

## **Recommended Housing and Husbandry for Models Susceptible to SARS-CoV-2**

### **SPECIAL BIOSECURITY PRECAUTIONS REQUIRED**

Although laboratory mice are not permissive for infection by SARS-CoV-2, the virus which causes COVID-19, certain specialized mouse strains may be susceptible to this virus. Special biosecurity precautions are required to protect the health and welfare of these specialized mouse strains as well as to protect personnel. Appropriate housing, husbandry practices and staff personal protective equipment (PPE) are required to prevent transmission of virus from infected staff or fomites to these specialized mouse strains and subsequently from infected mice to staff. Diligent observations and incorporation of SARS-CoV-2 testing into animal health testing programs serve as an additional line of defense.

### **SARS-CoV-2 Permissive Research Models**

Humanized ACE2 mice (Taconic model numbers 18222, 18225 and other model #s to be released in the future, hereafter individually and collectively referred to as "hACE2 mice") express the human ACE2 receptor, which is used by SARS-CoV-2 for entry into cells, and are susceptible to SARS-CoV-2 infection. These specialized mouse strains support SARS-CoV-2 viral replication and may develop weight loss, respiratory distress and die following infection with infection above a threshold viral dose.

Humanized immune system mice (Taconic models huNOG, huNOG-EXL, huPBMC-NOG, hPBMC-B2m-NOG and custom engraftment models) are engrafted with human immune cells which may express the human ACE2 receptor and may also be susceptible to infection by SARS-CoV-2. There is no published information regarding susceptibility of humanized immune system mice to SARS-CoV-2.

While caution is warranted when working with mice carrying human cells, the primary concern is for mice expressing human ACE2.

Subsequent to infection by SARS-CoV-2, susceptible models such as hACE2 mice may lose weight, display rapid or labored breathing, exhibit hunched posture and die. Severity of clinical illness may depend on initial inoculum. It is not yet known whether SARS-CoV-2-infected mice can transmit the virus to humans.

### **Housing and husbandry for hACE2 mice at Taconic**

The husbandry practices and PPE used in Taconic's housing locations for hACE2 mice are expected to prevent transmission of SARS-CoV-2 to the mice. Diligent observation and SARS-CoV-2 testing are designed to detect any transmission of virus.

- The hACE2 mice are housed at Taconic's Excluded Flora health standard in individually ventilated cages (IVCs) in barrier rooms. All supplies are sterilized prior to entry, with most supplies steam sterilized and limited entry of ethylene oxide or irradiated supplies.
- Prior to entry into IVC barrier rooms housing hACE2 mice, staff don sterile uniforms that completely cover the employee and wear powered air-purifying respirators (PAPRs) with HEPA filtration on intake and exhaust. While working in an IVC barrier room, staff disinfect hands and instruments between every cage.
- Animal manipulations including cage changes or procedures take place only in Class II BSCs or animal transfer stations with HEPA filtration.

- Staff working with hACE2 mice must answer a daily questionnaire to assess presence of COVID-19 symptoms and have their temperature taken prior to starting work. These personnel are tested for SARS-CoV-2 on a regular basis.
- hACE2 mice are observed daily for general health and respiratory distress and on a weekly basis for body score. hACE2 mice which display any respiratory distress or low body condition score are humanely euthanized, with review by Taconic's Veterinary Sciences staff for any potential concerns.
- All colonies of hACE2 mice are monitored by fecal PCR on a biweekly basis for SARS-CoV-2.
- Quarterly exhaust air duct (EAD) testing of each IVC rack housing hACE2 mice includes PCR screening for SARS-CoV-2.
- All waste (caging, dirty bedding, water bottles) from hACE2 colonies is autoclaved prior to washing and reprocessing.
- Euthanized hACE2 mice are treated as medical waste.
- hACE2 mice are packed in their barrier of origin into sterilized Taconic Transit Cages.

### **Basic housing and husbandry recommendations**

- ABSL designations are determined by the institutional biosafety committee.
- Taconic recommends use of IVC caging with cage change or other manipulations performed inside a Class II BSC or animal transfer station with air flow designed to protect both the animals and caretakers.
- Taconic recommends that staff wear protective PPE that includes full body coverage and respiratory protection.
- Taconic recommends that all supplies be sterilized to prevent viral transmission via fomites. This includes cages, bedding, enrichment materials, water and feed.
- Routine observations are important to identify any signs of clinical illness.
- Testing for SARS-CoV-2 may be incorporated into your animal health surveillance program, if desired. IDEXX BioAnalytics offers a PCR test for SARS-CoV-2. Fecal material should be collected from hACE2 mice. Sentinel testing is not likely to be informative as the typical laboratory strains used as sentinels are not susceptible to SARS-CoV-2.
- While the waste stream from uninfected hACE2 mice is not infectious, as an extra precaution, Taconic recommends autoclaving all waste coming from hACE2 mice in case of accidental/undetected infection.

### **Housing recommendations for SARS-CoV-2 infection studies**

- Animals which have been inoculated with SARS-CoV-2 require ABSL-3 housing.
- All institutional guidelines and requirements for ABSL-3 studies should be followed.

### **Questions?**

Taconic's experts can consult with you on specific questions. For questions regarding these housing and husbandry recommendations, please contact us at [info@taconic.com](mailto:info@taconic.com). To learn more about Taconic's portfolio of models and services for COVID-19 research, visit our [Coronavirus Toolkit](#).