**Spillover infection of coronaviruses and preparedness for COVID-19 with vaccine**

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**Abstract**

Coronavirus disease 2019 (COVID-19), which causes serious respiratory illness such as pneumonia and lung failure, was first reported in Wuhan city of China. The causative agent of COVID-19 was confirmed as a novel beta-coronavirus, now known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which is most likely originated from zoonotic coronaviruses, The outbreak of emerging severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) disease (COVID-19) in China has been brought to global attention and declared a pandemic by the World Health Organization (WHO) on March 11, 2020. Scientific advancements since the pandemic of severe acute respiratory syndrome (SARS) in 2002~2003 and Middle East respiratory syndrome (MERS) in 2012 have accelerated our understanding of the epidemiology and pathogenesis of SARS-CoV-2 and the development of therapeutics to treat viral infection. As no specific therapeutics and vaccines are available for disease control, the epidemic of COVID-19 is posing a great threat for global public health. To provide a comprehensive summary to public health authorities and potential readers worldwide, we introduced the current status of spillover infections of coronaviruses in this review.

Also, we reviewed the current models of SARS-CoV-2 infection and COVID-19-related disease mechanisms and suggest ways in which animal models can be adapted to increase their usefulness in evaluation of COVID-19 vaccine and pathogenesis.