GM the Hidden Science

By Andre Leu

The GMO protagonists would like you to believe that it is a simple matter of selecting the gene that is needed and neatly inserting it into the target species. This is a completely false perception promoted by the GMO industry. All current GMOs are a complex construction of segments of bacterial and viral genes.
The simplistic propaganda of just inserting a single gene to get a desired trait into a plant, animal or microorganism is a massive lie. At this stage our science is not sophisticated enough to insert a single gene and get it to work. Researchers use what can be best described as a shotgun approach. They either shoot the genetic material into the target cells, insert it after weakening the cell membrane with an electric shock/chemical, or use a modified microorganism to infect the target cell with the new genes.
The problem with these approaches is that the researchers do not know where the new genes have landed and if they will work.

Antibiotic Resistance Marker Genes

The most common method of discovering if the new gene will work involves using Antibiotic Resistance Marker Genes. These genes come from bacteria that are resistant to antibiotics. The marker genes are attached to the gene with the desired trait (herbicide resistance as an example) and they are shot into the target cells. These cells are then cultured and an antibiotic is added. The cells that live have adopted the new genes as they a resistant to the antibiotic.
These are then grown out as plants. The big problem with these plants is that every part of the plant has genes for antibiotic resistance. Many scientists and medical professionals have expressed concerns about these genes being horizontally transferred into the gut and mouth bacteria of humans and animals eating genetically modified food. They are worried that this could create bacteria that are resistant to the antibiotics needed to cure infections.
Horizontal gene transfer is where microorganisms take up genes directly through their cell walls rather than by the normal method of reproduction. It has been shown to occur with the antibiotic resistant super bugs that are now found in many hospitals.
When the potential danger of this was pointed out to the genetic scientists they dismissed it as impossible. Several studies have since shown that these antibiotic resistance genes can be transferred to bacteria in as little as two hours after eating genetically modified food.
New Scientist in July 2002 reported on a scientific experiment that showed that this can happen to bacteria in the human digestive system: For the first time, it has been proved that bacteria in the human gut can take up DNA from genetically modified food.
Currently every commercially released GMO plant has the antibiotic resistance genes in every cell. They should be banned for this reason alone.
Queensland researchers have developed a fluorescent marker gene that comes from a jellyfish. This gene can be used to select the cell with the desired trait as they fluoresce under an ultraviolet light. This will be a major improvement in the safety of GMOs over the current technology, however it does not address the most serious problem.

The cauliflower mosaic virus promoter. (CaMV)

When foreign DNA is inserted into organisms, three things usually happen. The most common one is that the foreign DNA is digested to provide energy and building blocks for the cell. It can also be rejected. The other response is to close over the foreign DNA and deactivate it.
All of these responses are defence mechanisms to overcome attacks by pathogens (disease). The host organism defends itself by getting rid of the foreign material. This is the reason why transplant recipients have to take anti rejection drugs. When the cells in our bodies are invaded by organisms that have foreign DNA a whole range of responses, collectively known as the immune systems can be activated to repel or destroy the invaders.
These are the things that tend to happen when foreign genes are shot/infected into a cell. They tend to be digested, rejected or closed over. Either way this means that the target organism will not have the desired trait from the new gene.
To overcome this, genetic scientists build a construction with a section of the cauliflower mosaic virus (CaMV) along with the new gene and the antibiotic resistant marker gene. The CaMV gives the signal that activates or promotes the new gene. It ensures that the gene is active so that its desired trait, like herbicide resistance, works in the new plant.
There are several problems with this. Every current GMO plant is part virus. Every cell of their bodies contains active sections of a virus. With billions of these plants now released into the environment, many scientists believe that there is a great risk of horizontal transfer of the viral genetic code from GMO plants into invading viruses, creating new virulent transgenic viruses.
The Union of Concerned scientists states: Recombination can occur between the plant-produced viral genes and closely related genes of incoming viruses. Such recombination may produce viruses that can infect a wider range of hosts or that may be more virulent than the parent viruses.
According to Dr Mae-Wan Ho of the Institute of Science in Society, London: GM constructs are designed to cross species barriers and to invade genomes. In other words, GM constructs are more likely to transfer horizontally. Genetic engineering will accelerate the generation of new viruses and bacteria.
When GMO scientists and researchers are questioned on this the standard reply is that the cauliflower mosaic virus is harmless and doesn't affect humans. We know that many harmless viruses change into to forms that can be serious. The flu is the classic example. Fifty years ago AIDS was restricted to monkeys and didn't effect humans.

SARS is a slightly modified common cold virus and is now a seriously fatal disease with the potential for massive epidemics.
According to Helen Pearson writing in the journal Nature, April 2003: “In a simple overnight experiment, researchers transformed a coronavirus that is lethal to cats into one that infects mouse cells by replacing a single gene. The result strengthens the idea that the SARS coronavirus might have arisen when an animal and human virus met and swapped genes, says the study's lead scientist"

The fact is no scientist can predict what would happen if transgenic viruses and bacteria emerged from GMO plants. It was only a short time ago these same scientists were saying pollen drift from GMOs would not affect nearby crops and that the horizontal transference of antibiotic resistant genes from GMOs into gut microorganisms was not possible. Dr. Mae-Wan Ho further states: This CaMV promoter is also known to work for genes all across the living world: in plants, bacteria, fungi, and, as we discovered recently in the literature more than 10 years old, also in frog eggs and human cells. It is able to substitute, in part or in whole, for the promoter of many other viruses. Viruses are not only everywhere in the environment, they also lie dormant in the genomes of all organisms, bacteria, plants and animals without exception. And there is evidence that such dormant viruses can be reactivated as a result of genetic recombination.

Unstable GM Constructs
A serious problem with the CaMV is that it has been proven to be unstable within the chromosomes of GMO plants. Researchers from the John Innes Center, UK one of the world’s major biotechnology research centres, have found that during field trails of GM plants, that later generations became unstable and variable.

The CaMV moves from one part of a chromosome to another and activates the new gene next it. This means it randomly causes genes within the plant to work in ways that would not normally occur. It could lead to all sorts of future problems like making plants that have small amounts of beneficial phyto nutrients, express them in toxic amounts, cause hormones and other regulatory functions to be pushed out of balance and cause future chaos in the genetic make up plants and animals that we do not understand. It is the equivalent of Russian Roulette with DNA.

Conclusion
Dr. Mae-Wan Ho sums up the potential dangers of this technology: GM constructs are designed to cross species barriers and to invade genomes. In other words, GM constructs are more likely to transfer horizontally.
Horizontal gene transfer will increase the opportunity for genetic recombination. The GM constructs are already of mixed origins, with base sequences similar to the genetic material of many pathogenic bacteria and viruses. That, again, as every geneticist should know, will greatly increase the probability for genetic recombination, and with a wide assortment of bacteria and viruses.
What is most concerning with this is that this viral promoter gene and other GM constructs have escaped into the wild relatives of GMO plants and also contaminated a sizeable proportion of non GMO crops like corn, canola and soybeans.
The potential danger is being completely ignored by regulatory authorities, with no ongoing research looking at these potential pathogenic transgenic viruses and bacteria.
Dr. Mae-Wan Ho warns: The scientists set up guidelines, based largely on assumptions, all of which have fallen by the wayside as the result of new scientific findings. Instead of tightening the guidelines, our regulators have relaxed them as commercial pressures built up. It does not take a great feat of imagination to see why genetic engineering will accelerate the generation of new viruses and bacteria.
We a looking at a large scale uncontrolled experiment and we do not know the outcomes. Logic and commonsense would state that we need a moratorium on the release of all GMOs until there is good quality, long term peer reviewed science that ensures that there are no risks. To do otherwise is to leave a massive problem for future generations.
Never forget that the scientist who invented DDT received a Noble Prize. We are still paying the hidden price of a lack of understanding of the long term consequences of this discovery.