

## Perfusion Chamber with Elastic and Porous Membrane

*Client: Dr. Donna Peters, UW Medical Sciences Center Department of Pathology*

*Advisor: Professor William Murphy, Ph.D.*

*Team: Holly Liske, Leader*

*Laura Piechura, Communicator*

*Joey Labuz, BWIG*

*Kellen Sheedy, BSAC*

### Problem Statement

Dr. Peters aims to test the effects of various drugs on the movement of fluid across a layer of human eye cells. Currently, the eye cells are supported on a silicon membrane that simulates the flexibility of the tissue in vivo. The membrane is placed in an Ussing perfusion chamber that measures the effects of pressure on the cell layer. This experimental system must be redesigned to allow greater control of the experimental conditions. Specifically, the chamber must allow for control of the movement of fluid, easy replacement of cell culture plates, and measurement of fluid pressure with computer-controlled transducers. In addition, a porous elastic membrane that permits fluid flow will replace the silicon membrane of the current system. A successful design will be used to screen for potential treatments of glaucoma.

### Week Two

#### Goals:

- Complete and submit the first draft of the Product Design Specifications.
- Meet with Dr. Peters to review and discuss the first draft of the PDS.
- Continue literature search of background information.
- Continue individual brainstorming for project design ideas.
- Conduct a formal brainstorming session following the second client meeting.

#### Activities:

- Holly: Met with Dr. Peters and a laboratory worker. (1.5 hr)  
Completed assigned portion of PDS. (.5 hr)  
Compiled and edited PDS. (1 hr)
- Laura: Met with Dr. Peters and a laboratory worker. (1.5 hr)  
Completed assigned portion of PDS. (.5 hr)  
Set up a meeting with Dr. Peters and emailed the PDS and list of questions. (.25 hr)
- Joey: Met with Dr. Peters and a laboratory worker. (1.5 hr)  
Completed assigned portion of PDS. (.5 hr)  
Brainstormed design ideas. (1 hr)
- Kellen: Met with Dr. Peters and a laboratory worker. (1.5 hr)  
Completed assigned portion of PDS. (.5 hr)  
Brainstormed design ideas. (1hr)

#### Accomplishments:

- Submitted a complete first draft of the PDS.

## Week Three Progress Report: September 21 to 27, 2007

- Formed a list of questions to send Dr. Peters prior to the second client meeting.
- Met with Dr. Peters and a laboratory worker to review each component of the PDS and to discuss answers to a list of project questions. The meeting was especially helpful in defining the direction and multiple goals of the project.
- Continued brainstorming project ideas.

**Difficulties:**

- Time constraints as this week limited the time spent on brainstorming and researching design ideas. We have planned to increase time spent on the project.
- Prior to the second client meeting, a limited amount of detail regarding the very complex project made brainstorming difficult and lacking confidence in applicability.

**Week Three**

**Goals:**

- Significantly increase the time spent on brainstorming ideas.
- Meet for a formal brainstorming session of design ideas.
- Further develop design ideas and begin to focus on three alternatives.

**Project Timeline**

Team Goals	9/7	9/14	9/21	9/28	10/5	10/12	10/19	10/26	11/2	11/9	11/16	11/23	11/30	12/7	12/14
Propose project	—														
Conduct background research	—	—	—												
Meet with Dr. Peters		—	—												
Develop PDS			—	—											
Brainstorm design ideas	—	—	—	—	—	—	—	—	—						
Choose design alternatives					—	—									
Plan midsemester presentation					—	—	—								
Write midsemester paper					—	—	—	—							
Choose final design								—	—						
Order materials									—	—					
Construct prototype									—	—	—	—			
Test prototype													—	—	
Plan final poster presentation												—	—	—	
Write final paper												—	—	—	
Meet with Professor Murphy														—	—

**Expenses**

No expenses have been incurred.