



FASEB

Federation of American Societies
for Experimental Biology

Representing 125,000 Researchers

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James Olds, PhD
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National Science Foundation
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Muriel Poston, PhD, JD
Director of the Division of Biological Infrastructure
National Science Foundation
4201 Wilson Boulevard
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Comments submitted via email to: DBICSBR@nsf.gov

Dear Drs. Olds and Poston:

The Federation of American Societies for Experimental Biology (FASEB) thanks the National Science Foundation (NSF) Directorate for Biological Sciences (BIO) and its Division of Biological Infrastructure (DBI) for seeking public feedback on the Collections in Support of Biological Research (CSBR) program. FASEB comprises 30 member societies, collectively representing 125,000 life science researchers. We are concerned that the planned CSBR hiatus will have a destabilizing effect on the collections community and hope the following comments will help inform your evaluation of this program.

Value of CSBR to Research and Education

The CSBR program provides valuable support for the preservation and organization of biological collections and their associated data, ensuring they remain available for future use. Both the research and education communities are beneficiaries of support for living and natural history collections, which provide access to specimens and stocks spanning the tree of life. These collections are employed in cutting-edge research projects across all biological disciplines, from genomics to ecology and agriculture. Many collections personnel collaborate with educators in the development of student laboratory exercises and other teaching materials. As centralized repositories, living collections extend the value of research funding by reducing duplicative material collection, creation, and maintenance. Furthermore, collections figure prominently in the following two major NSF priorities areas: reproducibility and “Rules of Life.”

One year ago, NSF published a framework on improving reproducibility, replicability, and robustness of funded research; collections uniquely contribute towards this goal. Stock and culture collections play a key role in standardizing nomenclature, controlling for genetic drift, providing technical expertise, disseminating best practices, creating and implementing quality control measures, and supplying ready access to strains and variants described in the scientific literature. Preservation of natural history collections permits investigators to confirm prior reports and collect additional data from the same specimens.

The American Physiological Society • American Society for Biochemistry and Molecular Biology • American Society for Pharmacology and Experimental Therapeutics
American Society for Investigative Pathology • American Society for Nutrition • The American Association of Immunologists • American Association of Anatomists
The Protein Society • Society for Developmental Biology • American Peptide Society • Association of Biomolecular Resource Facilities
The American Society for Bone and Mineral Research • American Society for Clinical Investigation • Society for the Study of Reproduction • The Teratology Society
The Endocrine Society • The American Society of Human Genetics • International Society for Computational Biology • American College of Sports Medicine
Biomedical Engineering Society • Genetics Society of America • American Federation for Medical Research • The Histochemical Society • Society for Pediatric Research
Society for Glycobiology • Association for Molecular Pathology • Society for Redox Biology and Medicine • Society For Experimental Biology and Medicine
American Aging Association (AGE) • U.S. Human Proteome Organization (US HUPO)

The “Rules of Life” BIO priority area also benefits from the availability of robust and diverse collections. Stock centers increase access to a variety of model organisms, including species and strains that no longer exist in the wild. Natural history collections serve as a record of biodiversity, housing irreplaceable specimens. Thus, collections enable assessment of biological principles across populations, species, time, and geographic locations, forming a critical foundation for many lines of inquiry in this priority area.

Need for Funding Stability

Continuity of support is crucial for collections. Stable funding facilitates regular preventive maintenance and quality control. Furthermore, operations of some collections cannot be temporarily scaled down without experiencing losses, such as living collections of organisms that cannot be cryopreserved. The FY 2017 planned hiatus marks the second funding pause in recent years, making it particularly disruptive. We are also concerned that the research community may interpret this forthcoming hiatus as a sign that NSF no longer values collections. Therefore, FASEB encourages NSF to work with the living collections community to examine models of financial support.

These collections are a critical component of research infrastructure and should be viewed as long-term investments. While user fees are an important income stream, collections should not rely solely upon them because this financial model limits access. When costs have been shifted to end users, collection personnel report reductions in stock utilization as high as 50 percent. Furthermore, overreliance on fees makes these resources particularly vulnerable to short-term fluctuations in use, which can lead to short-sighted decisions regarding a collection’s contents and scope. As other research sponsors benefit from the existence of these resources, a more collaborative or integrated approach to funding is worth exploring. FASEB would be happy to work with NSF in convening stakeholders to discuss ways that collections can be sustainably supported.

Synergy with Other NSF Programs

There are two DBI programs that are highly synergistic with CSBR, but, even collectively, they are incapable of replacing CSBR. Collection digitization, which is supported by CSBR and the Advancing Digitization of Biodiversity Collections (ADBC) program, enhances preservation and access. However, the original physical specimen will still be needed to conduct further analyses, such as sequencing genomes, measuring isotopes, and utilizing new imaging technologies. In addition, the ADBC program has little relevance to living stocks and cultures due to its focus on vouchered biological and paleontological collections. FASEB appreciates that NSF BIO is encouraging greater use of collections through a specialized track of its Postdoctoral Research Fellowships in Biology. If this approach demonstrably expands the user base, FASEB encourages NSF incorporate this strategy into programs for graduate students and early career faculty.

Other Opportunities to Extend the Value of Collections

NSF should take further steps to extend the value of collections. A comprehensive and regularly updated portal of stock and culture collections could increase utilization, much the way iDigBio facilitates discovery of natural history collections. In addition, DBI could work with the collections community to identify technological advancements that might reduce collections costs. NSF should also incorporate the use of collections into training materials on reproducibility. As living and natural history collections differ substantially in their needs and activities, FASEB recommends creating separate tracks within the CSBR program so that the goals and expectations of these awards can be tailored to the type of collection supported. For instance, CSBR objectives for living collections might prioritize broad access, high stock quality, and operational efficiency over innovation goals, which are more applicable to research projects.

Metrics for Evaluating CSBR

We also appreciate that DBI is seeking feedback on which metrics to employ in its evaluation of CSBR. FASEB encourages DBI to utilize a variety of metrics and to take into account the limitations of each approach. In addition to acknowledgement and citation of CSBR-supported collections in the scientific literature, DBI should consider assessing the size of the user base, volume of use, proportion of NSF BIO grantees that utilize any collections eligible for CSBR support, uniqueness of each resource, and diversity of research disciplines represented among users. We also recommend that DBI incorporate qualitative contributions, such as providing technical expertise to users and promoting reproducible and robust research practices. Finally, DBI should take into account the cost savings achieved through the centralized provision of resources as well as the financial and scientific costs of collection loss.

FASEB thanks NSF BIO and DBI for this opportunity to provide comments on this valuable infrastructure program. Please do not hesitate to let us know if we could be of further assistance to your evaluation of CSBR or any other collections efforts and activities.

Sincerely,

A handwritten signature in black ink, appearing to read "Hudson H. Freeze". The signature is fluid and cursive, with a long horizontal stroke at the end.

Hudson H. Freeze, PhD
FASEB President-Elect