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TO: Dr. Barry O Reilly, Secretary  
Interdepartmental working group on co-existence  
Department of Agriculture and Food  
National Crop Variety Testing Centre  
Backweston, Leixlip, Co. Kildare

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RE: Introduction of GM crops in Ireland.

*"Genetic engineering places in human hands the capacity to redesign living organisms, the products of three million years of evolution".*

— George Wald, Nobel Laureate in Medicine

## **Background**

It has often been said that genetic engineering is simply doing what traditional breeding techniques have been done for centuries, but doing it more precisely. No honest scientist would make this claim. Here is why:

Each of us is unique and part of our uniqueness comes from our genetic material, our DNA. DNA is found in the nucleus of the cell, in long structures called chromosomes. Genes are segments of DNA which specify the structure of proteins. Proteins include enzymes, hormones and body materials like muscle etc., which are vital for the normal functioning of the body.

Other stretches of DNA enable the proteins to interact with each other, to regulate the timing, the location and by how much each gene is expressed. Not surprisingly, this process is complex, poorly understood and, most significantly, it is not reflected in current genetic engineering techniques.

The 'science' of genetic engineering claims that each gene codes for its own unique protein. There are approximately 100,000 proteins in the human body so it follows that, if one gene corresponded to one protein and the assumption was correct, there would be 100,000 genes. But, there are only 30,000 genes in the human genome. This one fact: namely that one gene can give rise to multiple proteins destroys the claimed precision of genetic engineering.

The genes inserted in genetic engineering techniques operate continually. However, most of the genes in our cells are in an inactive state. For example, the genes in the iris that make the protein to give the eye colour do not appear to be active in the white of the eye. We cannot speak the language of the cell, and instruct the gene to 'get active' or 'rest'. In current genetic engineering techniques, a controlling piece from a virus is added to the new gene. Viruses, of course, can overcome the cells' natural barriers to infection and can also invade the nucleus where the DNA is found. The virus most commonly used is the Cauliflower Mosaic Virus. The new genetic material in the infected cell then works continually, putting the cell under increased strain. This operates independently of the cell's own harmonic system of self-regulation. Concern has been expressed about this process. The eminent scientist, Dr. Mae Wan Ho has stated that "The CMV virus has the potential to reactivate dormant viruses or create new viruses in all species to which it is transferred". Others have argued that gene transfer via these techniques resembles viral infection far more closely than traditional breeding techniques.

In current techniques, the process of gene insertion is imprecise and uncontrollable. It involves the random insertion of genes without the normal regulatory genes, whose functions are described above; furthermore a specific site on the gene cannot be targeted. Proof of this haphazard technique is that, for every viable artificial mutation, anywhere between 5,000 and 10,000 experimental gene insertions need to be undertaken. The viable cell is one that, in some form, has managed to integrate the new gene into its chromosomes. From there, it needs to be cultivated and bred traditionally to allow assessment so as to ascertain whether or not it actually fulfills the intended function, such as herbicide resistance.

## **Safety and Testing**

Foods need not be tested for safety if they are deemed to be 'substantially equivalent' to conventional foods. There is no scientific basis for this position, which claims that gross similarity is a sufficient criterion for establishing food safety. To decide if a food is substantially equivalent, only a limited set of characteristics, (selected by the manufacturer) need to be compared. If superficial testing reveals no significant difference between the GM food and its natural counterpart, no further food safety testing is required. The concept of substantial has been criticized by many scientists as profoundly flawed and scientifically unsupportable. Indeed, if the genetically modified products were meaningfully equivalent, nobody would pay for the modified variety. If there are differences, however minimal, and the difference was achieved outside the normal processes of the plant species, we are dealing with an unknown entity that requires rigorous testing.

A review of all the tests carried out on GM food to detect possible adverse health effects was undertaken in 2003. No human studies were undertaken, and a total of ten animal studies were identified. It may not be significant that five of these were undertaken in collaboration with private companies, none of which reported adverse health effects. What is significant however, is that in the independent tests, the remaining five reported (but did not explain) adverse effects, after feeding to animals for only 10-14 days. Changes noticed included thickening of the lining of the stomach and an increase in the number of white cells indicating possible immune involvement.

Food need not be labeled if it contains less than 1% of genetically modified plant material but allergies and other problems could well be caused by lower amounts than this.

A survey undertaken by the Food Safety Authority in Ireland in May 2001 found that 19 out of 26 products tested positive for GM ingredients. None were labeled as containing GM as they all contained less than 1%. One was even labeled 'No genetically modified corn used'. A survey the following year found that 18 of 37 soya samples tested positive, again all contained less than 1% GM ingredients. However, 5 out of 6 stated that they were 'GM free' and one was labeled 'organic'.

Children are particularly vulnerable to allergies, and infants under the age of two have the highest incidence of reactions to allergens in the diet.

If humans develop adverse reactions to GM foods, it may take years for them to be diagnosed. If thalidomide caused a birth defect that already was common, it would probably have remained in use a lot longer before its effects were detected. In March 1999, in the US, allergy to soya entered the top ten list of substances that commonly caused allergies and intolerances, along with the well-known hazards such as nuts. The link with soya was confirmed by antibody testing. GM foods may well contain allergens never before found in food.

It is disturbing to note that over half of the drugs approved by the Food and Drugs Administration in the USA had severe or fatal side effects that had not been detected during

the agency's review and testing, and these drugs were either withdrawn or needed major label changes. These drugs had of course been tested.

Despite the pervasive presence of GM foods in Ireland and the absence of testing for adverse health effects on humans, we have no epidemiological method of surveillance for adverse health effects from these foods.

### **Environmental concerns**

It has been found that, of all the environmental concerns expressed at the beginning of the GM experiment - resistance development, spread of genes in the environment, transfer of genes to other species and overuse of pesticides - every single one has been proven to be a reality.

Apart from the loss of biodiversity, the contamination of worldwide seed banks, the loss of organic varieties, the spread of resistance to wild species and the impoverishment of traditional farmers in competition with large-scale GM operators it has been found that increased herbicide and insecticide use is a major problem: After a honeymoon period where, indeed, farmers were able to grow successfully with reduced amounts of spraying, herbicide and insecticide use - after about 5 years of GM crops - are spiraling. This raises immediate, traditional toxicological questions, quite apart from the risk inherent in GM crops.

### **Conclusion**

#### ***The Irish Doctors Environmental Association demands an immediate moratorium on the growing and selling of GM foods in Ireland.***

- This experimental technology has not proven to be safe.
- It raises the risk of poisoning through herbicide and insecticide contamination.
- It endangers traditional crops, foods, health and the environment.
- It provides none of the claimed benefits that would make it worthwhile to take the incalculable risks.
- Irish consumers are not being asked for their informed consent. Instead, they are unwitting guinea pigs in a giant global experiment in which nobody is monitoring the results.

As things stand, precaution seems by far the better option, and therefore it is the considered position of the Irish Doctors' Environmental Association, that in view of the concerns outlined in our submission, the distances between GM crops and conventional or organic crops should be such that the growing of GM crops in Ireland is prohibited.

Dr. Elizabeth Cullen  
11 November 2004

#### References:

"Genetic Engineering Dream or Nightmare" Dr. Mae Wan Ho, Gateway Books 1999.

"Seeds of Deception" Jeffrey Smith. Green Books 2004.

Other references on file and available on request.