Journal of the British Global and Travel Health Association, vol 16 2016:1
doi:http://dx/doi/org/10.21864/jbgtha.2016.01a
May Journal Watch

Journal Watch

Edited by M Townend

Can genetically modified mosquitoes stop Zika? *Brooks M. BMJ 2016;353:i2548*

This BMJ article by a science journalist looks at the potential role of genetic modification of mosquitoes in the control of Zika virus in particular, but also in combating other mosquito-borne infections such as malaria and dengue. It refers initially to approval given by the WHO to "carefully planned pilot development" of the use of mosquitoes produced by the Oxitec company. These male mosquitoes have had a gene inserted that results in the death of 95% of their offspring before they reach maturity. The chief scientific officer of Oxitec is quoted as claiming that in every field trial to date there has been a 90% suppression of *Aedes aegypti* , the vector of Zika and dengue, compared with a maximum of 50% suppression obtained by the use of insecticides. The article also describes the CRISPR gene editing process, currently at a less advanced stage of development, in which sections of RNA are excised and replaced with a different type of RNA, which is then incorporated into the mosquito's DNA. One application of this technique involves turning off genes that direct the production of eggs in female *Anopheles gambiae* mosquitoes, the principal vector of malaria in sub-Saharan Africa. Another application is to make mosquitoes resistant to infection with *Plasmodium* parasites, while a third application seeks to modify the sex of mosquitoes to produce a predominantly male population, thereby reducing transmission of malaria by female mosquitoes. As such modifications would normally result in the transmission of only one copy of a modified chromosome to the offspring if a modified mosquito mates with a "normal" mosquito, the technique of "gene drive" which has recently been developed, may prove able to modify the second chromosome in the same way, resulting in almost all offspring inheriting the modification. This technique has already been developed in fruit flies and may prove applicable to mosquitoes. It is estimated, however, that field trials using mosquitoes developed by CRISPR are still five years away.

Comment

It remains to be seen whether genetically modified or genetically edited mosquitoes will be able to reduce transmission of Zika, malaria, dengue or any other mosquito-borne infections, but these techniques may well be a welcome addition to the methods currently available and could, if present promise is fulfilled, prove to be superior.

Cholera: still not defeated.

Lehmann R. BMJ 14 May 2016:270

This short item in the BMJ's Research Update section refers to a paper in the New England Journal of Medicine (doi:10.1056/NEJoa1510330) describing a trial of a single dose of the killed-cell oral cholera vaccine Shanchol in Bangladesh. Protective efficacy over six months or more was 40% for all episodes of cholera and 63% for severely dehydrating cholera in older children and adults, but lower in children under the age of 5 years. The author states that in the second decade of the 21st century we still do not have a good method of preventing cholera in the most vulnerable group, but goes on to say "Oh hang on, we do. Give them a clean water supply".

Comment

This brief article highlights two points: firstly, the relative lack of efficacy of cholera vaccines, and secondly the great importance of providing clean water supplies. This single public health measure would be one of the most effective interventions possible in reducing morbidity and mortality in resource-poor countries.