LABORATORY MOUSE COLONY MANAGEMENT DATABASE
PROJECT PROPOSAL
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Project Name: CTN Laboratory Mouse Colony Management Database
Team: #5 High Five
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1. Problem Statement

The laboratory in the CTN (center for translational neuromedicine) at Medical Center of University of Rochester, at which one of our group member Dr. Lu works, is embarking on mechanisms underlying neurological diseases including Alzheimer's disease using animal models (e.g. mouse and rat). One of the great challenges the lab faces is lacking an efficient data management system to keep track of the mouse colonies used for conducting medical experiments. Several reasons below call for establishing a database to manage the mouse colonies in the laboratory:

- A large group of members working in the lab consumes mouse in a daily base.
- A large volume of mouse strains that are used to test scientific hypothesis on daily basis.
- Same lab member may use different mouse strains and the same strain might be used by different members.
- Maintaining the mouse colonies is costly for a laboratory.

Currently the lab adopts online excel file to keep track the mouse records, but some issues remain using this approach:

- **Multiple-user Access:** More than ten lab members are working in the lab, with each one uses multiple mouse strains. For every member to update the excel file in multiple places (cells) for the mice they use, there is a need to maintain proper configuration of the data with data integrity and validation. Also, there is a call for a user-friendly interface of the data entry system, to simplify and optimize the data entry process. Meanwhile, a database benefits the

administrator of the lab to manage, modify and export the data efficiently, which facilitates their decision-making process.

- **Data Complexity:** Currently, there are more than 20 mice colonies, and each research project involves mice usage in different strains, with different gender and age. Using a database serves better needs to track the complex data.
- **Data Structure:** The data structure involved in this process is relational, rather than flat. Particularly, excel files were unable to keep track of which and how many mice have been used by which lab member at a specific time point.
- **Institutional Initiative:** Building a database cast great impact for laboratory management, which also set an example for other labs in the CTN to follow suit or learn from our pilot experience.

Therefore, to enhance efficiency in tracking the consumption of animal, and control the budget of the lab maintenance, an urgent need is to build a relational database using MySQL.

2. Target User

Users of the database are the members of the laboratory including the principal investigator, lab managers (administering the database), and the lab members.

The principal investigator needs to 1) know the current colony size of each mouse strain at any time, adding, removing and updating the mouse colony strain information (Relation 2 below); 2) Add and remove the lab members (Relation 1 below).

The Lab manager takes the responsibility to add or remove mouse strain by entering the information of mouse.

All the other lab members interacted with the database for the following purposes: 1) Check current status of the colonies: The lab members need to search the availability of certain mouse strain(s) of certain age and gender to locate a specific mouse. For example, what strains are available, how many mice are available, what are the available mice's age(s). Availability is defined as amount >0. These operations are linked to Mouse_colony relation (Relation 2 and 3 below). 2) Add/remove mice on Mouse_colony relation based on lab member's daily use of the mouse. 3) Check the usage of the colony (Relation 4 below).

3. List of Relations (Underlined = Primary Key)

1. Lab_member(member_name: string varchar(30), <u>university_id: int,</u> start_date:date, end_date:date)
2. Mouse_colony(<u>strain:string varchar (30)</u>, <u>gender: string varchar(10),</u> <u>birth_date: date</u>, amount: int)
3. Colony_location(<u>strain:string varchar(30),</u> location:string varchar(30))
4. Mouse_usage(<u>university_id: int,</u> <u>use_date:date,</u> <u>used_strain:string</u> <u>varchar(30),</u> <u>used_gender: string</u>, used_amount:int)

4. Data

We will collect the data from Dr. Yuan Lu's laboratory. As the previous usage of the mouse colony was not recorded in the excel file, our team plans to create our own data through loading the current mouse colony information and the lab member information to the database.

5. Web-Interface

The web-interface will serve both the lab administers (eg, the Principal Investigator) and the lab members.

1. Log_In Interface
2. All members Interface including (PI and lab manager):
    1. Check current status of the colonies.
    2. Add/remove mice on Mouse_colony relation.
    3. Check the usage of the colonies of their own.
3. Manager Interface (principal investigator and lab manager):
    1. add/remove Lab_member
    2. add/remove/update strain/location in Colony_location

*Please see the appendix A for the interface sketch.

Web-Interface Sketch (3 pages included):

Page 1: Main-Page for Log-in

Member

search
history

What mouse are you looking for?

Strain

Gender

Age

Submit

	Strain	Gender	Birth_date	Location	Amount

Add

Remove

Page 2: Lab_Member Interface

Manager

Search
Add
Remove
Update
History

Lab Member:

University_ID

Mouse Colony:

Strain   Gender   Age

Mouse Usage:

University_ID   Use_date   strain   Gender

U_ID	U_date	U_strain	U_gender	U_amount

Submit

Page 3: Manager_Interface