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Biocontainment lab construction requires additional safety precautions

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With space for researching infectious diseases and bioterrorism defense, the **University of Tennessee Health Science Center's** Regional Biocontainment Lab requires special safety precautions be embedded in the building's design.

Construction began March 9, and by the end of the summer of 2008, the biocontainment lab will be the first new building to appear in the UT-Baptist Research Park.

The research park, a **Memphis Bioworks Foundation** project, will provide laboratory, education and business space at the site of the old Baptist-Medical Center.

"It made sense to work with Memphis Bioworks," says Gerald Byrne, director of the biocontainment lab.

The lab facility was largely funded through an \$18 million grant from the National Institute of Allergy and Infectious Diseases. After the university provided \$7 million in matching funds, the total budget for construction is \$25 million. The institute has funded 13 similar structures throughout the nation. Like the other labs, the university's facility will assist in a variety of biomedical research.

"Originally it was meant to meet the national need in an increase in research in biotechnology and bio-defense," Byrne says.

But the purpose of the facility has been expanded to include research on emerging infectious diseases and developing vaccines. Initial studies will examine cholera, multi-drug resistant tuberculosis and Chlamydia infections.

Due to the contaminable nature of the pathogens that will be studied, the lab facility was designed to meet elevated safety precautions defined by the National Institutes of Health, Byrne says. It was not until the design met NIH specifications, after one and a half years, that the bidding process could begin, he says.

The two-story, 11,000-square-foot structure will mainly house laboratory space, with just over 3,000 square feet devoted to support and office space.

Most of the lab space will be designated at Biosafety Levels 2 and 3, as dictated by the Centers for Disease Control and Prevention. The designations dictate the type of material that can be allowed in the lab and the kind of safety precautions required. Byrne describes a laboratory at BSL-1 as similar to one found in a high school chemistry class that requires few safety precautions.

A BSL-2 laboratory houses agents that may cause disease, but aren't transmitted through the air. The BSL-3 laboratories, which will make up the majority of the Memphis lab, will contain infectious pathogens transmissible through air. These labs must be constructed in such a way that the agents can't escape and that only researchers wearing proper safety equipment will work with the materials.

A BSL-4 designation, the highest level of security, houses infectious agents with no known cure. None of the Memphis lab space will be designated BSL-4.

Security, structure and mechanical systems were closely examined to meet the safety precautions, says Roger Sigler, director of business development at **Inman Construction Corp.**, the general contractor building the Memphis lab.

To limit access, a buffer zone will be enforced around the building and several spaces will require thumbprint identification to enter, he says. Mechanical systems were enhanced to help with airflow because each laboratory will be completely sealed off when the door is shut, he says.

"We also somewhat beefed up the structural system for the seismic requirements and the type of facility (the lab is)," he says. For instance, Sigler used 2x8 beam in areas that typically call for 2x4s to add strength to the structure.

Though the facility will belong to UTHSC, the amenities can also be used by other members in the Southeast Regional Center of Excellence for Emerging Infections and Biodefense, a collection of

programs and facilities funded by the NIAID.

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