

Healthcare industry BW

University Hospital Tübingen starts clinical studies with an in-house developed vaccine for COVID-19

Novel vaccine trial to activate T-cell responses against SARS-CoV-2

A Phase I clinical trial using a self-developed vaccine against SARS-CoV-2 was initiated today at the University Hospital of Tübingen. In contrast to the currently evaluated vaccine candidates against COVID-19, the vaccine CoVAC1, developed by the Department of Immunology (Director Prof. Hans-Georg Rammensee) at the University of Tübingen, aims specifically at the induction of a T-cell-mediated immune response against SARS-CoV-2. The clinical study, financed by the Ministry of Science, Research and Arts of Baden-Württemberg, is based on the work of and headed by PD Dr. Juliane Walz in the KKE Translational Immunology at the Medical Department (Medical Director Prof. Helmut Salih) of the University Hospital. The Paul-Ehrlich-Institute, responsible for the approval of clinical studies, as well as the ethics committee Tübingen granted the start of the vaccination study on Wednesday, November 25, 2020.

The primary goal of the vaccination is the activation of a strong and long-lasting T-cell response against SARS-CoV-2, which, in the case of an infection, should prevent severe disease courses of COVID-19. "As far as we know, this is the first vaccine candidate that exclusively focusses on the activation of T-cells," reports principal investigator Juliane Walz.

"Model" cancer immunotherapy

The idea for the newly developed vaccine is derived from cancer immunotherapy, one of the main research topics of Tübingen's immunologists. For many years, the team around Hans-Georg Rammensee has been working on the development of so-called therapeutic peptide vaccines for cancer patients. "Peptides are short parts of proteins, which are presented to the immune system and here especially to T-cells on the surface of tumor and virus-infected cells", Hans-Georg Rammensee explains the biological background, "this enables the immune system to recognize 'foreign' cells and to eliminate them".

In addition to the direct attack of tumor or virus-infected cells, T-cells support the formation of antibodies. "If such peptides are applied as vaccines together with a suitable immune stimulator, a so-called adjuvant, T-cells can be activated specifically against tumor cells, but also against virus-infected cells," Juliane Walz describes the process. The novel adjuvant XS15 used in the COVID-19 vaccination study was likewise developed in Tübingen by the team around Hans-Georg Rammensee - for cancer vaccinations. "In our first preclinical and clinical applications we observed strong T-cell responses to both, tumor and viral peptides when applied together with XS15," says Hans-Georg Rammensee.

Why a T-cell based vaccine?

The fact that T-cells play an important role in COVID-19 disease was recently unraveled by the research group of Juliane Walz in the scientific journal Nature Immunology. This work also provides the basis for the now starting clinical study. Within this research work, respective peptides that are important for the recognition of the SARS-CoV-2 virus by the T-cells were identified in the blood of convalescent donors after COVID-19 disease. Furthermore, it was shown that the recognition of multiple of these peptides is important for a protective T-cell immunity against SARS-CoV-2. In a first follow-up analysis of the convalescent donors after six months, it was shown that the T-cell responses against certain peptides remain robust. In contrast results of own (<https://www.researchsquare.com/article/rs-114499/v1>) and other studies indicate that the antibody response, which is the primary target of the majority of vaccines currently under evaluation, rapidly decreases.

"Exactly those peptides that were identified to play an important role in long-term immunity after natural SARS-CoV-2 infection are now applied in the CoVAC-1 vaccine," explains Juliane Walz. "Furthermore, a vaccine designed exclusively for T-cell activation should not bear the theoretical risk of so-called antibody-mediated disease amplification".

Media attention is currently focused of course on the more advanced development of vaccines, for which approval is expected in the near future. "In view of the rapid development, however, it is still unclear whether a vaccine, and if so, which vaccine, will offer optimal protection and shows the best possible tolerability for specific groups of people, for example for elderly or pre-diseased people. With our development of this novel vaccine concept at the University Hospital Tübingen, we want to contribute

and create alternatives," says Helmut Salih, in whose Department for Translational Immunology the vaccine is being evaluated.

Vaccine production at the University Hospital Tübingen

The vaccine, which consists of multiple of the identified SARS-CoV-2 peptides, is produced in the "Wirkstoffpeptidlabor" and the GMP unit of the University Hospital Tübingen. Here, the University draws on its many years of experience and expertise in the production of vaccines for cancer patients, which have already been used in numerous clinical studies.

About the clinical study

In the first part of the clinical study, healthy volunteers between 18-55 years are vaccinated in the KKE Translational Immunology, subsequently also older volunteers with preexisting diseases can receive the vaccine. The study includes a screening appointment, a vaccination appointment and six control appointments within a period of six months.

Press release

01-Dec-2020

Source: Universitätsklinikum Tübingen

Further information

PD Dr. Juliane Walz

Prof. Dr. Helmut Salih

E-mail: [covid.kke\(at\)med.uni-tuebingen.de](mailto:covid.kke(at)med.uni-tuebingen.de)

- ▶ [More informationen to the clinical study](#)
- ▶ [Universitätsklinikum Tübingen](#)