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# Safe and Effective RNA Replicon Vaccine Against COVID-19

## A new combinatorial vector/VLP vaccine approach suitable for immunization of immune-compromised patients

**Reference: RNA Replicon Vaccine**


*Source: https://stock.adobe.com/uk/331786956*

## IP Status

Patent application submitted

## Seeking

Development partner, Commercial partner, Licensing

## About **LMU Munich**

Ludwig-Maximilians-Universität München is the University in the heart of Munich. LMU is recognized as one of Europe's premier academic and research institutions. The LMU Munich community is engaged in generating new knowledge for the benefit of society at large.

# Background

Sustainable control of the current COVID-19 pandemic requires effective and safe vaccines. While the front-runner mRNA vaccines from BioNTech/Pfizer and Moderna seem to be safe, concerns exist with a number of virus-vectored vaccines in terms of safety or efficacy. Scientists from LMU Munich and from the Paul-Ehrlich-Institute, have joined to develop an RNA replicon vaccine which is highly efficient in animal models.

# Tech Overview

The novel vaccine consists of a self-replicating RNA (replicon) derived from an animal rhabdovirus, vesicular stomatitis virus (VSV). The replicon encodes the part of the Coronavirus spike protein, which is the most important for eliciting a protective immunity. The replicons are enwrapped artificially into a VSV envelope for delivery of the RNA into cells where it can produce the protective antigen.

A peculiarity of the vaccine is the design and presentation of the antigen. While in current vaccines whole coronavirus spike protein is being used as an antigen, the VSV replicon encodes a chimeric transmembrane “minispike”, presenting only the receptor binding domain (RBD) of the spike protein. As most of the antibodies protecting against COVID-19 are targeted to the RBD, the design of the minispike avoids induction of non-necessary and potentially harmful immune responses. The chimeric antigen is presented by the replicon vaccine on the cell surface and stimulates production of antibodies which can block infection by the natural SARS-CoV-2 coronavirus.

An additional key feature of the minispike is that its membrane part is similar to a rhabdovirus glycoprotein, such that the RNA replicon in infected cells can be mobilized again, so that noninfectious virus-like particles (VLPs) decorated with minispike are released, which can further stimulate the immune system to produce antibodies. The vaccine is thus a combination of classical vector- and VLP-vaccines. As revealed in animal experiments, this 2-in-1 vaccination leads to production of high antibody levels, which are sufficient to completely protect transgenic animals from COVID-19 disease. A second (boost) vaccination as recommended for most conventional vaccines is thus not required.

Further Details

Safe and effective two-in-one replicon-and-VLP minispike vaccine for COVID-19: Protection of mice after a single immunization ; Alexandru A. Hennrich, Bevan Sawatsky, Rosalía Santos-Mandujano, Dominic H. Banda, Martina Oberhuber, Anika Schopf, Verena Pfaffinger, Kevin Wittwer, Christiane Riedel, Christian K. Pfaller, Karl-Klaus Conzelmann; PLoS Pathog 17(4): e1009064.

## Stage of Development

Proof of Concept in animal studies.

# Benefits

- Stimulates production of antibodies which can block infection by the natural SARS-CoV-2
- Avoids induction of non-necessary and potentially harmful immune responses
- Safe non-spreading single-round vector
- Second (boost) vaccination is not required

# Applications

- Immunization of patients against SARS-CoV-2
- Immunization of immune-compromised patients against SARS-CoV-2
- Platform for future development of vaccines against existing and emerging pathogens

# Patents

- Patent application submitted. Please contact TTO for further details.

# For further information, please contact us.


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