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Journal of Cell Signaling

Editorial

Lethal Human Coronaviruses

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EDITORIAL NOTE

Coronavirus infections of manifold origins have spread to date worldwide, causing severe respiratory diseases. Seven coronaviruses that infect humans have been recognized: HCOV-229E, HCoV-OC43, HCOV-NL63, HCOV-HKU1, SARS-COV, MERS-COV, and SARS-COV-2. Among them, SARS-COV and MERS-COV caused outbreaks in 2002 and 2012, respectively. SARS-COV-2 (COVID-19) is the most recently discovered. It has created a plain worldwide outbreak beginning in late 2019, leading to date to over 4 million cases globally. Viruses are genetically simple, yet highly diverse. However, the recent outbreaks of SARS-COV and MERS-COV, and the ongoing outbreak of SARS-COV-2, designate that there remains a long way to go to identify and develop specific therapeutic treatments. Only after gaining a better understanding of their pathogenic mechanisms can, viral pandemics. This paper mainly focuses on SARS-COV, MERS-COV, and SARS-COV-2. Virus host interactions, vaccine-based and drug-targeted therapies, and the development of new approaches for clinical diagnosis and treatment.

SARS-COV and MERS-COV fit to subgroups 2b and 2c of the beta coronaviruses, respectively, and SARS-COV-2 is a new member of beta coronaviruses, distinct from SARS-COV and MERS-COV. SARS-COV and SARS-COV-2 are similar in terms of invasion and self-replication, whereas MERS-COV has different targets. The cellular receptor of SARS-COV and SARS-COV-2 is ACE2, plus CD147 for SARS-COV-2, while that of MERS-COV is DPP4 (CD26). All of them evolved a mechanism to escape the host cell immune system. SARS-COV and SARS-COV-2 affect the RAS system by suppressing ACE2, leading to the onset of symptoms. MERS-COV causes symptoms by producing inflammatory cytokines and invading T cells. SARS-COV, MERS-COV, and SARS-COV-2 infections have similar symptoms, including fever, cough, myalgia, and shortness of breath, among others. Current treatments for SARS mostly include IFN-α, antiviral treatments, plasma therapy, host directed therapies, and systemic corticosteroids. For MERS, numerous therapeutics are in development, counting convalescent plasma, lopinavir/ritonavir, ribavirin, IFN, and novel therapies, including polyclonal antibodies, broad-spectrum antivirals, and AMPs. For COVID-19, candidates mainly include drugs targeting the S protein, nonstructural proteins (3CLpro, PLpro, helicase, and RdRp), mRNA vaccine, and recombinant vaccines are being rapidly developed.

So far this century, human beings have experienced numerous epidemic outbreaks, and each eruption had a negative impact at different levels, including health, economy, and even psychology and human behavior. In the future, more precautious measures should be obtainable to guide individuals and groups to take effective emergency measures and to support social stability, and physical and mental health. Also, additional studies of coronaviruses and disease epidemics should continue, to support the groundwork for future responses, medical therapies, vaccines, and methods of relieving personal anxiety. This review has decorated several methods, and the names and progress connected to several compounds and biologics currently below research and development, as well as the companies and researchers complicated in these efforts. For future directions, it has also labelled the changes and similarities, as well as the possible routes and potentials for directing each of the main three viruses examined.

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Received: June 2, 2021; **Accepted**: June16, 2021; **Published**: June 24, 2021

Citation: Asif AR (2021) Lethal Human Coronaviruses. J Cell Signal. 06: e238.