Improving the precision of small human tissue biopsy processing

Date: 2/11/26-2/17/26

Client: Dr. Angela Gibson
Advisor: Dr. Tracy Jane Puccinelli
Team:

Ruhi Nagarkatte (Team Leader)
Ella Lang (Communicator)
Gianna Inga (BSAC)
Simon Nam (BWIG)
Sarah Raubenstine (BPAG)

Problem Statement

In the treatment of extensive burns or wounds, patients rely on emerging treatment research in the field of tissue growth and healing. Currently, studies into the healing properties of porcine skin are conducted to visualize how viable epidermis cells migrate over the site of the wound to promote cell regrowth. However, once in a culture, the porcine tissue samples cannot remain viable unless all fat is removed and the cells are able to absorb the culture media. Additionally, this process of creating samples is not standardized, resulting in samples of varying sizes with jagged edges, which limits the efficiency of sample preparation. To solve this, fabricating a tool that incorporates multiple sample slots, with uniform sizing, and a fixed blade will help to streamline research efficiency and produce more viable samples that can be successfully imaged.

Brief Status Update

The team continued to consolidate research and testing data for the first draft of the article. Additionally, a time was scheduled to meet with the client on Friday, 2/20/26, to get feedback on the user interface with the design and observe tissue sampling methods. The team is hoping to get the materials for the new iteration of the biopsy press and start machining the week of 2/23/26.

Summary of Weekly Team Member Design Accomplishments

- Team
    - Scheduled a client visit for testing with tissue samples on 2/20/26
    - Continued to research sterilization methods and materials for the final design
    - Finalized material selection for ordering
- Ruhi Nagarkatte
    - Created journal article outline to divide among team members
    - Gathered research and potential testing data for the article
    - Helped plan a tissue testing time with the client
    - Prepared Progress Report #4
- Ella Lang

    - Researched printing with resin and pricing
    - Continued research of sterilization methods for polycarbonate to round out the sterilizability testing protocol
    - Helped plan a tissue testing time with the client
- Gianna Inga
    - Finalized the design
    - Finalized the materials and communicated my recommendations with the team
    - Communicated the design changes with our advisor and team members
- Simon Nam
    - Researched further into applications of polycarbonates / resins
    - Began working on the drafting of journal article

- Sarah Raubenstine
    - Attended BPAG meeting to discuss best funding practices for the upcoming semester
    - Began drafting and researching for journal article
    - Prepared testing protocols for tissue testing session with the client

Weekly/Ongoing Difficulties

In the upcoming week, the team is hoping to acquire the materials (polycarbonate, nylon) for the final iteration of the design and begin machining early next week. Additionally, the first draft of the journal article will be completed by next Wednesday, 2/25/26.

Upcoming Team and Individual Goals

- Team
    - Complete first draft of the journal article
    - Complete material orders from the client
    - Develop and execute a machining plan for next week
- Ruhi Nagarkatte
    - Complete assigned portion of the journal article
    - Assist in machining for the final design
    - Receive feedback from the client during tissue sample testing
- Ella Lang
    - Test a print using biomed clear resin
    - Assist in machining with polycarbonate
    - Order polycarbonate materials from the client
- Gianna Inga
    - Receive the material
    - Machine the parts of the design
    - Print the other parts of the design
    - Assemble final design
    - Test PLA design with tissue sample

- Simon Nam
    - Finalize the journal article
    - Help team with machining procedure
- Sarah Raubenstine
    - Order and track materials for machined portion of the design
    - Complete assigned portions of the journal article draft
    - Help with machining and printing most current prototype

Project Timeline

Project Goal	Deadline	Team Assigned	Progress	Completed
Preliminary Oral Presentation	Friday, 02/06/2026	All	100%	X
Preliminary Deliverables	Wednesday, 02/25/2026	All	20%	
Show and Tell	Friday, 03/20/2026	All	0%	
Executive Summary Draft	Friday, 04/03/2026	All	0%	
Executive Summary Final	Friday, 04/17/2026	All	0%	
Poster Presentations	Friday, 04/24/2026	All	0%	
Final Deliverables	Wednesday, 04/29/2026	All	0%	

Materials and Expenses

Item	Description	Manufacturer	Mft Pt#	Vendor	Vendor Cat#	Date	QTY	Cost Each	Total	Link
PLA	3D printed polymer through BME design Makerspace budget	Makerspace	N/A	UW-Madison	N/A	2/10/26	1	$2.81	$2.81	N/A

								TOTAL:	$2.81	