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Alarm sounded over self-spreading vaccine proposals

Virus vaccines for animals and humans that can spread on their own are being proposed in Europe and the U.S.

Since the first lab-modified virus capable of replication was generated in 1974, an evidence-based consensus has emerged that many changes introduced into viral genomes are likely to prove unstable if released into the environment. On this basis, many virologists would oppose the release of genetically modified viruses that retain the capacity to spread between individual vertebrate hosts.

Professor Ed Rybicki from the University of Cape Town (UCT) in conjunction with colleagues from Germany, Bonn, London, and Los Angeles now point out in a policy piece published in the journal *Science* that despite these concerns, self-spreading vaccines for animals are being researched in Europe and the Unites States (US). They are intended to limit the spread of animal diseases or disease spillover to humans.

Non-spreading viruses modified in the laboratory are already in use today, for example as vaccines for wild animals against rabies or for humans against polio. However, in all modified virus applications to date, rigorous efforts have been made to eliminate or, if this is not possible, minimize the capacity of viruses to spread in the environment between host individuals.

"The problems inherent in having vaccines that spread in an uncontrolled way are all too evident for polio – where the only poliomyelitis in the world right now is derived from back-mutated type 2 vaccine strain spreading in an uncontrolled way – and with escaped smallpox vaccine that is now endemic in cattle in Brazil," says Rybicki.

The molecular tools necessary to generate viral vaccines that retain their capacity to be self-spreading have existed for some time: In 2000, researchers demonstrated the transmission of a self-spreading rabbit vaccine in a field trial on a Spanish island. However, the European Medicines Agency declined to grant marketing approval for the vaccine. "So, no new technologies are needed to produce self-propagating vaccines. They can be developed using methods that already exist today," adds Filippa Lentzos of King's College London.

Scientists are currently vaccinating pigs with self-spreading viruses that have not been modified in a laboratory against African swine fever as part of a research project in Spain. In the US, a research project has just concluded that mathematically identified desirable properties of self-spreading vaccines. The U.S. Department of Defense's research agency, DARPA, is also experimenting to determine if self-spreading animal vaccines can prevent the spillover of pathogens to U.S. military personnel in areas they operate in.

"Because of the unclear legal situation, states should first clarify whether existing laws can be applied to self-spreading animal vaccines, because this has not worked out well for self-spreading viruses in the recent past", says Lentzos.

At the international level, "the issue could constructively be discussed in the negotiations for a United Nations agreement as part of the *Convention on Biological Diversity*, which is to be adopted this year," says Guy Reeves of the Max Planck Institute for Evolutionary Biology in Plön.

More information: http://web.evolbio.mpg.de/HEVIMAs/
Please request the password for access.

ENDS

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