

# Genetic Manipulation

Changes in the genetic makeup of plants and animals is usually a matter of chance, but can be improved upon with suitable wisdom, skill and care.

## Background

Purposeful genetic manipulation (purposeful-GM) faces heavy fear-based opposition. However, it is grounded in modern genetic biology and, when handled responsibly, has potential for advancing animal, human and environmental interests.

In the 1960s, scientists believed that our genes were perfect little pearls carefully honed by evolution over millions of years. Mutations were thought to occur in a gene perhaps "once in a hundred thousand generations" (p.19<sup>1</sup>).

That view was wrong. Mutations are now known to be natural and occur frequently. Each of our 25,000 genes will be mutated during our lifetime in over a billion cells in our body<sup>2</sup>. These mutations do not necessarily get passed on genetically, they accumulate while we are alive. Mutations are not limited to our body cells but also occur in our eggs and sperm which give rise to the next generation. Each of us is born with 40-80 genetic mutations<sup>3</sup> that occur in neither of our parents.

These new (de-novo) mutations occur entirely by virtue of daily random damage to genetic material, and are largely neutral in their impact. Sometimes, one or more might give someone an easier path to fitness or flexibility than their parents. Other times, they result in a susceptibility to minor ailments. Rarely, but catastrophically, they will result in a truly horrifying disease. But nature is blind and totally unconcerned if the result is a young body riddled with tumours, brittle bones, malfunctioning organs.

The driving forces behind genetic changes are the normal processes of metabolism... simply being alive. And this isn't just a process within animals like ourselves. It's everywhere. We share genetic material with plants, microbes and other animals.

The difference between the normal random changes and purposeful-GM is that purposeful-GM can be planned and thus more likely beneficial.

<sup>1</sup><http://books.google.com.au/books?id=dQkAAAAAMBAJ>

<sup>2</sup><http://www.amazon.com/gp/product/0815344546>

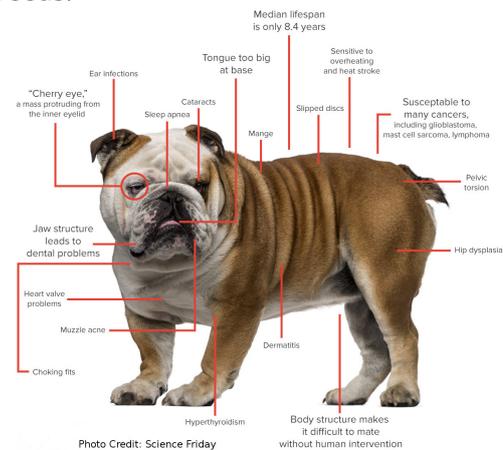
<sup>3</sup><https://genomebiology.biomedcentral.com/articles/10.1186/s13059-016-1110-1>

<sup>4</sup><https://www.scientificamerican.com/article/although-purebred-dogs-can-be-best-in-show-are-they-worst-in-health/>

## Selective breeding, a "natural" disaster

Purposeful-GM techniques come in two general classes. The first, selective breeding, is regarded as natural and acceptable by those opposed to genetic manipulation. Selective breeding is the frequently brutal deliberate mating of particular plants, animals – and even people – to achieve some particular goal. It's been used for everything from beans to beer and from beagles to bovines. The results of these so-called *natural* methods of purposeful-GM have been almost universally devastating for animals.

The list of pedigree pet problems is almost as long as the list of breeds.



For example, half<sup>4</sup> of Cavalier King Charles Spaniels will develop a serious heart condition by age five. In bulldogs and persian cats, it's breathing problems.

Every year, billions of chickens endure pain throughout most of their short life because they've been deliberately bred for rapid muscle growth and their skeletal systems can't keep up. Other species who are farmed have similar tales to tell. But among the worst abusers of these so-called natural breeding methods have been pet breeders.

Selective breeding may be natural in some sense, but it has been a disaster for animals.



Want a voice for animals in Parliament? Join, donate, or find out more about the Animal Justice Party at [animaljusticeparty.org](http://animaljusticeparty.org). You can also read our policies, here: [animaljusticeparty.org/policieslist](http://animaljusticeparty.org/policieslist).

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## Scientific GM

Until recently, more modern scientific genetic manipulation methods have been beyond the capacity of farmers and pet breeders. We don't yet know what they will do with them.

But some scientists are using the new techniques in ways which benefit animals. Insulin for diabetics used to be derived from pig pancreases, but these days it is produced using GM bacteria.

Many vegans take B12 produced by GM bacteria. Many non-vegans effectively get this same B12, but via sheep and cattle fed supplements by Australian farmers. They do this because many soils in Australia are cobalt deficient. Vegans just cut out the middle man.

As a last example, the heme molecule used by *Impossible Foods* to give its burgers their meaty flavour is also produced using GM bacteria. In contrast, farming cattle for beef may be viewed by some as 'natural', but it is both a climate disaster and a potent cause of bowel cancer.

## Irrelevant dichotomies: natural Vs artificial

The assumption that some technologies are somehow *natural* and therefore good and beyond criticism while others are somehow *unnatural* and intrinsically immoral is what makes a significant sector of the environment movement both irrational and, by their actions, cruel.

The dichotomy between natural and artificial is morally insignificant. What matters is the *purpose* and *outcome* of the manipulation. This is no different from any other technology.

## New technology, new questions

*CRISPR*<sup>5</sup> is the latest in a series of genetic manipulation tools. Many previous tools resemble a shotgun in the crudity of their operation. CRISPR enables letter perfect changes to DNA at a price and simplicity that will make it rapidly displace alternative technologies. But, as with all other technologies, it can be used for good or evil.

Some of the early CRISPR projects involve attempts to save the world's banana crop from a soil fungus that

is otherwise tipped to remove bananas from our diet in coming decades<sup>6</sup>. Almost all bananas are genetically identical which makes them particularly prone to disease. Duchenne muscular dystrophy<sup>7</sup> is caused by a small genetic defect which CRISPR researchers hope to correct.



CRISPR works by co-opting a tool used by bacteria for billions of years to protect them from viruses. The tool allows *precise* recognition and alteration of genetic material. Previous techniques were extraordinarily hit and miss.

The technical ease doesn't relieve us of the ethical obligation to think about the impacts of our manipulation, and it's the goal of the manipulations which should be the focus of regulators and the concerned public.

CRISPR is a fact. We can't undo the science, we can only try to regulate it. The regulation of simple and cheap tools is particularly challenging but absolutely essential. CRISPR will allow all manner of people to become involved; not just nice people with noble objectives. Anyone can get DIY kits<sup>8</sup> on-line for US\$150.

## Policy

GM has the potential to bring both benefit and harm. The Animal Justice Party (AJP) will therefore create policy regarding genetic manipulation on a case-by-case basis, drawing on the value base of kindness, equality, rationality and non-violence to assess the merits of each case. We seek regulation that prevents misuse and promotes social advancements. We will not hesitate to condemn GM when used in ways that harm animals. We will support GM where it removes existing forms of animal exploitation, improves human health, creates nutritious and sustainable crops, or helps protect our environment.

<sup>5</sup><https://en.wikipedia.org/wiki/CRISPR>

<sup>6</sup><https://www.sciencealert.com/fungal-disease-could-wipe-bananas-out-in-5-to-10-years-say-scientists>

<sup>7</sup><https://muscular dystrophy news.com/crispr-cas9-treatment-dmd/>

<sup>8</sup><http://www.the-odin.com/diy-crispr-kit/>



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