



Writing a Lab Report

Synthetic Biology Module 8
University of Rochester iGEM 2020

Checklist for Module 8

- Sample penguin smell test lab report
- Google Form for DNA extraction lab report submission



Module Overview

- Compositions of a lab report.
- DNA extraction lab.

Introduction

Purpose of Experiment:

- What question can you answer?
- Why do you want to answer that question?

Technical Background:

- How did you come up with your hypothesis?
- What should I know to be able to understand your experiment?



Introduction: Example

With this experiment, I want to test my hypothesis that penguins can smell krills.

This hypothesis is part of my research into penguin feeding habits, which would facilitate efforts to predict their fate in climate change.

I came up with this hypothesis because previous researches have shown that (1) birds can smell, (2) krills emit a smell different from sea water smell, and (3) other seabirds like petrels smell krills.

Krill smell comes from the DMS krills emit.



Methods

Materials and Set-up:

- Where you got the materials and equipment
- The settings of any tunable equipment

Procedure:

- Steps used to collect the data

Methods: Example

Materials:

1. Sea water off the coast of Antarctica.
2. DMS purchased from company X, product model Y number Z.
3. Cotton balls from company A, product model B number C.
4. 2 meter stick
5. Glue from company N, product model M number L.
6. Excel 2016.

Set-up:

The experiment takes place in a King Penguin colony in Antarctica.



Procedure: Example

1. Soak a cotton ball in sea water or DMS for 30 seconds.
2. Glue the cotton ball onto the 2 meter stick.
3. Find a sleeping penguin.
4. Hold the cotton ball right on top of the beak, not touching the penguin.
5. If the penguin wakes up within 3 minutes, mark as “reacted to smell”. Otherwise mark as “did not react to smell”.
6. Repeat from step 1 with DMS if you used sea water last time, or with sea water if you used DMS last time.
7. Analyze data with t-test analysis function in Excel.



Results & Discussion

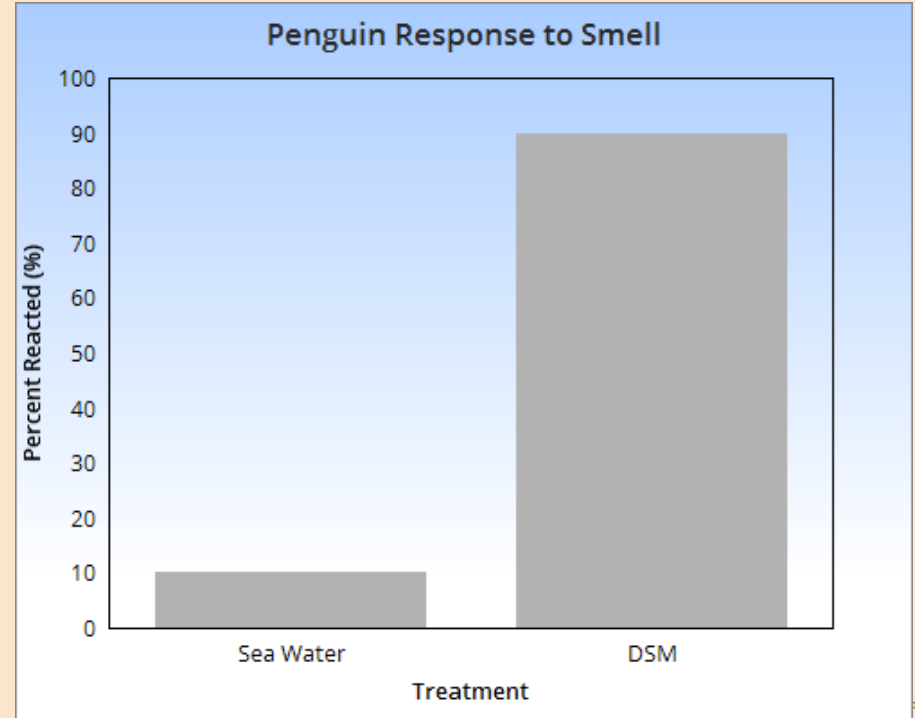
1. What do the numbers say at face value?
 - a. Are there any trends? (Include graphs!)
 - b. How significant are the trends?
2. Do the trends agree with your hypothesis?
 - a. If not, why do you think your results disagree with your hypothesis?
3. What should you do next?
 - a. Are there sources of errors in the experiments that you can eliminate by improving the procedures?
 - b. Do you need more data for a solid conclusion?
 - c. Can you use these results as basis for the next question in your research?



Results & Discussion: Example

Out of the 100 penguins sampled, only 10% penguins woke up from the sea water cotton balls, while 90% penguins woke up from the DMS cotton balls ($p < 0.05$, t-test). This result supports my hypothesis that penguins can smell DMS, and potentially krills.

I should have used a dry cotton ball or a cotton ball soaked in drinking water as another control. I cannot conclude from this finding whether penguins can detect DMS from krills when diluted in sea water. I should next dilute the DMS in sea water for my follow up experiments.



Conclusion

- Restate hypothesis
- Restate answers to hypothesis
- Limitations to experiment
- Did you take a step closer to your goal?

Supporting my hypothesis that penguins can smell krills, significantly more penguins woke up from the smell of DMS than sea water. Note that this finding only pertains to King Penguins in Antarctica and cannot be extrapolated to other seabird species. However, sense of smell is a probable feeding strategies of King Penguins for future studies.



Abstract

- Purpose of experiment
- Summary of procedure
- Summary of result and discussion

To protect penguins from global warming-related risks, it is necessary to understand how their lifestyles would change as temperature rises. To study penguin feeding habits, I investigate whether they use smell to find krills.

I observed reactions of sleeping penguins to a smelly chemical produced by krills, compared to the smell of sea water.

There was significantly more reactions to the krill smell than sea water, supporting my hypothesis that penguins can smell krills.

Future studies on penguin feeding habits should pay attention to their sense of smell.

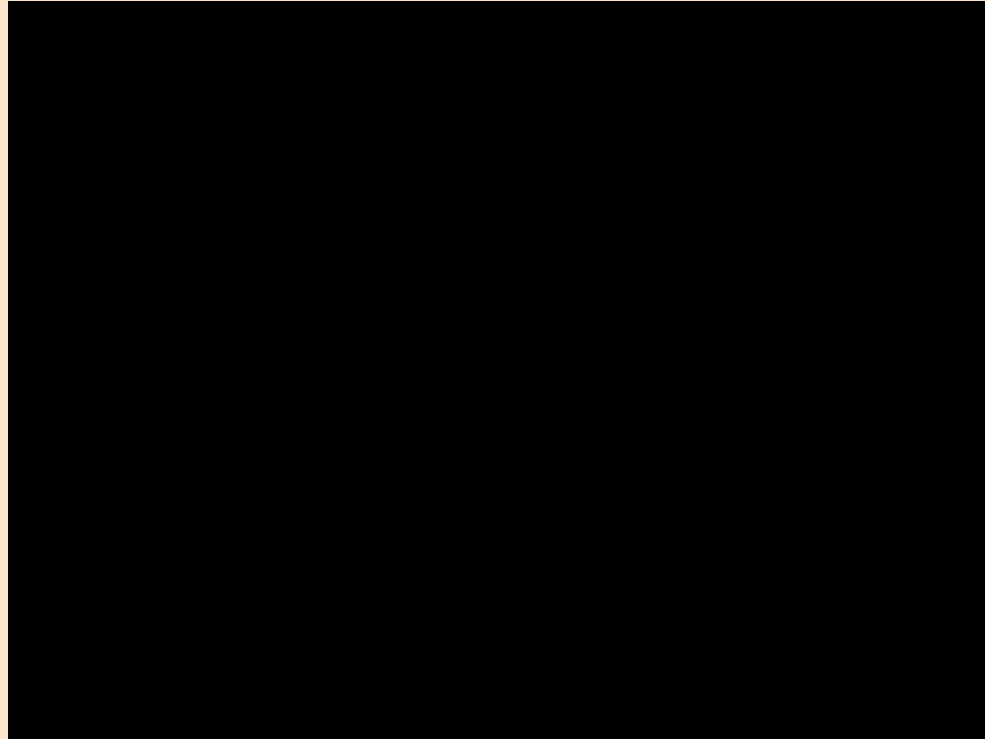




Video Source <https://www.youtube.com/watch?v=N6VF-3TXC9E>



What does DNA from saliva look like?



Thank you!

Email us at uofr.igem@gmail.com



Sources

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2. University of Toronto Writing Advice, “The Lab Report.” Retrieved from <https://advice.writing.utoronto.ca/types-of-writing/lab-report/>
3. Cunningham, G. B., & Bonadonna, F. (2015). King penguins can detect two odours associated with conspecifics. *The Journal of Experimental Biology*, 218(Pt 21), 3374-3376. doi:10.1242/jeb.128298

