

Genesis, genius or genocide

Genetically Modified Organisms - by Alf Orpen

"...progress is important in everything but food. When you ask for an orange, you don't want someone asking, an orange what?" - Andy Warhol

With licence applications by educational institutions, corporations and government bodies escalating here in Australia and worldwide for genetically modified plant trials, one thing is certain, paraphrasing the microbial ecologist from the UC, Berkeley, Dr Ignacio Chapela, we have indeed begun "the largest biological experiment humanity has ever entered into" when referring to genetic engineering (1).

As we are beginning to understand the long-term risk to the environment and human health from the widespread use of synthetic chemicals in agriculture, the world has embarked on a new technology, arguably the most powerful we have ever practised with such gusto. It warrants caution.

Since the 1975 Asilomar declaration moratorium by molecular biologists, we have been aware of the risks associated with genetic engineering and the real possibility of creating new viruses and bacteria that cause diseases as well as spreading antibiotic resistance to make infections untreatable.

In contrast to the growing worldwide scientific and public opinion, genetically modified organisms have been discharged throughout the world without a fully comprehensive grasp of the consequences in a manner that can only be described as dangerous absolutism. By 2003, since their introduction in 1996, commercial acreage of genetically modified crops increased to over 167 million acres worldwide (2).

It has been estimated that around 95% of leading scientists in this field are either funded, subsidised or own their own biotech companies.(3) Couple this with the required return on investment that's sought after and it's not difficult to see why there is a proliferation of such research & development. Activities that cover but are not limited (4) to the genetic engineering of forest and fruit trees, fish, cattle, grains, poultry, vegetables, insects and bacteria using genes from unrelated species that include humans are being applied.

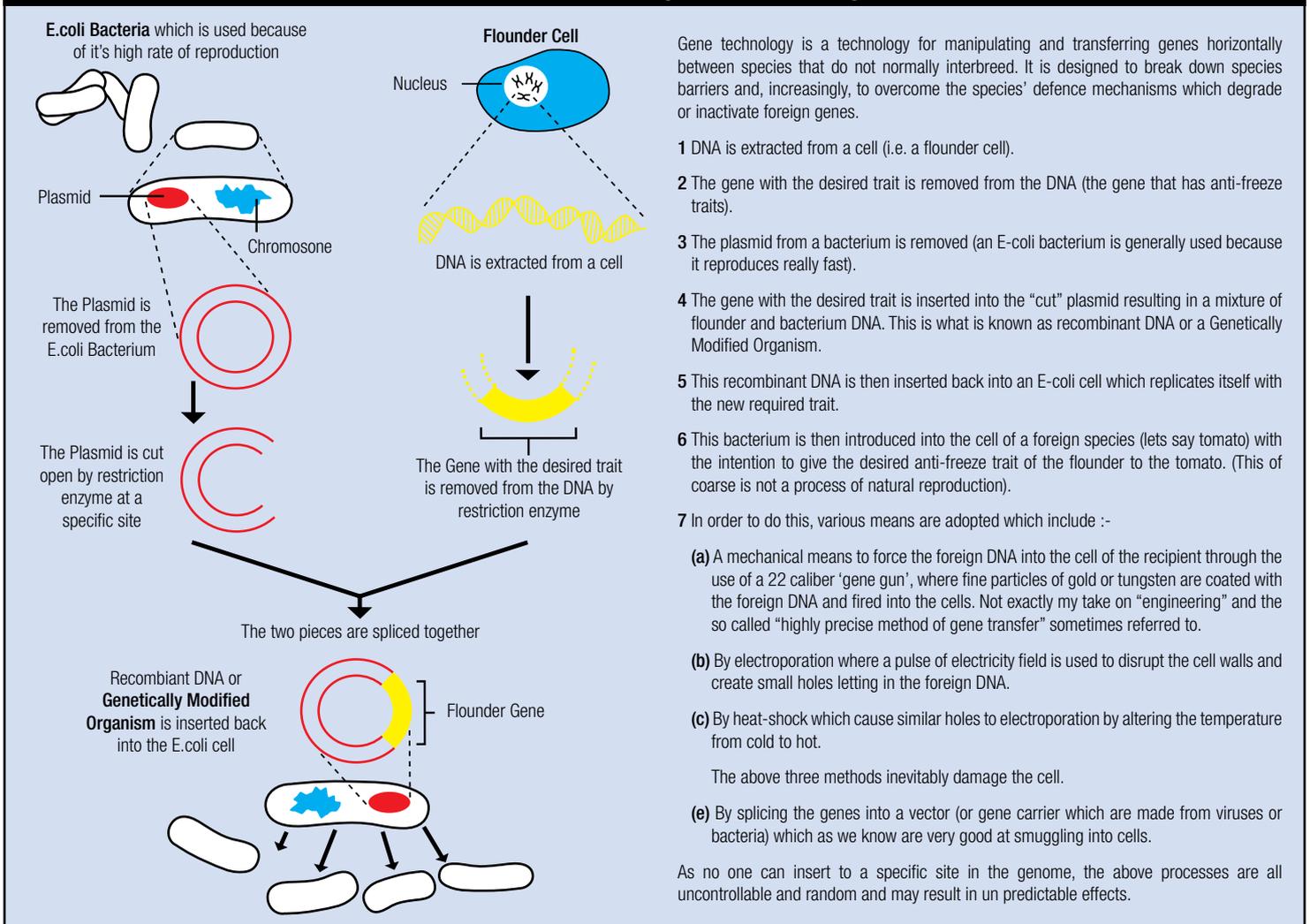
What you don't know doesn't harm you!

The above saying is indeed incorrect, for what we do not know can indeed harm us. It has been the case in such circumstances ranging from tobacco to food additives that the onus of proof of harm resides with the public rather than the proof of safety residing with the producer.

(My company) "should not have to vouchsafe the safety of biotech food. Our interest is in selling as much of it as possible. Assuring safety is the FDA's job." (5) - Phil Angell, Director of Corporate Communications for Monsanto

The awareness that little if anything is known about GM crops' cumulative or complex long-term effects needs to be our guiding principle. History has given us examples that consequences are usually realised decades after any mistakes are made. With testing for the most part being undertaken for short periods of weeks and months, we run the risk of the introduction of new allergens and toxins into our environment and

The Process: Genetically Modified Organisms



therefore our communities. Although our current political & commercial structures do not allow for it, decades are required for adequate research as the risks are undeniable. They stem from the unknowable and can only be adequately identified after long-term examination.

As noted by the eminent geneticist Erwin Chargoff "...The principal question to be answered is whether we have the right to put an additional fearful load on generations not yet born.....Our time is cursed with the necessity for feeble men, masquerading as experts, to make enormously far-reaching decisions. Is there anything more far-reaching than the creation of forms of life?... You can stop splitting the atom; you can stop visiting the moon; you can stop using aerosols; you may even decide not to kill entire populations by the use of a few bombs. But you cannot recall a new form of life..... An irreversible attack on the biosphere is something so unheard-of, so unthinkable to previous generations, that I could only wish that mine had not been guilty of it."(6)

Modus operandi

To start any pursuit today with the premise that the world is flat is obviously farcical. Yet, the genetic manipulation of genes is being conducted based on the science of Darwin & Newton. In essence, this modus operandi of 21st century technology based on the assumptions of 18th & 19th century knowledge is the major error.

Genetic engineering is not cross pollination, nor is it hereditary. Traditional plant & animal breeding has always been species specific. When plants or animals mate (are crossed) various traits are transferred. When a black cow mates with a white cow, the likely outcome is a genetic modification, a black & white spotted cow. But is placing the gene of a fish into a tomato the same?

"Only a fool tests the depth of the water with both feet."- African Proverb

i-not robot

DNA self-replicates, machines do not. Machines do not grow, reproduce, self heal, and cannot adapt or respond to experience. The belief of the unchanging characteristic of a DNA as a number of discrete genes functioning separately that when put together like parts of a machine result in a plant or human, is the mindset that dominates this arena. The textbook definition of biotechnology, that living organisms are "component parts" that can be used to make a useful product, process or service is naïve.

Although the project was abandoned and the company DNA Plant Technology of Oakland, California has no plans to resume its efforts, it did attempt to implant the gene of the Arctic flounder into a tomato. The reason for this was quite practical, the fish can tolerate very cold water because its blood contains a natural anti-freeze.

Notwithstanding the fact that I am personally opposed to such manipulations, if I were to wear my rational hat for a moment and approach biology in a mechanical context, it would seem quite reasonable to do so, a tomato that withstands frost, wow! That however is precisely the problem. This thinking is both linear and logical, but certainly not complete and certainly not reflective of the realities of life.

Genetic engineering is built on the belief that foreign genes will always operate the same way in the new host organism. As noted in the excellent expose Genetic Engineering, Dream or Nightmare, by the biologist Dr Mae-Wan Ho, "...no gene functions in isolation, there will almost always be unexpected and unintended side-effects from the gene or genes transferred into an organism". Physicist Dr Vandana Shiva concurs in her book Biopiracy, "Genes are not independent entities, but dependent parts of an entirety that gives them effect. All parts of the gene interact, and the combination of genes are at least as important as their individual effects in the making of an organism".

Is that your "property"? From human rights to genetic rights.

Although originally denied, the first patent on life for a genetically engineered bacterium by Dr Chakrabarty of General Electric was approved in 1980. From this point onwards living beings have been judged on the same grounds as machines.

Since then thousands of patents on life have been registered by ICI, Pepsico, Lubrizol, Ciba-Geigy, DuPont and Monsanto to name but a few. Patents are considered Intellectual Property Rights (IPRs), that is, they are owned by the inventor.

The so called "inventions" that are now patented and/or being pursued comprise of a variety of intermixing life and synthetic forms.

Although not exhaustive, the following give some indication of the magnitude:

- herbicide resistant plants (possible increase in herbicide usage and producing herbicide resistant weeds)*
- cows that produce plastic*
- sheep with pharmaceuticals*
- edible vaccines*
- spermicidal plants (plants with properties that make them sterile)*
- total tree pesticides (potentially creating a forest that kills insects)*
- fish with human growth hormones*
- vitamin A enriched rice & bananas*

Upon reading this list, surely some fundamental questions arise? Why not simply make available sweet potatoes, carrots, mangos or spinach all rich in Vitamin A, rather than carry the risk of genetically engineering a rice plant or a banana? (It has been calculated that an adult would need to eat 9kg/19.8 lbs each day of such rice for the required intake of Vitamin A, whereas two carrots would suffice.) Why create organisms with spermicidal characteristics, (known in the industry as terminator technology), which cause second generation seeds and animals to be sterile? Although disguised in the form of social benefits, the answers lead squarely back to the commercial benefits of "ownership".

If one accepts for commercial reasons that patents on life are justified, why then do these "products" not need to meet stringent health regulatory tests? The argument from their backers is that the organisms being created are "substantially equivalent" to the original species. Does not the granting of a patent require a point of difference that is both novel and not obvious? Surely a case of having the cake and eating it too.

It's almost unbelievable that such a momentous matter has never been voted on by the general public. Principal questions such as can life be owned and is life a commodity have never been debated sufficiently in public. Such questions are so important that they require a referendum.

The heartstring argument.

If you were to plant tomato seeds, what would you expect to grow? Tomatoes! Yes! No trick question, everyone gets it. By the same logic, most of us would agree that from the seed of a lie, one cannot harvest the fruit of truth!

One of the justifications expressed for the proliferation of GE crops is the heartstring argument that we need it to feed the world. This point penetrates the heart of thinking people who would not otherwise contemplate the acceptance of GE crops.

By 2030 the world's population is expected to top eight billion. Can the world produce enough food to meet global demands? The answer is yes, according to the report released in July of 2000 titled "Agriculture: Towards 2015/30" prepared by the UN's Food and Agriculture Organisation (FAO) Global Perspective Studies Unit. This conclusion was reached by experts whose quantitative analysis specifically did NOT allow for any production from GE crops. These were not factored in due to the ongoing uncertainties regarding the technical performance, safety and acceptance of GM crops.

Other studies show that we currently produce more food per person than at any other time in history (4.3 pounds per day – nearly 2kg per person per day). So why are so many people starving? The answer is two-pronged; firstly, it's not how much we grow but the distribution of what we grow, or more precisely the lack thereof. Secondly, the simple fact that most aid agencies agree on is that world hunger is a terrible symptom of world poverty. This phenomenon relates exclusively to the way our economy functions.

Notes:

1. Genetically Engineered organisms are also referred to as Genetically Modified Organisms (GMO) and Recombinant DNA. Genetic Engineering (GE) is defined as "A set of techniques from molecular biology by which the genetic material of plants, animals, micro-organisms, cells and other biological units may be altered in ways or with results that could not be obtained by methods of natural mating and reproduction or natural recombination."
2. The United States, Argentina, Canada & China respectively are the four largest producers of predominantly genetically modified soybeans (55%), cotton (21%), canola (16%) and corn (11%). Reported by the ISAAA (International Service for the Acquisition of Agri-biotech Applications).
3. An example of this is seen here in Australia in one of our publicly funded research organisations. The CSIRO is required to find 30% of their funding from the corporate sector and depends on corporate patented enabling technologies. Such funding directs research in favour of products that can be commercialised or the promotion of patented products.
4. Various food additives such as gums and (artificial) vitamins are produced. Furthermore non-natural vitamin C is often made from corn; and vitamin E is usually made from soy. Non-food items that may contain GM soy or corn derivatives include cosmetics, soaps, detergents, shampoo, and bubble bath liquid.
5. Reported in the New York Times Magazine Oct 25, 1998 article Playing God in the Garden.
6. Erwin Chargoff, Sketches from a Life before Nature (New York : Rockefeller University Press).