

New vaccine candidate against SARS-CoV-2 based on MVA vector

CSIC has developed a vaccine candidate based on a modified Vaccinia virus Ankara (MVA) vector, that contains a codon-optimized gene sequence encoding the Spike protein of SARS-CoV-2 coronavirus. This vaccine prototype can elicit a strong immune response in a mammal against COVID-19, according to their *in vivo* murine and hamster model assays.

Industrial partners from the pharmaceutical industry are being sought to collaborate through a patent licence agreement.

An offer for Patent Licensing

Effective vaccine eliciting strong immune response in rodents

The emergence of coronavirus SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) and its high impact on global health have made imperative the development of safe and effective vaccines for this virus, the causal agent of COVID-19 disease.

CSIC researchers have developed an MVA-based vaccine that induces a strong immune response against SARS-CoV-2 through strategies leading to a better expression of the antigen, that leads to an increased immunization. They have achieved a high expression of the antigen through the use of strong synthetic promoters, and an optimization of the gene sequence based on the use of alternative synonymous codons and introduction of mutations that stabilize the protein.



Vaccination

Main innovations and advantages

- There are some authorized human vaccines based on MVA.
- Robust potency of the vaccine based on the MVA vector, use of strong promoters and gene design.
- In immunogenicity assays, Balb/c mice were inoculated with 2 doses of the vaccine, where IgM and IgG were significantly increased.
- K18-hACE2 transgenic mice were vaccinated by the intramuscular route with two inoculations of the vaccine and then infected with a lethal dose of SARS-CoV-2 intranasally. Complete protection from body weight loss and from death in animals vaccinated were achieved accompanied by a dramatic decrease of virus titers in lungs and brain.
- In Syrian hamsters, the results showed complete absence of lung lesions in animals vaccinated and undetectable levels of virus by day 4 in nasal turbinates and lungs, indicating an effective protection.
- The isolation procedure facilitates the update of the vaccine for new SARS-CoV-2 variants in weeks.

Patent Status

European patent application filed suitable for international extension

For more information, please contact:

Raquel Ballesteros Lozano

Deputy Vice-Presidency for Knowledge Transfer

Spanish National Research Council (CSIC)

Tel.: +34 915681919

E-mail: raquel.ballesteros@csic.es
comercializacion@csic.es