MouseDB Documentation

Release 0.1

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ONE

MOUSEDB CONCEPTS

Data storage for MouseDB is separated into packages which contain information about animals, and information collected about animals. There is also a separate module for timed matings of animals. This document will describe the basics of how data is stored in each of these modules.

1.1 Animal Module

Animals are tracked as individual entities, and given associations to breeding cages to follow ancestry, and strains.

1.1.1 Animal

1.1.2 Breeding Cages

A breeding cage is defined as a set of one or more male and one or more female mice. Because of this, it is not always clear who the precise parentage of an animal is. If the parentage is known, then the Mother and Father fields can be set for a particular animal.

1.1.3 Strains

1.2 Data Module

Data (or measurements) can be stored for any type of measurement. Conceptually, several pieces of data belong to an experiment (for example several mice are measured at some time) and several experiments belong to a study. Measurements can be stored independent of experiments and experiments can be performed outside of the context of a study. It is however, perfered that measurements are stored within an experiment and experiments are stored within studies as this will greatly facilitate the organization of the data.

1.2.1 Studies

In general studies are a collection of experiments. These can be grouped together on the basis of animals and/or treatment groups. A study must have at least one treatment group, which defines the animals and their conditions.

1.2.2 Experiments

An experiment is a collection of measurements for a given set of animals. In general, an experiment is defined as a number of measurements take in a given day.

1.2.3 Measurements

A measurement is an animal, an assay and a measurement value. It can be associated with an experiment, or can stand alone as an individual value. Measurements can be viewed in the context of a study, an experiment, a treatment group or an animal by going to the appropriate page.

CHAPTER

TWO

MOUSEDB INSTALLATION

2.1 Configuration

MouseDB requires both a database and a webserver to be set up. Ideally, the database should be hosted separately from the webserver and MouseDB installation, but this is not necessary, as both can be used from the same server. If you are using a remote server for the database, it is best to set up a user for this database that can only be accessed from the webserver. If you want to set up several installations (ie for different users or different laboratories), you need separate databases and MouseDB installations for each. You will also need to set up the webserver with different addresses for each installation.

2.2 Software Dependencies

1. **MouseDB source code**. Download from one of the following:

1. http://github.com/davebridges/mousedb/downloads for the current release
2. http://github.com/davebridges/mousedb for the source code via Git

Downloading and/or unzipping will create a directory named mousedb. You can update to the newest revision at any time either using git or downloading and re-installing the newer version. Changing or updating software versions will not alter any saved data, but you will have to update the localsettings.py file (described below).

1. **Python**. Requires Version 2.6, is not yet compatible with Python 3.0. Download from http://www.python.org/download/.
2. **Django**. Download from http://www.djangoproject.com/download/
3. **Database software**. Typically MySQL is used, but PostgreSQL, Oracle or SQLite can also be used. You also need to install the python driver for this database (unless you are using SQLite, which is internal to Python 2.5+). See http://docs.djangoproject.com/en/dev/topics/install/database-installation - Django Database Installation Documentation for more information.

2.3 Database Setup

1. Create a new database. You need to record the user, password, host and database name. If you are using SQLite this step is not required.
2. Go to localsettings_empty.py and edit the settings:

- DATABASE_ENGINE: 'mysql', 'postgresql_psycopg2' or 'sqlite3 depending on the database software used.

- DATABASE_NAME: database name
- DATABASE_USER: database user
- DATABASE_PASSWORD: database password
- DATABASE_HOST: database host

1. Save this file as localsettings.py in the main MouseDB directory.

2.4 Web Server Setup

You need to set up a server to serve both the django installation and saved files. For the saved files. I recommend using apache for both. The preferred setup is to use Apache2 with mod_python. The following is a httpd.conf example where the code is placed in /usr/src/mousedb:

```
Alias /static /usr/src/mousedb/media
Alias /media /usr/src/mousedb/media
<Directory /usr/mousedb/media>
   Order allow,deny
   Allow from all
</Directory>
<Location "/mousedb/">
   SetHandler python-program
   PythonHandler django.core.handlers.modpython
   SetEnv DJANGO_SETTINGS_MODULE mousedb.settings
   SetEnv PYTHON_EGG_CACHE /var/www/eggs
   PythonOption django.root /mousedb
   PythonDebug On
   PythonPath "['/usr/src'] + sys.path"
   PythonInterpreter mousedb
</Location>
```

If you want to restrict access to these files, change the Allow from all directive to specific domains or ip addresses (for example Allow from 192.168.0.0/99 would allow from 192.168.0.0 to 192.168.0.99)

2.5 Final Configuration and User Setup

1. Go to mousedb/admin/auth/users/ and create users, selecting usernames, full names, password (or have the user set the password) and then choose group permissions.

CHAPTER

THREE

ANIMAL DATA ENTRY

3.1 Newborn Mice or Newly Weaned Mice

1. Go to Breeding Cages Tab
2. Click on Add/Wean Pups Button
3. Each row is a new animal. If you accidentaly enter an extra animal, check off the delete box then submit.
4. Leave extra lines blank if you have less than 10 mice to enter
5. If you need to enter more than 10 mice, enter the first ten and submit them. Go back and enter up to 10 more animals (10 more blank spaces will appear)

3.2 Newborn Mice

1. Enter Breeding Cage under Cage
2. Enter Strain
3. Enter Background (normally Mixed or C57BL/6-BA unless from the LY breeding cages in which case it is C57BL/6-LY5.2)
4. Enter Birthdate in format YYYY-MM-DD
5. Enter Generation and Backcross

3.3 Weaning Mice

1. If not previously entered, enter data as if newborn mice
2. Enter gender
3. Enter Wean Date in format YYYY-MM-DD
4. Enter new Cage number for Cage

3.4 Cage Changes (Not Weaning)

1. Find mouse either from animal list or strain list

2. Click the edit mouse button
3. Change the Cage, Rack and Rack Position as Necessary

3.5 Genotyping or Ear Tagging

1. Find mouse either from animal list or strain list, or through breeding cage
2. Click the edit mouse button or the Eartag/Genotype/Cage Change/Death Button
3. Enter the Ear Tag and/or select the Genotype from the Pull Down List

3.6 Marking Mice as Dead

3.6.1 Dead Mice (Single Mouse)

1. Find mouse from animal list or strain list
2. Click the edit mouse button
3. Enter the death date in format YYYY-MM-DD
4. Choose Cause of Death from Pull Down List

3.6.2 Dead Mice (Several Mice)

1. Find mice from breeding cages
2. Click the Eartag/Genotype/Cage Change/Death Button
3. Enter the death date in format YYYY-MM-DD
4. Choose the Cause of Death from Pull Down List

CHAPTER

FOUR

STUDIES AND EXPERIMENTAL SETUP

Set up a new study at /mousedb/admin/data/study/ selecting animals

You must put a description and select animals in one or more treatment groups

If you have more than 2 treatment groups save the first two, then two more empty slots will appear. For animals, click on the magnifying glass then find the animal in that treatment group and click on the MouseID. The number displayed now in that field will not be the MouseID, but don't worry its just a different number to describe the mouse. To add more animals, click on the magnifying glass again and select the next animal. There should be now two numbers, separated by commas in this field. Repeat to fill all your treatment groups. You must enter a diet and environment for each treatment. The other fields are optional, and should only be used if appropriate. Ensure for pharmaceutical, you include a saline treatment group.

CHAPTER

FIVE

MEASURMENT ENTRY

5.1 Studies

If this measurement is part of a study (ie a group of experiments) then click on the plus sign beside the study field and enter in the details about the study and treatment groups. Unfortunately until i can figure out how to filter the treatment group animals in the admin interface, at each of the subsequent steps you will see all the animals in the database (soon hopefully it will only be the ones as part of the study group).

5.2 Experiment Details

- Pick experiment date, feeding state and resarchers
- Pick animals used in this experiment (the search box will filter results)
- Fasting state, time, injections, concentration, experimentID and notes are all optional

5.3 Measurements

- There is room to enter 14 measurements. If you need more rows, enter the first 14 and select "Save and Continue Editing" and 14 more blank spots will appear.
- Each row is a measurement, so if you have glucose and weight for some animal that is two rows entered.
- For animals, click on the magnifying glass then find the animal in that treatment group and click on the MouseID. The number displayed now in that field will not be the MouseID, but don't worry its just a different number to describe the mouse.
- For values, the standard units (defined by each assay) are mg for weights, mg/dL for glucose and pg/mL for insulin). You must enter integers here (no decimal places). If you have several measurements (ie several glucose readings during a GTT, enter them all in one measurement row, separated by commas and *NO spaces*).

CHAPTER

SIX

AUTOMATED DOCUMENTATION

6.1 Data Package

6.1.1 Models

class **Assay** (**args, **kwargs*)
Assay(id, assay, assay_slug, notes, measurement_units)

class **Diet** (**args, **kwargs*)
Diet(id, vendor_id, description, product_id, fat_content, protein_content, carb_content, irradiated, notes)

class **Environment** (**args, **kwargs*)
Environment(id, building, room, temperature, humidity, notes)

class **Experiment** (**args, **kwargs*)
Experiment(id, date, notes, experimentID, feeding_state, fasting_time, injection, concentration, study_id)

class **Implantation** (**args, **kwargs*)
Implantation(id, implant, vendor_id, product_id, notes)

class **Measurement** (**args, **kwargs*)
Measurement(id, animal_id, experiment_id, assay_id, values)

class **Pharmaceutical** (**args, **kwargs*)
Pharmaceutical(id, drug, dose, recurrance, mode, vendor_id, notes)

class **Researcher** (**args, **kwargs*)
Researcher(id, first_name, last_name, name_slug, email, active)

class **Study** (**args, **kwargs*)
Study(id, description, start_date, stop_date, notes)

class **Transplantation** (**args, **kwargs*)
Transplantation(id, tissue, transplant_date, notes)

class **Treatment** (**args, **kwargs*)
Treatment(id, treatment, study_id, diet_id, environment_id, transplantation_id, notes)

class **Vendor** (**args, **kwargs*)
Vendor(id, vendor, website, email, ordering, notes)

6.1.2 Forms

6.1.3 Views and URLs

6.1.4 Administrative Site Configuration

6.2 Animals Package

6.2.1 Models

6.2.2 Forms

6.2.3 Views and URLs

6.2.4 Administrative Site Configuration

CHAPTER

SEVEN

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MODULE INDEX

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