, looked at results of feeding studies in farm animals, and examined what happens when animals consume various proteins and DNA.
- **Conclusion:** "Meat, milk and eggs produced by farm animals fed biotechnology-derived crops are as wholesome, safe and nutritious as similar products produced by animals fed conventional crops."

Consumer Groups Oppose Food From Cloned Animals



- A consumer lobby, the **Center for Food Safety**, filed a legal petition asking FDA to launch a **moratorium** on food from cloned animals.
- **Consumer Federation of America** criticized FDA for not making its full risk assessment or scientific studies available for **comment**.
- Both groups questioned whether **consumers would buy** products from cloned animals.
- Opposition to food from cloned animals is expected from **those with moral arguments** and **animal welfare groups** amid reports that claim animal cloning research has led to premature deaths and abnormalities.

SOURCE: foodproductiondaily.com (October 25, 2006).

Consumer Perception of Products From Clones

POLL

Considering cloned food products

A survey shows most Americans would at least consider buying meat and milk products from cloned animals if approved by the government.

If the FDA determines that meat from cloned animals and their offspring is safe and you learned that a food product you regularly purchase included meat from the offspring of cloned animals, would you ...

Continue to buy the food as usual Buy it, but plan to find out more

21% 11 32 35

Consider buying it after you find out more Never buy it again

If the FDA determines that milk from cloned animals and their offspring is safe and you learned that a food product you regularly purchase included milk from the offspring of cloned animals, would you ...

Continue to buy the food as usual Buy it, but plan to find out more

23% 10 32 33

Consider buying it after you find out more Never buy it again

NOTE: Poll of 1,040 adults taken Dec. 8-11, 2006; margin of error ± 3 percentage points; "don't know" and "refused" were omitted.

SOURCE: Center for Food, Nutrition and Agriculture Policy

AP

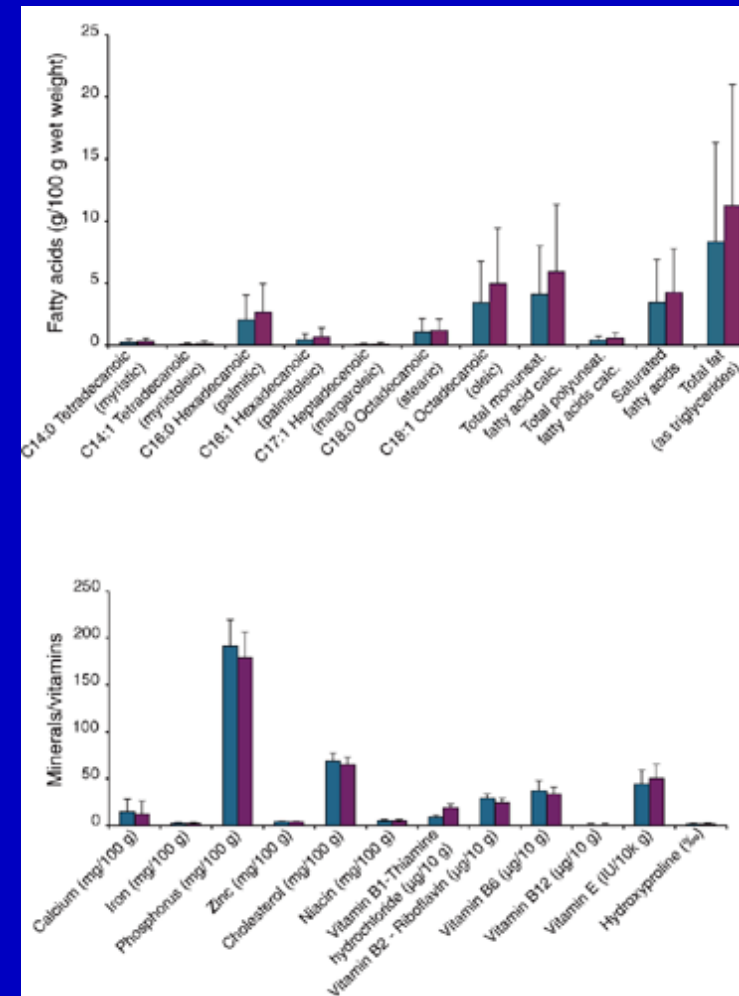
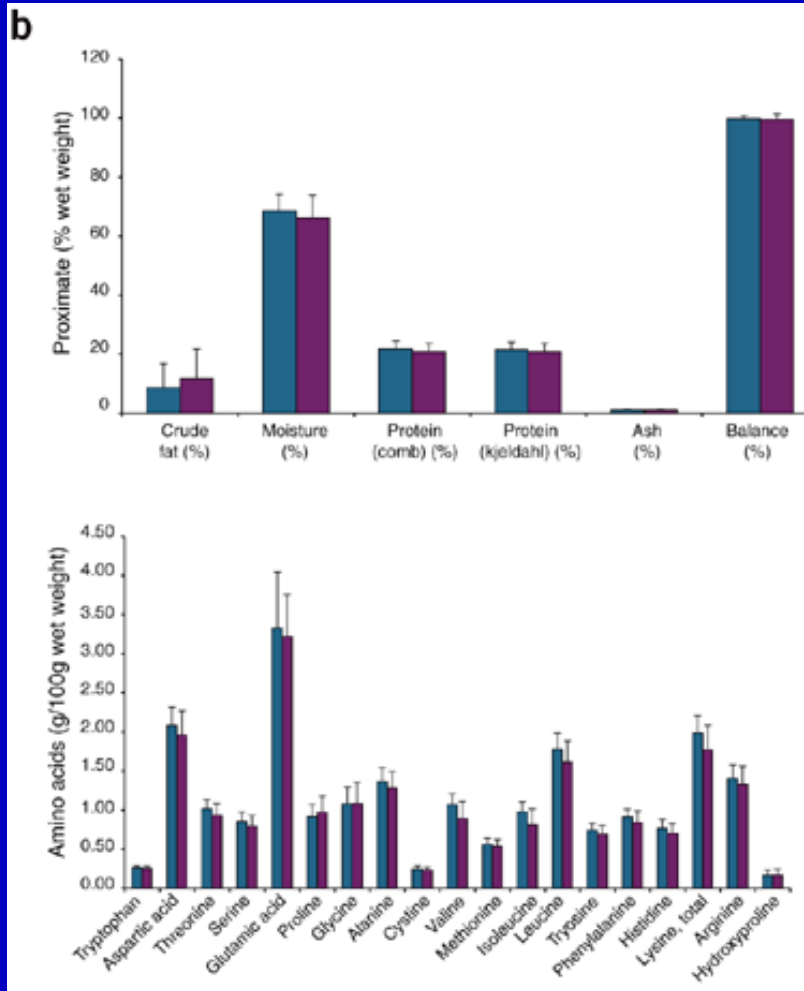
Is It Safe to Eat Cloned Meat?

- “The meat & milk from clones of cattle, swine, and goats, and the offspring of clones from any species traditionally consumed as food, are as safe to eat as food from conventionally bred animals.”
- No difference in labeling



Products From Clones

- No “New” substances in the products



Are Products from Clones Being Marketed?

- Previously- a **voluntary moratorium** was on food from cloned animals
- Soon, this probably will be lifted
- However, process with sheep/lamb will continue



-
- Concern regarding use of genetically modified (GMOs) in agriculture was brought to consumers' attention worldwide when Greenpeace developed clever posters featuring Tony the Tiger™ on Kellogg's Genetically Modified Frosted Flakes of Corn – and calling it "**Frankenfood.**"
 - Years later, in an interview for the Florida Times-Union, Patrick Moore (co-founder of Greenpeace) said "The campaign of fear now being waged against genetic modification **is based largely on fantasy and a complete lack of respect for science and logic.**"



Patrick Moore

WTO ruling against EU ban on beef with hormones a 'victory': U.S. official

- January 1, 1989- EU ban on meat imports from implanted animals
 - March 31, 2008- World Trade Organization's announced that ban remains scientifically unjustified would be a boon to U.S. beef producers — as well as EU consumers.
-

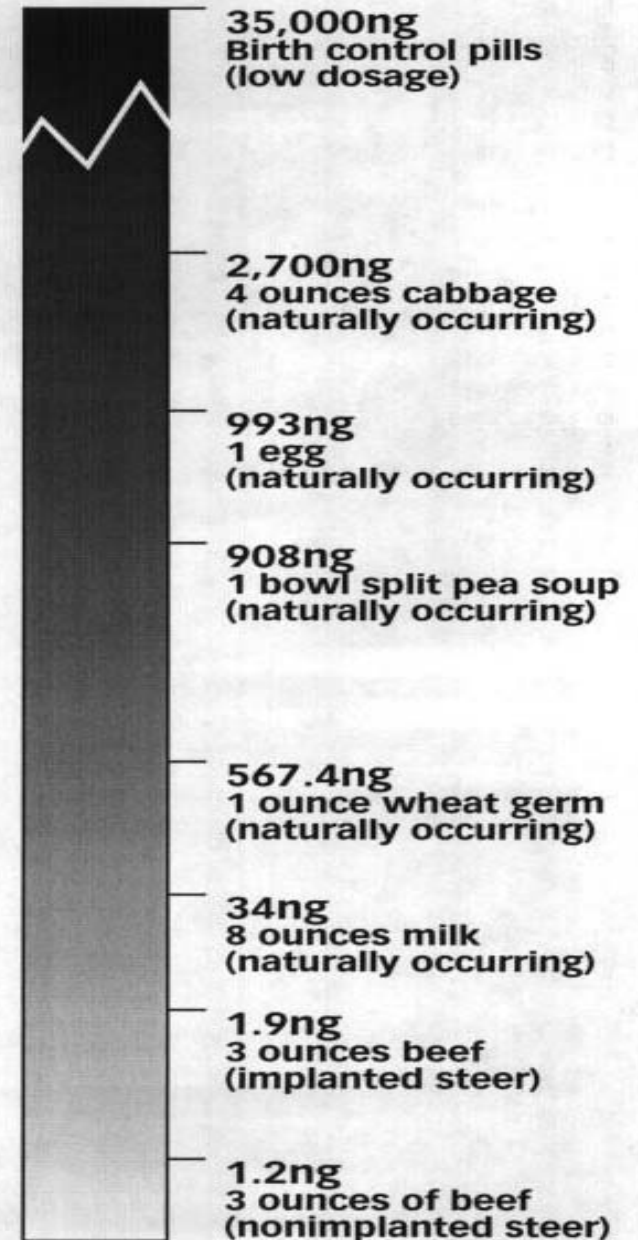
Hormones in Meat

- Estrogenic levels in beef
- Using Beef as birth control
 - Beef from a NON-implanted steer
 - 29,167 3-ounce steaks per day
 - Beef from an implanted steer
 - 18,421 3-ounce steaks per day



Estrogenic Levels in other foods

- 3.25 lbs of cabbage
- 36 eggs
- 39 bowls of split pea soup
- 4 lbs of wheat germ
- 1,030 cups of milk



Note: not to scale

Advocates Against rBGH Milk File Citizens Petition



- Cancer Prevention Coalition, Organic Consumers Association and Family Farm Defenders **filed a petition** (February 26, 2007) with FDA.
- It requests **immediate suspension of approval** of rBGH based on "imminent hazard," citing Food, Drug & Cosmetic Act law.
- The groups claim there is **evidence of increased risks of cancer** from the consumption of milk from cows injected with rBGH.

Can BST Given To Dairy Cows Endanger Personal Or Public Health?

- **Gordon Niswender** – BST (also called BGH) will have **no effect** on humans because it is not biologically active in humans and, when eaten, is broken down (to amino acids) in the human digestive tract.
- **D.N.R. Veeramachaneni** – BST would have **no effect** on humans, even if it was injected into them in pure form, because BST does not bind to human growth hormone (HST) receptors.



Gordon Niswender, PhD



D.N.R. Veeramachaneni, BVSc, MScVet, PhD

Questions?