KMPC has been using mouse models to study the mechanism of infection by the SARS-CoV-2 virus.

MOUSE PHENOTYPING CENTER: A PILLAR OF PANDEMIC RESEARCH

SOUTH KOREA'S MOUSE PHENOTYPING CENTER has proven a valuable resource in the COVID-19 pandemic.

The COVID-19 pandemic has seen biomedical research accelerate to an unprecedented speed in pursuit of vaccines and treatments. While much focus has been on large-scale clinical trials in humans, just as important is the preclinical research for rapid evaluation before clinical trials. The Korea Mouse Phenotyping Center (KMPC), led by Director Je Kyung Seong, a professor at Seoul National University, has played a crucial role in establishing a nationwide preclinical protocol setup for COVID-19 research. "We generated our COVID-19 mouse model with different types of promoters to study various COVID-19 complications. We are not only distributing these models, but also sharing our research data resources," says Seong. In this respect, the work being undertaken at KMPC has the potential to translate well beyond its walls and to act both as a model and as a resource for researchers in the fight against COVID-19.

For the last two years, KMPC has focused a significant amount of its efforts on COVID-19, including establishing an infectious disease research alliance with seven laboratories equipped to biosafety level 3 (BSL-3). By linking these BSL-3 laboratories under the KMPC umbrella, the centre has been able to coordinate preclinical COVID-19 trials across all the laboratories as efficiently as possible. It also developed unified protocol guidelines that are followed by all the laboratories in the network, to ensure the research and results meet the same standards. So far, the network has conducted around 47 preclinical studies in mouse and hamster models of COVID-19, all of which have been supported by the South Korean Ministry of Science and ICT.

KMPC laboratories have also been using mouse models to examine the mechanism of infection with SARS-CoV-2. One area of research has used SARS-CoV-2 virus particles labelled with a radioisotope to track the movement of the aerosolized virus when it is inhaled or administered through the nose. The radioisotopes can be traced with molecular imaging to show the path of the virions from air to cell and then throughout the body. "These kinds of tools are very beneficial to evaluate the efficacy of candidate drugs against COVID-19," Seong says.

[KMPC] HAS BEEN ABLE TO COORDINATE PRECLINICAL COVID-19 TRIALS.

In addition to establishing the unified protocol guidelines for laboratories in their network, the KMPC also built a laboratory information management system (LIMS) which combined the preclinical protocol design and research data warehouse. This platform connects laboratories around the country and allows researchers to share or communicate their research and results easily. The KMPC plans to open this platform as a public database for sharing preclinical data to speed up the operation on new COVID-19 drug development.

The KMPC is already looking to the future, for the next infectious disease outbreak. The huge amount of non-clinical data collected using model animals during the COVID-19 pandemic can serve as the foundation of big data that can inform the development of vaccines and treatments. ∎

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