Development of platform technologies for testing anti-infectives against animal coronaviruses

The National Institute of Animal Biotechnology (NIAB), Hyderabad in collaboration with Translational Health Science & Technology Institute (THSTI), Faridabad has recently initiated a project to explore establishment of platforms for large-scale (high-throughput) screening of compounds which may have the ability to block the virus to propagate in relevant cells, focusing on pig and poultry coronaviruses and using mouse and rat coronaviruses as models. The proposed platforms involve engineering of cells and viruses so as to avoid the handling of live virus, and developing read-outs through color development. The project is funded by the Department of Biotechnology (DBT) and is envisaged to result in the establishment of a technology platform that can be further fine-tuned against animal and human coronaviruses, with the potential to apply similar techniques to other viral infections of humans and animals.

The recent pandemic of COVID-19 has highlighted that coronaviruses are an important threat to public health. Coronaviruses are a group of respiratory and enteric viruses which infect birds and mammals alike. In humans, four coronaviruses have been known to be associated with common cold. Two others, including the one that causes COVID-19, cause severe acute respiratory syndrome. One of these, the Middle Eastern Respiratory Syndrome Virus has caused outbreaks in the last two decades, with fatal outcomes. On the other hand, old as well as new coronaviruses with serious disease burden exist in domestic animals and poultry. These include at least four coronaviruses that cause diarrhea and at least one coronavirus which causes respiratory disease in pigs, a coronavirus which causes two different disease conditions in cats, coronaviruses which cause vomiting and diarrhea in dogs, and a coronavirus which causes severe and fatal respiratory
disease in poultry. In addition, mouse and rat coronaviruses are important pathogens which affect the health of laboratory animals, and have implications for the interpretation of results of experiments conducted on these animals. Mammalian coronaviruses causing disease are acquired mostly from bats but also from rodents. It is hypothesized that a diverse range of coronaviruses exist and do not cause disease in bats, and that spill-over and adaptation of such coronaviruses to animals and man and subsequent disease can be anticipated. There is need to investigate and understand various aspects of this group of zoonotic viruses. At the same time, there is requirement for the establishment of protocols and platforms to study ways and means to treat or prevent the viral infection

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