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Editorial

Transforming A Coronavirus Protein into A Nanoparticle for Production of Promising COVID-19 Vaccine

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In the mid-1960s, coronavirus were found that it can infect both humans and animals (birds and mammals), whereas novel coronavirus-2019 (2019-nCoV or COVID-19) with closed relation to SARS-CoV was first identified from a patient with pneumonia, related to the cluster of acute respiratory illness cases from Wuhan, China. Presently, there is no best vaccine to end the COVID-19 pandemic.

The antibodies to receptor-binding domain (RBD) that locates on the characteristic COVID spike have the potential to destroy this part of the SARS-CoV-2 (COVID-19).

By using the RBD protein itself as an antigen that could induce high-levels of antibodies, a component of vaccine against RBD protein that can achieve this goal.

A same-size-to-COVID-19-virus nanoparticle was produced by converting the RBD that would generate antibodies in higher levels and finally generate an immune response.

To easily converted small, purified proteins into particles, a technology was developed by using small nanoparticles formed from the naturally-occurring fatty components of liposomes. To form more nanoparticles and generate an immune response, a new study included a special lipid of cobalt-porphyrin-phospholipid (CoPoP) within the liposomes that makes the rapid binding of RBD protein to the liposomes.

To maintain its correct, three-dimensional shape and the particles' stability in the same incubation conditions as those in the human body, the RBD was converted into nanoparticles. To induce high antibody level, mice and rabbits were immunized with the RBD particles. Only the approach with converting the RBD into particles containing CoPoP gives strong responses to enhance the immune system, whereas other vaccine adjuvant does not.

In conclusion, for targeting this specific antigen, the above method could help information of vaccine design.