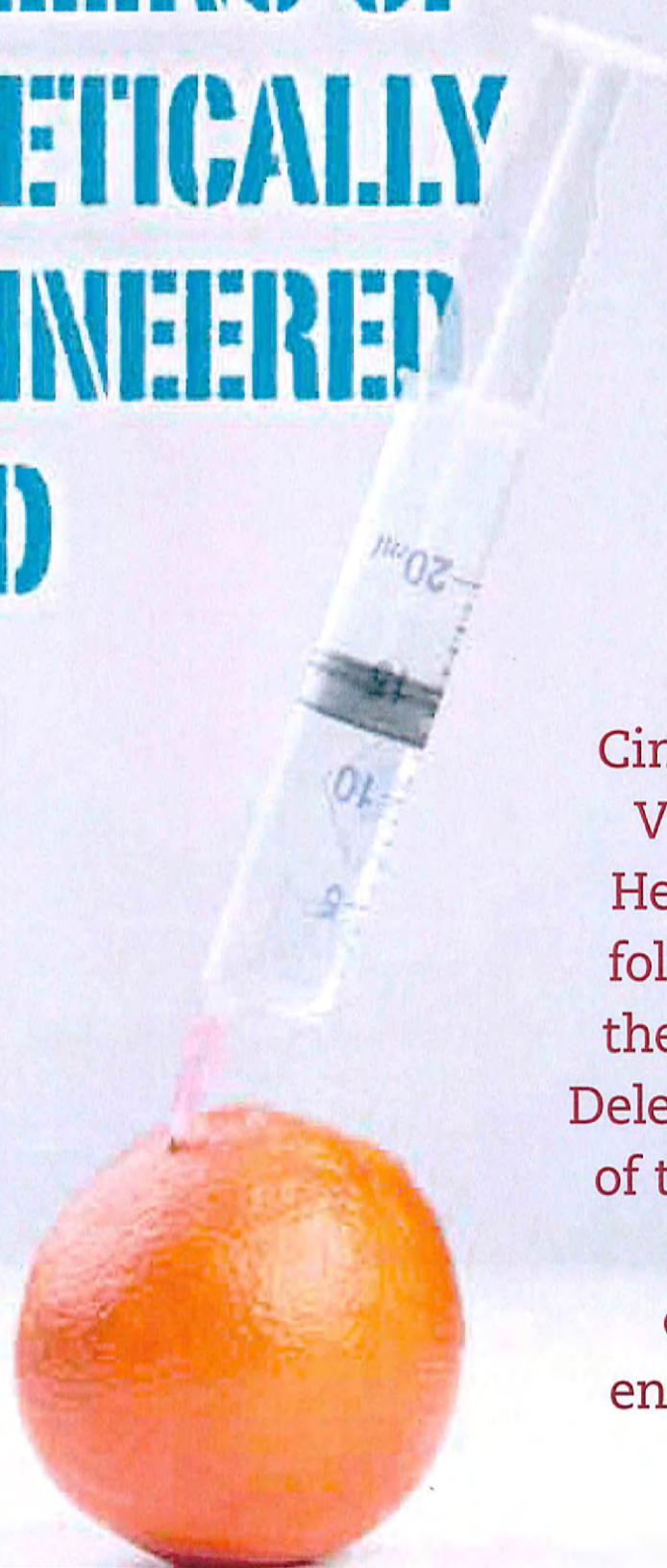


# LABELING OF GENETICALLY ENGINEERED FOOD



Cindy Russell, MD,  
VP-Community  
Health, wrote the  
following letter to  
the AMA House of  
Delegates, in support  
of their resolutions  
on labeling  
of genetically  
engineered foods.



Date: June 3, 2012

Dear AMA Reference Committee:

I am writing a letter in support of an AMA position to call for mandatory labeling of genetically engineered foods, mandatory independent testing of genetically modified foods and as testimony regarding Resolution #508A-11, introduced by the Illinois Delegation, and Resolution #509A-11, introduced by the Indiana Delegation.

I am the author of the California Medical Association House of Delegate Resolution in 2002 to ask for labeling of genetically modified foods. Even 10 years ago, there was insufficient scientific evidence to consider genetically modified foods as safe for long-term human or animal consumption. It is no different today. Although industry reports adequate safety testing, independent peer-reviewed studies show there is evidence of potential adverse health effects as well as environmental effects of GMOs. (18)(19)(20)(21)(39)(40) Some scientists question the validity of current in vitro allergy testing and call for more rigorous long-term animal studies. (8) Reports of acute effects of GMO crops to humans and animals have also been documented. (14)(44)

Physicians and public health experts have reason to be concerned and ask the AMA to take action to address this issue, as genetically modified organisms (GMOs), by definition, create novel allergens and potential new pathogens. (29) Gene expression in GMOs can be altered as well, in ways we have yet to fully understand. Because 70%–80% of the population is exposed to GMOs in the food supply, this magnifies the public health risk of adverse effects, even if there is only a small percentage of sensitive individuals.

**Public health concerns with genetically modified foods include the following:**

- Allergenicity and increasing food intolerances with inadequate testing of novel GMOs (8)(23)(24)(25)(26)(27) (28)(36)(54)
- Inadequate testing of reproductive or developmental effects (11)(60)
- Adverse effects of unusual human/plant GMOs (35)(56)(57)(58)(59)
- Spread of antibiotic-resistant genes (9)(49)
- Adverse effects on nutritional value (25)
- Transfer of genetically modified DNA to gut bacteria (10)(31)(41)(48)
- Increase in pesticide use and levels in humans (11)(33)(45)(50)(51)(52)(53)
- Maternal transfer of genetically modified DNA to fetal bloodstream (12)
- Multigenerational reproductive toxicity (12)(13)(16)
- Toxicity to liver, kidney, adrenal, immune system (14) (15) (16)

In addition, there are concerns expressed by experienced-based farmers including toxicity of crops to livestock, increasing resistance of GM crops to pesticides, increased dependency on more toxic pesticides, reduction of biodiversity of crops, harm to beneficial insects, unwanted spread of genetically modified plants to organic crops or forests, transfer of GM traits to soil and native plants, food security, and seed saving ability. (18)(19)(21)(30)(31)(32)(33)(34)(38)(45)(46)(47)

GMO food labeling, as well as valid independent pre- and post-mar-

ket testing, is necessary for public health officials, physicians, and their patients to be able to identify and monitor adverse reactions of GMOs, as well as for personal choice. The Food Allergen Labeling and Consumer Protection Act of 2004 requires packaged foods to list major allergens such as tree nuts, wheat, and soybeans, as well as colorings or flavorings that may be allergenic. (5) The USDA also requires food labeling to provide general information desired by consumers such as fat, sugar, protein, total calories, fiber, and vitamins. This allows the consumer to make individual choices about the food they eat. (6) (7) Most consumers wish to have GMOs labeled as such. Over 40 countries already require labeling of genetically modified foods including the EU, Japan, Australia, Brazil, and China. Whether or not one believes there are safety concerns, it is both sensible and responsible for physicians to ask for both accurate labeling of GM foods, as well as independent pre- and post-market testing of genetically engineered crops.

**Genetically Modified Foods Are Different**

Genetically modified foods are profoundly different than conventional foods in how they are developed. They are legally patented as different. Genes are literally forced into cells by three different methods. The location of the desired genes is unpredictable. In addition, genetic expression and gene interaction on the entire cell or organism is unpredictable. The engineering is random and not precise, as we are led to believe. We also know that there is not one gene trait interaction for most processes directed by DNA. One gene trait may require several other genes in order for the organism to fully express a desired trait or to function in a certain environment.

We do not fully understand these complex interactions of DNA, and its co-worker mRNA, on other genes. Scientists have discovered and are studying a new level of complexity in the genome called epigenetics. Developmental biologists have found that the inherited expression of DNA can be altered not by nucleotides as we have been traditionally taught, but also by processes including “methylation” of the DNA, mRNA effects, and conformational changes in protein structure. The new inherited mutations affect whether a gene will be over expressed or under expressed, or even be functional. These important genetic changes are not investigated by industry prior to commercialization of GMOs. One study of these effects, in Australia, found that the added genes in the GM crop were “methylated” and this was what was felt to be causing the toxicity of the GM PEA to rat kidney and liver. Epigenetic changes appear to be causing inherited metabolic syndrome in children whose parents are obese or have diabetes. (1) (2) (3) (4)

In addition, the DNA in genetically modified organisms is not stable and can mutate with different effects on function, nutritional value, and toxicity. This may account for reports of acute human toxicity of some GM crops when pollinating.

The gene cassette incorporated into the new GMO cell consists of the DNA for the desired trait, an antibiotic resistant gene, and promoter genes. Newer crops now contain genes that turn off reproduction, the “terminator technology.” This combination of genetic material undergoes changes as it is pushed into the gene into an unknown area of the chromosome and is further altered by the cells’ growth in tissue culture. Gene expression (temperature tolerance, yields, toxin production, pesticide production) may be altered depending on the location of the genes insertion on the chromosome.

Physicians are particularly concerned with what appears to be an increase in food allergies and food intolerances. The desired trait may be expressed, but the protein produced by a GMO is truly a novel protein.

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# Labeling of Genetically Engineered Food, from page 51

Testing of GMOs is currently performed on the new DNA code to determine if there is any DNA which is similar to common allergens such as soy or peanut. This testing is inadequate to fully know how the insertion of the genes affects the plant or animal DNA and whether or not epigenetic changes have occurred that would also affect the allergenicity of the GM crop. Scientists have called for more accurate allergy testing with rat models, prior to commercial introduction of the GM crop. (8)

The introduction of antibiotic resistant genes is particularly troubling as we are seeing a dramatic rise in antibiotic resistance. It has now been demonstrated that DNA from GMOs can be transferred to soil and gut bacteria via horizontal transfer.

Genetically engineered crops are novel synthetically-created foods and thus require advanced methods of safety assessment and labeling in order to protect humans and livestock, as well as the complex and fragile environment upon which we all depend.

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