

Gene Editing

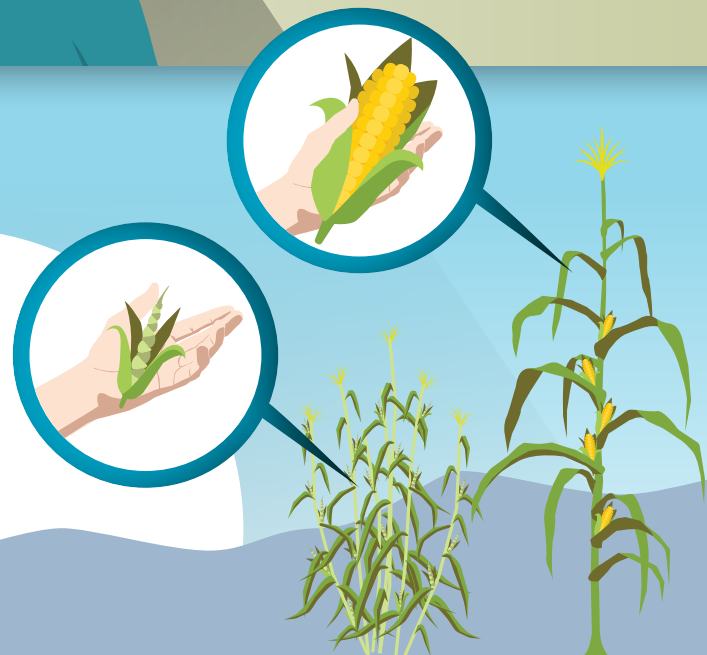
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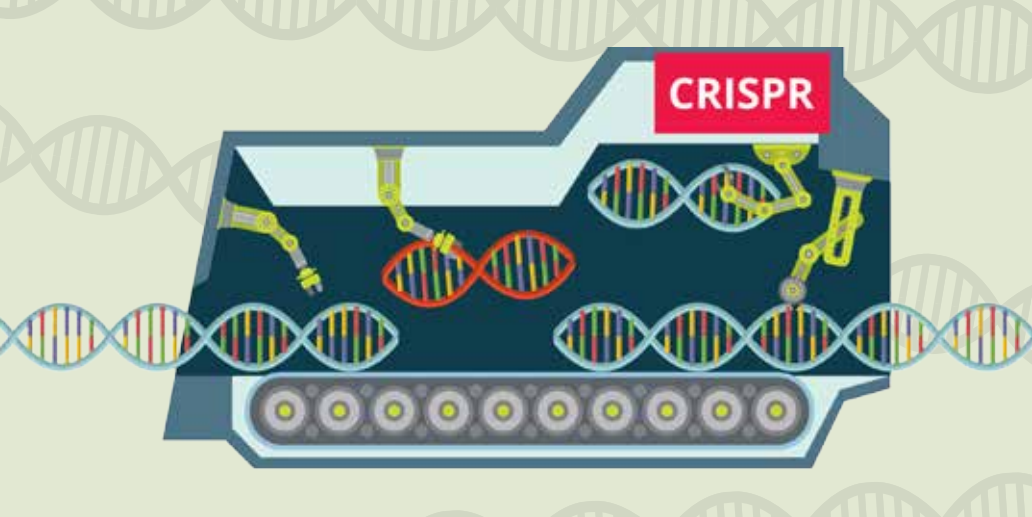
An organism's genetic material, or genome, is made of long molecules of DNA. These carry instructions on how to build that organism, like a manual which tells all the cells in the body how to behave.



Sometimes DNA can change, creating new and different versions of a gene. This is called a 'gene mutation'. These mutations mean that different individuals can carry different versions of the same gene, such as different eye colour.

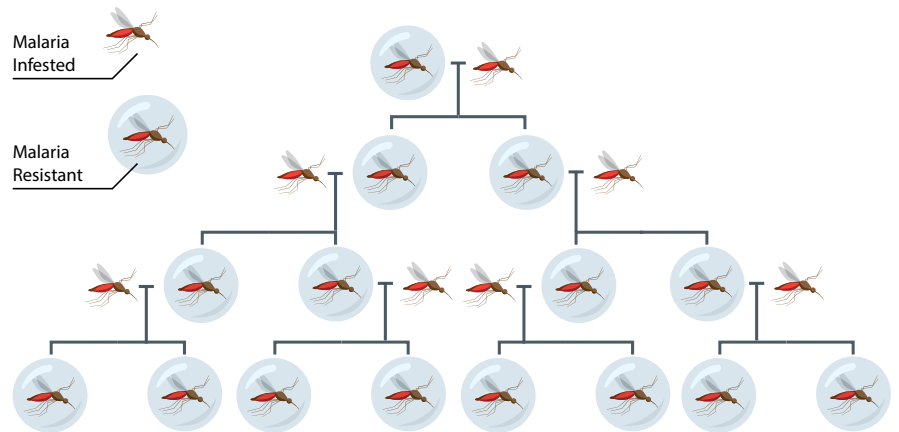
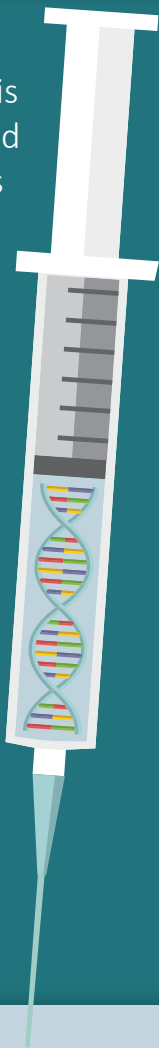
In agriculture, genetic variations have been used for centuries to select better versions of crops and animals. An ancient grass called teosinte has over 10,000 years of agricultural selection become the maize plant we know today.





In 2012 new gene editing technology called CRISPR was developed. This makes it possible to quickly and easily insert, delete or replace individual genes in precise locations within DNA, or to switch genes off altogether.

Today gene editing is beginning to be used for new approaches in research, medicine, and agriculture. In medicine, gene editing has already been approved for use in patients to make immune cells attack cancer cells, and has the potential to treat genetic diseases such as, haemophilia, cataracts, cystic fibrosis and more.



In agriculture, gene editing is being used to create more hardy and productive plants and animals, introducing desirable characteristics more quickly than conventional agricultural selection allows. In conservation, researchers may be able to use gene editing to introduce a sterilisation gene into a pest as part of a pest-eradication programme, or spread a malaria resistance gene in mosquitoes.

It is now difficult to distinguish between genetic changes generated by conventional breeding, gene editing, or natural mutation. Gene editing technology is getting cheaper and easier, so is being used more frequently. While it can make more precise changes to genetic material than earlier techniques, there can still be unintended effects. As a result, while the technology offers exciting new opportunities, it also comes with risks, and many legal and ethical implications.

