

TOXIC *corn:*

**SUMMARY OF NEW SCIENTIFIC EVIDENCE
ON THE HEALTH DANGERS POSED BY
GENETICALLY ENGINEERED FOOD**

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GREENPEACE

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Executive Summary

Greenpeace respectfully submits the following recommendations to George Abbott, Minister of Health, as part of the ongoing BC Conversation on Health public dialogue. Greenpeace is an international, independent environmental organization with 80,000 supporters across Canada, dedicated to protecting the environment. Greenpeace has been active in campaigning on the issue of genetically engineered (GE) organisms in the environment and in the human food chain for ten years. We draw the attention of the Minister to a growing body of evidence linking genetic engineering to serious health and environmental risks. Our recommendations echo those of the Provincial Health Officer's 2005 Annual Report regarding GE food. Namely, we ask the Minister to create legislation for the mandatory labelling of genetically engineered food. We also encourage the Minister to work with his federal and provincial counterparts to ensure that the 58 recommendations of the 2001 Royal Society of Canada expert panel report "Elements of Precaution: Recommendations for the Regulation of Food Biotechnology in Canada" are implemented. In the longer term, we encourage the government of B.C. to develop a policy framework to make B.C. a global leader in health, by becoming GE-free in time for the 2010 Olympics.

Recent studies on several varieties of GE organisms grown or sold in Canada and in British Columbia offer indications that food made with GE ingredients should not be considered equivalent to food made from conventional sources. Studies of feeding trials on rats concerning two different types of genetically engineered corn, MON863 and NK603, both of which are grown in Canada and are present in the B.C. food supply, show signs of toxicity resulting in the subjects, including liver and kidney problems in the rats fed GE corn as well as differences in growth rates between rats fed GE corn and those fed conventional corn. Additionally, a study on a third variety of GE corn, MON810, also grown in Canada, found that salmon fed this GE corn showed signs of liver stress and altered white cell populations, indicative of an immune response taking place as a result of the GE corn in their diet. Together these studies provide a clear

warning of the potential risks British Columbians face from a diet containing unknown, unlabelled and uncontrolled genetically engineered ingredients.

Genetically engineered organisms have no place in the food supply of British Columbians. GE food poses unnecessary risks to human health, biodiversity and the environment. Genetic engineering is based on imprecise science that has been surpassed and outdated by modern advances in agronomy and genetics. At a minimum, British Columbians want the right to know what is in the food they consume and feed to their families, so that they can avoid potentially dangerous GE ingredients. According to a recent poll, 79 per cent of British Columbians want mandatory labelling of GE foods before the next provincial election. We expect the Minister to take seriously these concerns of the overwhelming majority of the B.C. population.

Greenpeace thanks the Minister for providing this forum, Conversation on Health, in B.C. We look forward to the Minister's response to our suggestions on genetically engineered food and health. Like the vast majority of British Columbians, we look forward to the Minister taking action and making B.C. a leader in providing healthy food choices for British Columbians via the imposition of mandatory labelling of GE foods.

What is GE Food?

Genetic engineering refers to the use of techniques of modern biotechnology such as recombinant DNA or cell fusion that overcome the natural reproductive barriers in order to artificially move genetic material between species.¹ Genetic engineering allows scientists to take the DNA from one organism, such as a bacterium or a salmon, and insert it into another, such as a tomato or a corn plant, creating a transgenic, or genetically engineered (GE), organism (also known as a genetically modified organism—GMO). The results are not found in nature and cannot be achieved by traditional cross-breeding techniques. GE food includes whole foods, such as genetically engineered papaya, but most GE food

substances in Canada are found in processed foods, where one or more of the ingredients may be derived from GE organisms. The most common GE crops globally are corn, soy, canola and cotton. These crops are processed into a wide variety of ingredients, including corn starch, soy protein, canola oil and cottonseed oil, which are found in approximately 70 per cent of the processed food sold in Canadian grocery stores.

The first applications of genetic engineering took place in the 1970s when scientists discovered mechanisms for transferring genetic material from one organism to another. By 1995, the first commercial application was approved in Canada: a delayed-ripening tomato that its developers marketed as a “Tomato Flavr Savr.” Although this particular product was a commercial failure, it paved the way for the approval for dozens of other GE crops in Canada over the next 12 years. Today there are 56 GE varieties with Health Canada Food Safety approval.² Of these, the vast majority are engineered to be tolerant to specific herbicides (37) or to produce their own insecticides (24), or have a combination of these two characteristics. Recently, seed companies have begun selling products that produce multiple insecticides as well as having herbicide resistance.³

Public Input and Scientific Criticism of GE Foods

The emergence of GE food in Canada has been met with resistance and scepticism as to its benefits and safety. Overwhelmingly and consistently, Canadians have responded to polls and to public input processes held by federal and provincial levels of government by saying that they do not want GE food, and if GE food is to be allowed, it needs to be labelled so that consumers have the right to avoid it.⁴ In British Columbia, the most recent poll conducted in December 2006 showed 79 per cent of voters want GE food labelled before the next provincial election in 2009. Previously, in 2001, a public input process held by the newly elected Liberal government received 99.1 per cent support for

mandatory GE labelling legislation, among the 891 groups and individuals who made submissions.⁵

Five years after the introduction of GE foods in Canada, the federal government convened an expert panel of the Royal Society of Canada, a group of pre-eminent scientists in the fields of biology, and biotechnology, to assess the regulatory process and capacity for biotechnology in Canada. Its report, *Elements of Precaution: Recommendations for the Regulation of Food Biotechnology in Canada*, was released in 2001 and made 58 recommendations for improvement of GE regulation in Canada. Among its conclusions, it expressed concerns for “the prospect of serious risks to human health, of extensive irremediable disruptions to the natural ecosystems, or of serious diminution of biodiversity... Approval of products with these potentially serious risks should await the reduction of scientific uncertainty to minimum levels.”⁶ In particular, it criticised the regulatory process for relying on an unscientific concept of substantial equivalence rather than a “rigorous scientific assessment of their potential for causing harm to the environment or to human health.”⁷ Since 2001, there has been “minimal” progress on the vast majority of their recommendations,⁸ leaving British Columbians vulnerable to health and environmental risks from GE foods which have never been subject to scientific testing.

Recent awareness of the paramount importance of proper diet underlines the potential risks to health British Columbians face from unlabelled GE foods. The most recent Provincial Health Officer (PHO) annual report, *Food Health and Well-Being in British Columbia*, begins by noting “Food is a prerequisite and determinant of health.”⁹ The report goes on raise concerns about the dangers of genetically engineered foods:

Concerns over the use of genetically modified organisms include the transfer of allergenic proteins to unrelated foods, augmentation of natural toxicities in foods, transfer of genes that confer antibiotic resistance, and outcrossing, which is the inadvertent mixing of genetically modified genes with wild related species.¹⁰

The report raises the possibility that biotechnology can introduce proteins, to which some individuals may have potentially fatal allergies, into foods that were previously free of these allergens. The PHO report makes the following recommendations to government:

- Endorse the Royal Society of Canada's recommendations on genetically modified foods (see Appendix A of this document).
- Labelling should be provided on all genetically modified foods to allow for consumer's choice.¹¹

Greenpeace supports these recommendations as minimal immediate steps towards providing a healthier, safer food environment for all British Columbians. Greenpeace also supports the removal of GE organisms from the food supply and from the environment. We encourage the government of B.C. to develop a policy framework to make the province a global leader in health, by becoming GE-free in time for the 2010 Olympics. Other provincial health bodies, including the Ontario Public Health Association¹² and the Quebec National Public Health Institute,¹³ have also made very similar recommendations.

New Scientific Evidence on Risks of GE Foods

When genetically engineered organisms first entered the Canadian food system and environment in the late 1990s, there was almost no scientific evidence regarding their safety. Environmental groups such as Greenpeace argued that in the absence of certainty, the precautionary principle should apply. The precautionary principle holds that in the face of threats to the environment or human health that are serious or irreversible, society should take a cautious approach, even in the absence of availability of a full risk assessment or scientific evaluation.¹⁴ The Royal Society of Canada, in its report *Elements of Precaution: Recommendations for the Regulation of Food Biotechnology in Canada*, agreed that genetically engineered organisms represented a case where a precautionary approach was warranted. Due to the self-reproducing nature of GE organisms,

the risks associated with them have an unlimited capacity to spread exponentially. For ten years, Greenpeace has argued that GE organisms should not be released into the food chain or into the environment.

Most recently, a series of studies has given a more concrete picture of the potential health dangers posed by consuming GE food. Studies outlined here have been conducted by independent researchers. Much of the recent research on health risks of GE food has been published in peer-reviewed scientific journals. The following sections of this report concentrate on the emerging body of evidence on the risks associated with GE corn.

Monsanto corn MON863

In May 2007, *Archives of Environmental Toxicology and Contamination* published one of the first studies linking a commercialized GE crop to health problems in mammals.¹⁵ The study, authored by researchers from the Committee for Independent Research and Information on Genetic Engineering (*Comité de Recherche et d'Information Indépendantes sur le Génie Génétique*—CRIIGen) re-analyzed safety tests from rat-feeding trials of a GE corn submitted by Monsanto to European regulatory authorities. Despite Monsanto's claim that the feeding trials showed no significant differences between the GE corn and conventional corn, the independent re-analysis of the results found abnormalities in the kidneys and liver as well as differences in growth rates between the two groups.

Monsanto corn MON 863 is genetically engineered to produce an insecticide providing the plant with resistance to Western and Northern corn rootworms (*Diabrotica* spp.), pests endemic to Eastern and Central North America. It belongs to a category of GE crops called *Bt* (as in *Bt* corn), because it produces a toxin similar to a protein—Cry3b1—produced by the natural bacterium *Bacillus thuringiensis* (*Bt*). *Bt* bacteria in small doses acts as a natural insecticide and has been used for decades by organic farmers to deal with sporadic infestations

of certain agricultural pests. Monsanto hoped to confer these properties of resistance to MON863.

Genes to produce the insecticidal protein Cry3b1 as well as a gene conferring antibiotic resistance were introduced to a line of conventional (i.e., non-GE) corn, A634, by means of particle bombardment. MON863 differs from other *Bt* corn marketed in Canada (MON 810, *Bt* 11, *Bt* 176) in that these earlier varieties produced a slightly different toxin which targeted the European corn borer (*Ostrinia nubilalis*). MON863 was approved for unconfined release in Canada in March 2003. This means that it can be grown anywhere in Canada where corn is normally grown. Health Canada approved MON863 for human consumption two weeks later.

By the time MON863 received approval in Canada, warning signs were appearing across the Atlantic. In September 2002, experts at the French Genetic Engineering Commission began raising critical questions regarding the test data derived from Monsanto's rat feeding study with MON863. German authorities similarly published warnings that the Cry3b1 protein possesses similarities to other toxins which were of high relevance to human health. For the next two years, Greenpeace worked with independent researchers and activists in Europe to obtain the release of the original test studies so that they could be submitted to independent analysis by a transparent body. Although Monsanto sought to maintain the results of the feeding trials as confidential, German authorities finally released the documents to Greenpeace in 2005. Greenpeace published these findings and turned them over to CRIIGen for independent analysis. The results of the CRIIGen analysis were published in the Arizona-based, peer-reviewed scientific journal *Archives of Environmental Contamination and Toxicology* in May 2007.

The independent scientists found "with the present data it cannot be concluded that GM corn MON863 is a safe product." After the consumption of MON863:

- **There were “*signs of toxicity*” in the liver and kidney of the test animals.** Analysis of blood, urine, liver and kidneys showed signs of disruption to kidney/liver function. The researchers conclude that “*the two main organs of detoxification, liver and kidney, have been disturbed.*”
- **Weight gain was different.** Rats showed slight but dose-related significant variations in growth for both sexes, resulting in 3.3 per cent decrease in weight for males and 3.7 per cent increase for females.¹⁶

Because the approval of MON863 in Europe was based on Monsanto’s statement that all statistical differences between the rats fed GE corn versus those fed conventional corn were not statistically meaningful, the team of independent researchers, led by Dr. Gilles-Eric Séralini from the University of Caen, sought to test the hypothesis by subjecting the test results to rigorous statistical analysis. They found a number of errors in both the results reported by Monsanto as well as in the methods of research and analysis used by the biotechnology company. Longer and more thorough research will be needed to quantify the full toxicological effects of MON863, but at this stage the balance of evidence suggests the prudence of removing this product from the human food chain.

Greenpeace has submitted copies of these results to the Canadian Food Inspection Agency (CFIA) as well as to federal, provincial and territorial Agriculture Ministers across Canada.¹⁷ At this stage, the CFIA has not indicated that it will rescind authorization for MON863. Neither has it committed to releasing publicly the technical information on which it has based its approval. We can only assume that the evidence Monsanto submitted in Europe for approving this product is similar to that in the studies it submitted in this country. In any case, the validity of the findings of the CRIIGen study holds true across borders: “it cannot be concluded that GM corn MON863 is a safe product.” Until Canadian regulatory authorities remove MON863 from the food chain, the only tool British Columbians might use to avoid eating this and other toxic GE

products is labelling. Mandatory GE labelling is an essential part of the health system for British Columbia.

Monsanto corn NK603

Subsequent to the publication of the AECT article on MON863, CRIIGen released preliminary results of another study of rat feeding trials on a type of Monsanto GE corn called NK603.¹⁸ Like the MON863 study, it was based on a re-analysis of data submitted by Monsanto to European regulatory authorities. Again, the initial results of this analysis showed dangers of toxicity in Monsanto's GE corn line NK603. There were abnormalities in the liver and kidneys of the rats fed GE corn, as well as weight differences between those rats and the rats fed conventional corn. A pattern is emerging showing the dangers of feeding GE corn to rats. Though we do not know how these results can be interpolated to human populations, the warning signs are clear.

The Monsanto corn line NK603 contains an *Agrobacterium* gene, providing the plant resistance to glyphosate, the active ingredient in Monsanto's Round Up brand herbicide. The modification enables farmers to spray herbicide on the crop throughout the growing season without damaging the productivity of the corn plants. Although NK603 was approved in Canada in 2001, there have been no long-term studies of its safety to humans.

Like MON863, NK603 was produced by a technique called particle bombardment. This technique involves shooting shards of metal with gene plasmids attached into the cell nucleus of the target organism. One particular danger of this technology is that it is impossible to predict where the genes will end up within the genome of the resulting organism. Many scientists now see this as an inherent flaw in the science behind genetic engineering as a consensus is growing that placement within the genome plays a fundamental role in gene behaviour.¹⁹

NK603 is grown in British Columbia and is widely used as silage feed for BC cows. It enters into the human food chain in every dairy product made from pooled milk supplies drawn from areas where NK603 is grown. Recent sampling of corn grown in the Fraser Valley found NK603 growing within five kilometres of certified organic farms, potentially threatening them with contamination.²⁰

Although the results of the CRIIGen study are only preliminary at this stage, they indicate a pattern of toxicity, including abnormalities in kidneys and liver that should not be ignored. The source of the data, Monsanto feeding trials used to justify the safety of the product in question, shows a further pattern of insufficient regulation of GE products in Canada, Europe and elsewhere. It can no longer be considered adequate to allow biotechnology companies like Monsanto to conduct their own safety tests and to analyze the results themselves. Moreover, it is not in the public interest for regulatory agencies, including the CFIA and Health Canada, to block public independent access to the findings on which approval of these products is based. We call for the full implementation of the Royal Society of Canada's recommendations on genetic engineering, to provide greater transparency and safer regulation of GE in Canada.

Monsanto corn MON810

In the meantime, a third study was published in the *Journal of Fish Diseases*.²¹ This time the GE corn in question was MON810. MON810 has been grown since 1997, and was one of the earlier GE crops approved in Canada. Surprisingly, in the past ten years there are no long-term studies available on the effects of GE corn in the food supply. This is the first study of salmon fed GE corn. This is a potentially significant issue in British Columbia, where a growing salmon farming industry could result in GE corn entering the human food chain through salmon feed.

Like MON863, MON810 is a *Bt* corn containing synthetic bacterium genes which enable the corn to produce an insecticide, in this case the protein Cry1A(b). This protein gives the corn greater resistance to the European corn borer, a cyclical

pest in Central and Eastern North America. The study by a team of Norwegian researchers examined five groups of salmon given feed made from different mixtures of GE and non-GE corn, with the following results:

- They found the GE “maize seemed to induce significant changes in white blood cell populations which are associated with an immune response.”²²
- As well, fish fed the GE diet showed changes in liver and intestinal activity as well as increased levels of heat shock protein.²³
- The researchers also raised concerns that insertion of new genes can alter how existing genes express themselves.²⁴

In other words, the new genes cause the original non-engineered genes to behave in new and unpredictable ways. The DNA of living organisms is much more complex than scientists previously believed. There is not a one-to-one correlation between genes and protein production. Interactions between genes affect which proteins are produced in which quantities. For British Columbians who consume salmon fed GE corn, the researchers raise concern that not all the GE DNA is broken down in the process of digestion. Some of it may remain in the fish tissue when it reaches the consumer: “Quite large transgenic DNA sequences survive feed processing and can be found in all parts of the digestive tract, and can be absorbed.”²⁵

Like the studies on MON863 and NK603, this MON810 study shows not only the limits to our knowledge on the safety of GE crops, but contributes to a growing body of evidence that GE crops may be positively harmful for consumption by other organisms. It raises questions about the predictability of GE technologies and the effects of GE feed even at lower levels in the human food chain.

It gives powerful corroboration to the concerns raised by Greenpeace and other organizations over the past ten years about the safety of GE organisms in the food supply. The Ministry of Health should move as quickly as practical to make

the B.C. food chain free of genetically engineered organisms and to provide labelling to give British Columbians the opportunity to avoid GE products.

Conclusion and Recommendations

To date there have been no long-term studies on how GE food affects human health. Given the growing evidence of how GE food affects other organisms, long-term human test trials would not be conscionable. Moreover, without mandatory labelling, epidemiological studies of genetic engineering in the food supply are impracticable.²⁶ Greenpeace makes the following recommendations to the Minister in regard to genetic engineering and human health.

1) Mandatory labelling

The vast majority of British Columbians would like to see labels identifying products which contain GE ingredients. To date, federal voluntary GE labelling legislation has failed to produce a single product anywhere in Canada labelled as containing genetically modified organisms (GMOs). The B.C. government has the power and capacity to enact mandatory labelling legislation. Such legislation has proven practical in over 40 countries around the world. Also, studies and experience have shown labelling to be affordable. The cost of GE labelling in Australia and New Zealand was equivalent to a 0.1 per cent of the cost of the total food bill in the region. Such a figure would amount to \$18 million for B.C.'s total \$18 billion food sector. A recent study in Quebec found that the cost of labelling would amount to approximately \$28 million. The vast majority of the costs estimated in this study would be borne by industry rather than government. And most of these costs have probably already been absorbed by industry through regular traceability management systems. A B.C. government study in 2001 found that costs to business in British Columbia could be as low as \$9 million.²⁷ Mandatory labelling would be a positive and affordable step in reducing British Columbians' exposure to the risks of genetically engineered foods, as outlined in this submission.

2) Royal Society of Canada recommendations

The government of B.C. can also play a role in ensuring that the recommendations of the Royal Society of Canada's expert panel report *Elements of Precaution: Recommendations for the Regulation of Food Biotechnology in Canada* are implemented. The B.C. Minister of Health should be working with his federal and provincial counterparts to ensure that there is more rigorous independent testing of GE foods grown and sold in Canada. The Minister should work to ensure the precautionary principle is implemented and GE products are not assumed to be safe until full safety tests are conducted. The concept of "substantial equivalence" should be removed as a basis for deciding the safety of GE foods, as the evidence in this submission demonstrates.

3) GE-free Olympics

British Columbia will be host to the world in 2010, on the occasion of the Olympics. Premier Gordon Campbell has committed to making B.C. a leader in world health by this date. What better way to show leadership in health than by pledging to become the first jurisdiction in North America that is GE-free. Already, a number of regions in B.C. have developed GE-free zones, including Powell River and the Southern Gulf Islands. Following on GE labelling legislation, the province could develop a long-term strategy towards removing all GE organisms from the food supply chain. Elements of this strategy would include: a ban on outdoor production of GE food in British Columbia, including outdoor field trials; mandatory labelling of GE food; an end to use of GE products in schools, hospitals and other provincial institution; as well as a requirement that all Olympic facilities provide GE-free food and beverages throughout the 2010 games. The Olympics would be a showcase for B.C.'s excellence in all aspects of health and diet.

Greenpeace thanks the Minister for the opportunity to contribute to this Conversation on Health. We look forward to future dialogue with the Minister and with the public on the issue of GE foods.

Notes

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- ¹ See OECD 2005, and Convention on Biodiversity 2007.
- ² CFIA, 2007. Note that only LMOs (living modified organisms) are considered “GE” by the international community and by Greenpeace. About 20 plants on the CFIA list are non-LMO.
- ³ CIRIGen, 2007. An example of such a “third generation” GE organism sold in Canada is the G3 line of corn marketed by Monsanto, which produces pesticides for rootworm and corn borer as well as tolerance to the Monsanto herbicide Roundup. It should be noted that there is no safety assessment available in Canada to show that combining these multiple traits produces no additional health or environmental risks.
- ⁴ Some of the recent polls: Strategic Communications, 2006; Leger Marketing, 2007. Available at: <<http://www.greenpeace.org/canada/>>.
- ⁵ Ministry of Public Safety, and Solicitor General, 2001.
- ⁶ RSC, 2001, p. 206.
- ⁷ RSC, 2001, p. 191.
- ⁸ P. Andree, 2006, p. 10.
- ⁹ British Columbia Provincial Health Officer, 2006, p. xvii.
- ¹⁰ Ibid, p. 87.
- ¹¹ Ibid. p. 114.
- ¹² Ontario Public Health Association, 2001.
- ¹³ Institute national de santé publique au Québec, 2001.
- ¹⁴ P. Andree, 2007, p. 5.
- ¹⁵ Saralini et al, 2007.
- ¹⁶ Greenpeace, 2007a.
- ¹⁷ Greenpeace, 2007b.
- ¹⁸ CIRIGen, 2007.
- ¹⁹ D. Caruso, 2007, “A Challenge to Gene Theory, a Tougher Look at Biotech,” *NY Times*, July 1.
- ²⁰ Sampling by Greenpeace of five farms in an area east of Abbotsford, BC, found three farms growing NK 603.
- ²¹ Sagstad et al, 2007.
- ²² Ibid, p. 201.
- ²³ Ibid, p. 210.
- ²⁴ Ibid, p. 202.
- ²⁵ Ibid, p. 210.
- ²⁶ P. Andree, 2006, p. 10, “[W]ell-designed surveillance requires the ability to isolate populations who are exposed to a product from those that are not. In the case of GM foods, this can be achieved most easily where GMOs are labelled.”
- ²⁷ Ministry of Attorney General, 2001, p. 5.

Appendix A: Royal Society of Canada Recommendations on Genetically Modified Foods (2001)

The Provincial Health Officer's (PHO's) 2005 annual report recommends implementing of the recommendations of the 2001 Royal Society of Canada (RSC) report. The PHO makes note of the following RSC recommendations:

- Approval of new transgenic organisms for environmental release, and for use as food or feed, should be based on rigorous scientific assessment of their potential for causing harm to the environment or to human health.
- Design and execution of all testing regimes of new transgenic organisms should be conducted in open consultation with the expert scientific community.
- New technologies should not be presumed safe unless there is a reliable scientific basis for considering them safe. The Panel rejects the use of "substantial equivalence" as a decision threshold to exempt new genetically modified products from rigorous safety assessments on the basis of superficial similarities because such a regulatory procedure does not adequately protect people or the environment.
- Those who would deploy biotechnical products should assume the primary burden of proving their products safe, and should be required to carry out the full range of tests necessary to reliably demonstrate safety.
- Where there are scientifically reasonable grounds to suspect the possibility of serious harms to human health, animal health, or the environment, the lack of proof of such harms should not be considered proof that they are safe. They should be treated as potentially harmful until their safety level is established.
- The prospects of serious risks to human health, of extensive, irremediable disruptions to the natural ecosystems, or of serious diminution of biodiversity demand that the best scientific methods be employed to reduce the uncertainties with respect to these risks. Approval of products with these potentially serious risks should be withheld until their safety level can be measured.
- Conservative safety standards with respect to certain kinds of risks (e.g., potentially catastrophic) should be used. When "substantial equivalence" is invoked as an unambiguous safety standard (and not as a decision threshold for risk assessment), it stipulates a reasonably conservative standard of safety consistent with a precautionary approach to the regulation of risks associated with genetically modified foods.

- Canadian regulatory agencies and officials should exercise great care to maintain an objective and neutral stance in their public statements and interpretations of the regulatory process with respect to the risks and benefits of biotechnology.
- Canadian regulatory agencies should seek ways to increase the public transparency of the scientific data and the scientific rationales of their regulatory decisions.
- Approvals of genetically engineered products should be based on risk assessments performed by an independent, peer-reviewed, non-governmental system that is supported by regulatory agencies. The data and the rationales upon which the risk assessment and the regulatory decision are based should be publicly available.
- The Canadian Biotechnology Advisory Commission should undertake a review of the problems related to the increasing domination of the public research agenda by commercial interests, and make recommendations for public policies that promote and protect fully independent research on the health and environmental risks of agricultural biotechnology.

(Source: British Columbia Provincial Health Officer, 2006.)

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