

### Lab Notebook Guidelines

1. Always write in pen.
2. Include a Table of Contents at the front of the lab notebook.
3. Number and date every page of your notebook.
4. Write in the lab notebook as the work is being done.
5. Write down EVERYTHING you do:
  - a. Include the make, model, serial number and contact information for every machine or instrument you use.
  - b. For every chemical used, write down the name of the chemical, company it came from, formula weight, contact information for the company, and lot number.
  - c. Include your experimental plan and describe the purpose and procedure of each task and experiment.
  - d. Record raw data directly in the lab notebook, and include analyzed data (stapled/pasted to the book) as well, be sure to describe the analysis process.
  - e. Include in your lab notebook any typed procedures used, graphs made, excel files, etc. On each typed page indicate the date, your initials, and the file name. Also make a backup copy of any lab file relating to your research.
  - f. Include any ideas you think of, problems encountered, and observations made while performing an experiment.
  - g. Include the reference information for any article referred to or used for your research.
6. To delete an entry, draw a line through the area to be deleted so it is still legible. Make corrections next to the deleted entry, and initial and date the corrected entry.
7. The notebook and its contents are to be considered confidential and can not be shared with non-members of the lab without permission from the Prof. Lu.

Instruction Read and Understood by \_\_\_\_\_

Dated \_\_\_\_\_

## Protocol Template

"[Click here to insert title of protocol]"

Prepared by -- "[Click here to insert your name]"

Date -- "[Click here to insert the date]"

Objective – "[Click here to insert objective of the procedure detailed in this protocol]"

Principle – "[Click here to insert a brief description of the scientific principle behind the procedure]"

Materials –

1. "[Click here to insert a list of materials used]"

Procedure –

1. "[Click here to insert a detailed list of all steps of the procedure]"

Notes –

1. "[Click here to insert any notes, such as safety concerns]"

References –

"[Click here to insert any references/manual used to prepare the protocol]"

Write-up Format for Experimental Plan

- a. DATE and YOUR NAME
- b. TITLE OF THE EXPERIMENT
- c. OBJECTIVES – Describe the purpose of the experiment
- d. HYPOTHESIS – Give your expectation of how the end-point analysis will be related to the experimental variables. (ex. Cell number will increase over culturing time, Scaffold mechanical properties will decrease as calcium concentration declines.)
- e. EXPERIMENTAL DESIGN – how to conduct the right experiment to test the hypothesis
  - control and experimental groups
  - experimental variables – what will be changed in the experiment
  - number of samples/group/time point ( $n > 5$  for quantitative,  $n = 3$  for qualitative)
  - conditions of the experiment
- f. END-POINT ANALYSES – parameters which will be measured in this experiment, and any tests that will be done to analyze the data/samples
  - ex. GAG expression – determined by histology
  - ex. Young's modulus/stiffness – determined by mechanical testing under tension
- g. MATERIALS and EQUIPMENT NEEDED
  - number of cells
  - total number of samples needed
  - solutions
  - equipment that you will use to conduct the experiment or end-point analyses
- h. EXPERIMENTAL PROCEDURE
  - Describe the experimental conditions - ex. Cells will be cultured in a humidified environment in a 12-well plate, etc.
  - Describe how will the end point analysis be performed, i.e. the testing steps which will be used in endpoint analysis
- i. POTENTIAL PROBLEMS – what might go wrong with experiment or limitations of this study.
- j. FUTURE STUDIES – the next step in the study or the next experiment which can be used to solve any potential problems.
- k. REFERENCES – the articles, sources which helped you to design this experiment

## Research Presentation/Journal Club Presentation Guidelines

Each semester, all lab members will be required to present at a laboratory meeting their research performed during the semester. All presentations will be given individually, even if projects overlap. In addition, each lab member will be required to present at least one article each semester at journal club.

Presentations should be prepared in PowerPoint using the lab's slide template, and one printed copy (in handout format, 3 slides per page) must be given to Prof. Lu at the beginning of the presentation. Additionally, for journal club presentations, photocopies of the article to be reviewed by the presenter should be photocopied and distributed to all other members of the lab one week prior to the presentation.

Presenters are responsible for all material shown on the slides and, in the case of journal club, for all material in the article being reviewed. There is no set time limit for presentations, but they should be long enough to provide sufficient detail and clear explanations. There will be a question and answer session following each presentation during which time the audience can ask questions about the presentation or article.

Below is a list of suggested sections to be included in the presentation:

1. Title Slide – Should include title, presenter's name, lab name, and date
2. Outline – Provide an outline of the material to be presented
3. Significance/Motivation– Discuss the significance and importance of the research performed
4. Background– Include slides that detail background material for those in the audience who may be unfamiliar with the research
5. Objectives – Explicitly state the objectives of the research.
6. Hypotheses/Expected Outcomes – Discuss the hypotheses and the reasons why the stated outcomes are expected.
7. Materials and Methods – List (and explain if necessary) the materials used in the experiments. Also discuss the procedures used to perform the experiments.
8. Experimental Design – Explain the organization of the experiments, including all experiment and control groups.
9. Results – Present all results of the experiments that were performed.
10. Discussion – Discuss the results, including their relevance and agreement with the hypotheses.
11. Limitations – List and explain and limitations of the experiment
12. Your Critique (For Journal Club Only) – Discuss what you feel are the strengths and weaknesses of the article and research performed.
13. References – List all references used in preparing the presentation.
14. Acknowledgments – Acknowledge all those who assisted you.

## Library Search and Managing References Using the Reference Manager

### General

Reference Manager (by ResearchSoft) is a database for managing and storing references. This database contains information about references found from online sources, and is capable of importing data from the web as well as exporting a list of references to a document. Both of these processes save time and effort when writing a report, or searching for a document.

Opening Reference Manager: To start Reference Manager, click on start → Reference Manager 10 → Reference Manager. To open an existing database go to File → open database. To create a new database, go to File → new database.

### Acquiring a reference from the web:

1. Find the article you are looking for on pub-med at website:  
<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi>
2. You can add references to the "Clipboard" and download them together or individually.
3. After the desired references are selected, make sure that the Format is "MEDLINE" and send to "File" and is selected in the dropdown box, and then click SEND.

### Loading a reference:

1. After downloading the reference file (filename.fcgi), open up Reference Manager 10.0 program.
2. Open up your database or create one if you don't already have one.
3. Click on References up on the list, and then choose Import Text File.
4. In the Import Text File window choose the filter as PubMed.cap, and open up the text file that you saved on the computer's hard drive which will most likely be saved as filename.fcgi.
5. Click Import on the bottom left, and the reference file will be appended to your database.

### Managing References:

1. To sort references by authors, reference ID, or title, simply click on the each tab in the window.
2. To delete a reference, right-click on the reference and select delete.
3. To copy a reference between databases, select the reference then go to References → copy between databases, and follow the prompts.
4. To generate a bibliography, go to Bibliography → Generate from Reference List. Select the proper type of bibliography, as well as the font, and click ok

P.S. If you cannot find your article on pub-med, then you can enter the reference data manually. This is done by:

1. Click on *References* up at the list again and choose "New".
2. A window will pop up, and you can enter your information manually, then close this window and save the changes.

**\*\* REMEMBER TO SAVE FREQUENTLY**