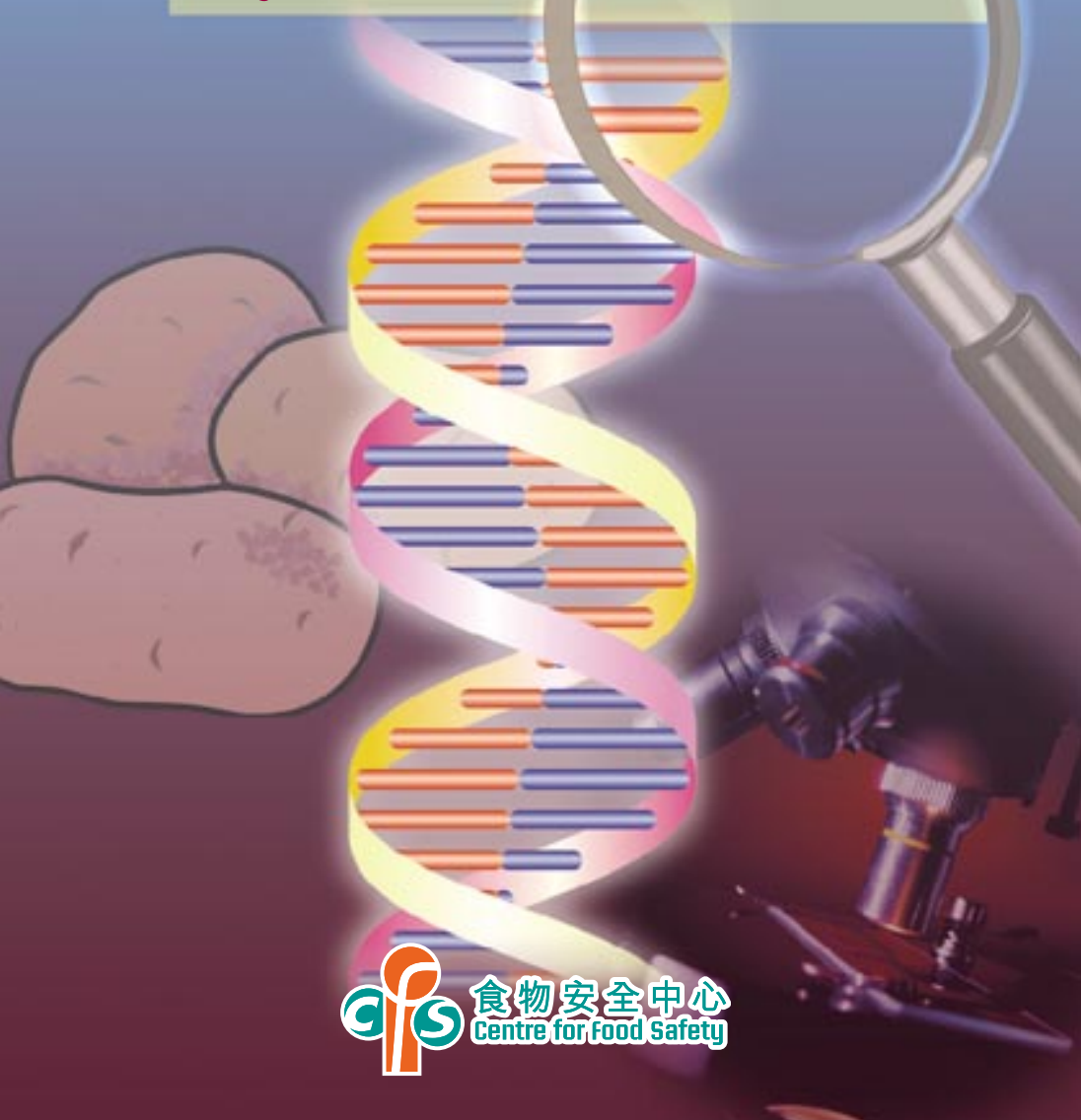


# KNOW MORE – GENETICALLY MODIFIED FOOD

**Myths and Facts**



## I. What are Genetically Modified (GM) foods?

GM foods are derived from GM organisms, whose genes have been modified using modern biotechnology such as genetic modification. Without knowing the exact mechanism, farmers centuries ago made use of various breeding methods to produce grain and plants which were bigger, tastier or easier to grow. Nowadays, scientists are learning to identify and modify genes controlling specific characteristics.



## II. Are GM foods safe for human consumption?

According to the World Health Organization (WHO), GM foods currently available on the international market have passed risk assessments and are not likely to present risks for human health. In addition, no effects on human health have been shown as a result of the consumption of such foods by the general population in the countries where they have been approved.

## III. How about the stories regarding the safety of GM foods in the media? Are they true?

There have been reports that GM foods available in the market may cause allergy and have health implications. The following are some of the common examples being misreported and the facts of such myths:

**Question 1:** Did L-tryptophan from GM source cause severe illnesses, the eosinophilia myalgia syndrome (EMS), and even deaths?

### Myth

In 1989, there had been an outbreak of the disease eosinophilia myalgia syndrome (EMS) affecting over 1500 people with at least 37 deaths in the USA. EMS is characterised by flu-like symptoms, intense muscle pain and skin inflammation and even memory disturbances. The cause of this outbreak was linked to certain batches of a dietary supplement, L-tryptophan (an essential amino acid), manufactured in Japan. Some people believed that the use of GM bacterium for the production of L-tryptophan was the main cause.



It has been reported that the manufacturer had changed the production procedures by reducing amount of activated carbon used in a purification step. The development of EMS was, in fact, found to be linked with the presence of contaminants, which was probably introduced by the poor purification step, rather than the GM bacterium itself.

**Question 2:** Is milk from cows treated with bovine somatotropin (BST) produced from GM bacteria unsafe for human consumption?



**Myth**

Bovine somatotropin (BST) is a growth hormone produced naturally in cows. Because of its stimulating effect on milk-production, BST has been produced from GM bacteria for increasing milk production in animal husbandry in the USA. The rBST (BST from GM source) residue in milk was believed to have health implication in both human and animals. Therefore, it was banned in some countries.



There is not enough scientific evidence to show that BST from either natural or GM source may pose significant risk to human. Some countries have allowed the use of BST in animal husbandry. However, when cows were injected with BST from either natural or GM source, they may suffer from mastitis, infertility or lameness. Taking animal welfare into consideration, some countries, such as Canada, do not allow the use of BST. Therefore, the decision to use or not to use BST is not related to genetic modification.

**Question 3:** Would the consumption of GM potatoes affect growth and immune system?

**Myth**

In 1998, a preliminary research conducted by Dr. Pusztai at Rowett Research Institute of the United Kingdom showed that "feeding GM potatoes to rats would affect their growth and immune system". Hence the consumption of GM foods may affect our immune system.



The results have been criticised by several scientific authorities including the Royal Society of the United Kingdom. They commented that the study design was flawed and its conclusions were based on inadequate data. Hence the conclusions were unjustifiable. The Royal Society also commented that general conclusions about the safety of GM foods could not be drawn based on individual studies on GM foods.

**Question 4:** Would genetic modification introduce allergens to foods?



It has been reported that some of the GM soya bean products available in the market may contain allergens from Brazil nuts.



Genes from Brazil nut were transferred to soya bean so as to increase its methionine (an essential amino acid) content. When the soya bean was found to contain an allergen from Brazil nuts, this product was immediately withdrawn from further development and was never released into the market. In fact, all GM foods have been subject to stringent safety assessment before they are available in the market. It is possible to develop foods containing toxins or allergens by both traditional breeding and genetic engineering. However, the advantage of genetic engineering is that the gene of interest can be well defined and introduced into organisms more precisely. Hence, the possibility of developing a food with toxins and allergens can be better recognised when compared with conventional breeding.

**Question 5:** Would antibiotic resistance marker genes in GM crops increase the antibiotic resistance in microorganisms resided in human gut?



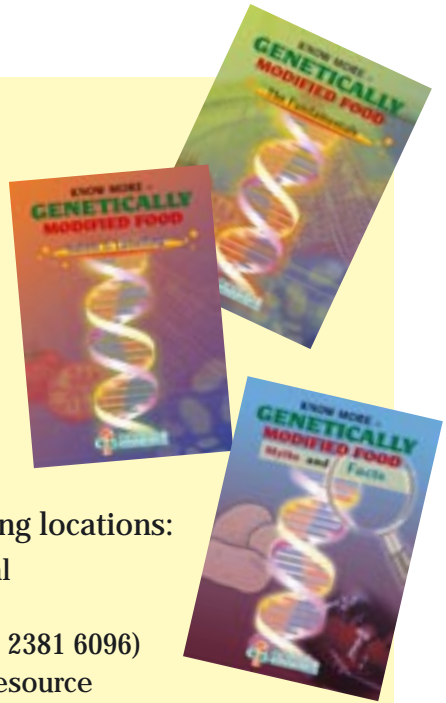
During the development of GM crops, antibiotic resistance marker gene was used to identify those plant cells which had been incorporated with the desired genes successfully. It has been suggested that these genes may be transferred to microorganisms in the gut of humans eating such crops, thereby compromising the therapeutic use of antibiotic in disease treatment.



Various regulatory agencies have reviewed the use of antibiotic resistance marker gene. Though the transfer mentioned above would happen theoretically, the chance was small since many discrete consecutive steps were supposed to be involved. Nevertheless, the industry has been advised not to use marker genes carrying information of resistance to antibiotics which are frequently used for therapeutic purposes, and to research on the use of alternative marker genes.

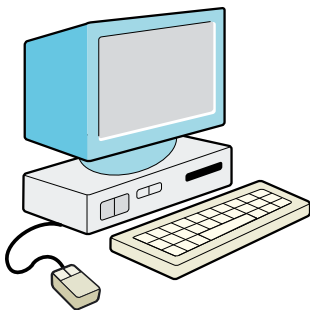
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- 1. The Fundamentals**
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