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The Better To See You With

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Jacques: The Better To See You With

The better to see you with

A white interior design aids insect, disease research
A room with white walls, white countertops, white cabinets and white lab coats is ideal for the work of Stephen Higgs, research director of the Biosecurity Research Institute, associate vice president for research and Peine biosecurity chair at Kansas State University.

The all-white room is the institute’s new arthropod containment laboratory and will help scientists see small black insects easily — a must-have feature when working with insects smaller than one-eighth of an inch.

“The institute is a unique facility in what it can do because it has the ability to study plant pathogens, animal pathogens, food safety and security and now vector transmitted viruses,” Higgs said. “There are many viruses that we don’t completely understand the interaction among the three components of disease transmission: virus, vector and its vertebrate host.”

Once fully operational, the lab will be home to arthropods such as mosquitoes, ticks and biting flies called Culicoide midges. Arthropods are known to be carriers of many viruses, including bluetongue, the Schmallenberg virus, Rift Valley fever, West Nile virus, yellow fever virus and African swine fever.

The insect lab is a result of a collaborative funding and planning effort between the institute and the U.S. Department of Agriculture’s Arthropod-Borne Animal Diseases Research Unit, or ABADRU, which recently relocated from Wyoming to Kansas. Scientists from both facilities will work together using the institute’s secure biosafety level-3 and biosafety level-3-agriculture capabilities to understand disease transmission.

“Having an arthropod containment laboratory at the institute allows us to examine the interaction of viruses with the arthropod vectors, as well as a specific arthropod’s ability to transmit viruses to animals — otherwise known as vector bite transmission,” said Barbara Drolet, research microbiologist with the Arthropod-Borne Animal Diseases Research Unit who will be working in the lab.

Little is known about transmission of the Schmallenberg virus. It causes abortion in sheep and cattle, but so far it has only been documented in Europe, Higgs said.

“There are no other labs in this country that can perform large animal studies with these viruses at the same capacity,” Higgs said. “The way that the building is constructed and all of the protocols we have in place make this the safest place to perform this kind of research.”

To work in the insect lab, researchers must go through rigorous training. This includes Higgs, who has studied vector-transmitted viruses since 1985.

Part of the training specific to working with insects is counting.

“Everything we do in the laboratory has been well rehearsed with uninfected insects,” Higgs said. “Even simple things such as counting are critical because we must account for all of our insects at all times. The rule is simple: If at the end of an operation you ended up with 99 instead of 100, then you would have to stay in that room until the missing one is found, no matter how long it takes. Facility construction, operating procedures and personnel training ensure safe and secure research.”

Although all insects are contained within three separate containers — one inside another — to eliminate the possibility of an escapee, the room has added safety precautions. Two separate forceful airstreams blast any would-be escapee away from the door back into the center of the room, and handheld vacuums are available for transferring the insects. Low ceilings and the all-white color of the room make it easier to find and capture an insect in the highly unlikely event that one did get out of a carton, Higgs said.

“The establishment of the arthropod lab at the Biosecurity Research Institute facilitates collaborative work, giving Kansas State University a competitive advantage over many academic institutes,” Higgs said. “It also benefits the nation in preventing or limiting viruses from infecting our country because the more we know the less vulnerable we are.”

By Stephanie Jacques, Communications and Marketing