Development of universal vaccine against SARS using replicon platform technology

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We have developed a vaccine candidate for Coronavirus Disease 2019 (COVID-19) using our proprietary technology that is based on a self-amplifying RNA (replicon) vaccine vector. Immunization with this replicon vaccine provides high expression levels of antigens, induction of strong immune responses using vectors that are safe and well tolerated. The high expression is due to the intracellular replication of the RNA that provides a significant dose-sparing effect. The dose-sparing effect is especially important during pandemics where large numbers of doses must be manufactured quickly. The optimal dose of a replicon vaccine is expected to be 1-10 μg, compared to 100 μg for nonreplicating RNA vaccines, and 1-4 mg/dose for DNA vaccines. Our vaccine is designed to express the receptor-binding domain (RBD) of the S protein, the domain that induces most neutralizing antibodies. Previously, we manufactured this vaccine expressing RBD from Wuhan strain and entered phase1 clinical trials (immunizations to naïve population and to two-immunized population). To develop this replicon platform for next pandemic coronavirus vaccine, we will make a new approach to express RBD from the predicted sequence of the next pandemic strain and also express conserved CD8 T cells among CoV-1 and CoV-2 strains. The vaccine manufacturing and supply system will be established in Japan. These efforts will enable the development of a safe and effective vaccine and contribute to protection of the Japanese population against next pandemic coronaviruses.