

Laboratory Notebooks

Biochemistry Boot Camp

Session # 8

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Overview

- What is a Lab Notebook?
- What to include in Notebook?
- How to maintain a good Notebook?
- Entry Examples

What is a Lab Notebook?

- Primary record of research
- Contains:
 - Background for experiment
 - Method used
 - Data recorded
 - Interpretation of results
- Be sure to contain enough information in your notebook that you or someone else can follow what was done and reproduce the results

What to include in Notebook?

- Table of Contents
- Title of Project and Date
- Experimental Details
 - Procedure, list of reagents used, list of instruments used, what water was used
- Print out of data
 - Gels, Graphs and Figures that support results
- Protocols and Calculations
- Conclusion

Maintenance and Ethics

- All data goes into the lab notebook
 - “Good” and “Bad” results
 - Failed or contradictory experiments
- No pages come out of the lab notebook
 - Even if there are mistakes or spills on the page
 - Don’t skip pages
 - Cross out any unused parts of the page
- Correct mistakes
- Honesty is essential

*Information taken from NIH: [https://www.training.nih.gov/assets/Lab_Notebook_508_\(new\).pdf](https://www.training.nih.gov/assets/Lab_Notebook_508_(new).pdf)

Correcting Mistakes in Notebook

- Bad

~~I measured the UV absorbance at 260 nm to be 0.025, a concentration of 75.0 uM.~~
Misread the 260 value. A_{280} is 0.531, or 123 uM.

- Good

~~I measured the UV absorbance at 280 nm to be 0.325, a concentration of 75.0 uM. — RH 06/01/16~~
Misread the 260 value. A_{280} is 0.531, or 123 uM.

*Information taken from Dr. Fitzkee’s Presentation on Laboratory Notebooks (2010).

Recording the Data

- Directly into notebook in black or blue ink
 - Make sure you choose an appropriate pen to document results – many bleed when exposed to water or common solvents
- Make entries only in ruled areas of the numbered pages
- Unnumbered pages not to be used
- Attach supporting data

Pen Test

Pens Tested:

1. Control
2. Erasing
3. Water
4. Methanol
5. Ethanol
6. Acetone
7. Baking`

*Pen Test Done by Colin Purrington:
<http://photography.colinpurrington.com/lab-notebook/h636c797b#h636c797b>

Pen	Control	Erasure	Water	Methanol	Ethanol	Acetone	Baked
Bic Accountant fine point (red)	123	123	123				123
Bic Accountant fine pt (black)	123	123	123				123
Bic Round Stic med (black)	123	123	123				123
Cross fountain pen (blue/black)	123	123	123	123	123	123	123
Dixon Ticonderoga 1368-2 soft pencil	123	123	123	123	123	123	123
Pentel Hybrid Gel Roller (black)	123	123	123	123	123	123	123
Pilot G-2 07 (black)	123	123	123	123	123	123	123
Sakura Gelly Roll fine (black)	123	123	123	123	123	123	123
Sakura Gelly Roll fine (blue)	123	123	123	123	123	123	123
Sakura Gelly Roll XPGB (blue)	123	123	123	123	123	123	123
Sakura Gelly Roll XPGB (green)	123	123	123	123	123	123	123
Sakura Gelly Roll XPGB (red)	123	123	123	123	123	123	123
Sakura Pigma Micron .45 mm (black)	123	123	123	123	123	123	123
Sanford Sharpie extra fine (black)	123	123	123	123	123		123
Sanford Sharpie extra fine point (red)	123	123	123				123
Sanford Sharpie ultra fine point (blue)	123	123	123				123
Sanford Uni-Ball Gel RT Med (black)	123	123	123	123	123	123	123
Sanford Uni-Ball Vision fine (black)	123	123	123	123	123	123	123
Sanford Uni-Ball Vision fine (blue)	123	123	123	123	123	123	123
Sanford Uni-Gel RT fine (blue)	123	123	123	123	123	123	123
Zebra Sarasa 0.7 (blue/black)	123	123	123	123	123	123	123

Journal References

First Author Year Journal Volume First Page
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 Smith, J. et al. (2010) Nature. 465: 302.

- Some information from the paper that pertains to your research
 - Concentration of solutions, equilibrium constants, mechanisms, etc.

Calculations Example 1

- Making 100 mL of 200 mM NaCl (1.17 g), 20 mM HEPES pH 7.3 (2 mL), 10% (w/v) Glycerol (10g)

- Making 100 mL of:

200 mM NaCl

$$\frac{100 \text{ mL} \left| \cancel{1 \text{ L}} \right| 0.2 \text{ mol} \left| 58.44 \text{ g} \right|}{1000 \text{ mL} \left| 1 \text{ L} \right| 1 \text{ mol} \left| 1 \text{ mol} \right|} = 1.17 \text{ g}$$

Calculations Example 2

- 20 mM HEPES pH 7.3 (1 M Stock)

$$C_1 V_1 = C_2 V_2$$

$$(100 \text{ mL}) * (20 \text{ mM}) = (x \text{ mL}) * (1000 \text{ mM})$$

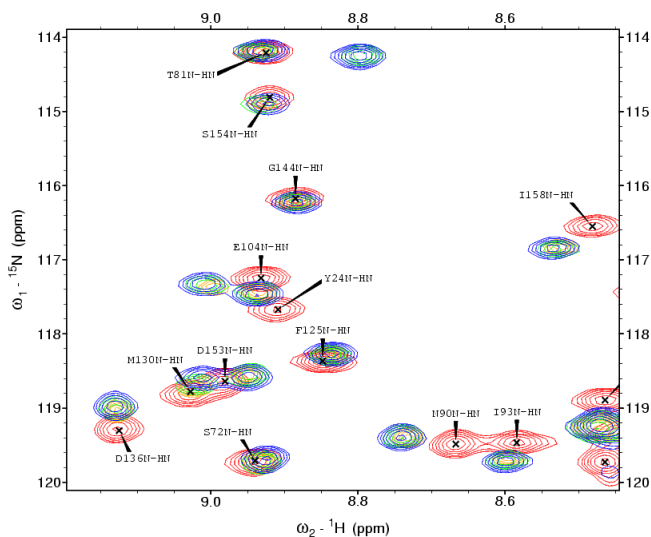
$$x = 2 \text{ mL}$$

Who Owns the Notebook

- Your Research Adviser
- The University
- Which means your notebook stays in the lab
- Make photocopies of the pages are okay and encouraged

Complex Data Example

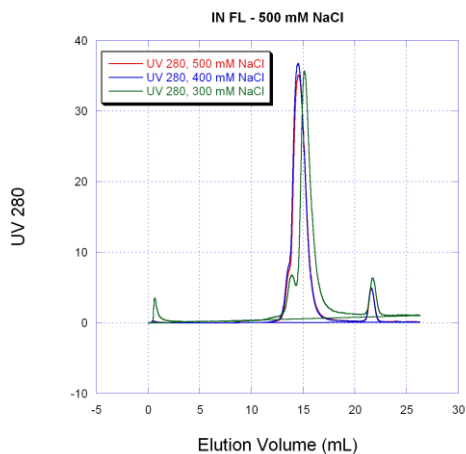
- A print of data similar to this should be in your notebook
- Reference what we are looking at in this spectrum



*Information taken from Dr. Fitzkee's Presentation on Laboratory Notebooks (2010).

Cross Referencing Data Example

- Chromatogram data is stored on FPLC PC with filename "20100315 Size Exclusion.dat" in the "Smith data" directory. Details given on pg. 65. I collected fractions C1-C5 for further study. A_{280} trace is pasted at right.



*Information taken from Dr. Fitzkee's Presentation on Laboratory Notebooks (2010).

Questions of the day?

- In what ways do you benefit by keeping a good lab notebook?
- In what ways do others benefit?

*Information taken from Dr. Fitzkee's Presentation on Laboratory Notebooks (2010).

Recap on why to keep a good record?

- Convenience
 - Know what you did
 - Keep data in one place
 - Continuity between members
- Catastrophe
 - Fraud
 - Professional work ethic
 - Evidence for patent lawyers

*Information taken from Dr. Fitzkee's Presentation on Laboratory Notebooks (2010).

Thank You!

Questions?