Scientist develop specialised mouse models to study COVID-19

New Delhi, Oct 13: Animal models are required to understand the pathogenesis of any virus and its effects on multiple organs in the body, and for developing effective treatments and vaccines. Mouse models are the pre-eminent platform for preclinical studies. They provide insights into disease etiology and serve as a platform for vaccine and drug development.

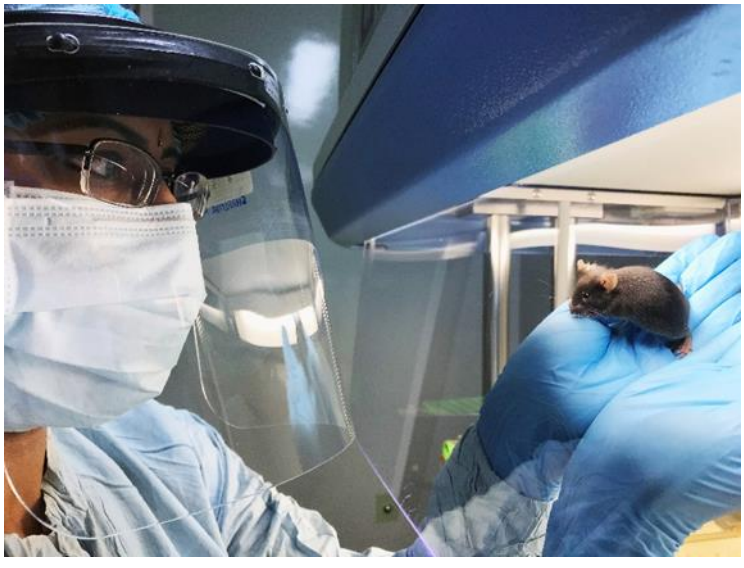
Studies have shown that the Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV-2), the virus that causes COVID-19, enters the human body by binding to an enzyme called human angiotensin-converting enzyme 2 (ACE2). However, due to structural differences between the ACE 2 enzymes in mouse and human beings, commonly used wild-type mouse strains are not appropriate for studying infections of coronavirus.

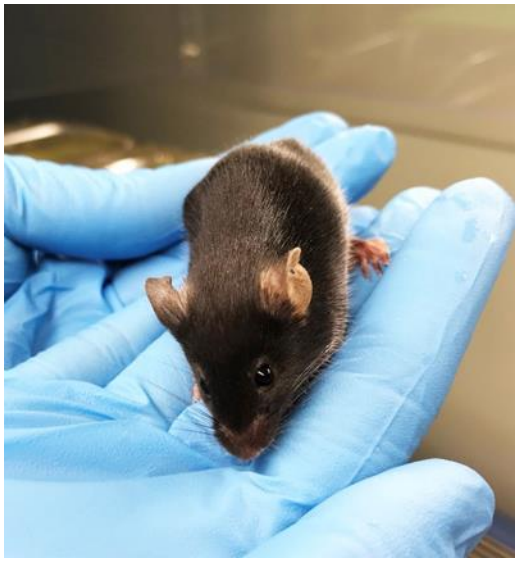
The Mouse Genome Engineering Facility (MGEF) at the Bangalore Life Science Cluster (BLiSC) has designed three different sets of ACE2 mouse models to overcome the problem, leveraging its expertise and infrastructure established with support from the DBT funded National Mouse Research Resource (NaMoR) grant.

The first model, named Tg (K18-hACE2)/Blisc mouse, is a humanized model expressing the human ACE2 gene in the lung airways as well as other organs. These mice are available for shipment. More information can be found at: https://www.ncbs.res.in/research-facilities/acrc

The second is a humanized hACE2 mouse model. It is a Targeted Knock-IN hACE2-KI model in which the mouseACE2 gene is replaced by the human ACE2 gene. This model is expected to more faithfully recapitulate the full endogenous spatio-temporal expression levels of ACE2.

In the third set, two different mAce2 ‘Knock-OUT’ mice have been generated. In the first, Ace2-KO1/Blisc, the first exon of mAce2 has been deleted. In the second, Ace2-KO2/Blisc, there is a deletion of the entire 47Kb mouse locus. These mice would result in the complete loss and/or dramatically reduced Ace2 activity and function and would be resistant to COVID infection - they will be useful to understand the normal function of Ace2.





BLiSC-ACRC facility staff handling/observing a new humanized ACE2 mouse.

Pic: BLiSC-ACRC facility staff handling/observing a new humanized ACE2 mouse.

Current updated information on the availability of these mice is provided at: https://www.ncbs.res.in/research-facilities/acrc

Altogether these mouse models will allow researchers to study ways to block infection, understand how inflammation develops after infection and the short and long-term effects of the virus on different organs of the body. Importantly, the production of these mice within India avoids the delays in importing the animals from overseas. As a consequence, many Indian researchers can immediately test their ideas on how to combat the virus causing COVID19 and make important contributions to stopping this pandemic.

The project was implemented by DBT- Institute for Stem Cell Science & Regenerative Medicine (DBT-inStem), in collaboration with National Centre for Biological Sciences, NCBS Animal Care and Resource Centre, and Mouse Genome Engineering Facility.

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Link: https://www.instem.res.in/