

Could CRISPR be used as a biological weapon?

August 31 2017, by James Revill



Bioterrorism exercise. Credit: Oregon National Guard/Flickr, CC BY-SA

The gene editing technique CRISPR has been in the limelight after scientists reported they had used it to safely remove disease in human embryos for the first time. This follows a "[CRISPR craze](#)" over the last

couple of years, with the number of academic publications on the topic growing steadily.

There are good reasons for the widespread attention to CRISPR. The technique allows scientists to "cut and paste" DNA more [easily](#) than in the past. It is being applied to a number of different peaceful areas, ranging from cancer therapies to the control of disease carrying insects.

Some of these applications – such as the engineering of mosquitoes to resist the parasite that causes malaria – effectively involve tinkering with ecosystems. CRISPR has therefore generated a number of ethical and safety concerns. Some also worry that applications being explored by [defence organisations](#) that involve "responsible innovation in gene editing" may send worrying signals to other states.

Concerns are also mounting that gene editing could be used in the development of biological weapons. In 2016, [Bill Gates remarked](#) that "the next epidemic could originate on the computer screen of a terrorist intent on using genetic engineering to create a synthetic version of the smallpox virus". More recently, in July 2017, John Sotos, of Intel Health & Life Sciences, stated that [gene editing](#) research could "[open up the potential for bioweapons of unimaginable destructive potential](#)".

An annual [worldwide threat assessment report](#) of the US intelligence community in February 2016 argued that the broad availability and low cost of the basic ingredients of technologies like CRISPR makes it particularly concerning.

However, one has to be careful with the hype surrounding new technologies and, at present, the security implications of CRISPR are [probably modest](#). There are easier, cruder methods of creating terror. CRISPR would only get aspiring biological terrorists so far. Other steps, such as growing and disseminating biological weapons agents, would

typically be required for it to become an effective [weapon](#). This would require additional skills and places CRISPR-based biological weapons beyond the reach of most terrorist groups. At least for the time being.

This does not mean that the hostile exploitation of CRISPR by non-state actors can be ignored. Nor can one ignore the [likely role](#) of CRISPR in any future state biological weapons programme.

International efforts

Fortunately, most states around the world regard biological warfare with particular abhorrence. There are already measures in place to prohibit and prevent the development of biological weapons. At the international level, this includes the [Biological and Toxin Weapons Convention](#).

Under this [convention](#), states have agreed "never under any circumstances to acquire or retain [biological weapons](#)".

This convention is imperfect and lacks a way to ensure that states are compliant. Moreover, it has not been adequately "tended to" by its member states recently, with the last major meeting unable to agree a further programme of work. Yet it remains the cornerstone of an international regime against the hostile use of biology. All 178 state parties [declared in December of 2016](#) their continued determination "to exclude completely the possibility of the use of (biological) weapons, and their conviction that such use would be repugnant to the conscience of humankind".

These states therefore need to address the hostile potential of CRISPR. Moreover, they need to do so collectively. Unilateral national measures, such as reasonable biological security procedures, are important. However, preventing the hostile exploitation of CRISPR is not something that can be achieved by any single state acting alone.

As such, when states party to the convention meet later this year, it will be important to agree to a more systematic and regular review of science and technology. Such reviews can help with identifying and managing the security risks of technologies such as CRISPR, as well as allowing an international exchange of information on some of the potential benefits of such technologies.

Most states supported the principle of enhanced reviews of science and technology under the convention at the last major meeting. But they now need to seize the opportunity and agree on the practicalities of such reviews in order to prevent the convention being left behind by developments in science and technology.

Biological warfare is not an inevitable consequence of advances in the [life sciences](#). The development and use of such weapons requires agency. It requires countries making the decision to steer the direction of life science research and development away from hostile purposes. An imperfect convention cannot guarantee that these states will always decide against the hostile exploitation of biology. Yet it can influence such decisions by shaping an environment in which the disadvantages of pursuing such weapons outweigh the advantages.

This article was originally published on [The Conversation](#). Read the [original article](#).

Provided by The Conversation

Citation: Could CRISPR be used as a biological weapon? (2017, August 31) retrieved 23 April 2024 from <https://phys.org/news/2017-08-crispr-biological-weapon.html>

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