

M3D1: Growth of phage materials

11/12/15

Career Fair







Nov 20 3-5p

W20-306

Lab business

- Office hours
 - Maxine: Thu and Fri 10-11a in 16-239
 - Noreen: Thu and Fri 6:30-8:30p in 56-302
 - Leslie: Fri 10-12p in 16-429b
- M3 assignments
 - Research proposal
 - Homework
 - Mini-report

We are in the homestretch...

3	1	R/F Nov 12/13	AB 	Growth of phage materials	Homework due Protein engineering report due Sun, Nov 15 at 5 pm
3	2	T/W Nov 17/18	AB 	Purify active materials	Homework due
3	3	R/F Nov 19/20	AB 	Cathode construction	Lab quiz Homework due
		T/W Nov 24/25	AB 	Lecture as scheduled, but no lab!	
		R/F Nov 26/27		Thanksgiving holiday	
3	4	T/W Dec 1/2	AB 	TEM	Homework due
3	5	R/F Dec 3/4	AB 	Battery assembly and testing	Lab quiz Homework due Biomaterials engineering mini-report due Thu/Fri, Dec 3/4 at 10 pm
3	6	T/W Dec 8/9		Research proposal presentations	Research proposal presentation slides due Tue/Wed, Dec 8/9 at 1 pm
		R Dec 10		Feedback and celebratory lunch!!!	

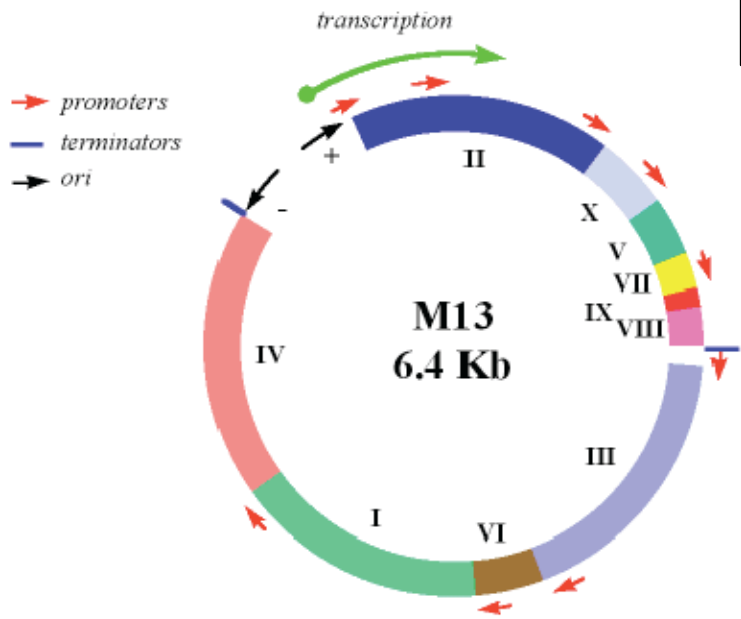
Mod 3 overview

1. Purify M13 phage
2. Generate Fe(III)-phage nanowires
3. Construct cathode
4. Visualize nanowires using TEM
5. Build Li-ion battery
6. Measure capacity

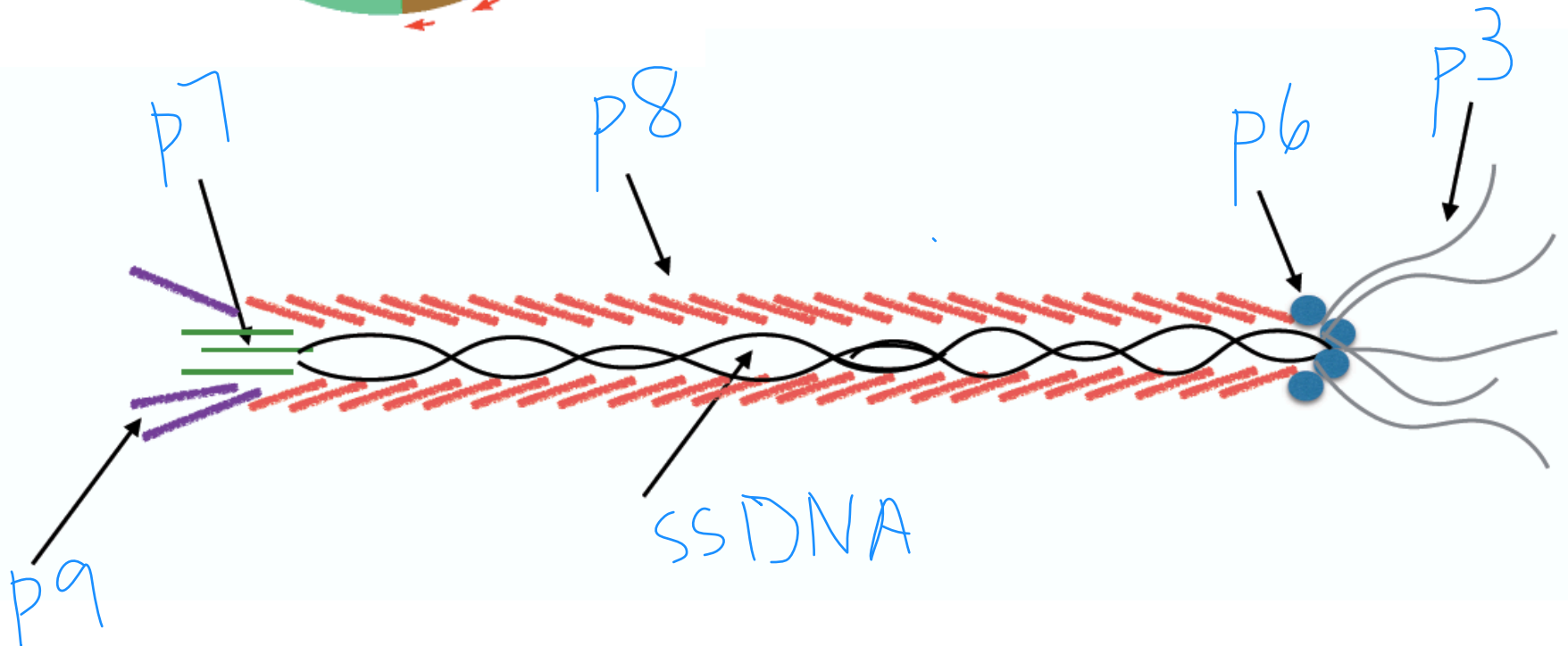
Your experimental question:

How does phage quantity effect battery capacity?

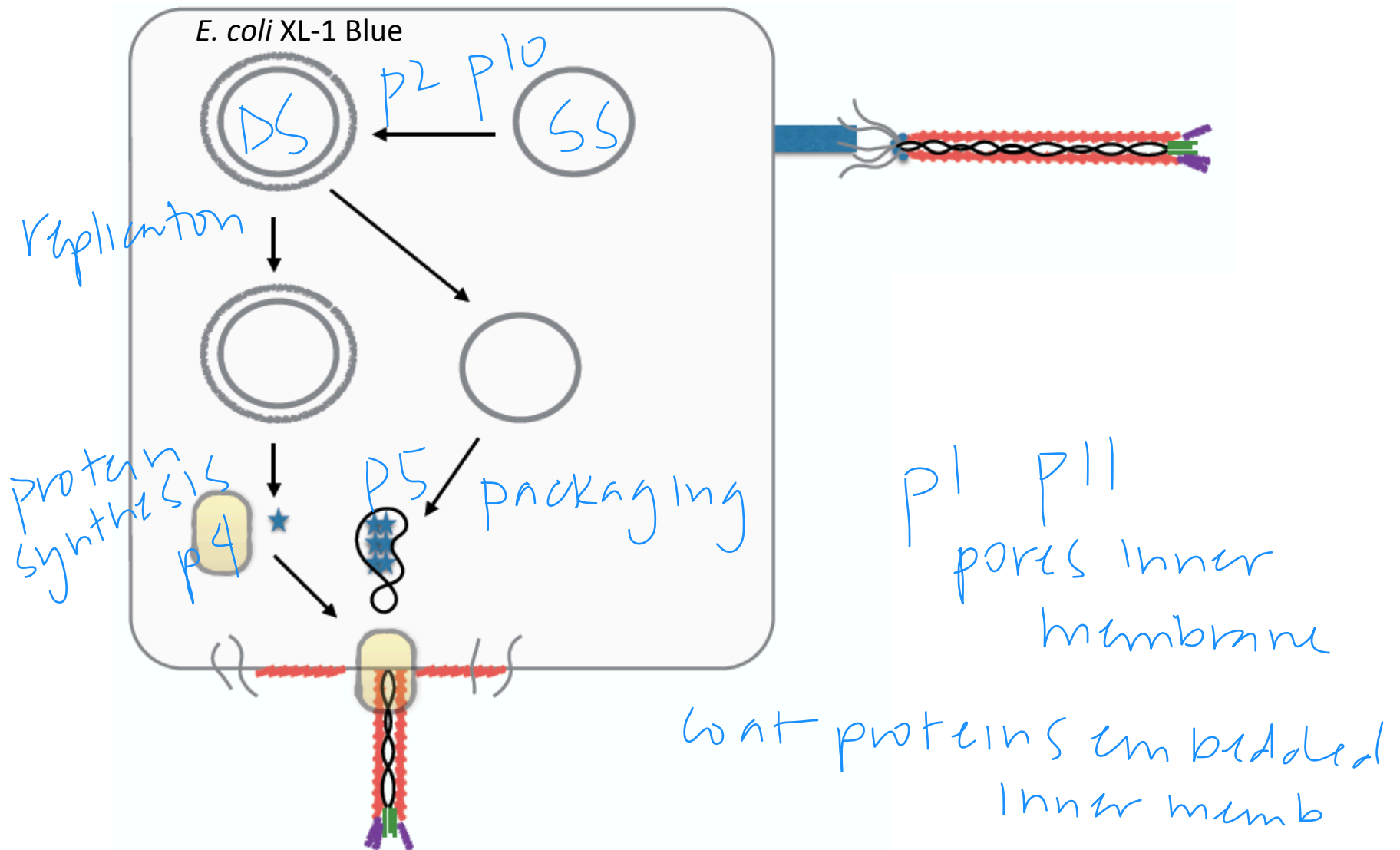
M13 phage genetics and structure



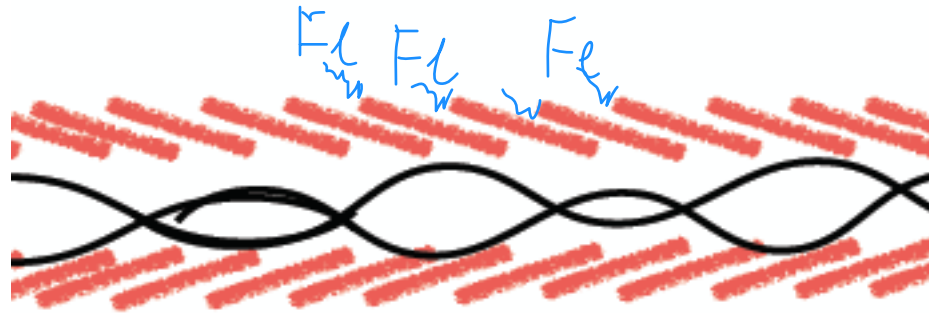
'packaging'



Overview of M13 phage biology

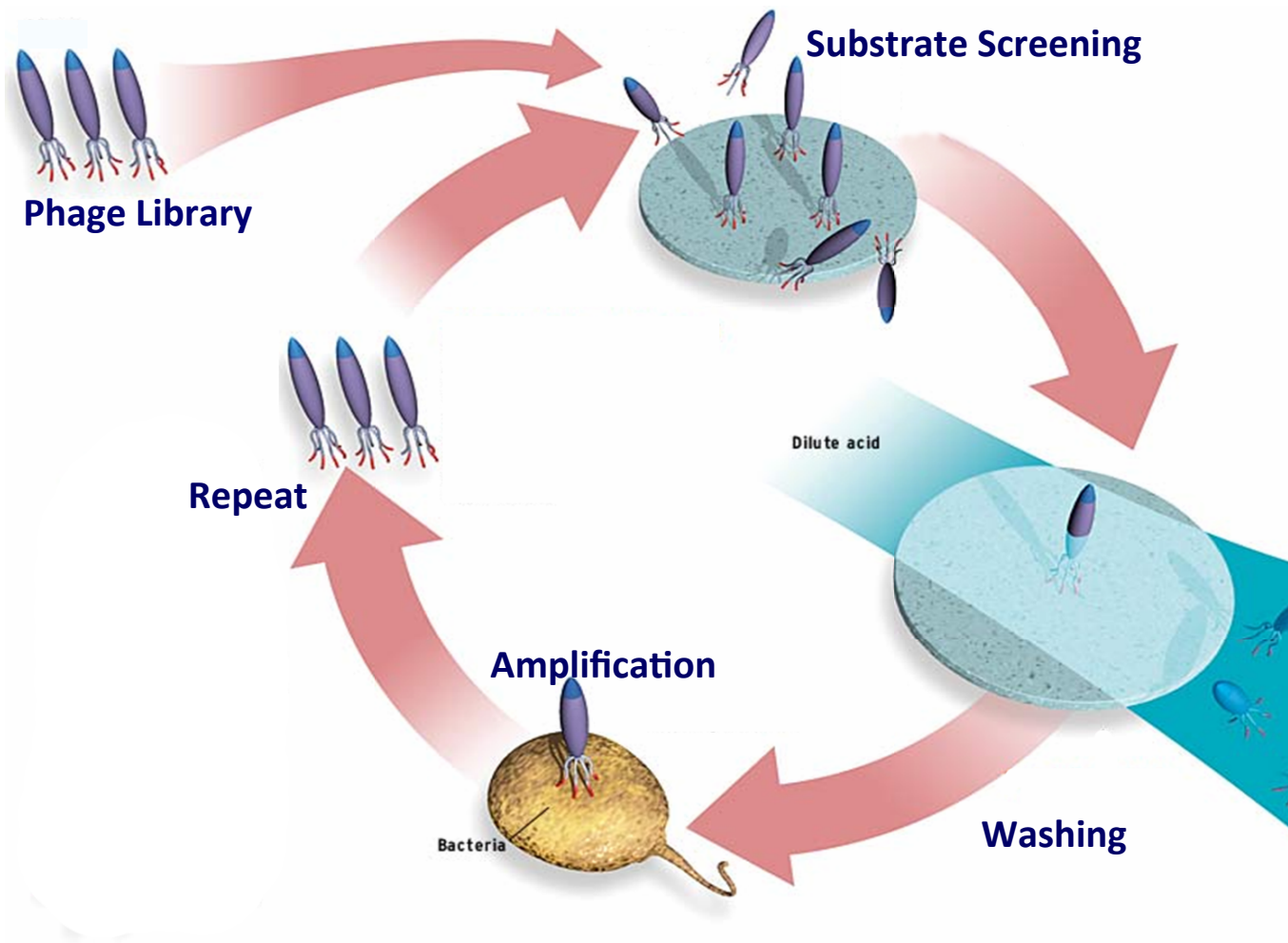


M13 is a biological nanomaterial

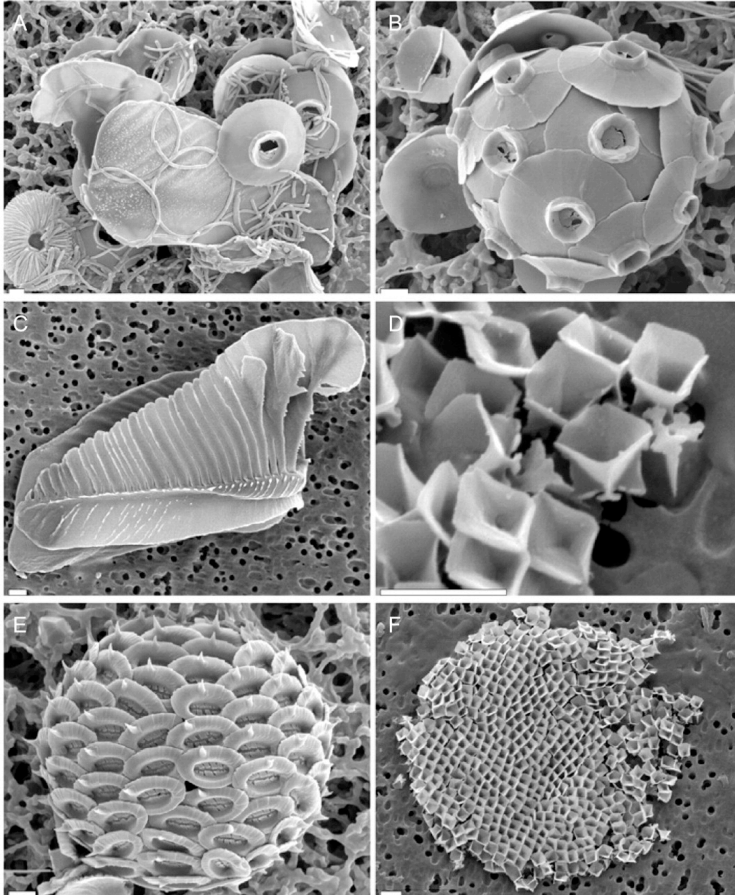


- p8 coat protein mutated to contain sequence DSPHTELP
- Modified p8 proteins bind single wall carbon nanotubes (SWCNT) and iron

Overview of phage display

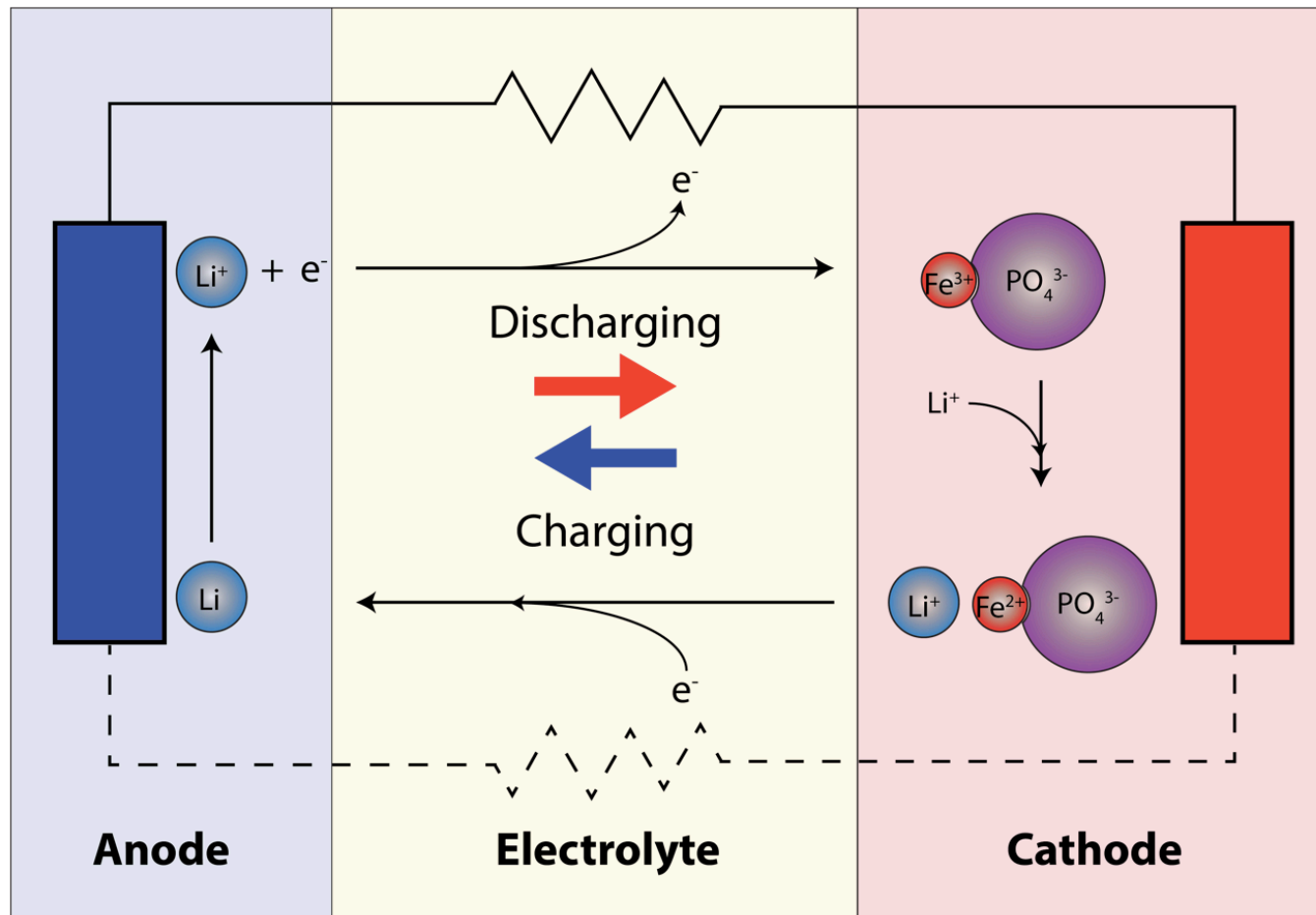


M13 phage and biomineralization



- Environmental conditions
- Organization
- M13 provides scaffold for $\text{Na}(\text{FePO}_4)$ cathode construction

M13 nanowires as battery cathode



Thank you, George!

Today in lab...

- Purify phage
- Begin Fe(III)-phage biomineralization

