National Center for Biodefense and Infectious Disease (NCBID)

Director: Charles Bailey, PhD

Key Interests
Infectious Disease | Vaccine Development | Proteomics | Host-Pathogen Interactions | Vector Ecology | Diagnostics | Pathology | Therapeutics | Nanotechnology

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Research Focus
The National Center for Biodefense and Infectious Diseases (NCBID) focuses on host-pathogen interactions in the lab applying proteomics and nanotechnology to diagnostic, therapeutic, and vaccine development. Researchers work in Mason’s Biomedical Research Laboratory, which is one of 13 regional biocontainment labs funded by NIAID/NIH. The facility is capable of housing multiple species and has a variety of established animal models with an emphasis on aerosolized exposures. Additionally, the NCBID is interested in vector-host-pathogen interactions in the field, especially during inter-epidemic periods. The team is working with collaborators in Costa Rica to facilitate field studies of vector ecology in native tropical regions, including mosquitoes that transmit Zika virus in the upper canopy of forests.

NCBID welcomes strategic alliances and collaborative relationships with defense contractors, biotechnology and pharmaceutical partners, federal government agencies, and private researchers to protect citizens nationally and internationally from potential biological threats.

NCBID has the expertise, facilities and equipment that allow researchers to ask and answer vital questions about disease.
- Capability to perform animal studies in multiple species, from mice up to nonhuman primates
- Aerobiology studies with nose-only, whole-body, and head-only delivery capabilities
- Virological assays to quantify loads, including standard plaque assays, 96-well plate assays, absolute q-RT-PCR assays, and focus forming assays
- Bacterial assays to identify biochemical activity or 16S rRNA, compound library and combinatorial library screening, minimal inhibitor concentration assays, minimal bactericidal concentration assays, time-kill kinetic assays, resistance development/mutant selection and microbial quantitation through q-PCR
- Therapeutic development through the discovery of novel host-based targets
- Classic and novel proteomic technologies to perform mechanism of action studies
- Testing and evaluating new therapeutics and vaccines in vitro and in vivo
- Using blood-based molecular profiling technologies to investigate novel correlates of protection or correlates of efficacy