GUIDELINES FOR WRITING A LAB REPORT
FOR BIOL 215L (MICROBIOLOGY FOR HEALTHCARE PROFESSIONALS)

Your lab report will focus only on your "unknown" bacteria, which you collected, cultured, isolated, analyzed, and identified. The content of the report is based on parts of Labs 2, 3, and 4.

It is critical that you read and follow these directions very carefully, or points will be taken off. Writing for the sciences is different than writing for your English classes or other classes.

There is a sample lab report at the end of these guidelines. There is also a journal article by Dr. Wittmann-Price (Department of Nursing at FMU) on my website for you to compare to these guidelines.

Title

Be specific but keep the title simple and short.

Author and affiliation

Provide your name and affiliation (use FMU; see sample lab report for an example).

Abstract

This is a very brief summary of your goal in these experiments, what you did, and your results. Include the Genus name of the bacteria you identified. Do not include data or references to the literature.

Introduction

In this section, start by explaining how bacteria are identified by microbiologists. Besides the Gram stain and the biochemical tests that you conducted, you should briefly mention other techniques such as different types of stains, other biochemical tests (e.g., the Enterotube II system), genetic tests, or immunologic tests.

You will find information on bacterial identification techniques in the textbook, other books, or online references. Do not copy information word-for-word. Paraphrase it.

Be sure to reference your sources of information with numerical footnotes at the end of the appropriate sentence, in superscript font, as shown in the sample lab report.

At the end of the Introduction, state the goal of the study (to collect, culture, isolate, test, and identify bacteria).

Do not say what genus of bacteria you found, do not describe the bacteria you found, and do not discuss specific bacteria in this section!

Methods

This section is a description of what you did, written in a way that anyone could read it and repeat your experiment. If you use information from the lab manual or lab PDFs, do not copy it word-for-word. Paraphrase it.

Use past tense, as follows:

> "To begin, I poured a nutrient agar Petri plate and let it cool and solidify."

Do not use present tense or provide "cookbook style" directions to the reader, such as:

> "To begin, pour a nutrient agar Petri plate and let it cool and solidify."

As a reminder, you should briefly describe each of the following procedures:

- Poured the Petri plate and the type of culture medium used
- Swabbed your skin (or cell phone)
- Incubated the Petri plate at 37°C
- Examined and selected one colony
- Transferred a sample of one colony to an agar slant and incubated it
- Gram stained your bacteria (each step explained)
- Conducted 6 biochemical tests (glucose, sucrose, lactose, litmus milk, nutrient gelatin, starch agar – don't forget to include pouring iodine on the starch Petri plate after incubation)
- Conducted the catalase test

Results

In this section, insert the three tables (Tables 1, 2, and 3) that show your results. The titles of the tables go above the tables. Refer to the tables in the text, as shown in the sample lab report. Also write one sentence saying what the Genus name of your bacteria is.

Discussion

Because this class is focused on healthcare, explain whether the bacteria you identified can be pathogenic to humans, and if so, what disease(s) they can cause.

You will find that information in the textbook, other books, or online references. Do not copy information word-for-word. Paraphrase it. Be sure to cite the sources of that information in this section, as in the Introduction.

References

This section is a list of all sources of information you cited in the text. You need to reference at least 3 sources of information in your lab report.

Use the following format (shown in bold) for your references, based on the *American Medical Association Manual of Style*, 10th Ed., 2007. The references will be numbered in order of their mention in the text. See the sample lab report for an example.

- A book:

  Strelkauskas A, Edwards A, Fahnert B, Pryor G, Strelkauskas J. Microbiology A Clinical Approach. 2nd Edition. New York, NY: Garland Science; 2016.

  (in the above reference, there are 5 authors, the book title is Microbiology A Clinical Approach, it is the second edition, the publisher is located in New York, NY, the publishing company is Garland Science, and the year of publication is 2016)

- A scientific journal:

  Baron EJ. Presumptive and rapid methods in bacteriology. *Clin Microb* 2008; 11(2):185-188.

  (in the above reference, there is one author, the title of the article is Presumptive and rapid methods in bacteriology, the journal name is Clinical Microbiology, the volume number is 11, the issue is 2, and the page numbers are 185-188)

- A website:

  Staphylococcus aureus. Wikipedia. https://en.wikipedia.org/wiki/Staphylococcus_aureus. Accessed October 4, 2016.

  (in the above reference, the title of the webpage is Staphylococcus aureus, the website company is Wikipedia, and it was accessed on October 4, 2016)

**** Sample Lab Report for BIOL 215L ****

ISOLATING AND IDENTIFYING BACTERIA FROM HUMAN SKIN

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Abstract

In this study, I collected, cultured, and identified bacteria from human skin. Based on the results of the Gram stain and various biochemical tests, I concluded the bacteria were *Streptococcus*.

Introduction

There are many different ways that bacteria can be identified by microbiologists. For example, morphological and biochemical characteristics can be used to identify and classify bacteria. Newer tests include molecular (genetic) techniques, such as analyzing the 16S rRNA composition of bacteria.[1]

The goal of this study was to collect, culture, isolate, test, and identify bacteria from human skin.

Materials and Methods

First, I poured melted nutrient agar into a Petri dish and let it cool and solidify. I then swabbed the skin on my forearm and streaked it across the Petri plate. I then incubated the Petri plate at 37°C.

After incubation, I selected one colony and described its morphology. Using a sterile transfer loop, I transferred a sample of the colony to an agar slant and incubated it. I also Gram stained bacteria from that colony.

To Gram stain the bacteria, I dried and heat-fixed a sample on a slide. Then I applied crystal violet for 30 seconds, rinsed with water, then applied iodine for 30 seconds. I applied ethanol for several seconds, and then rinsed with water. I then applied safranin for 30 seconds. Finally, I rinsed the slide, dried it, and examined it microscopically with 1000X magnification. I described the Gram stain results and the cell morphology.

After the agar slant had incubated, I used a sample of the bacteria for several biochemical tests. Using a sterile transfer loop, I inoculated glucose, sucrose, and lactose fermentation tubes with the bacteria. I also added some bacteria to a tube of litmus milk and I stabbed a sample into a tube of nutrient gelatin.

I streaked a line of bacteria on a starch agar Petri plate and then incubated it and all of the tubes at 37°C.

After incubation, I interpreted the results.[2] I recorded any color changes and other visible results in the tubes. I also poured iodine on the starch Petri plate and interpreted the results of that test. Finally, I added a small amount of hydrogen peroxide to a sample of the bacteria to test for catalase.

Results

The results are provided in Tables 1, 2, and 3. Based on these results and referring to the literature, I concluded the bacteria collected from my skin were *Streptococcus*.[3]

Table 1. Unknown bacteria colony morphology.

COLOR	white
SIZE (mm)	1-2 mm
FORM	punctiform
MARGIN	entire

Table 2. Unknown bacteria cell morphology.

BACTERIA SOURCE	STAIN REACTION	CELL MORPHOLOGY
Human forearm	Gram positive	Streptococci (cocci in chains)

Table 3. Biochemical properties of the unknown bacteria.

BIOCHEMICAL TEST	RESULTS / DESCRIPTIONS
Glucose fermentation	Acid produced, no gas
Sucrose fermentation	Acid and gas produced
Lactose fermentation	No acid or gas produced
Litmus milk reaction(s)	Curd and whey formation
Protein (gelatin) hydrolysis	Positive for protein hydrolysis (liquefied)
Starch hydrolysis	Positive for starch hydrolysis
Catalase	Positive for catalase (bubbles produced)

Discussion

Streptococcus can be pathogenic in humans, causing such diseases as pharyngitis ("strep throat"), pneumonia, meningitis, and dental caries. Medically important species include *Streptococcus pyogenes*, *S. pneumoniae*, and *S. mutans*. [4]

References

1. Patel JB. 16S rRNA Gene Sequencing for Bacterial Pathogen Identification in the Clinical Laboratory. *J Mol Diagn* 2001; 6(3):313-321.

2. Pryor G. Biochemical Properties of Bacteria and Detection of Motility. http://people.fmarion.edu/gpryor/LAB%204%20BIOL%20215L.pdf. Accessed February 17, 2016.

3. Holt JG, Krieg, NR, Sneath P, Staley JT, Williams ST. Bergey's Manual of Determinative Bacteriology. 9th Edition. Philadelphia, PA: Lippincott Williams and Wilkins; 2000.

4. Streptococcus. Wikipedia. https://en.wikipedia.org/wiki/Streptococcus. Accessed February 22, 2016.