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MERS-CoV against COVID-19

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Editorial Note

Scientists have developed a Middle East respiratory syndrome coronavirus (MERS-CoV) strain that could be used as a vaccine against the disease In its envelope protein, the mutant MERS virus, rMERS-CoV-&#916E, has a mutation that makes it capable of infecting a cell and replicating its genetic material, but deprives it of the ability to spread and cause disease to other tissues.

Scientists suggest it could be used as the basis of a safe and efficient live-attenuated vaccine against MERS once additional safe guards are engineered into the virus. The injected vaccine can only circulate and generate sufficient antigen in a reduced number of cells to immunise the host.

Most individuals, including those in direct contact with a vaccinated person, cannot be affected by it. Although the overall number of cases is still relatively small, public health authorities are concerned by the case fatality rate and the spread of the virus to countries outside the Middle East. A much more severe outbreak is likely if the virus has the capacity to spread easily from person to person. On coronavirus molecular biology for the synthesis of the infectious cDNA clone of the MERS-CoV genome on the basis of the published sequence. In a bacterial artificial chromosome, they inserted the viral cDNA chromosome and mutated some of its genes, one by one, to study the effects on the ability of the virus to infect, reproduce, and reinfect cultured human cells.

Mutations that disabled the accessory genes 3,4a,4b and 5 did not appear to interact with the virus. Mutant viruses had growth rates close to those of the wild-type virus, suggesting that the mutations did not disable the virus enough for mutants to be deployed in the vaccine.

For a live attenuated MERS vaccine, a large amount of rMERS-CoV-&#916E virus will be needed. Some 'packaging cells' are build that convey the E protein is lacking in the virus and individual will not be able to supply the E protein to the defective virus when the virus is given to a person for vaccination. After generating antigens to prepare the human immune system to combat an infection with MERS-CoV, the virus will die. MERS-CoV-1916E is a very promising candidate for a vaccine, but further work remains before clinical trials can begin.

One safe guard is the mutation in the E protein that prevents the virus from spreading, however the US Food and Drug Administration needs at least three safe guards to include a recombinant live attenuated vaccine strain to ensure that the virus does not readily return to its virulent form. In order to ensure that the virus does not return to virulence in a single recombination event, mutations in genes that are located in regions of the genome of the virus that are far away from the E protein gene.

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