

The use of genetic technologies in plants, animals and microorganisms

Joint statement from the Royal Society and Chinese Academy of Sciences

Research into genetic technologies (defined as anything to do with understanding, making or adapting genetic material) is a global endeavour. It is therefore important that countries work together to develop international norms, protocols and codes of conduct for genetic technologies research. UK and Chinese researchers have been at the forefront of many emergent uses of genetic technologies, which is why the Royal Society and the Chinese Academy of Sciences came together for a policy dialogue on priorities for genetic technologies research and how the research and use of these technologies should be governed.

Joint research and open data

Scientists in both China and the UK are working to improve understanding of plant and animal genetics and to use that understanding to help respond to global challenges. Examples include preventing plant and animal disease, increasing the productivity of agriculture whilst lowering environmental impacts, and conserving biodiversity. There are already many collaborations between UK and Chinese scientists, for example the Chinese Academy of Sciences – John Innes Centre *Centre of Excellence for Plant and Microbial Science*. This policy dialogue identified opportunities for further collaboration, such as sequencing the wheat genome to help develop strains of wheat that are more resilient to climate change, disease and other stresses. Further opportunities will come from the bottom-up engagement between scientists in both countries.

The results of these collaborations, particularly where they result in genomic data such as sequencing data that is openly available to all, should have global benefits. There are also specific opportunities for collaboration between Chinese, UK and African scientists as part of the One Belt, One Road Initiative which aims to increase connectivity and collaboration with China, Europe and East Africa as well as the countries in between.

Regulation

The current approaches to regulating genetic technologies used in agriculture in both the UK and China mean that it is hard to translate the discoveries of scientists in these countries into useable products. For example, there are no GM plants or animals produced commercially in the UK and only a virus-resistant papaya and insect-resistant cotton grown in China.

The Royal Society has a long-standing position that the agricultural products of genetic technologies should be regulated based on the trait introduced rather than the process used to introduce that trait. The emergence of new genome editing techniques that enable precise changes to be made to DNA has raised new questions about how genome editing products should be regulated, particularly when the same changes could have been made through conventional breeding processes. Whilst a trait-based approach to regulation would ensure that all new agricultural products go through a regulatory process, further discussion is required of whether some genome editing products should be exempt from the current process-based regulations that apply to genetically modified organisms. This is a question that both the UK and China are faced with.

Public engagement

An important test of any approach to regulating the products of genetic technologies is whether it is seen as trustworthy by the public. Both the Royal Society and the Chinese Academy of Sciences recognise the importance of understanding the concerns that people have about genetic technologies and responding to those concerns in the ways that genetic technologies are developed. This is why the Royal Society organised a public dialogue on genetic technologies in the UK and the Chinese Academy of Sciences participated in this dialogue as observers.