Creating Tomorrow’s Solutions to Infectious Diseases and Bioterrorism

UTMB Galveston National Laboratory
The University of Texas Medical Branch
Welcome to the Galveston National Laboratory (GNL) at the University of Texas Medical Branch at Galveston (UTMB). Within this state-of-the-art facility, an extraordinary group of scientists is engaged in translating research ideas into products aimed at controlling emerging infectious diseases and defending our society against bioterrorism. The GNL is a national resource comprising an important part of our country’s research infrastructure. Work done within the GNL complements and enhances UTMB’s decades of prominence in biomedical research. It also provides a world-renowned center for training researchers in infectious diseases.

The GNL was constructed with funding awarded in October 2003 by the National Institute of Allergy and Infectious Diseases/National Institutes of Health (NIAID/NIH). Formally dedicated on November 11, 2008, the facility provides much needed research space and instrumentation to safely develop therapies, vaccines and diagnostic tests for naturally occurring emerging diseases such as SARS, West Nile encephalitis and avian influenza—and for microbes that might be employed by terrorists. Products likely to emerge from investigations within the GNL include novel diagnostic assays, improved therapeutics and treatment models, and preventive measures such as vaccines.
OUR HISTORY

The GNL is the latest in a series of advances that have taken UTMB’s infectious diseases research program from being a local point of pride to an internationally renowned resource in the fight against some of the world’s leading threats to health. The university first got involved in such work more than a century ago, when yellow fever was common on the Gulf Coast. UTMB was there in the early days of the 20th century to care for victims of the 1918 influenza pandemic. And it remains here today, generating and imparting knowledge that will help alleviate the suffering caused by infectious diseases worldwide.

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>1994</td>
<td>Center for Tropical Diseases established</td>
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<tr>
<td>1995</td>
<td>World Health Organization (WHO) Collaborating Center for Tropical Diseases designated; one of 12 such centers worldwide and the only one in the U.S.</td>
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<tr>
<td>1997</td>
<td>UTMB receives biodefense grant from the Defense Advanced Projects Research Agency (DARPA)</td>
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<td>2000</td>
<td>Sealy Center for Vaccine Development established</td>
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<td>2001</td>
<td>Sept. 11 and subsequent anthrax attacks focus public attention on bioterrorism</td>
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<tr>
<td>1997</td>
<td>World Reference Center for Emerging Viruses and Arboviruses—world’s largest reference center for viruses transmitted by insects— relocates to UTMB</td>
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<tr>
<td>2000</td>
<td>WHO Collaborating Center for Arbovirus and Hemorrhagic Fever Virus Research established</td>
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<tr>
<td>2001</td>
<td>University of Texas System approves construction of a biosafety level 4 laboratory at UTMB</td>
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<tr>
<td>2001</td>
<td>UTMB Center for Biodefense and Emerging Infectious Diseases established</td>
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<tr>
<td>1997</td>
<td>Medical Mycology Reference Center for the study of fungi established</td>
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<tr>
<td>2000</td>
<td>NIH Cooperative Hepatitis C Research Center relocated to UTMB</td>
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1994

UTMB breaks ground on the Robert E. Shope, M.D. Laboratory—the first full-sized maximum containment facility in the U.S.

National Institute of Allergy and Infectious Diseases (NIAID) Hepatitis C Antiviral Contract awarded to UTMB.

2002

NIAID awards UTMB grants to lead the Western Regional Center of Excellence for Infectious Diseases, the only two national centers for infectious diseases.

Robert E. Shope, M.D. Laboratory and the John Sealy Pavilion and only two national centers for infectious diseases.

2003

UTMB breaks ground on the NIAID laboratory.

2004

UTMB breaks ground on the NIAID laboratory.

2005

Galveston National Laboratory formally dedicated.

2006

Galveston National Laboratory formally dedicated.

2007

UTMB breaks ground on the NIAID laboratory.

2008

UTMB breaks ground on the NIAID laboratory.

2009

Shope Laboratory and the John Sealy Pavilion.
OVERVIEW OF RESEARCH MADE POSSIBLE BY GNL

Researchers at the GNL will work on therapeutics, vaccines and diagnostics aimed at addressing today’s important emerging infectious diseases. Much of this research will be carried out in high- and maximum-containment laboratories required for the safe handling of highly pathogenic organisms.

Some of the research areas and capabilities within the GNL include:

RESEARCH AREAS

- Anthrax (therapeutics and vaccines)
- Avian (H5N1) influenza (antivirals, vaccines)
- Chikungunya (basic research)
- Encephalitic alphaviruses (antivirals, vaccines)
- Hemorrhagic fever viruses (basic research, antivirals)
- Plague (basic research, therapeutics)
- Rickettsia and ehrlichia (basic research, vaccines)
- Rift Valley fever virus (basic research, vaccines)
- Tuberculosis (vaccines)
- Tularemia (basic research, therapeutics)
- Vaccinia (vaccine responses)
- Viral hepatitis (basic research, therapeutics)
- West Nile encephalitis (basic research, therapeutics)

CAPABILITIES FOR PRODUCT TESTING AND DEVELOPMENT

- Advanced in vivo imaging
- Aerobiology
- BSL-2, -3 and -4 containment
- Cryo-electron microscopy
- Genomics
- Insectary
- Pre-clinical validation
- World Reference Center for Emerging Viruses and Arboviruses
OUR RESOURCES

• Constructed in 2003, UTMB’s initial BSL4 lab—the Robert E. Shope, M.D. Lab—was the first full-sized maximum-containment lab located on a university campus in America.

• The GNL will be home to a workforce of approximately 300 scientists and staff.

• As a leader in infectious disease research, telemedicine and distance education, UTMB is uniquely positioned to respond to infectious disease outbreaks and incidents of bioterrorism.

• The National Biodefense Training Center at UTMB is poised to become the prime site to train young researchers to help operate the new BSL3 and BSL4 facilities coming online across the country in the next few years. This makes UTMB a national resource of extreme value.

• The GNL is the only national lab facility of any kind in Texas.

• The Bill and Melinda Gates Foundation has provided a grant, the first of its kind awarded to a Texas school by the foundation, totaling $9.5 million for flu vaccine development.

• UTMB is home to the world’s first high-resolution cryo-electron microscope placed within a high-containment BSL3 lab, allowing detailed analysis of highly pathogenic emerging viruses.

• Awards from the U.S. Department of Defense Threat Reduction Agency and others allow UTMB scientists to contribute to international efforts to reduce the risk of bioterrorism and engage with scientists around the world to study high-risk pathogens such as anthrax, plague and tularemia as they occur in nature.

GNL COMPLEX FAST FACTS

Total gross square feet:
Approximately 300,000*

Total net square feet:
146,479*

Total laboratory space:
96,000 square feet of BSL2, BSL3 and BSL4 laboratory and supporting space*

Total BSL4 space:
14,000 square feet*

Total construction cost:
$173.6 million

Federal grant amount:
$115 million

State of Texas match:
$58.6 million

Economic impact:
$1.4 billion statewide over 20 years

Construction start date:
May 2005

Dedication Date:
November 11, 2008

Ownership:
UTMB owns and operates the GNL in support of the biodefense research agenda of NIAID.

*Includes space in adjacent Keiller Building
OUR ECONOMIC IMPACT

In addition to the substantial contributions the GNL will make possible for the health, safety and security of the U.S. and the world, these programs can also result in a notable contribution to the economy of Texas.

<table>
<thead>
<tr>
<th>Project</th>
<th>Output (Gross State Product)</th>
<th>Employment (Person-years)</th>
<th>State Fiscal Revenue (over 5 years)</th>
<th>Local Government Revenues (over 5 years)</th>
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</thead>
<tbody>
<tr>
<td>Regional Center of Excellence</td>
<td>$69.4 million</td>
<td>1,003</td>
<td>$3.559</td>
<td>$0.386</td>
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<tr>
<td></td>
<td>(over 5 years)</td>
<td>(over 5 years)</td>
<td>(over 5 years)</td>
<td>(over 5 years)</td>
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<tr>
<td>GNL Construction Phase</td>
<td>$286.1 million</td>
<td>4,262</td>
<td>$15.777</td>
<td>$1.705</td>
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<tr>
<td></td>
<td>(over 5 years)</td>
<td>(over 5 years)</td>
<td>(over 5 years)</td>
<td>(over 5 years)</td>
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<tr>
<td>GNL Research and Implementation Phase</td>
<td>$1.1 billion</td>
<td>18,226</td>
<td>$55.594</td>
<td>$5.968</td>
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<tr>
<td></td>
<td>(over 20 years)</td>
<td>(over 20 years)</td>
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The findings from this analysis illustrate the enormous benefits accruing from the location of these major research initiatives in Texas. It must be noted, however, that these effects, which are impressive, are only part of the story. The research from these initiatives and the concentration of major scientific talents and resources will enhance the competitiveness of Texas for attracting pharmaceutical firms, emerging biotechnology enterprises and other related firms. This type of activity is a high priority for the state and contributes to sustainable prosperity. Most important of all, the location of a National Biocontainment Laboratory and Regional Center of Excellence at UTMB allows the state a critical and expanding role in promoting health, safety and security for people throughout the world.

*Economic impact analysis performed by The Perryman Group in November 2004.*
THE INSTITUTE FOR HUMAN INFECTIONS AND IMMUNITY

The GNL plays an important role in UTMB’s work to create the environment and core facilities necessary to translate research ideas into products aimed at prevention, early diagnosis and treatment of infectious diseases. The Institute for Human Infections and Immunity (IHII) was established in October 2004 as the hub of UTMB’s infectious disease research programs. Created within UTMB’s uncommonly collaborative research environment, the IHII is housed within the GNL and acts to engage researchers across departments and disciplines and to integrate UTMB strengths in emerging infections with interdisciplinary research programs.

Infectious disease-related centers and research programs at UTMB include:

- The Center for Biodefense and Emerging Infectious Diseases
- The Robert E. Shope, M.D. BSL4 Laboratory
- The Sealy Center for Vaccine Development
- The Center for Hepatitis Research
- The World Health Organization Collaborating Center for Tropical Diseases
- The World Reference Center for Emerging Viruses and Arboviruses
- The McLaughlin Endowment for Infection and Immunity

The university also provides leadership through the **Western Regional Center of Excellence for Biodefense and Emerging Infectious Diseases**. The WRCE, an NIH-funded consortium led by UTMB, includes institutions in Texas, New Mexico, Louisiana, Oklahoma and Arkansas. This cooperative network of interactive research projects and core resource facilities is in its sixth year of operation and is designed to contribute substantially to the nation’s biodefense mission by fulfilling a carefully crafted scientific strategy on a common theme. At the forefront of the WRCE’s scientific endeavors are collaborations on host–pathogen biology for the development of novel vaccines, diagnostics and therapeutics against agents that could be employed by terrorists.
The support, participation and input of the local community are vital to the success of UTMB and its infectious disease programs, including the GNL. UTMB has and will continue to work alongside our neighbors on this important national mission. We aim to set new standards for openness and transparency while remaining compliant with laws and regulations governing research on disease-causing organisms.

We meet regularly with our Community Advisory Board (CAB), a group of approximately 60 members of professional and civic organizations, to keep them informed on the important work being done at UTMB and to get their help in sharing the information with the community at large.

A seven-member GNL Community Liaison Committee (CLC) also meets regularly. The CLC is composed of well-informed and interested local citizens nominated by the Galveston County judge and appointed by the Executive Vice Chancellor for Health Affairs of the University of Texas System. The CLC reports to the president of UTMB and provides outreach and feedback to facilitate the flow of information among the GNL, the university and the community.
If you have any questions or comments, please visit us online at www.utmb.edu/gnl or contact us at ihii.web@utmb.edu.