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Valued Fruit Fly Facility Will Expand with HHMI Support

The Howard Hughes Medical Institute (HHMI) has awarded \$364,000 to more than double the capacity of a vital repository that is a resource for the worldwide community of scientists who study the fruit fly, *Drosophila melanogaster*.

The Bloomington *Drosophila* Stock Center (BDSC), on the campus of Indiana University, houses 30,000 fruit fly strains and helps develop scientific tools that are used to design new fly strains. The new grant will allow the BDSC to renovate and expand the facility so it can curate 60,000-70,000 different genetic fruit fly variants that are important for research.

"This grant is going to be incredibly valuable to the fruit fly research community," says Thomas C. Kaufman, director of the BDSC, which serves 1,700 different research groups. "Without this funding, we would be losing fly strains that are vital to future research."

For the last century, the fruit fly, *Drosophila melanogaster*, has been the workhorse of biology and genetics laboratories. Researchers often turn to fruit flies and other model organisms to answer some of biology's most challenging questions, such as learn how basic biological systems work and how those same systems might function in humans. Thousands of researchers worldwide use the fruit fly as a model because it is relatively easy to work with and reproduces quickly.

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The BDSC has been a resource for scientists for more than a century. Each week, its staff of 25 sends out 3,000 fruit fly samples—each housed in a small plastic vial—to scientists around the world. The center tries to collect as many different types of fly strains with novel mutations as it can, Kaufman says. Among the most popular are those with variations in two genetic pathways: Hippo, which serves as a shut-off switch for organ growth, and Notch, which is important in embryonic development. They also receive requests for flies with specific physical traits, like white eyes or curly wings.

Twenty-five years ago, when the stock center moved from the California Institute of Technology to Indiana University, it was home to just 1,675 different strains of *Drosophila*. But recent technological advances have made it easier to quickly create thousands of different mutations. For example, a scientist may knock out thousands of genes looking for one or two that help explain a certain trait or disease. That means the scientist has thousands of fruit flies with genetic variations that aren't of interest to her. However, those same fly mutants may be of vital interest to other scientists. But it's difficult for a scientist in a single lab to respond to dozens or hundreds of requests for fruit flies and to maintain the storage space and food requirements needed to keep them healthy long-term.

That's where BDSC comes in. "The stock center is a critical resource for the entire fly research community," says Gerald Rubin, a fruit fly geneticist and HHMI vice president and director of the Janelia Farm Research Campus. "*Drosophila* research has always been part of HHMI's research program, and we value the stock center's work to make *Drosophila* strains and other resources readily available."

The HHMI support will allow the BDSC facility, which takes up most of one floor of Jordan Hall on the Indiana University campus, to expand to accommodate 30,000-40,000 new fruit fly strains and additional office space. It currently keeps three eight-ounce vials housing of each type of fruit fly in its main facility—young, middle aged, and old – and a backup copy in another facility on a different floor of the same building. It also does regular checks to make sure each strain remains uncontaminated. "We have the maintenance and storage down to a science," Kaufman says.

BDSC has applied for federal funding to build a new facility that could house 100,000 fruit fly strains. But that grant application has not yet been funded, despite favorable reviews, Kaufman says. HHMI investigator Hugo Bellen, who is a member of the BDSC's board of directors, recommended that the BDSC approach HHMI for a grant that would allow the facility to keep accepting new strains and serving the fly community until it can get the funding needed for the new building.

"It is something that helps the entire community and, speaking as a scientist, this is the kind of thing that is very, very hard to get support for. It is not

discovery research but it is basically a service facility,” says Jack Dixon, vice president and chief scientific officer at HHMI. “*Drosophila* is one of the most important model organisms, and they have been great at making them available to the research community.”

In the past, HHMI has provided support to facilities that serve the wider scientific community. In 2008, HHMI contributed \$15 million to the costs of construction at the Cold Spring Harbor Laboratory in Cold Spring Harbor, NY, and another \$15 million toward revamping the Marine Biological Laboratory in Woods Hole, MA. Both are used widely by HHMI investigators and are considered vital scientific training grounds for the broader biomedical research community. In 2005, HHMI gave a \$250,000 donation to BDSC to improve and expand its kitchen facilities, which cook a polenta-like mixture that includes cornmeal, molasses, and agar to feed the fruit flies, so it could accommodate more flies in its current space.