Development of an inactivated vaccine candidate for SARS-CoV-2

The virus SARS-CoV-2 has caused COVID-19 disease which has led to an unprecedented public health crisis world-wide. The scientific community is still searching for a vaccine and there are currently no SARS-CoV-2 specific treatments, an effective vaccine is urgently needed.

Researchers have developed a “pilot-scale production of a purified inactivated SARS-CoV-2 virus vaccine candidate (PiCoVacc), which induced SARS-CoV-2-specific neutralizing antibodies in mice, rats and non-human primates”. The induced antibodies neutralized 10 representative SARS-CoV-2 strains which suggests that there may be a possible broader neutralizing ability.

“Three immunizations using two different doses (3 μg or 6 μg per dose) provided partial or complete protection in macaques against SARS-CoV-2 challenge, respectively, without observable antibody-dependent enhancement of infection.”

The researchers showed evidences for the safety of PiCoVacc in macaques; and did not observe infection enhancement or immunopathological exacerbation in their studies. “The results suggest a path forward for clinical development of SARS-CoV-2 vaccines for use in humans. Phases I, II and III clinical trials with PiCoVacc, as well as other SARS-CoV-2 vaccine candidates, are expected to begin later this year”.

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Immunogenicity and protective efficacy of PiCoVacc in nonhuman primates. Macaques were immunized three times through the intramuscular route with various doses of PiCoVacc or adjuvant only (sham) or placebo (n=4). SARS-CoV-2-specific IgG response (A) and neutralizing antibody titer (B) were measured. Data points represent mean +/- SEM of individual macaques from four independent experiments; error bars reflect SEM; dotted lines indicate the limit of detection; horizontal lines indicate the geometric mean titer (GMT) of EC50 for each group. Protective efficacy of PiCoVacc
against SARS-CoV-2 challenge at week 3 after immunization was evaluated in macaques (C-F). Viral loads of throat (C) and anal (D) swab specimens collected from the inoculated macaques at day 3, 5 and 7 pi were monitored. Viral loads in various lobes of lung tissue from all the inoculated macaques at day 7 post-infection were measured (E). RNA was extracted and viral load was determined by qRT-PCR. All data are presented as mean ± SEM from four independent experiments; error bars reflect SEM. Asterisks represent significance: *P < 0.05 and **P < 0.01. Histopathological examinations (F) in lungs from all the inoculated macaques at day 7 post infection. Lung tissue was collected and stained with hematoxylin and eosin.

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