**Synthetic Biology**

Group #SD1501

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| Group Members: | Andrew Bossert |
|  | Christopher Jordan-Denny |
|  | Nicolette Lippert |

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**Introduction**

The purpose of this project is to answer the question: Is the transmembrane potential of a cell effected by exposure to radio waves? This project will be based on effort researching and developing a hypothesis based on the question stated above and a procedure to test that hypothesis. The following are the requirements for the project created by the advisor (Dr. Ewert) and the students (Andrew Bossert, Christopher Jordan-Denny, and Nicolette Lippert), to which all parties agree to:

**Requirements**

* Design an experiment and equipment when necessary to test the for mention hypothesis
* Analyze all results from the experiment and report them in a professional manner whether conclusive or inconclusive.
* The cell maybe either synthetic or organic.
* Third party (NDSU) equipment will be used to generate radio frequencies in the 1 – 8.5 GHz spectrum.
* IEEE standards up to and including safe exposure levels for the radio frequencies will be used to limit the time and the power levels the cells are exposed to.
* Design II will focus on selecting the hypothesis and setting up the experiment which will be implemented in Design III.
* Properly shielded equipment and an electromagnetic shielded room may be used during the experiment.
* The probes must be adequately sized to the testing cell, any external equipment necessary for data acquisition, or device functionality has no restriction size.
* The standard budget for a senior design project is allowed.
* Jared Hanson is doing the theoretical research regarding the project.
* The Intellectual Property produced by the students will belong to the students.
* Should their work be successful, the students will be listed as co-authors of the paper.
* There will be weekly meetings between the students and their advisor, unless a time confliction occurs, and all parties agree that it is not feasible to meet at the predetermined time.
* The students will develop, or select, the instrumentation necessary to measure the transmembrane potential.
* The above may include hardware, and/or software.

**Summary**

In conclusion, the main focus of this project is to discover if we can alter the potential across the cell membrane using radio frequencies. The end goal of the project do an experiment on either real cells or synthetics ones and take transmembrane potential measurements while under the exposure of radio waves.

**This document describes all project requirements set forth by the advisor and/or client. Grading will be performed at the end of the semester according to the level at which these requirements are met.**