



Position Statement on Genetically Engineered Food

Health Care Without Harm opposes the production and marketing of genetically engineered (GE) foods. These foods are not adequately assessed for their credible adverse effects on human or animal health, or on the environment in which they are produced. Also of concern is the threat posed by genetic engineering to environmentally sustainable food production and the threat to the economic livelihood of farmers pursuing sustainable food production.

We therefore encourage health care providers to purchase non-GE foods to the extent possible and to source from suppliers that demonstrate a strong commitment to alternatives to GE food, and that support local farmers and sustainable practices.

Background

For about a decade,¹ companies have introduced genetically engineered (GE) foods into the marketplace. Going beyond traditional breeding, GE technologies artificially manipulate and transfer a new range of genetic material into the food supply, producing foods that would not otherwise occur in nature. Most GE crops are used for animal feed, but food industry figures suggest that up to 70 percent of packaged foods in U.S. supermarkets may contain ingredients from GE corn, soy, or canola.² Americans therefore consume GE foods absent adequate studies to assure that there will be no adverse impacts on human or animal health or on the environment.

Outside the U.S., the situation is very different. Dozens of countries, including all of the E.U., Japan, Russia, China, Australia and many others require labels on GE food. In Europe, traceability of GE crops from the farm to the final product is also required. In January 2005, the Parliamentary Assembly of the Council of Europe noted the health and safety issues around GE crops and lack of studies assessing these threats, stating that “the health risks to humans (allergies, nutritional effects, etc) so far have hardly been examined ... (and) there is as yet no reliable information concerning their medium- and long-term environmental effects.”³

Human Health Concerns

Few long-term studies have been conducted to assure that production and consumption of GE foods will carry no adverse long-term health impacts. A 2003 peer-reviewed literature search found just ten published studies specifically designed to assess the potential for health effects from GE foods or feed.⁴ For hospitals, patient health is of particular concern, since some patients may be more vulnerable to possible problems from GE foods than the general public. For example, full digestion of proteins decreases the likelihood they will survive to produce harm (via direct toxicity or allergenicity), whereas digestive function is sometimes compromised in hospital patients. The immune system in such patients may also be compromised, making them more generally susceptible to harm.

Allergies: Genetic engineering moves proteins novel to the human diet into the food supply. One study showed that a gene from a Brazil nut, when transferred to a soybean, could cause adverse reactions in people with nut allergies if they consumed the GE soy.⁵ An editorial in the *New England Journal of Medicine* noted that unlike gene donors used in most GE crops, Brazil nuts are a known allergen. For the majority of GE crops, the editorial noted, novel genes are not fully assessed for allergenicity, stating that, “Because FDA requirements do not apply to foods that are rarely allergenic or to donor organisms of unknown allergenicity, the policy would appear to favor industry over consumer protection.”⁶

Antibiotic Resistance: Most genetically engineered foods in production today carry fully functioning genes that confer resistance to one or more antibiotics, inserted in order to help identify those cells that have successfully taken up the foreign genes.⁷ The British Medical Association, World Health Organization and other medical authorities have called for action to eliminate the use of antibiotic resistance genes in GE crops.⁸

Consistent with what is known about the spread of antibiotic resistance is the concern that genes or other determinants of antibiotic resistance could occur from GE plants to bacteria living in the animal or human gut,^{9,10} where they might be furthered transferred to unrelated bacteria. Concerns have been raised that people eating

GE foods while taking prescribed antibiotics could find the therapeutic effectiveness of the latter blunted by the former.¹¹ Transfer of antibiotic resistance can also occur in the environment, from GE plants to pathogenic bacteria carrying that resistance to humans.^{12,13}

Toxicity: Genetic engineering can unpredictably increase levels of a naturally occurring toxin in foods, or create foods that include a toxin that does not normally occur.¹⁴ Unexpected changes in food are common with genetic engineering,¹⁵ and the existing inadequate safety evaluations could miss potentially toxic changes.¹⁶

Contamination of Organic and Natural Food: Over 100 incidents have been documented involving GE material contaminating foodstocks produced without GE technology, and/or illegally entering the food or feed supply.¹⁷ In at least two cases, animal drugs unapproved by the FDA and grown in GE pharmaceutical (pharm) crops have contaminated natural crops destined for the food supply.¹⁸ Such pharm crops are still widely grown, even though a National Academy of Sciences expert committee warned in 2002 that pharm crops could cross with food crops, “with the unanticipated result of novel chemicals in the human food supply.”¹⁹

Cloned and GE Animals: Currently food products from cloned or GE animals are in development, and the biotechnology industry hopes to market poultry, pork, beef, milk and other foods from such animals in the near future. But since they create difficult pregnancies and many deformed animals for every “successful” birth, these technologies are inherently cruel to animals. Many scientists now believe that cloning may cause inherent defects that may be unpredictable, undetectable, and could cause food safety concerns. As one cloning scientist stated, “Even apparently normal clones have an abnormal regulation of many genes.”²⁰

Threats to Environmental Sustainability and Social Responsibility

HCWH promotes the purchase of healthy food that is socially responsible and environmentally sustainable. Based on existing science, the purchase and use of GE foods violates these principles.

Increased Herbicide Use: While industry claims GE crops reduce pesticide use, a 2004 analysis found the opposite. Chuck Benbrook, the former Director of the National Academy of Sciences’ Agricultural Board estimated adoption of GE crops actually has resulted in a 122 million pound increase in pesticide use in the U.S. since 1996.²¹ Scientists have found weeds are developing resistance to herbicides used with GE crops,²² and warn that resistant weeds are requiring farmers to use higher application rates of herbicides and/or more toxic

chemicals,²³ with potentially more toxins tainting our food and the environment.

Threats to Non-target Species and Soil Ecology: Lab studies and field trials have suggested that GE crops could harm butterflies and other insects, other wildlife, and soil ecology.²⁴

Threats to Organic Farming: Like weed resistance, insect resistance to GE crops is also a concern. GE insect resistant crops produce an insect toxin, Bt, which has been safely used by farmers for decades. A natural bacteria-derived insecticide, Bt has been called the world’s most important biological insecticide, and is permitted as an emergency pest control in organic farming. Once insects evolve resistance to engineered Bt crops, organic farmers who rely on Bt sprays could face uncontrollable infestations.²⁵

Conclusion

Based on plausible and credible evidence of risks to human and animal health and to ecosystems, unresolved uncertainties about the full scope and scale of those risks, and concerns about threats to sustainable food production from genetic engineering, HCWH encourages health care providers to take precautionary action by requesting and preferentially purchasing non-GE foods from suppliers.

Since GE foods in the U.S. are not labeled, hospital food service providers face challenges in avoiding them. Nonetheless, hospitals can take steps to minimize their use of GE foods, increase purchasing of organic food (which are made without ingredients from GE crops, under USDA national organic standards), and can request that their suppliers avoid GE foods. Hospitals can also urge policymakers to support food and agricultural regulations that protect the natural food supply, promote non-GE alternatives, and require labeling of GE foods.

Some specific steps hospitals can take include:

- Surveying suppliers: hospitals can let their food suppliers know that they are interested in sourcing non-GE foods, and can ask suppliers about the availability of organic or non-GE alternatives.
- Buying local: Direct relationships with farmers and other food purveyors can bring hospitals more control over the source of food, including whether the food was produced from gene altered seed.
- Avoiding common GE ingredients: most GE foods are from three main crops: soy, corn, and canola. Hospitals can look for least-processed products with fewer such ingredients. Buying organic food also insures against the use of GE crops, as USDA organic standards preclude the use of GE seeds.
- Lobbying for regulations on pharm crops: As the target customers for the products of pharming, the health care industry can play a key role in demanding

regulations that will protect the food supply and require strict safety rules. These should include restrictions against using food crops in pharmaceutical production, and a requirement for closed, indoor cultivation of all pharm plants.

- Lobbying against the approval of food from cloned or GE animals: Hospitals should join animal welfare, environmental, and consumer advocates in urging legislators to ban the marketing of food products from cloned and GE animals.

ENDNOTES

- 1 The first genetically engineered crop marketed in the U.S. was the Flavr Savr tomato in 1994. Genetically engineered soy marketed in 1996 was the first introduction of a GE crop that became widely grown.
- 2 Bill Lambrecht, Dinner at the New Gene Café, St. Martin Press, 2001; Associated Press, "US Sour on EU Biofood Vote," July 4, 2003, online at <http://www.cbsnews.com/stories/2003/06/25/tech/main560287.shtml>.
- 3 The Parliamentary Assembly of the Council of Europe, Genetically Modified Organisms (GMOs) Resolution 1419 (2005), online at http://www.gmofree-europe.org/PDFs/Council_of_Europe.pdf
- 4 I.F. Pryme and R. Lembcke, 2003. "In vivo studies on possible health consequences of genetically modified food and feed--with particular regard to ingredients consisting of genetically modified plant materials." *Nutrition and Health* 17: 1-8
- 5 Nordlee, J.A., Taylor, S.L., Townsend, J.A., Thomas, L.A. and R.K. Bush. 1996. Identification of a brazil-nut allergen in transgenic soybeans. *The New England Journal of Medicine* , 334(11): 688-692.
- 6 Nestle, M. 1996. Allergies to Transgenic Foods -- Questions of Policy. *N Engl J Med* 334(11): 726-728.
- 7 The Union of Concerned Scientists describes the use and risks of antibiotic resistance genes in GE crops, see http://www.ucsusa.org/food_and_environment/genetic_engineering/risks-of-genetic-engineering.html; see also Friends of the Earth 1999. Briefing, "Antibiotic Resistance Genes in GM Foods, April, online at http://www.foe.co.uk/resource/briefings/antibiotic_resistant_genes.html#Footref3.
- 8 British Medical Association, 1999. "The Impact of Genetic Modification on Agriculture, Food and Health," Interim Statement, May; "Submission of the British Medical Association, to the Health and Community Care Committee, On The Health Impact Of Gm Crop Trials," November 2002; According to the WHO "20 questions on genetically modified foods," online at <http://www.who.int/foodsafety/publications/biotech/20questions/en/>: "the use of [GE food] technology without antibiotic resistance genes has been encouraged by a recent FAO/WHO expert panel"; EU Scientific Steering Committee, 1999. Opinion on AntiMicrobial Resistance, May 28, online at http://europa.eu.int/comm/food/fs/sc/ssc/out50_en.pdf ; Royal Society of Canada, 2001. "Elements of Precaution: Recommendations for the Regulation of Food Biotechnology in Canada."
- 9 Tappeser, B., Jäger, M., and Eckelkamp, C., 1998. "Survival, Persistence, Transfer - An Update on Current Knowledge on GMOs and the Fate of their Recombinant DNA," study commissioned by the German Environmental Protection Agency, Institute For Applied Ecology, Freiburg, Germany, online summary article at <http://online.sfsu.edu/~rone/GEessays/Survival%20PersistenceTransfer.htm>.
- 10 A study with a model gut found that DNA from GE crops survived digestion long enough to confer resistance to bacteria: J. van der Vossen, et.al., 1998. "Development and application of an in vitro intestinal tract model for safety evaluation of genetically modified foods" in Food Safety Evaluation of Genetically Modified Foods as a Basis for Market Introduction, pp.81-99. Ministry of Economic Affairs, P.O. Box 20101, 2500 EC The Hague, The Netherlands.
- 11 T. Netherwood, et.al., 2004. "Assessing the survival of transgenic plant DNA in the human gastrointestinal tract." *Nat Biotechnol* 22, pp. 204-209; also, John Heritage, 2004. "The fate of transgenes in the human gut." *Nat Biotechnol* 22, pp. 170-72. In addition, a laboratory study has shown gene transfer from a genetically modified micro-organism to bacteria in the intestine of insects can occur: C. Tebbe, et. al., (1994) Überleben der Untersuchungsstäme und Persistenz ihrer rekombinanten DNA. *BioEngineering* 6/94, pp.14-21. FDA has acknowledged this problem, suggesting only that "...advice could be provided that the antibiotic likely to be affected should not be taken together with food": U.S. Food and Drug Administration, Guidance for Industry: Use of Antibiotic Resistance Marker Genes in Transgenic Plants. Draft guidance for comment, September 4, 1998, online at <http://www.cfsan.fda.gov/~dms/opa-armg.html>
- 12 Widmer, R.J. Seidler and L.S. Watrud. 1996. "Sensitive detection of transgenic plant marker gene persistence in soil microcosms" *Molecular Ecology*. 5, pp. 603-613. This study found that antibiotic resistance genes from GE tobacco survived in soil for 4 months.
- 13 Gebhard, F., and Smalla, K. 1998. "Transformation of Acinetobacter sp. Strain BD413 by Transgenic Sugar Beet DNA". *Applied Environmental Microbiology*, pp. 1550-1554, Vol 64, No. 4. This lab study demonstrated that soil bacteria can acquire antibiotic resistance genes from a GE plant.
- 14 Inose, T. and K. Murata. 1995. Enhanced accumulation of toxic compound in yeast cells having high glycolytic activity: A case study on the safety of genetically engineered yeast. *International Journal of Food Science and Technology*, 30: 141-146; V.P. Grichko, et.al., 2000. "Increased ability of transgenic plants expressing the bacterial enzyme ACC deaminase to accumulate Cd, Co, Cu, Ni, Pb, and Zn." *J. Biotechnology*, Jul 28; 81(1): pp. 45-53
- 15 Gurian-Sherman, D., "Unintended Effects of Genetically Engineered Food Plants," Center for Food Safety, July 26, 2004, online at http://www.centerforfoodsafety.org/pubs/Briefing_Unintended_Effects7.26.2004.pdf
- 16 National Academy of Sciences 2000. p. 69, online at <http://darwin.nap.edu/books/0309069300/html/69.html>; EPA FIFRA Scientific Advisory Panel No. 2000-03, September 28, 2000, p. 12.
- 17 See http://www.gmcontaminationregister.org/index.php?content=nw_detail1
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- 23 Ohio State University Extension and Purdue University Extension News, "Fighting Weeds in Biotech Crops Takes Skill," February 18, 2000 online at <http://www.agriculture.purdue.edu/agcomm/aganswers/story.asp?storyID=2167>; Chemicals suggested for use with RR crops on the site or from other sources include paraquat (a chemical banned in much of Europe), 2,4-D (banned in five countries), alachlor (not approved or banned in much of Europe), and others, see "Monsanto and University of Missouri Investigate Case of Difficult To Control Waterhemp In Missouri," press release, Sept. 23, 2005 at http://www.weedresistancemanagement.com/layout/press_releases/09-23-05.asp ; Boyd Kidwell, "Ground Zero for the War on Resistant Weeds," June 26, 2005, online on Monsanto website at http://www.weedresistancemanagement.com/layout/weed_management/wm_oi_ground_zero.asp; Adrea Johnson, "Research Shows Value of Pre-Emergent Herbicide in Glyphosate Systems," July 7, 2005, *Farm & ranch guide*, online On Monsanto website at <http://www.monsanto.com/monsanto/layout/media/05/10-03-05.asp>; Monsanto and University of Missouri Investigate Case of Difficult To Control Waterhemp In Missouri, Sept. 23, 2005 at http://www.weedresistancemanagement.com/layout/press_releases/09-23-05.asp; see also Larry Steckel, University of Tennessee, quoted in Andrew Burchett, "Glyphosate Resistant Weeds On the Move," *Farm Journal*, 9/28/05.
- 24 EPA FIFRA Scientific Advisory Panel, SAP Report No. 99-06, February 4, 2000, online at <http://www.epa.gov/scipoly/sap/1999/december/report.pdf>; A. Watkinson, et.al., "Predictions of Biodiversity Response to Genetically Modified Herbicide-Tolerant Crops." 2000. *Science*, vol. 289, September, pp. 1554-57; J. Losey, et.al., 1999. "Transgenic pollen harms monarch larvae." *Nature* 399:214 (for more on Bt and monarch butterflies, see http://www.biotech-info.net/butterflies_btcorn.html); Angelika Hilbeck, et.al., "Review of Non-target organisms and Bt-plants." Report to Greenpeace, April 2000; Threats to Soil ecology: Two studies have found adverse impacts from GE soybeans on soy root formation and nitrogen fixation, see Hoagland, R.E., Reddy, K.N., and R.M. Zablotowicz, 1999. "Effects of glyphosate on Bradyrhizobium japonicum interactions in Roundup-Ready soybeans," *Weed Science Society of America Annual Meeting Abstracts*, Vol. 39. Accessible at: <http://www.biotech-info.net/bradyrhizobium.html> , and King, C., Purcell, L., and E. Vories, 2001. "Plant growth and nitrogenase activity of glyphosate-tolerant soybeans in response to foliar application," *Agronomy Journal*, Vol. 93: 179-186, online at <http://agron.scijournals.org/cgi/content/full/93/1/179>
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