**New England Collaborative Data Management Curriculum**

**A Joint Initiative of the University of Massachusetts Medical School**

**& the National Network of Libraries of Medicine, New England Region**

**Case Excerpt: Regeneration of Functional Heart Tissue in Rats**

The goal of the study is to try to regenerate functional heart tissue in a rat by delivering stem cells to the heart.

Two days before we operate on the rat, we take adult stem cells and incubate them for 24 hours with our marker for cells [fluorescent nanoparticles]. We then put them in a solution and inject them into a tube that has a biological suture in it, so the cells sit down on the outside of the biological suture. We incubate it for 24 hours, and then do the surgery. During the surgery, we open up the thoracic cavity of the rat and create a myocardial infarction by occluding the left anterior descending coronary artery. At this point it is ischemic; we keep it ischemic for 1 hour, not letting any blood flow go through, and then we reprefuse it and let the blood go back. About a minute after that, we put the biological suture with the cells on it through the infarcted region. We then close the rat up and put it back in the cage for a week. We go back a week later, open the rat up again, and use our camera system to acquire images of the heart. We take images with two cameras simultaneously and we’ll also have a pressure transducer which syncs automatically with the pictures inside the left ventricle cavity to measure left ventricle pressure. Then we reposition our cameras and take another data set and we usually do that about 4 or 5 times to look at different regions around that infarct. Then we euthanize the animal, cut sections of the heart, and put them onto slides. We stain some of them for specific markers in looking to find out exactly where the stem cells are in that cross section and take additional images of these.

In addition to stored images of the living heart and of heart sections after euthanization, we store measurements of the left ventricle pressure that syncs with images of the living heart. We look at the data we acquired and use our home-grown custom software to track particles on the surface of the heart to see how far and how fast those particles are moving.

The paper lab notebook basically performs the function of being an index into the actual datasets and it should record all the information the PI specifies. The content of a lab book relates to a particular experiment and is used by all staff working on that experiment. There could be on average 5-6 people using the notebook. We also have a paper surgical log that is kept with the animal and whatever project staff write down in that surgical log should be transferred into the lab notebook – so the data have to be in 2 places. They have to be kept with the animal in case there is a problem with the animal, but the PI also needs the data in the lab notebook to be able to write papers. Lab notebooks are just in the PI’s office or lab with no backup.

1. Data ownership, privacy and ethical issues

1. What are the ethical or privacy issues in this study and how are they being addressed? What are the implications do these issues have for re-use?
2. What are the issues related to the home-grown custom software used for analysis in terms of potential future re-use?
3. Who will own any copyright or intellectual property rights to the lab notebooks, data sets or custom software code?
4. How might the data sets or custom software be licensed or fees charged if rights exist?
5. If re-use requires sharing of lab notebooks, how might this be managed? What would make re-use of lab notebooks easier?


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