

Title: Microencapsulation of tissues and cells for treatment of hormone-related diseases.
(microencapsulation), Project #4

Client: Dr. Craig Atwood (GRECC 11G, VA Hospital)

Faculty Advisor: Professor William Murphy (2154 ECB)

Team Albert Kwansa, Team Leader

Members: John Harrison, Team Communicator

Yik Ning Wong (Jacqueline), Biomedical Student Advisory Committee (BSAC) Representative

Eric Lee, Biomedical Web Implementation Group (BWIG) Representative

Project Webpage: http://homepages.cae.wisc.edu/~bme200/microencapsulation_f06.

Dates: 11/13/06 – 11/19/06, Week 11 (Progress Report #10)

Project Design Statement: To design polyethylene glycol diacrylate (PEG-dA) hydrogels for the encapsulation of Murine Leydig Tumor Cells in an effort to increase cell viability and testosterone secretion. The PEGDA hydrogels must provide immunoprotection and allow for the effective diffusion of oxygen, nutrients, hormones, and metabolic wastes. The overall goal is to restore the testosterone level of castrated mice via injection or implantation of the PEG-dA encapsulated cells.

Restatement of Previous Team Goals:

1. Meet with Amy (Grad Student in Prof. Kao's Lab) possibly on Mon, 11/13/06 around 12 noon about assistance with PEG diacrylation.
2. Obtain all supplies needed for PEG diacrylation.
3. Plan to perform diacrylation by Fri, 11/17/06.

Summary of Team Accomplishments:

1. Met with Amy at 12 noon on Mon, 11/13/06 at VA Hospital and planned to meet on Fri, 11/17/06 to perform the diacrylation.
2. Communicator obtained permission from Prof. Kao to perform the reaction in his lab (preferred us not to carry out the reaction ourselves due to safety reasons).
3. Obtained PEG MW12000 and triethylamine from Sigma-Aldrich through our client and picked up packages on Fri, 11/17/06 at 4:00pm. Unable to locate the acryloyl chloride during pickup.
4. Prepared calculations for Friday's reaction (i.e., amounts of PEG (10g), triethylamine 2.5 molar excess, & acryloyl chloride 4.5 molar excess).
5. Fri, 11/17/06 → Amy performed part 1 of diacrylation (additions of triethylamine & acryloyl chloride) and stirred contents overnight.
6. Sat, 11/18/06 → Amy performed part 2 of reaction: Precipitation of PEGdA with cold ethyl ether and allowed product to dry in a vacuum oven.
7. In items 5 & 6 above, team members assisted with other tasks such as weighing the PEG, calculation adjustments, providing extra hands in the fume hood, and washing glassware.
8. Amy then offered to perform the dialysis and lyophilization.
9. Dr. Atwood states that he has 96-well microplates that we may be able to use.

Current Individual Goals:

- Albert Kwansa [Team Leader]:
Work on 10th progress report due Sunday, 11/19/06 by 5pm.
Awaiting arrival of 25µm thick Tefzel film sample from CS Hyde Company.
- John Harrison [Team Communicator]:
- Yik Ning Wong (Jacqueline) [BSAC Representative]:
- Eric Lee [BWIG Representative]:

Summary of Current Team Goals:

1. Pick up PEGdA product from weekend diacrylation reaction either on Wed, 11/22/06 or Mon, 11/27/06 from Dr. Kao's Lab.
2. Obtain photoinitiator and begin fabrication of non-cell seeded PEGdA gels.

Fall Semester Schedule:

Week	Day	Date	Activities	Goals (From BME Schedule)
1	M	9/4	Labor Day	
	T	9/5		
	W	9/6		
	R	9/7		
	F	9/8	Take team photo. General research of project topic. Review past reports and presentations.	[Form teams. Select project. Contact client. E-mail team roles to advisor.]
2	M	9/11	Team meeting-1 on Mon, 9/11 at 11 am in ECB. (Develop list of questions for first client meeting)	[Literature search. Meet w/Client.]
	T	9/12		
	W	9/13		
	R	9/14		
	F	9/15	Client meeting-1 on Fri, 9/15 at 12:00 pm in GRECC, VA Hospital.	
3	M	9/18	Advisor meeting-1 on Mon, 9/18 at 4 pm near 2154 ECB.	[Develop understanding of project. Develop PDS.]
	T	9/19		
	W	9/20		
	R	9/21	Team meeting-2 on Thurs, 9/21 at 7:00 pm in ECB.	
	F	9/22		
4	M	9/25	Team meeting-3 on Mon, 9/25 at 2:30 pm in ECB. Advisor meeting-2 on Mon, 9/25 at 3:30 pm near 2154 ECB.	[Brainstorm]
	T	9/26	Team meeting-4 on Tues, 9/26 at 8:15 pm in ECB.	
	W	9/27		
	R	9/28		
	F	9/29	Advisor meeting-3 on Fri, 9/29 at 1:00 pm near 2154 ECB. (Evaluate current direction)	
5	M	10/2	Team meeting-5 on Mon, 10/2 at 2:30 pm in ECB. Advisor meeting-4 on Mon, 10/2 at 3:30 pm near 2154 ECB.	[Design Alternatives]
	T	10/3		
	W	10/4		
	R	10/5		
	F	10/6	Team meeting-6 on Sun, 10/8 at 7:00 pm in ECB.	
6	M	10/9	Advisor meeting-5 on Mon, 10/9 at 3:30 pm near 2154 ECB.	[Work on Mid-Semester Presentation & Report]
	T	10/10		
	W	10/11		
	R	10/12		
	F	10/13	Lecture: [Oral Presentation Guidelines, Peer Review of Report Drafts]	

BME 400-BME Capstone Design

Date: 11/19/06

7	M	10/16	Team meeting-7 on Mon, 10/16 at 2:30 pm in ECB. Advisor meeting-6 on Mon, 10/16 at 3:30 pm near 2154 ECB.	Work on Mid-Semester Presentation
	T	10/17		
	W	10/18		
	R	10/19		
	F	10/20	Team meeting-8 on Fri, 10/20 at 12:00 pm in ECB.	
8	M	10/23	Team meeting-9 on Mon, 10/23 at 3:20 pm in ECB. Advisor meeting-7 on Mon, 10/23 at 3:30 pm near 2154 ECB.	[Decide on Final Design]
	T	10/24	Team presentation development in CAE at 5:30 pm.	
	W	10/25	Team presentation development in ECB at 5:45 pm.	
	R	10/26	Team presentation practice at 9:30 pm in room 1047 ECB (reserved through Student Leadership Center).	
	F	10/27	[MID-SEMESTER PRESENTATIONS] *NEW (BME 400 Only) [Design Notebooks Due to Advisor] **NEW	
9	M	10/30	Team meeting-10 on Mon, 10/30 at 2:30 pm in ECB. Advisor meeting-8 on Mon, 10/30 at 3:30 pm near 2154 ECB.	[Work on Design]
	T	10/31		
	W	11/1		
	R	11/2		
	F	11/3	Team meeting-11 on Fri, 11/3 at 12:00 pm in ECB.	
10	M	11/6	Team meeting-12 on Mon, 11/6 at 2:30 pm in ECB. Advisor meeting-9 on Mon, 11/6 at 3:30 pm near 2154 ECB.	[Work on Design]
	T	11/7		
	W	11/8		
	R	11/9		
	F	11/10	Lecture: [Machine Shop required lecture] Team meeting-13 on Sat, 11/11 at 4:30 pm in ECB.	
11	M	11/13	Meeting w/Amy on Mon, 11/13 at 12 pm at Rennebohm Hall. Advisor meeting-10 on Mon, 11/13 at 3:30 pm near 2154 ECB.	[Work on Design]
	T	11/14		
	W	11/15		
	R	11/16		
	F	11/17	Diacrylation of PEG from 11/17 – 11/19 at Rennebohm Hall primarily carried out by Amy (Graduate Student from Dr. Kao's Lab).	
12	M	11/20	Advisor meeting-11 on Mon, 11/20 at 3:30 pm near 2154 ECB.	[Work on Design]
	T	11/21		
	W	11/22		
	R	11/23	THANKSGIVING	
	F	11/24		
13	M	11/27		[Work on Design]
	T	11/28		
	W	11/29		
	R	11/30		
	F	12/1		
14	M	12/4		[Work on Presentation]
	T	12/5		
	W	12/6		
	R	12/7		
	F	12/8	[FINAL POSTER PRESENTATIONS]	
15	M	12/11		[Final Meeting w/Advisor]
	T	12/12		
	W	12/13	[Final Report & Design Notebooks Due to Advisor]	
	R	12/14		
	F	12/15		