

JAX mouse models and the SARS-CoV-2 virus

There are specific proteins used by coronaviruses to gain entry into cells and cause infection. One such protein important in SARS CoV-1 infection and highly likely used by SARS CoV-2 is human angiotensin-converting enzyme 2 (hACE2). The virus binds poorly to the mouse hACE2 homolog and thus mice do not develop significant clinical disease (PMID: [17079315](#), [31996437](#)). Therefore, in general, mice are not susceptible to infection with the Coronavirus (SARS-CoV-2) that is associated with COVID-19. However, The Jackson Laboratory has two types of mouse strains that may be vulnerable to infection by the virus. One type is a strain of transgenic mice: B6.Cg-Tg(K18-ACE2)2PrImn/J ([Stock No. 034860](#)) that expresses the human ACE2 receptor for the SARS-CoV-2 virus under the control of the Keratin 18 promoter. The other type includes various strains of humanized mice (immunodeficient mice engrafted with either human CD34+ hematopoietic stem cells or peripheral blood mononuclear cells). In the humanized mice, subsets of cells from the human hematopoietic compartment do express hACE2 receptor and other potentially relevant molecules, and may render these mice vulnerable to infection. However, the susceptibility of humanized mice to SARS-CoV-2 infection has yet to be demonstrated experimentally. Nonetheless, mice with any cells expressing hACE2 should be handled in a manner consistent with CDC/ABSA/WHO guidelines for prevention of infection of humans with the SARS-CoV-2 virus. Proper PPE and handling methods should be used at all times when working with these mice.

In order to work with our animals at JAX, personnel must change into extensive PPE including sterilized garments, gloves and respiratory protection (PAPRs or hood with N95 mask and face shield). Animals are only handled in a laminar flow hood. There is no physical contact or respiratory interchange between the animals and the personnel who work with them. In addition, humanized mice are handled under BSL2 conditions. Therefore, although it is technically/scientifically possible for the transgenic and humanized mice to be infected, we feel the probability of infection with SARS-CoV-2 is extremely remote given the strict handling conditions. Additionally, we will be testing mice from the hACE2 transgenic colony by PCR for detection of SARS-CoV-2 in the near future.