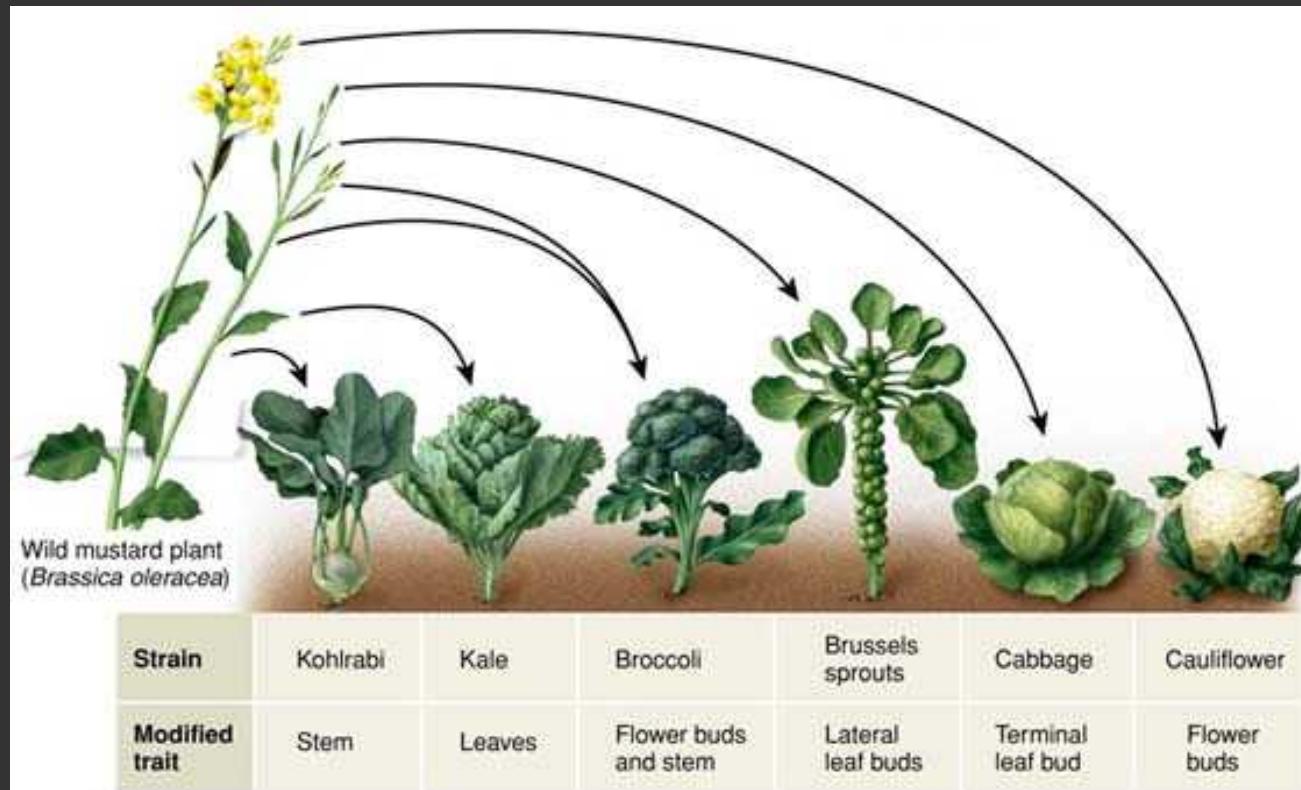
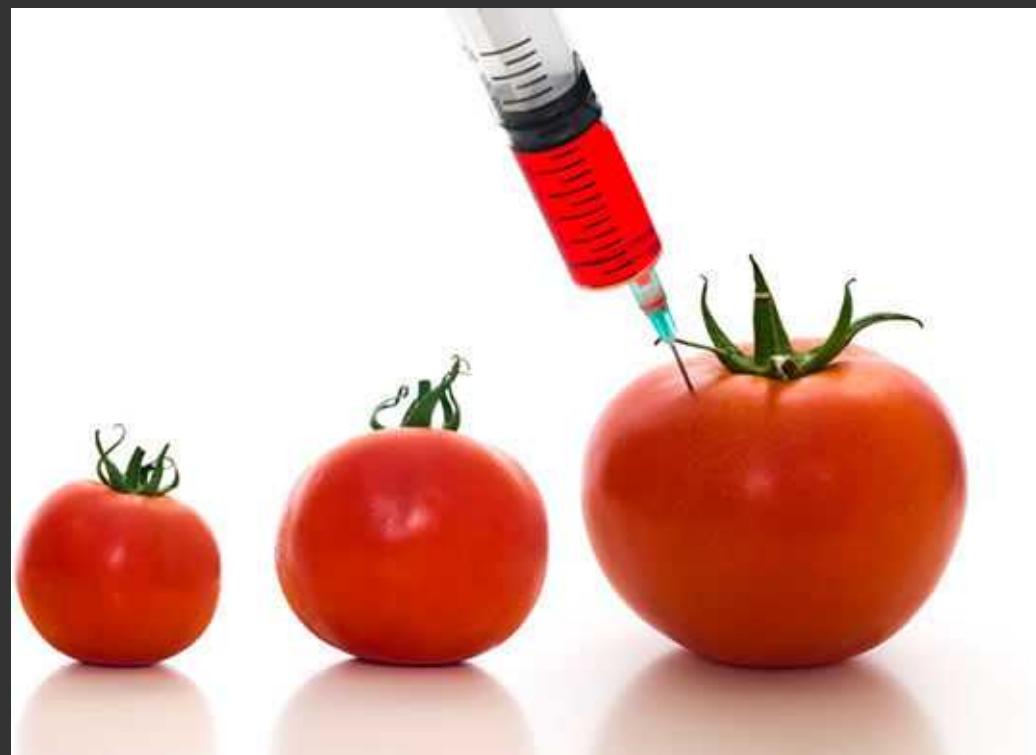


Transgenic GMOs & Frankenfoods

Humans have been modifying food plants ever since they figured out how to grow them

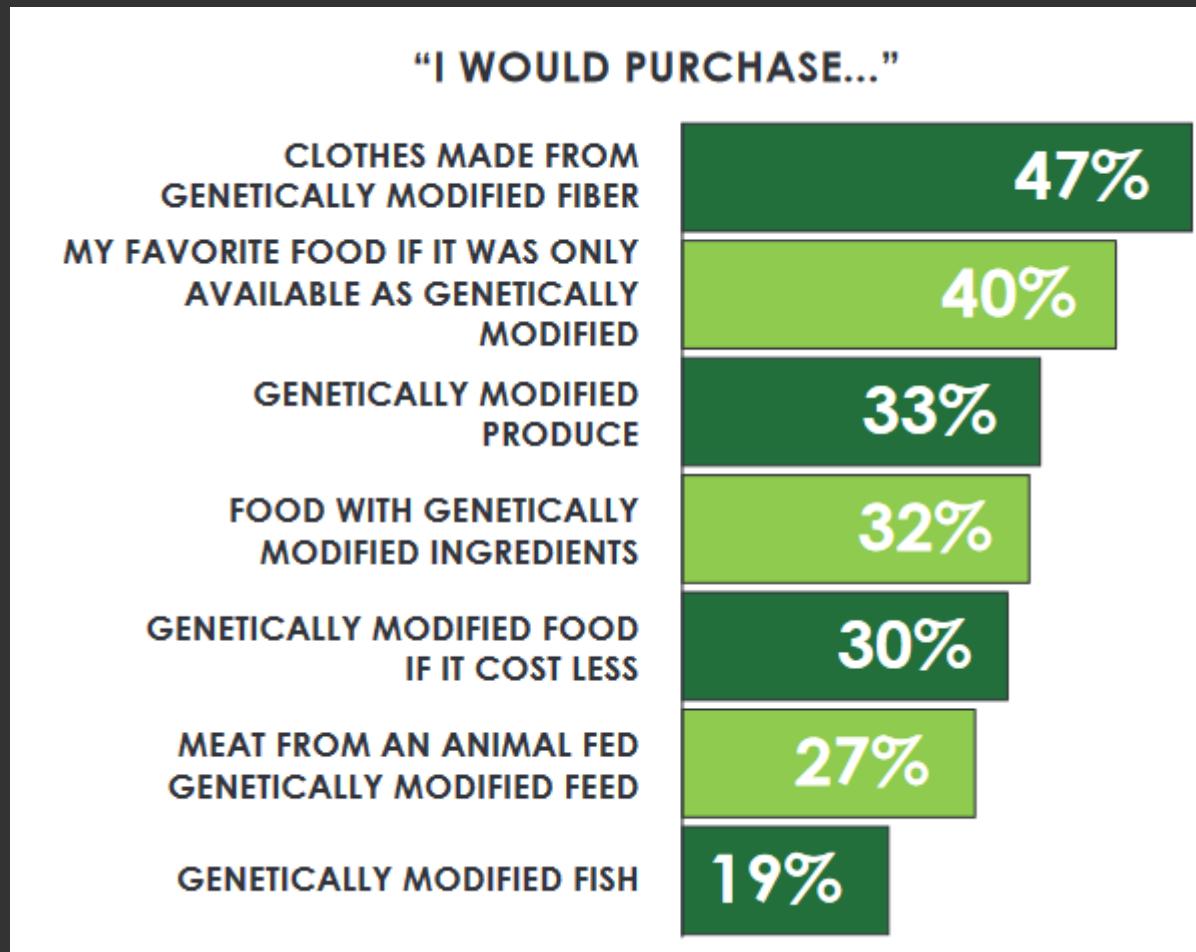


When you hear “GMO,” is this what you think of?



Surveys show that this is what people think of.

Survey of 3000 Florida residents

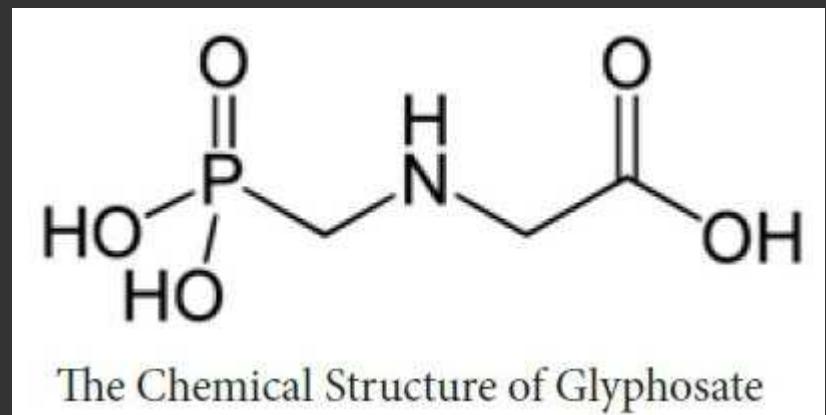


Setup:

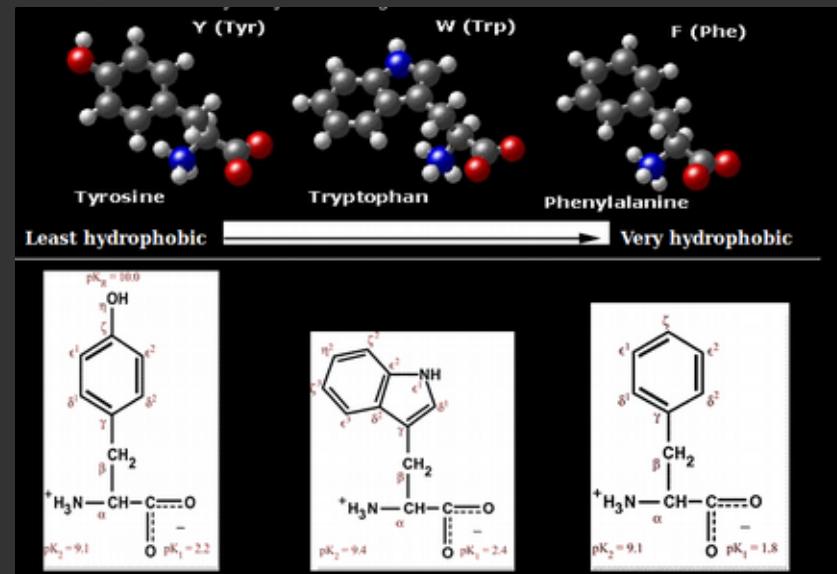
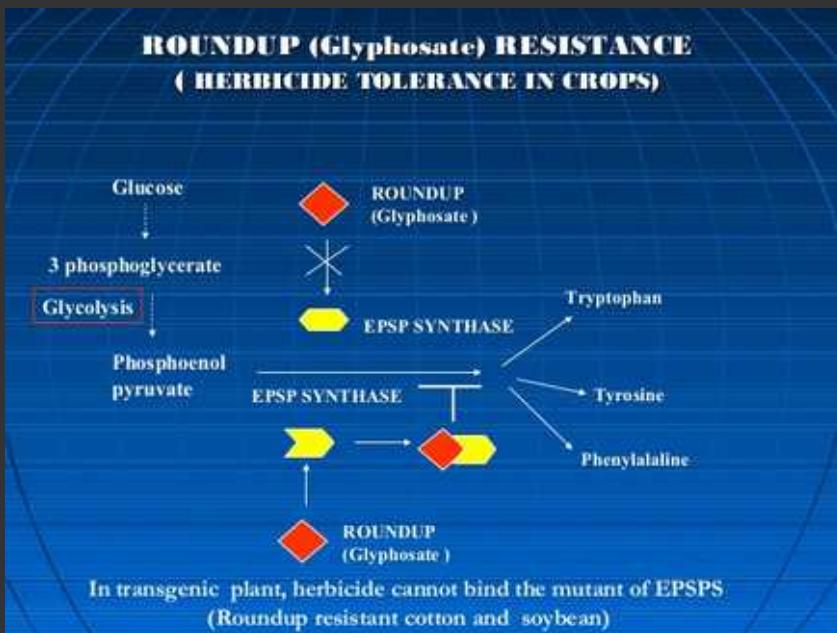
- 7+ Billion humans on earth
- All of them need to eat food
- This population is supported (caused?) by industrial agriculture
- Need methods for efficient agriculture



Glyphosate interferes with plants' ability to synthesize certain amino acids

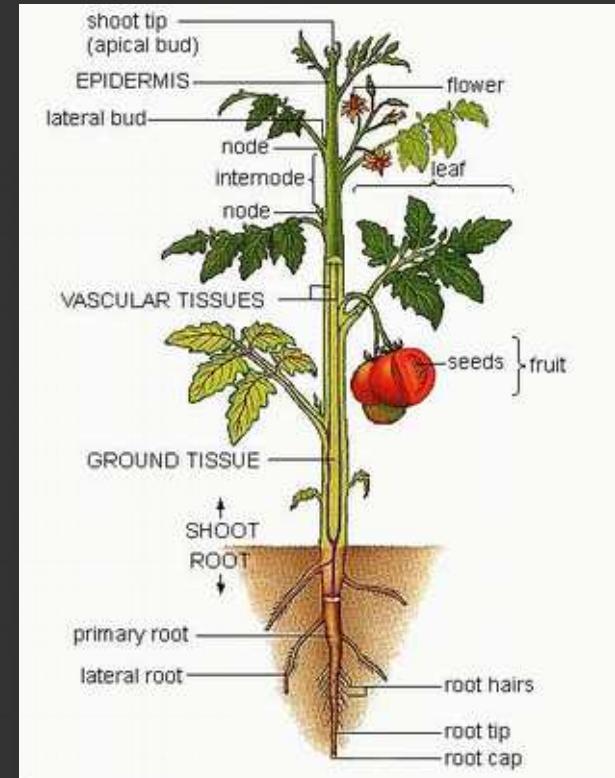
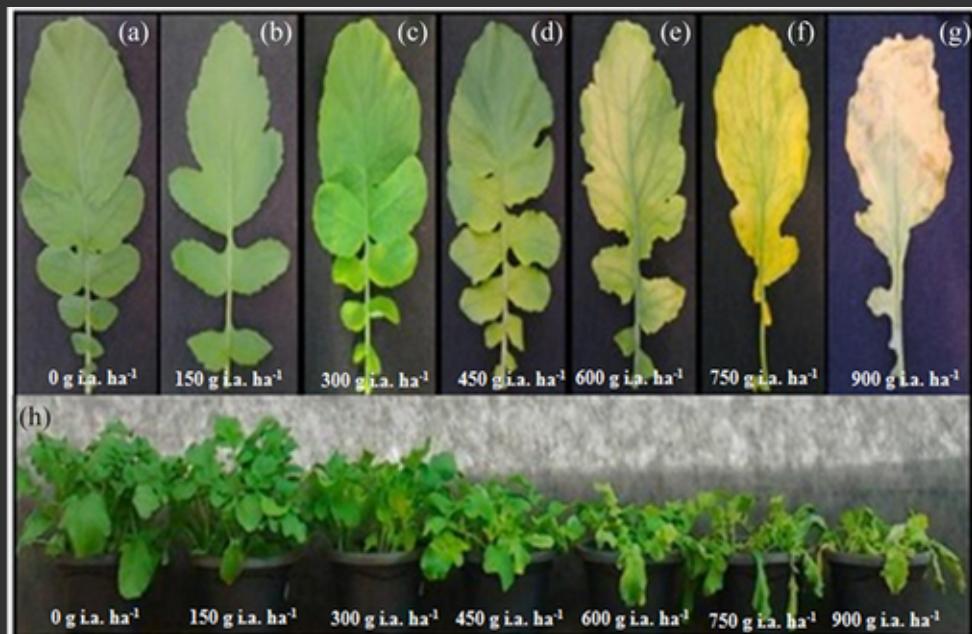


The Chemical Structure of Glyphosate



Glyphosate became popular because it is rapidly biodegradable and super effective, but the biggest downside was that it was easy to accidentally kill food crops at the same time.

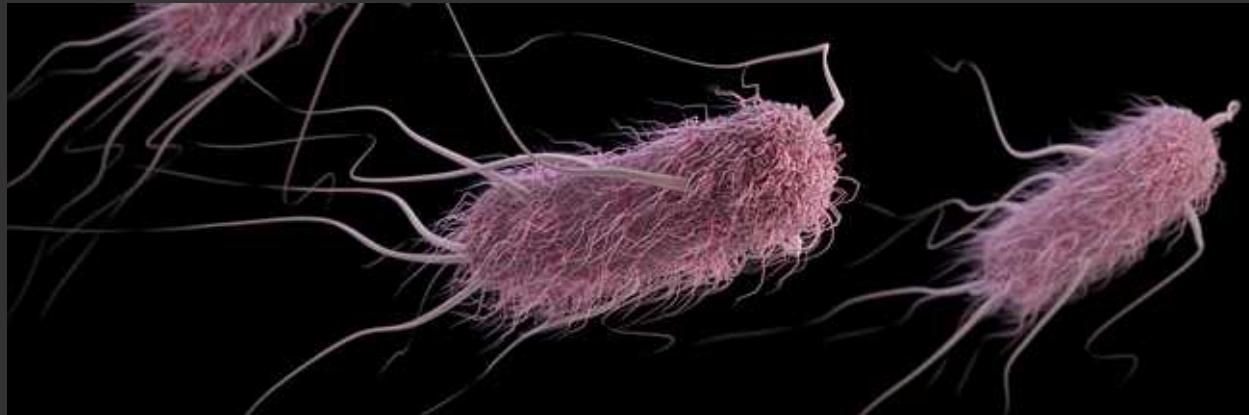
Glyphosate “takes no prisoners!”



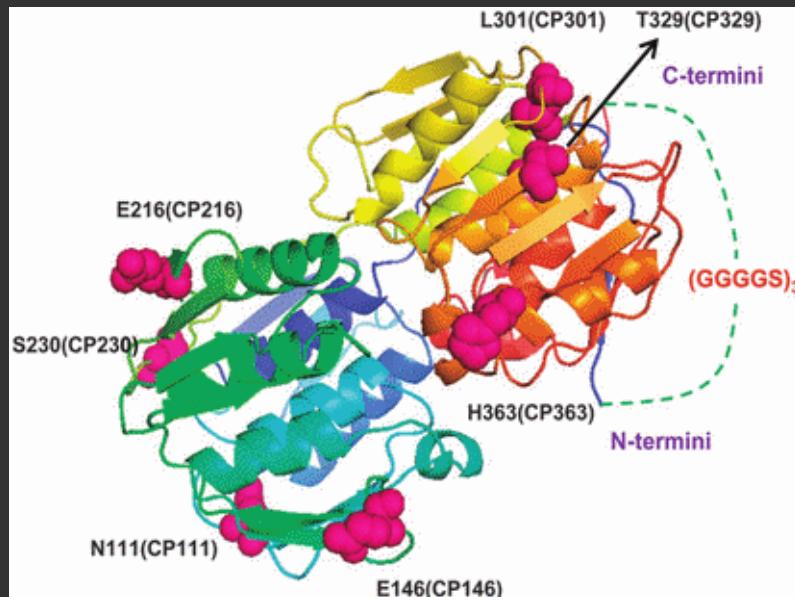
Monsanto, the manufacturer of glyphosate, decided to make crop varieties that were resistant to glyphosate



E. coli strain had naturally resistant EPSP protein

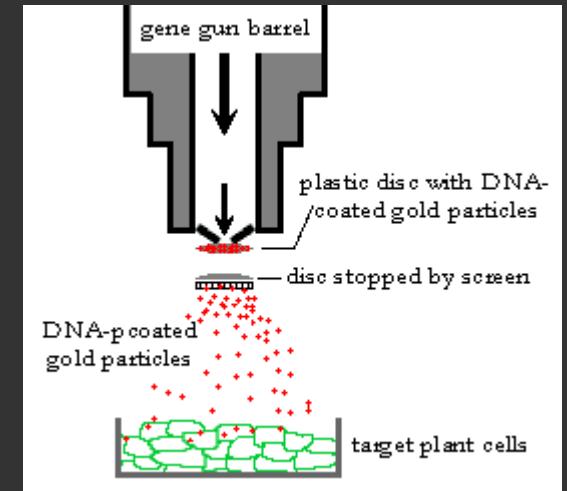


E. coli EPSP protein

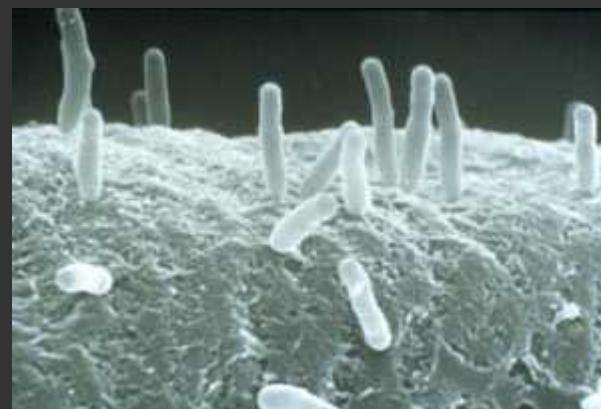
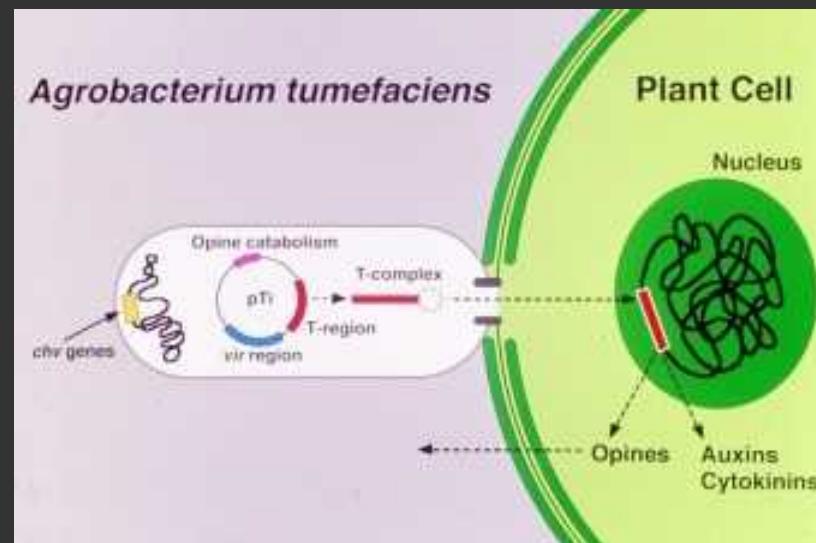


Okay, great!
But how do you get a bacteria
gene into a plant genome?

Gene guns



Agrobacterium



Procedure for plant transformation

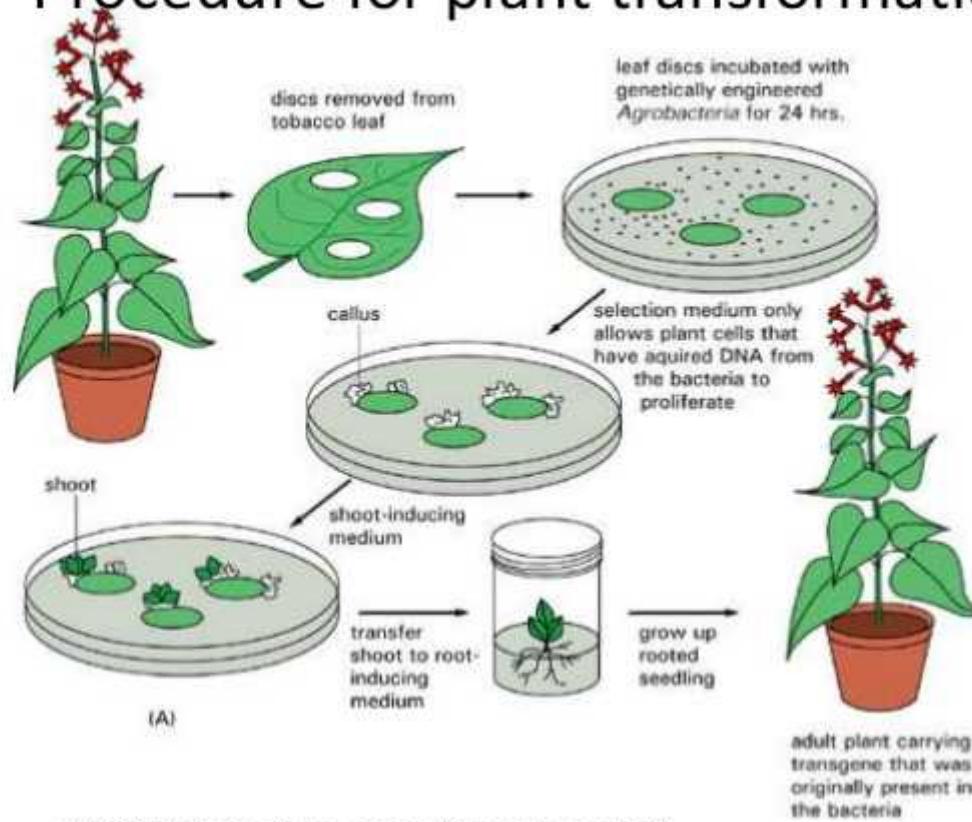
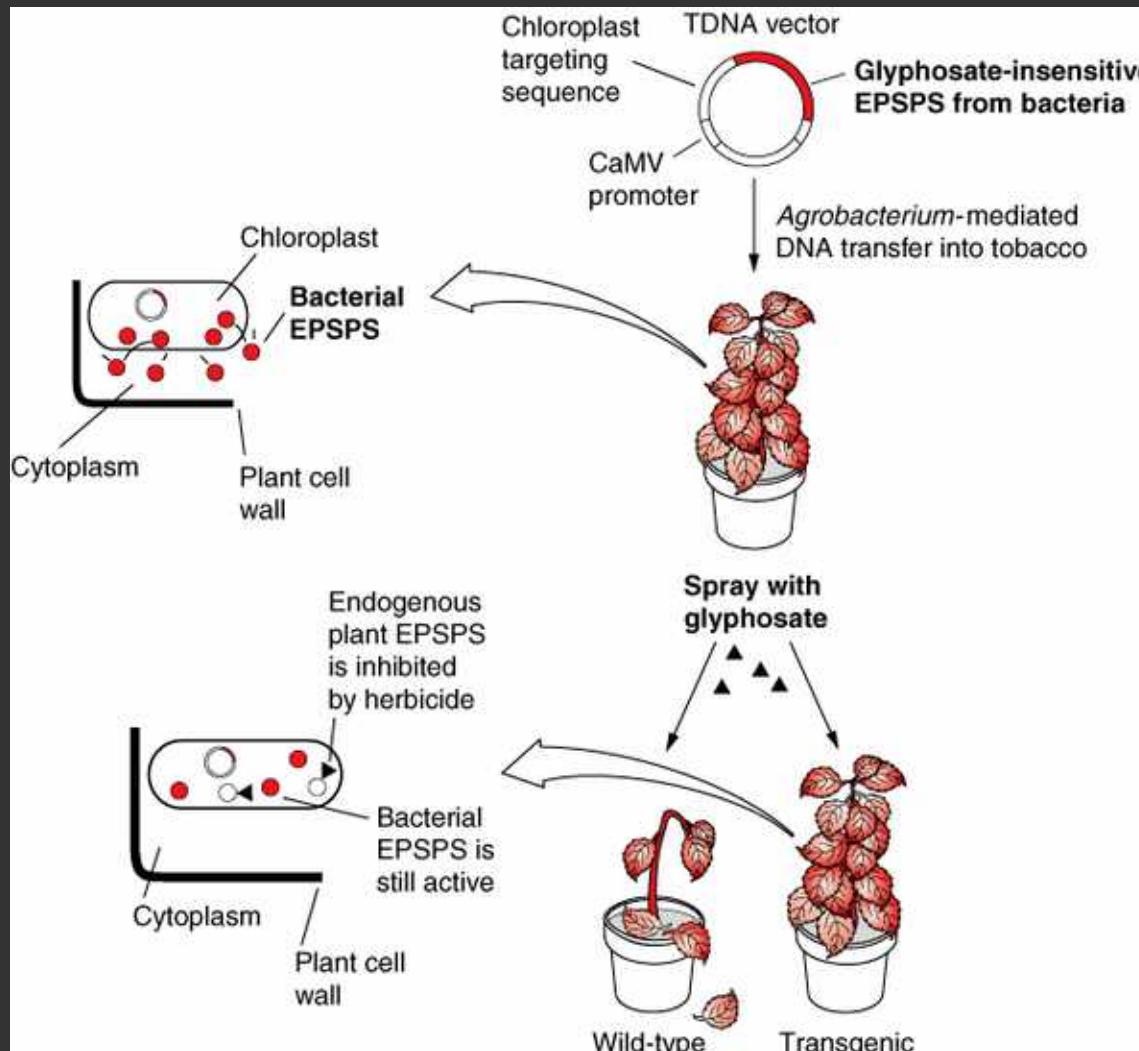


IMAGE: Mol bio of the cell by Albert (pg no:599)

What, specifically, is different about Roundup Ready™ plants?



No weeds means more efficient monoculture (+ big money for Monsanto)



What does this mean for society?

Effects on human health from eating transgenic foods?

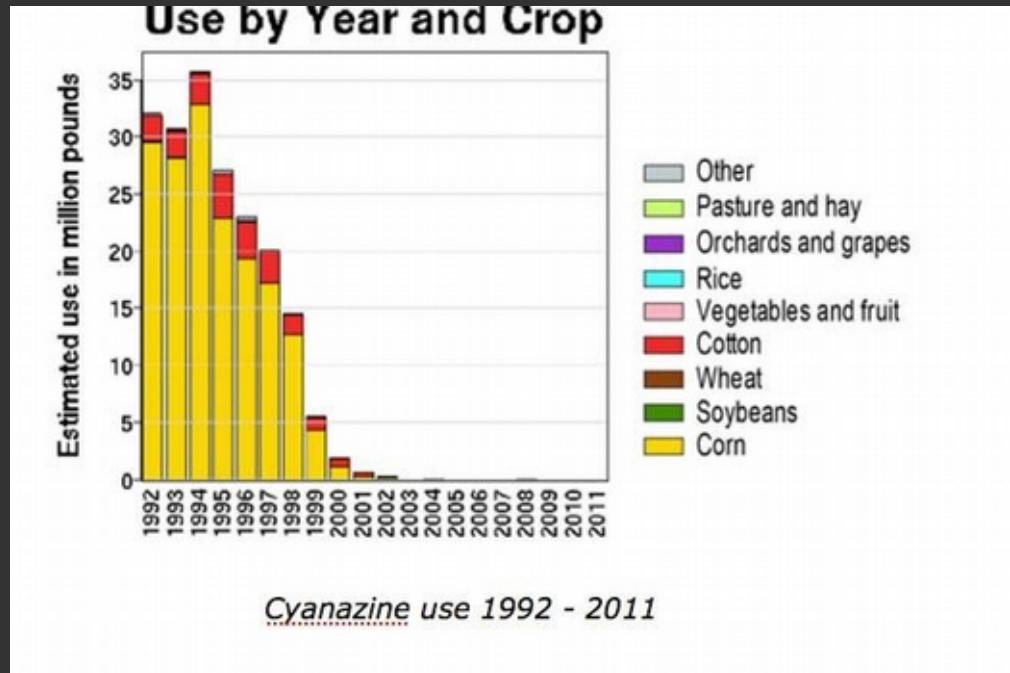
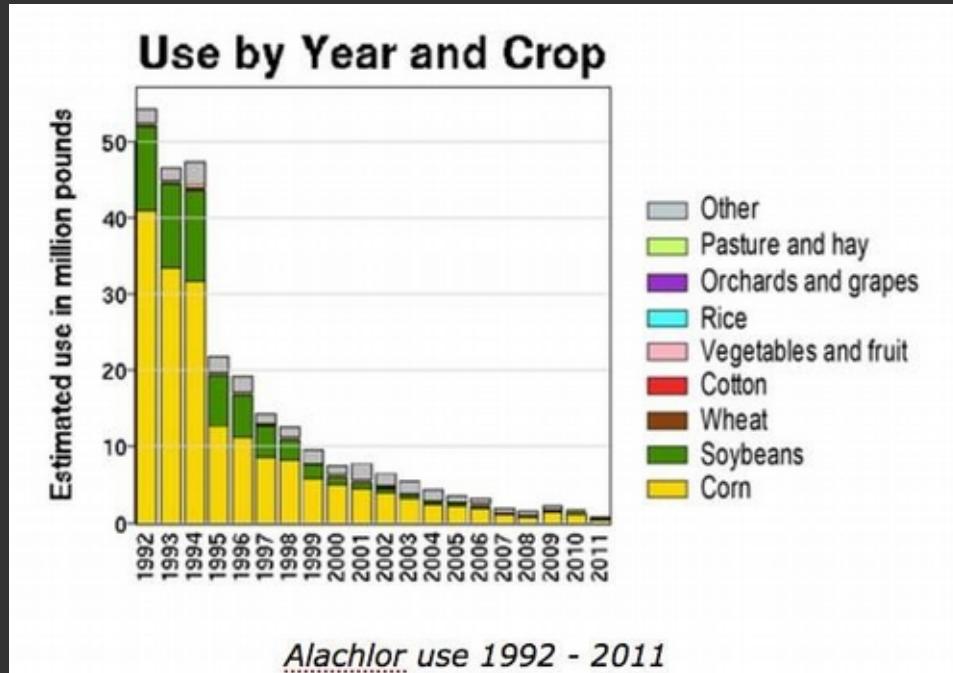
Implications of centralizing world's food supply into a few very large corporations?

Ecological implications?

Farmer livelihoods?

Less world hunger?

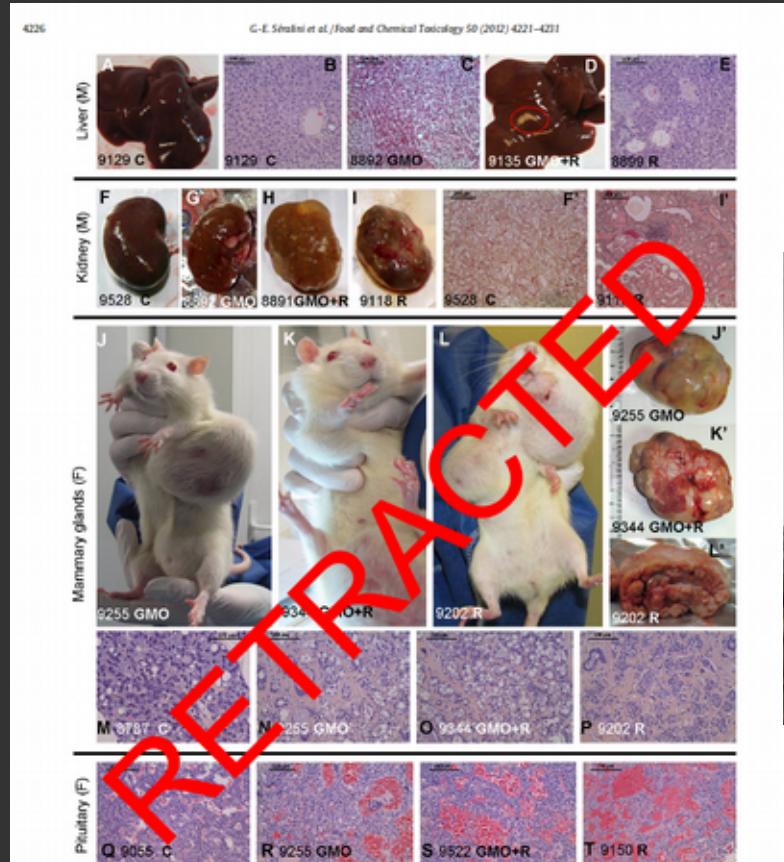
Before glyphosate, farmers just used different pesticides



LD50 (Toxicity values)

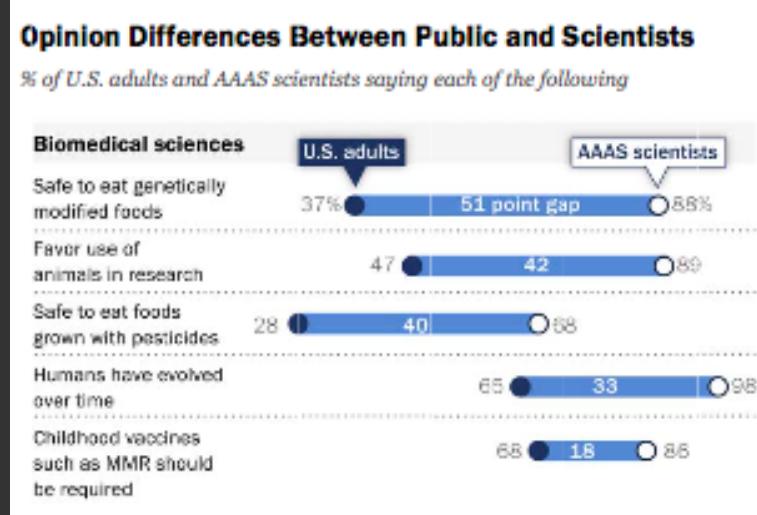
Caffeine	127 mg/kg
Cyanazine	182 mg/kg
Alachlor	930 mg/kg
Table Salt	3,000 mg/kg
Glyphosate	5,600 mg/kg

GMOs cause faster tumor growth in rats



Not scientifically literate

Just kidding... that was a fake study.



“... contrary to popular misconceptions, GM crops are the most extensively tested crops ever added to our food supply. There are occasional claims that feeding GM foods to animals causes aberrations ranging from digestive disorders, to sterility, tumors and premature death. Although such claims are often sensationalized and receive a great deal of media attention, none have stood up to rigorous scientific scrutiny. Indeed, a recent review of a dozen well-designed long-term animal feeding studies comparing GM and non-GM potatoes, soy, rice, corn and triticale found that the GM and their non-GM counterparts are nutritionally equivalent.”

– American Association for the Advancement of Science

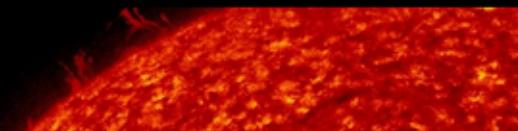
AMERICA



1 In 4 Americans Thinks The Sun Goes Around The Earth, Survey Says

February 14, 2014 · 5:55 PM ET

SCOTT NEUMAN



Just over half understood that antibiotics are not effective against viruses.

The Washington Post
Democracy Dies in Darkness

The Volokh Conspiracy

Science study: Republicans struggle with evolution, Democrats struggle with the Earth going around the Sun

Only 55% of Americans could correctly answer that the Earth revolves around the Sun AND that it takes 1 year to do so.

Only 48% of Americans could correctly answer that species have evolved.

Appendix table 7-9

Correct answers to factual knowledge questions in physical and biological sciences: 1988–2012

(Percent)

Question	1988 (n = 2,041)	1990 (n = 2,005)	1992 (n = 1,995)	1995 (n = 2,006)	1997 (n = 2,000)	1999 (n = 1,882)	2001 (n = 1,574)	2004 (n = 2,025)	2006 (n = 1,864)	2008 (n = 2,021)	2010 (n = 1,932)	2012 (n = 2,256)
Physical science												
1. The center of the Earth is very hot. (True)	80	79	81	78	82	80	80	78	80	84	84	84
2. The continents on which we live have been moving their locations for millions of years and will continue to move in the future. (True)	80	77	79	78	78	80	79	77	80	78	80	83
3a. Does the Earth go around the Sun, or does the Sun go around the Earth? (Earth around Sun)	73	73	71	73	73	72	75	71	76	72	73	74
3b. How long does it take for the Earth to go around the Sun? (One year) ^a	45	48	46	47	48	49	54	NA	55	52	52	55
4. All radioactivity is man-made. (False)	65	63	73	72	71	71	76	73	70	71	67	72
5. Electrons are smaller than atoms. (True)	43	41	46	44	43	46	48	45	53	54	51	53
6. Lasers work by focusing sound waves. (False)	36	37	37	40	39	43	45	42	45	49	47	47
7. The universe began with a huge explosion. (True) ^b	54	32	38	35	32	33	33	33	33	38	38	39
Biological science												
1a. It is the father's gene that decides whether the baby is a boy or a girl. (True) ^c	NA	NA	65	64	62	66	65	62	64	62	61	63
1b. It is the mother's gene that decides whether the baby is a boy or a girl. (False) ^d	NA	72	NA	NA								
2. Antibiotics kill viruses as well as bacteria. (False)	25	30	35	40	43	45	51	54	56	54	50	51
3. Human beings, as we know them today, developed from earlier species of animals. (True) ^b	46	45	45	44	44	45	53	42	43	46	47	48

NA = not available, question not asked.

^aQuestion was asked only of survey respondents who answered correctly that the Earth goes around the Sun. Individuals who responded incorrectly that the Sun goes around the Earth also count as having responded incorrectly to the question on the length of the Earth's revolution around the Sun.

^bQuestion was asked of 1,558 survey respondents in 2004 and 1,152 respondents in 2012.

^cQuestion was asked of 1,506 survey respondents in 2008.

^dQuestion was asked of 515 survey respondents in 2008.

NOTE: "Don't know" responses and refusals to respond count as incorrect.

SOURCES: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Public Attitudes Toward and Understanding of Science and Technology (1988–2001); University of Michigan, Survey of Consumer Attitudes (2004); University of Chicago, National Opinion Research Center, General Social Survey (2006–12).

Flat Earth Proponents



