

# Sample Lab Report for Lab #1: Written in LaTeX

Your Name

January 30, 2014

## Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
<b>2</b>	<b>Methods</b>	<b>1</b>
2.1	Preparation . . . . .	2
2.2	Heart . . . . .	2
2.3	Lungs . . . . .	3
<b>3</b>	<b>Results</b>	<b>4</b>
3.1	Photo results . . . . .	4
3.2	Dissection Worksheet . . . . .	5
<b>4</b>	<b>Discussion</b>	<b>5</b>

## 1 Introduction

This Lab allowed us to identify and compare the size, shape and tissue type of the major anatomic landmarks of the heart and lungs. The goal of the lab was not, however, simply to observe anatomy but to associate structure with function.

The heart is a pump for blood that comes into the right atrium, goes out through the right ventricle, returns through the left atrium, and leaves again through the left ventricle. Based on this knowledge, we attempted to link measurements and observations of structure in the preparation to associated functions of the heart.

We describe in Section 2 below the methods we implemented beyond or as modifications of those included in the lab instructions. Section 3 contains the results and Section 4 contain the presentation and analysis of the results from the experiment.

This document is meant to show off LaTeX in a form that should be easy to substitute for a lab report you might wish to write. Note the books that describe LaTeX and how to use it, my favorite of which is “Guide to LaTeX” by Kopka and Daly.<sup>1</sup> There are many sites online to find specific information but a general overview book is a good investment.

Figure 1 contains the basic bovine anatomy that was the basis for our preparation.

## 2 Methods

We used the methods described in the lab manual and highlight only the details and extensions we performed in the lab.

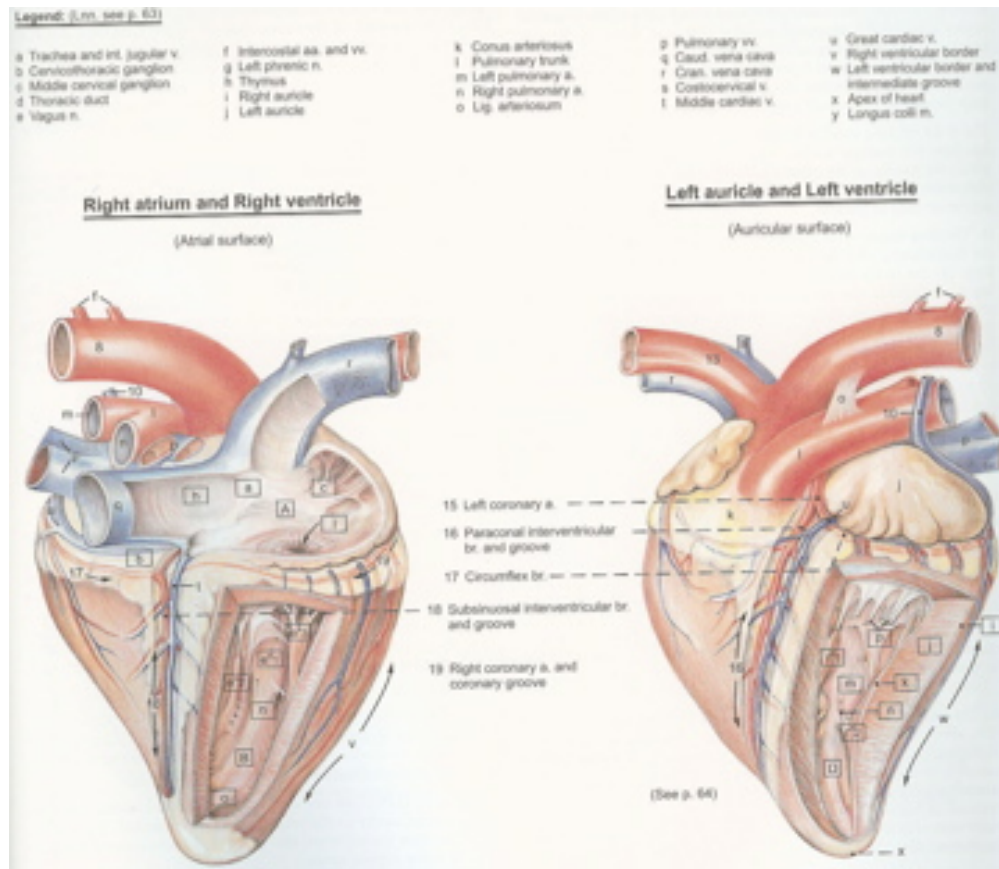


Figure 1: **Diagram of cow heart anatomy.** This image provided the guidance needed to evaluate the bovine specific anatomical features from our preparation. Note especially the orientation of the venae cavae, which are approximately orthogonal in orientation to that of a bipedal mammal like the human.

## 2.1 Preparation

To prepare the dissection, we first obtained a dissection kit, rubber/latex gloves, and (optionally) fashioned ourselves a dissection apron from the plastic on hand. We did not find it necessary to wash the preparation as it came quite clean from the storage bag. We unpacked all the dissection tools from the case and laid them out in some organized fashion. We then laid out the heart and lung preparation on the plastic material and observed the large scale anatomy, identifying the following organs:

- lungs, both left and right
- heart, covered in pericardial sac
- long portion of the trachea

We then carefully separated the heart from the rest of the tissue and dissected it clear, leaving at least a few centimeters of the major vessels attached.

## 2.2 Heart

We followed the steps described in the provide web sites but modified the order of dissection slightly....

## 2.3 Lungs

To dissect the lungs we first separated the lungs from the preparation, being careful to preserve access to the bronchi. With pressured air from the lab supply valves, we inflated the lungs via the bronchi until the lungs became completely full. Once we deflated the lungs, we sliced them open as illustrated in the web site and exposed bronchi and the first three generations of airways.

Just for fun, We end this page here with an explicit command `\newpage`

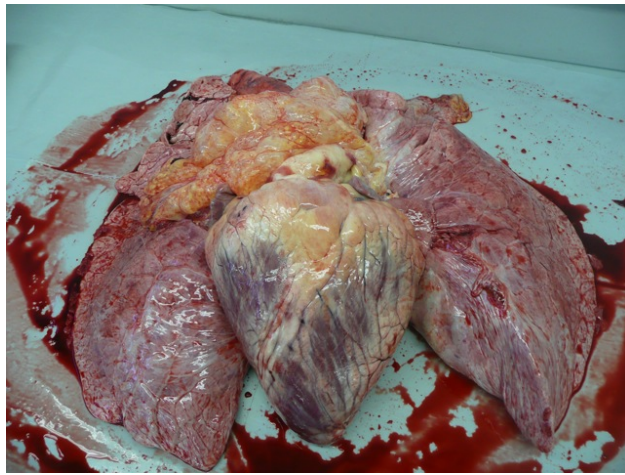


Figure 2: **Overview photo of the cow heart and lungs.** The photos includes the heart in the middle surrounded by the left and right lungs on either side. The pericardial sack was already removed from the heart for this photograph. See text for details.

### 3 Results

Our results consist of photos and a table of values measured from the preparation, included in Section 3.2, below.

#### 3.1 Photo results

Note also the vspace commands, which add or subtract space, depending on the sign of the numeric value. The value of `-.25in` removes  $\frac{1}{4}$  inch of space from the space, moving the figure higher on the page. A positive `.25in` will create a large gap, moving the text down.

The page break that happens here is a result of the tables that follow—they usually require their own page so they force a new page rather than break part way through.

### 3.2 Dissection Worksheet

Cardiac Structure	Dimensions /Diameter(mm)	Wall Thickness(mm)	Comments
Whole Heart			
Superior Vena Cava			
Inferior Vena Cava			
Right Atrium			
Right Ventricle			
Left Atrium			
Left Ventricle			
Mitral Valve			
Aorta			
Left Main Coronary			
Right Main Coronary			
Aortic Valve			
Aortic Arch Branch vessels			
Pulmonary Artery			
Pulmonic Valve			
Pulmonary Veins			
Tricuspid Valve			
Pulmonary Artery Branch Vessels			
Chordae Tendinae			

Pulmonary Structure	Dimensions /Diameter(mm)	Wall Thickness(mm)	Comments
Trachea			
Left Main Bronchus			
Right Main bronchus			
2nd Generation Bronchus			

## 4 Discussion

The discussion section often contains references to papers, although a lab report may not require this level of sophistication. We can cite a single paper, in this case a technical report<sup>2</sup> or a set of multiple papers,<sup>3–6</sup> which LaTeX will format as a string of numbers instead of a list including all entries, *e.g.*, 1,2,3,4,5 = 1–5.

Note also that LaTeX does a wonderful job with equations, although the syntax takes a little while to figure out. For example:

$$y = \frac{1}{\sqrt{x^2 + 2\sigma z}} \quad (1)$$

## References

- [1] H. Kopka and P.W. Daly. *Guide to LaTeX*. Addison Wesley, fourth edition, 2004.
- [2] American Heart Association. Heart diseases and stroke statistics-2005 update. Technical report, American Heart Association, Dallas, Texas, 2008.
- [3] M.J. Ackerman, V.M. Spitzer, A.L. Scherzinger, and D.G. Whitlock. The visible human data set: an image resource for anatomical visualization. *Medinfo*, 8 Pt 2:1195–1108, 1995.
- [4] T.J. Badger, R.S Oakes, N.E. Fish, J.J.E. Blauer, C.J. McGann, R.S. MacLeod, and N.F. Marrouche. New MRI method to detect abnormal electrical tissue using delayed enhancement MRI: Correlation with electroanatomic voltage maps. In *American College of Cardiology*, page (in press), Chicago, Illinois, 2008.
- [5] R.C. Barr and M.S. Spach. Inverse solutions directly in terms of potentials. In C.V. Nelson and D.B. Geselowitz, editors, *The Theoretical Basis of Electrocardiography*, pages 294–304. Clarendon Press, Oxford, 1976.
- [6] R.C. Barr. Adaptive sampling of cardiac waveforms. *J. Electrocardiol.*, pages S57–S60, 1988.