Turning the Page: A Transition to Digital Colony Files

Nicole Pandell, Sean Clohessy, Do Dang

Beth Israel Deaconess Medical Center, Department of Genetics

Abstract

Background:

The Pharmacogenetic Core Facility aids investigators in the design, organization, and management of cancer related murine studies. Services include ultrasound imaging, colony development, treatment administration, and tissue collection.

Efforts to expand existing murine colonies while simultaneously creating new genetic models led to a need for clear and consistent record keeping

Objective:

In order to monitor the efficiency of breeding set ups and ensure the timely expansion of individual colonies our team sought to transition from a history of recording in books to maintaining online records.

Background

Investigators who had worked with the Core facility were planning to expand current research goals. In addition to the growth of preexisting colonies new customers were beginning projects with Core.

Between February 2016 and February 2017 the number of breeding set ups doubled. With more mice being generated it was vital to update the current record system. Historically notes had been kept in books which worked well when there were fewer colonies. The increase in projects drove the initiative to overhaul the current record system. Focus was placed on creating flexible spreadsheets that could reflect the most up to date breeding set ups in the animal holding rooms.

Murine colony management requires well organized breedings to create experimental genotypes. Studies are often completed over the course of months. This coupled with the time needed for mice to mature and reach enrollment status makes for a situation in which all factors must be closely monitored.

The Core needed to streamline a record system that could be easily updated and shared with all parties involved. In order to adapt to growing demands a switch had to be made in how all murine colonies were managed.

Methods

A census of each colony was completed in order to organize relevant information

1. **Genotype**: Depending on the genetic model a mouse may experience quick disease progression, sterility, or immune deficiency.
2. **Status**: Once enrolled on treatment mice must be monitored for drug toxicity and other effects.
3. **Age**: After six months mice are no longer considered viable breeders. To effectively generate pups mice must be switched out continuously.
4. **Location**: Colonies are grouped together within the holding rooms. Having the location and cage information in the lab allows for better understanding of available space.

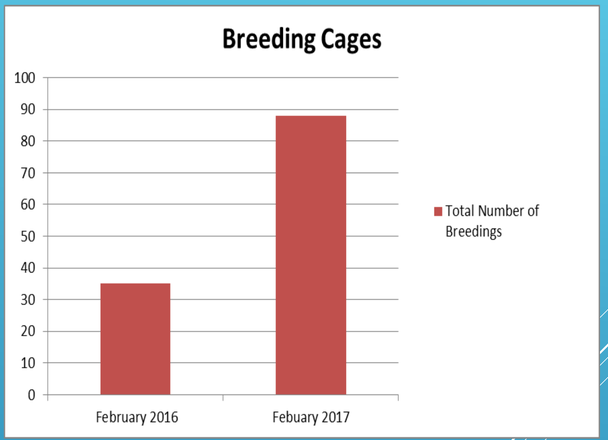

Figure 1: Bar graph representing the increase in breeding cages from 2016 to 2017

Results

#	Mouse ID	Cage Card	SEX	DOB	AGE (W)	DOXY Start	Age at Induction	Date for SL move	Weeks on DOXY	Date Enrolled	Imaging Date	Comments
1	794	445777	M	07/24/16	31.7	09/12/16	7.1	10/28/2016	24.6		12/5/2016	
2	796	449805	F	07/24/16	31.7	09/12/16	7.1	10/28/2016	24.6			
3	797	445781	F	07/24/16	31.7	09/12/16	7.1	10/28/2016	24.6	11/14/2016		
4	798	445781	F	07/24/16	31.7	09/12/16	7.1	10/28/2016	24.6		12/5/2016	Given to Elena 12/20/16
5	803	445784	M	07/26/16	31.4	09/12/16	6.9	10/28/2016	24.6	11/30/2016		
6	806	445781	F	07/29/16	31.0	09/12/16	6.4	10/28/2016	24.6	11/30/2016		
7	821	446997	M	08/14/16	28.7	09/12/16	4.1	10/28/2016	24.6	11/14/2016		
8	822	446997	M	08/14/16	28.7	09/12/16	4.1	10/28/2016	24.6	11/14/2016		
9	823	445781	F	08/14/16	28.7	09/12/16	4.1	10/28/2016	24.6		12/5/2016	
10	841	447003	M	08/15/16	28.6	09/12/16	4.0	10/28/2016	24.6			
11	842	447003	M	08/15/16	28.6	09/12/16	4.0	10/28/2016	24.6			
12	843	446994	M	08/15/16	28.6	09/12/16	4.0	10/28/2016	24.6			
13	852	449805	F	09/04/16	25.7	10/31/16	8.1	12/27/2016	17.6			
14	853	449805	F	09/04/16	25.7	10/31/16	8.1	12/27/2016	17.6			
15	856	449805	F	09/04/16	25.7	10/31/16	8.1	12/27/2016	17.6			
16	857	449805	F	09/04/16	25.7	10/04/16	4.3	11/30/2016	21.4			

Figure 2: Screenshot of mouse colony including, mouse number, date of birth (DOB), age in weeks, and date enrollment. Any information pertaining to the study is included in the document.

For more information, contact:

Nicole Pandell, Research Technician: npandell@bidmc.harvard.edu

Turning the Page: A Transition to Digital Colony Files

Nicole Pandell, Sean Clohessy, Do Dang

Beth Israel Deaconess Medical Center, Department of Genetics

Progress to Date

Breeding Chart

	A	B	C	D	E	F	G	H	I	J
1	*Cage ID*	459965	Genotype A		Genotype B					
2	**Mouse Colony**	Male	Females					**Mouse #**	**Gene A**	**Gene B**
3	**#**	7	161	177	54	55		7	+/+	+ive
4	**DOB**	08/04/16	08/07/16	08/29/16	09/14/16	09/14/16		161	-/-	-ive
5	**Date Set-Up**	12/14/16						177	-/-	-ive
6	**Comments**	L1		02/13/17	01/03/17			54	+/+	-ive
7				(separated)	59			55	+/+	-ive
8		L2			02/20/17					
9					11				100%	0.5
10		L3							HZ	
11									100%	0.5
12									WT	

Figure 3: Sample Breeding set up

This chart details the genetic expectations a specific breeding will produce. The right shows the genotypes of each mouse in breeding, allowing investigators to quickly gauge the genetic probability of the offspring.

In addition to the date of birth (DOB) for each breeding mouse, information regarding the length in of the breeding is provided. L1 stands for Litter 1. As the breeding continues the date of birth for each litter is added. If a female is not producing offspring it will be easy to spot.

When a female is pregnant she must be separated from the breeding cage. The dark lines on both sides of 177 indicate she is separated from the original cage. The clear visual differences allow investigators, at a glance, to understand where mice are.

Challenges

The effectiveness of this system relies on the continued effort of research technicians and investigators to maintain up to date files. If too much time has passed since the files are reviewed it could lead to mishandled information.

The finer details of the files are still being worked out. Formatting the information that should be included verses what may not be necessary is still being decided upon.

Next Steps

In addition to colony management there are other aspects Core work that would benefit from a streamlined record system. Currently we keep paper records for:

1. Drug preparation and Distribution
2. Euthanasia and Tissue Collection
3. Treatment logs

Once the colony files have been finalized we will be working to transition other aspects of Core Management to digital files.

Conclusions

In order to effectively manage a growing number of colonies the Core had to transition from books to online file storage. While the initial transition took a large coordinated effort between managers and technicians having the files in place should allow for consistent updating.

Hopefully this move will lead to more efficiency in murine colony management. The less time spent in the animal holding rooms allows for more time in the lab. Being able to understand the set up of the animal rooms while at the lab bench makes for a clearer understanding of daily goals.

For more information, contact:

Nicole Pandell, Research Technician: npandell@bidmc.harvard.edu