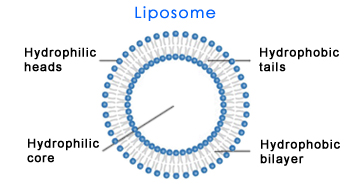
**Liposome Fabrication Lab**

**Introduction**Liposomes are spherical vesicles with a lipid bilayer. They can be created or fabricated in the lab, and drugs can be put inside of the liposomes to promote drug delivery. In this investigation, you will fabricate liposomes and determine how changing one variable in the process could affect the final product. You will use this lab to explain how changing the fabrication process could be beneficial or harmful to scientists and doctors using this technology.

**Part 1: Lab Preparation:**You and your group will answer the question, “What happens to liposome size as the time of force agitation during liposome fabrication changes?” You and your group will design an experiment to test this question. Using information from the PowerPoint, fill out the experimental design and procedure below. Get your lab preparation information stamped by your teacher before starting the lab.

Materials:  
Dry liposomes in centrifuge tube  
P1000 micropipette and tips  
P10 micropipette and tips  
Glass microscope slides  
Light microscope with 20x objective  
Vortex machine  
Distilled H2O

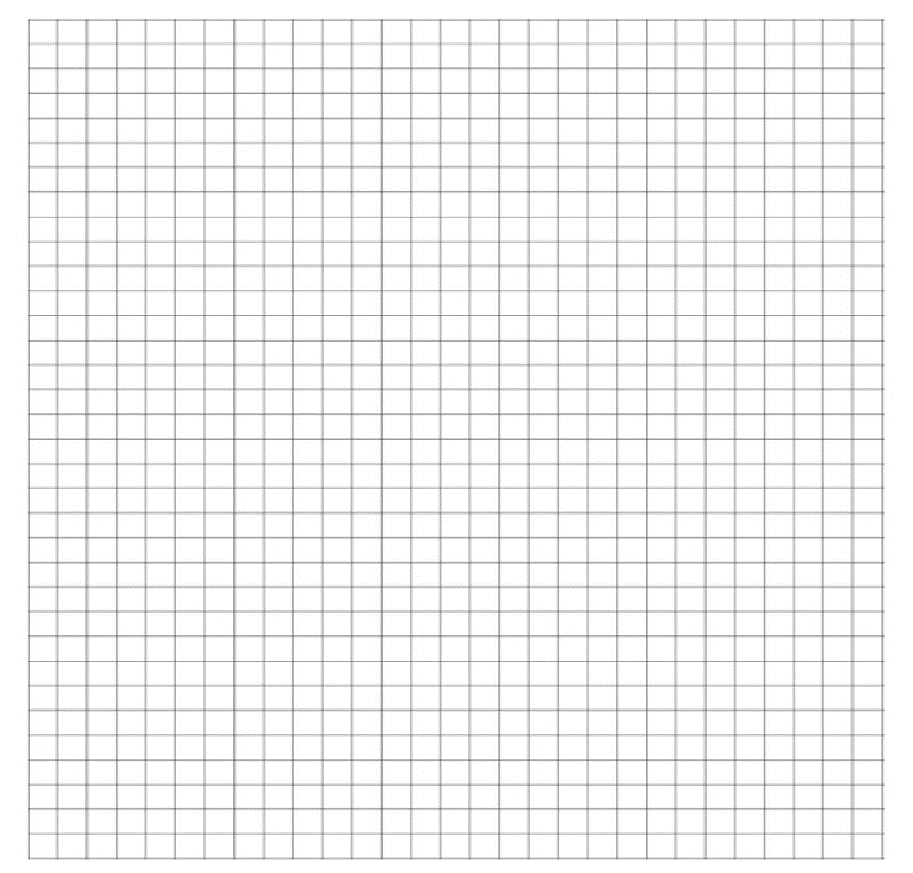
|  |  |
| --- | --- |
| **Experimental Design** | |
| **Experimental Question** | **Hypothesis** |
| **Independent Variable** | **Dependent Variable** |
| **Control Group** | |

**Write group roles here:**

**Procedure:  
1.**

**Data Collection** (record your data and observations in the table below)

|  |  |  |
| --- | --- | --- |
| **Table 1. Agitation effect on liposome size** | | |
| **Agitation time (s)** | **Size of liposomes (mm)** | **Observations** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Graph your data here  
**

**Analysis questions**1. What trends do you observe in your data?

2. What did you see in your observations? Did anything surprise you?

3. Why do you think the results are the way they are?

4. Compare your data with the class data, what similarities or differences are there?

5. In what cases do you think larger liposomes are best for the patient? What about smaller liposomes?

**Extension Activity – Measuring liposomal drug release time**In the previous activity, you made liposomes with an empty core. In this activity, you will fabricate liposomes with food coloring in the core of the liposome and measure the time it takes for the liposomes to release the food coloring.

Procedures:  
1. Add 1 mL of the food dye solution into the liposome vial  
2. Vortex for 3 minutes  
3. View the liposome on the microscope and count 20 liposomes. Of the 20 liposomes, score how many have at least 50% food dye in the core  
4. Repeat #3 at 10 minutes, 30 minutes, and 60 minutes.  
5. Record your data below & analyze the results in your CER.

|  |  |  |
| --- | --- | --- |
| **Table 2. Food dye release time** | | |
| **Time** | **# of majority dyed liposomes** | **Observations** |
| 0 min |  |  |
| 10 min |  |  |
| 30 min |  |  |
| 60 min |  |  |

**Scientific Paper Draft (Claim-Evidence-Reasoning)**Write a CER that answers the question, “What happens to liposome size as the time of force agitation during liposome fabrication changes?” Use evidence from the lab and reasoning from the text to support your paper. After you finish the draft, get it checked by the teacher for review and revision.

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