HOW TO CATCH A VIRUS

A Georgia lab makes record time entering the battle against herpes

Cleanrooms are designed to keep the bad stuff out, but sometimes science puts a new spin on air control — a need to keep the bad stuff in. For example, to create the new Level 4 Bio-Safety Lab at Georgia State University's Viral Immunology Center, engineers and architects used state-of-the-art methods, but the goal was to construct a superior facility that allows research on the herpes B virus by keeping it strictly contained.

As if that weren't enough of a challenge, the project team found themselves very short on time. From start to finish, the process for a bio-safety lab meeting Level 4 specifications often takes three to five years. This team had 12 months.

Why the rush? The university was trying to enter the research arena on a world-class scale in a hurry, and William J. Todd, president of the Georgia Research Alliance, knew that meant attracting a world-class researcher.

"The recruitment of Julia Hilliard to Georgia State University was a critical step in developing the intellectual infrastructure to make Georgia a player in the biotechnology economy," says Todd. "We absolutely had to have this sophisticated lab in order to woo her to Atlanta."

The resulting facility is one of the few Level 4 containment laboratories in the world, and the only such U.S. lab built in an academic setting.

DESIGN PARAMEDICS

Having set the goal of bringing Dr. Hilliard to the area, the alliance next called Hellmuth, Obata + Kassabaum, Inc. (HOK, Atlanta). The firm had also designed the new Infectious Diseases Laboratory for the Centers for Disease Control and Prevention in Georgia.

HOK set about designing a laboratory containing a 30-ft, hermetically sealed, Class 3 biological safety cabinet, or "glove box," where scientists can safely conduct research on the virus. The glove box is separated into eight compartments, with each having a different purpose, such as freezing or centrifuge. Each unit can be completely sealed off from the others and separately contaminated, if necessary. Also, the BSL-4 lab has special engineering and design features to prevent microorganisms from being disseminated into the environment.

This meant coordinating a tailor-made HVAC system for the 2,000-sq-ft laboratory, functioning completely separate from the system serving the rest of the building. Jon Crane, a vice president for HOK, reports that this involved placing a Des Champs (Natural Bridge Station, VA) "Wringer Plus" air handling system on the building's roof. **Strobic Air (Harleysville, PA)** exhaust fans allow supply and exhaust air to be processed using a single packaged unit.

The design also allowed for complete redundancy regarding the exhaust air. One unit starts if the other stops, and if both stop, the system shuts off to avoid pressurizing the inside environment.

"We also went with an oversized exhaust fan and barometric damper arrangement to decrease the airflow," says Crane, who noted that this allows more than enough flexibility to adjust the air pressure whenever and however appropriate.

Researchers hope that after containing the herpes B virus in this hermetically sealed biosafety "glove box," they can bring a vaccine out to the rest of the world within several years.

DOCTOR IN THE HOUSE

While the thought behind the HVAC component selection does help the system support the work inside the laboratory, the HVAC design process also helped the facility meet its unusually tight deadline. Crane says that while HOK had accumulated a lot of experience in lab design, the one lesson it learned on this project was how much time can be saved by bidding out the HVAC system as a single unit.

"Combining the system under the responsibility of one rep allowed it all to happen rather smoothly," Crane recalls. The approach also paid off when coordinating he assembly of the Class 3 cabinet, allowing the construction to proceed with flawless timing as all the parts came into place.

Most importantly, the project won over Dr. Hilliard. She brought her team of scientists from the Southwest Research Foundation for Biomedical Research (San Antonio), and they began their testing of the herpes-B-infected primates and humans in June. With vaccine trials now under way, Dr. Hilliard predicts that a herpes B vaccine could be achieved within five to 10 years.

—Robert Beverly