

# MYCOBACTERIA RESEARCH LABORATORIES

Emphasis on the Complex Biology of Pathogens and Hosts

Antibiotic Resistance and Mode of Action

Discovery and Testing of New Drugs and Diagnostics

Vaccine Development

Generation of Novel Models of Disease

## The MRL at Colorado State University

### WHO WE ARE

The Mycobacteria Research Laboratories (MRL) is the largest academic research group in the United States (more than 20 faculty) devoted to the study of tuberculosis (TB), leprosy, Buruli ulcer, and emerging non-tuberculous mycobacterial diseases. A world leader in basic, preclinical, and field research related to mycobacterial diseases, the MRL is situated in a unique environment with access to exceptional resources and facilities, which include more than 10,000 sq. ft. of BSL3 and ABSL3 laboratory space and state-of-the-art equipment. The MRL is highly integrated and collaborates extensively internally and with a number of private companies, non-profit foundations, and research and clinical laboratories around the world. These partnerships provide resources and expertise that speed translation of research findings to real-world clinical applications such as improved diagnostics, new therapies, and more effective vaccines.

### THE PROBLEMS ADDRESSED

- **Tuberculosis (TB)** – kills more people each year than any other infectious disease and is among the ten leading causes of death worldwide. With 480,000 new antibiotic-resistant cases annually, without new research, deaths due to TB will only increase.
- **Leprosy** – a chronic disease affecting the skin, peripheral nerves, respiratory tract, and eyes. Leprosy is curable, but with an incubation period that averages five years, this disease is able to linger in populations resulting in hundreds of thousands of new cases each year.
- **Buruli ulcer** – a chronic, debilitating disease that primarily affects children and causes permanent disfigurement and disability. Early detection and treatment are key to preventing or minimizing the effects of this disease.
- **Non-tuberculous mycobacteria (NTM)** – primarily considered opportunistic pathogens, some of the most pathogenic NTM are emerging as leading causes of pulmonary infections in patients with cystic fibrosis. Currently, the prevalence of NTM infections is increasing globally, with very few treatment options available.
- **Animal and zoonotic mycobacterial infections** – mycobacterial infections of domestic and wild animals have substantial economic impacts on agriculture and, due to potential zoonotic infections, are a major public health concern.



## WHAT WE DO

Through teaching, training, research, and outreach, MRL scientists have a global influence on the understanding and treatment of mycobacterial diseases.

- The MRL is at the forefront of research and training in mycobacterial diseases, consistently producing high-impact publications with real-world implications for understanding, diagnosing, treating, and preventing these diseases. Over the past six years, MRL scientists have published more than 420 scientific articles and their work has been cited more than 4,000 times.
- The technologies employed and developed by MRL researchers for the study of mycobacteria are relevant to the broader fields of infectious diseases; antimicrobial resistance; microbiology; biochemistry; immunology; medicine; and diagnostic/biomarker, vaccine, and drug discovery.
- The MRL is a major provider of preclinical testing of candidate anti-mycobacterial drugs and vaccines in multiple animal models.
- MRL support of global research efforts includes the characterization and purification of macromolecules produced by *M. tuberculosis* and *M. leprae*.
- The expertise of the MRL is shared through the training and mentorship of students, fellows, and visiting-scientists from around the globe.

## MRL CORE STRENGTHS

- Biochemistry
- Bacteriology
- Immunopathology
- Animal models of disease
- Preclinical testing
- “Omics” based technologies

## WORK WITH THE MRL

The MRL continues to pursue excellence in research and training, and welcomes new opportunities for research collaborations that leverage the expertise of MRL scientists. The MRL also welcomes inquiries about partnerships with foundations, individuals, or commercial entities that share the common goals of control and elimination of tuberculosis, leprosy, and other mycobacterial diseases.

To learn more about MRL faculty and their research interests, visit our website at <http://mrl.colostate.edu/>.

To learn more about contract services or to obtain specialized research reagents visit <http://mrl.colostate.edu/services-reagents/>.

To support the MRL's educational and outreach activities visit <https://advancing.colostate.edu/MRL>.

