

Contact: Diana Gonzalez

**REQUEST TO ESTABLISH A NEW CENTER AT IOWA STATE UNIVERSITY  
CENTER FOR ADVANCED HOST DEFENSES, IMMUNOBIOTICS, AND TRANSLATIONAL  
COMPARATIVE MEDICINE**

**Action Requested:** Consider approval of the request by Iowa State University to establish a Center for Advanced Host Defenses, Immunobiotics, and Translational Comparative Medicine (CAHDIT) as part of the Department of Biomedical Sciences in the College of Veterinary Medicine.

**Executive Summary:** The proposed Center will focus on basic research, translational comparative medicine, and education. This proposal was reviewed by the Board Office and the Council of Provosts and is recommended for approval. Creation of the Center requires Board of Regents approval, as stated in the Board of Regents Policy Manual §6.08, because the Center will require an annual institutional commitment  $\geq$  \$250,000. This request addresses the Board of Regents Strategic Plan priorities (2.0) to “provide needed service and promote economic growth” and (3.0) to “discover new knowledge through research, scholarship, and creative activities.”

**Background:**

- ◇ **Center Objectives.** The proposed Center activities will result in cost-effective prophylactic and immunotherapeutic interventions for infectious, auto-immune, neoplastic, metabolic, and reproductive diseases that affect both human and animal health at the local, state, national, and global levels. The proposed Center will address intractable, emerging new zoonotic, bioterror agents, as well as drug-resistant microbial agents affecting humans and animals.
- ◇ **Collaborations.** The proposed Center will provide an organizational structure to mobilize, integrate, and cross-fertilize other institutions (U. S. Department of Agriculture/Agricultural Research Service; National Veterinary Services Laboratories; Center for Veterinary Medicine; National Animal Disease Center; and the University of Iowa) with ISU's resources and infrastructure. These collaborations will promote more sustainable human and animal healthcare practice and promote reform through improved and novel methods of prophylaxis, which will reverse and improve the current unsustainable global practice of managing diseased hosts therapeutically. The proposed Center will also foster and focus initiatives to sustain and produce more global cost-effective and efficient sources of consumable animal protein.

Some collaborations are funded and operational, such as the U. S. Department of Defense Multidisciplinary University Research Initiative grant of \$5 million that includes faculty from ISU and SUI College of Medicine and Clinical NIH Center, and the Department of Microbiology. Another project between SUI and the Defense Sciences Office/Defense Advanced Research Projects Agency will be funded this year. Additional opportunities may exist with Kansas State University and its new containment facility.

- ◇ Relationship to College's Strategic Plan. The proposed Center will complement the College of Veterinary Medicine's existing centers<sup>1</sup> and departments<sup>2</sup> and support the strategic plan regarding research and translational comparative medicine. The proposed Center will provide a collaborating forum for academic pursuits leading to potential commercialization. The discovery work in the naturally-occurring food, pet, and working animal species will serve as critical proof-of-concept studies for similar pathogens of humans and promote the "One Medicine" concept of the proposed Center.
- ◇ Relationship to other centers. Due to the nature of the proposed Center's research, which involves host defense, one of the more complex systems in the vertebrate body, a wide variety of innate and acquired immune system interactions involving an infinite number of regulatory pathways and molecules will need to be identified, characterized, and isolated in structure and function. The complexity of these systems is superimposed on another set of complex interactions involving various classes of microbes, their disease vectors, and cells of the host including those related to cancer.

This will require collaborative molecular biology in areas of toxicology, neurobiology, molecular and macro-molecular structural/ultra-structural biology, chemical and bioengineering, medicinal chemistry, nanoscale delivery, formulation, immunobiology, human and animal genomics, bio-informatics, animal genetics/transgenics, human sciences, applied mathematics and statistical biophysics/computational sciences, ecology, economics, business intellectual property development, and administration/entrepreneurial development. The ISU Biotechnology and Instrumentation Facility provides a unique collection of university core service expertise and instrumentation that can be leveraged to obtain large National Institutes of Health (NIH) grants and contracted support.

- ◇ Unique role of Iowa State University. The proposed Center is unique in Iowa. However, there will be opportunities to develop state-wide inter-institutional collaborations to complement the mission of the proposed Center. These complementary related resources and infrastructures include multi-species bio-containment facilities, national diagnostic capabilities, unique microbial and immunological reagents, regulatory and biologics expertise, access to human medicine and clinical trials, NIH Clinical Translational Research Center, and genomic medicine. The College of Veterinary Medicine encompasses the most significant concentration of comparative medical expertise and related instrumentation/technical capability and facilities in the Regent Enterprise.

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<sup>1</sup> Center for Food Security and Public Health; Veterinary Diagnostic Laboratory; Veterinary Medical Research Institute.

<sup>2</sup> Biomedical Sciences; Veterinary Clinical Services; Veterinary Diagnostic and Production Animal Medicine; Veterinary Microbiology and Preventive Medicine; and Veterinary Pathology.

- ◇ Required Resources. The proposed Center will be administered by a director and manager. A cross-disciplinary team has already been assembled with complementary expertise in microbiology, carbohydrate and protein biochemistry, molecular biology and immunology, biomaterials chemistry, and nanoparticle technology. The inter-institutional team consists of an expert in carbohydrate chemistry, two immunologists with expertise in the interactions between host and bacterial pathogens regarding mucosal immunity, three chemical engineer experts in biomaterials for vaccine delivery and aerosol-based vaccines, a microbiologist with expertise in intra-cellular trafficking, four medical microbiology experts, and a pathology and animal model expert.

The physical facilities for the proposed Center include offices for the director and manager, administrative and secretarial assistance, and a newly renovated 1400 sq. ft. laboratory.

- ◇ Expected need. The proposed Center is expected to be in existence through 2030. A three-year start-up and five-year growth plan are currently being prepared and will be used to guide the proposed Center's focus, development, and growth. Its continued existence will be justified by its annual success in attracting research dollars for investigator-initiated and program project grants from government and private sources. The proposed Center will be evaluated to determine continued viability and existence if no active funded research is available for more than two consecutive calendar years. The proposed Center will train M.S., Ph.D., and dual degree professional and graduate students, post-doctoral level candidates, as well as visiting scientists. An emerging new career area central to the proposed Center is "vaccinology," which could be developed with other career paths stimulated by the success of the proposed Center.

- ◇ Costs and funding sources. The cost of the proposed Center is expected to be \$100,000 during the first year, increasing to \$615,000 during the seventh year. The proposed Center anticipates year-to-year growth which will be based on external funding. The collaborative, multiple investigator-driven structure of the proposed Center is consistent with current large programmatic funding streams and is expected to assure improved review scores and continuous funding.

The majority of initial funding for years one and two will be provided as start-up funds by the College of Veterinary Medicine and the Office of the Vice President for Research and Economic Development. In addition, \$20,000/year will be provided from the Endowed Chair position.