

NEWS

Funding fears prevent researchers from sharing their mice

BY VIRGINIA HUGHES

9 JANUARY 2012

The Jackson Laboratory

Public progress: Once results from a new mouse model are published, scientists may send the animals to The Jackson Laboratory, a nonprofit repository.

The Jackson Laboratory

Public progress: Once results from a new mouse model are published, scientists may send the animals to The Jackson Laboratory, a nonprofit repository.

Larry Reiter studies the chromosomal region **15q11-13**, one of the genomic hotspots most firmly linked to autism. At his small lab at the University of Tennessee Health Science Center in Memphis, Reiter has sometimes relied on mutant mice — such as **animals missing UBE3A**, a key gene in the region — engineered by other groups for his experiments¹.

But in the past couple of years, as competition has intensified in autism research, Reiter has had trouble gaining access to new mouse models. Frustrated, he has decided to focus instead **on fruit flies**.

Reiter says he worries that others might be similarly discouraged. “People will shy away from working in this area, because they can’t get the mouse to work on,” he says.

On paper, most funding organizations, such as the National Institutes of Health (NIH) and SFARI — this website’s parent organization — as well as most scientific journals stipulate that once researchers publish details of a model animal, they must make the animals available to other labs (see [list](#)).

“Failure to comply with the sharing plan may be carefully considered in future funding decisions for the investigator and their institution,” says J.P. Kim, director of the Division of Extramural Inventions and Technology Resources within the NIH [Office of Extramural Research](#).

In practice, however, many researchers intentionally delay sharing or don’t share at all.

“It’s sort of the ugly secret,” Reiter says. “There is a long and proud tradition in the mouse field of holding on to your mouse, sometimes for 20 years.”

Pressure to publish:

In the past year alone, scientists have debuted [more than a dozen mouse models](#) carrying autism-related genetic glitches, to much fanfare.

The hope is that by studying the brains and behaviors of these mutants, researchers will find common pathways behind the diverse disorder, and build an arsenal of drugs to treat it. But first, they must thoroughly investigate and compare the different models.

Creating a mutant mouse is an enormous investment, costing a lab several years and tens of thousands of dollars. In the autism field, a new mouse model can mean a high-profile paper, which in turn helps secure grants. This combination pits labs against one another to create the first model of a hot autism gene — and makes them likely to keep preliminary results to themselves.

“Because the incentives are about novelty more than about reproducibility, it’s really important for people to be first,” says [Ricardo Dolmetsch](#), assistant professor of neurobiology at Stanford University in Palo Alto, California. Dolmetsch’s team is working on a [mouse model of 16p11.2 variations](#).

“You’re in this difficult position because you have to weigh the imperative to share against the fact that your postdoc’s career depends on this,” Dolmetsch says.

Rules about sharing, he adds, are often vague and difficult to enforce.

For example, researchers applying for an NIH grant to make a mouse model must include a

“sharing plan” outlining how the mice will be made available to other scientists. The NIH requires this to happen in a “reasonable time frame,” which is typically after publication of the results.

To share their mice, researchers can send mice directly to others, or they can deposit the models in a central repository, such as the nonprofit **Jackson Laboratory** in Bar Harbor, Maine. They can also apply for NIH funding for the costs related to sharing.

In many cases, however, the researchers aren’t willing to share, and the NIH rarely enforces the rules.

Even when a scientist is willing to share, the process takes time and money. Researchers sometimes have to work out complex intellectual property issues with their institutions, manage tricky breeding procedures, or ensure that their mouse lines don’t carry pathogens.

The process can take years, and some groups use that to their advantage, notes **Gordon Fishell**, professor of neuroscience at New York University. “There are a million and one things you can say if you don’t want to give out your mice.”

Scientists whose requests aren’t answered are also often reluctant to lodge complaints because they could impair future collaborations.

A few researchers say, however, that sharing isn’t a real problem because the incentives to share tend to outweigh those to hoard.

“We put all of our mice into Jackson even before they’re published,” says **Thomas Südhof**, professor of molecular and cellular physiology at Stanford. “In today’s culture, anybody who doesn’t share their models after they’ve been published is suicidal.”

A way forward:

As director of the Mouse Model Repository at Jackson Labs, it’s **Cat Lutz**’s job to convince researchers to send mice to Jackson Labs as soon as possible. One common argument she says she hears from them is a fear of getting scooped.

This is particularly true in emerging fields such as autism, where there is an intense focus on animal models. For example, **four different mouse models** with mutations in **SHANK3**, a leading autism candidate gene, **debuted in the past year**^{2,3}.

One of the teams is led by **Guoping Feng**, who says he will send his SHANK3 mice to Jackson Labs in two or three years. Until then, he says, his team will only collaborate with groups who don’t compete with his research interests.

“We cannot just give the mice to everybody,” Feng says. “They would end up doing exactly the same project that we’re doing.”

To encourage sharing, Jackson Labs occasionally agrees to keep a certain strain of mice confidential for a year or more, according to Lutz. The cost to the researchers is roughly \$2,500 per model, but Jackson may even cover that for mice expected to be popular.

Mouse models are supposed to be tools for the whole field, Lutz says. She cites a set of mouse models of spinal muscular atrophy as a good example: A private foundation hired a company to create the mice and immediately sent them to Jackson Labs for public distribution.

“The animals went from concept to extremely well-characterized in a very short period of time,” Lutz says. “If they’re sitting in some individual person’s mouse room facility, they’re just not that accessible.”

For models relevant to autism research, SFARI is paying for several models — including strains with a deletion in the **16p11.2** region and those lacking the **CNTNAP2** gene — to be bred and distributed by Jackson Labs.

Some researchers say they want to see many of the autism mouse models tested using the same equipment, housing and feeding conditions.

“People tend to think that isn’t very exciting work, but I disagree,” says **Richard Paylor**, professor of neuroscience and molecular and human genetics at Baylor College of Medicine in Houston. “I think it’s actually more important to understand the models that we have than going for a new model.”

But a project of that nature is likely to require significant start-up capital and widespread agreement on what tests to perform, Paylor notes. “It sounds like it should be fairly simple to do, but actually it’s very difficult to get people to agree.”

Mouse-sharing policies

- **National Institutes of Health**
- **Cell**
- **All Nature journals**
- **Science**
- **Science Translational Medicine**

References:

1: Heck D.H. *et al. Hum. Mol. Genet.* **17**, 2181-2189 (2008) [PubMed](#)

2: Durand C.M. *et al. Nat. Genet.* **39**, 25-27 (2007) [PubMed](#)

3: Wang X. *et al. Hum. Mol. Genet.* **20**, 3093-3108 (2011) [PubMed](#)