Department
for Environment
Food & Rural Affairs

Gene Editing

Summary

The way that plants and animals grow is controlled by the information in their genes. For centuries, farmers and growers have carefully chosen to breed individual animals or plants that are stronger or healthier so that the next generation has these beneficial traits. But this is a slow process.

Technologies developed in the last decade enable genes to be edited much more quickly and precisely to mimic the natural breeding process. This has the potential to hugely benefit ordinary farmers and unleash UK research.

Gene editing should not be confused with genetic modification (known as GM). Genetically modified organisms are those where DNA from a different species has been introduced into another. Gene edited organisms generally do not contain DNA from different species, they contain changes that could be made more slowly using traditional breeding methods.

At the moment, following a European Court of Justice ruling in 2018, gene editing is regulated in the same way as genetic modification. The UK Government is consulting on changing these rules in England, allowing gene editing research to be used to produce beneficial crops and livestock, but with strong health and safety rules.

In other countries, including Australia and Japan, most gene edited organisms are not regulated as genetically modified organisms.

What are the benefits of gene editing?

- Gene editing will give us the opportunity to ensure that animals, plants and crops can be stronger and healthier, and more resistant to diseases. This will be of real benefit to ordinary farmers and will unleash our research capabilities. Wider adoption of this technology will also benefit the developing world and increase climate resilience.

Healthier plants, animals and crops

- Crops could become more resistant to diseases decreasing the need to use pesticides that could potentially damage wildlife and the environment, for example bees. Gene editing research has produced wheat and rapeseed that are more resistant to disease.
- Research has shown that gene editing may help to resist dangerous diseases like Swine Fever in pigs and Avian Influenza in chickens. This is good for farmers, and the welfare of their animals.

Healthier food

- Gene edited crops can produce fruit and vegetables that are healthier to eat.
- In Japan, gene edited tomatoes are available that could lower blood pressure.
- Research from Rothamsted Research in Hertfordshire is investigating how gene editing in wheat products can be used to reduce the potential for the formation of a carcinogen called acrylamide. This could decrease the risk of cancer.

Unlocking world leading UK research

- The UK already has some of the world's leading researchers on gene editing, for example at Rothamsted Research and at the Roslin Institute in Edinburgh. We want to make the UK the best place in the world to conduct this research and to lead the way in producing stronger and healthier plants and animals.
- At the moment, farmers and producers suffer losses from diseases that damage their livestock and crops or are forced to use pesticides that could be damaging to the environment. Gene editing could mean that this stark choice is avoided as farmers have access to plants and animals that are naturally resistant to diseases. Gene editing is being used to develop disease resistant crops much more quickly and efficiently than would be possible using traditional breeding. These include wheat, rapeseed and sugar beet.

Q&A

Is gene editing safe?

Gene editing makes the same types of changes to plants and animals that occur naturally and through traditional breeding. We are gathering information from this consultation so that we can make sure that gene editing is safe, that food and environmental standards are not relaxed.

Does this mean that "frankenfoods" are now on the menu?

No. Our consultation does not propose to change the regulations controlling genetically modified foods containing genes from another species. Genetically modified foods are subject to rigorous safety testing and are already available in the UK under strict safety rules. There are already more than 60 GM foods in existence that have be thoroughly assessed for their safety and authorised for use in the UK. They must be labelled so consumers will always know what they are buying.

Does this mean that there would be no rules at all for gene editing?

Although gene edited products would not be regulated as Genetically Modified Organisms, they would still be subject to the UK's world class standards that apply to protect the health and safety of people, animals and the environment.

Will consumers be unsure about what they are eating or drinking and whether it is natural?

There will be no weakening of our strong food safety standards. We set very high standards of food safety, and existing controls on GM crops, seeds and food will continue to apply. The consultation is an opportunity for people to voice any concerns they may have.

Is this move a threat to the UK's high food standards?

No. The government's science-based approach is underpinned by public safety being the number one priority. The government is also clear it will not sign a trade deal that will compromise on our high environmental protection, animal welfare and food standards. The UK is a world leader in these areas and that will not change.

Will gene editing give big business more control over our food supply?

No. Much of the world's leading research into gene editing has been led by pioneering small and medium sized businesses.