M3D2: Biotemplating

4/17/15

1. Lab Treat ✓
2. Complex Au:NP with Ti(I-Pro)3 (created your own nano composites!)
3. Set-up TEM grid
4. Wash your new nanowires

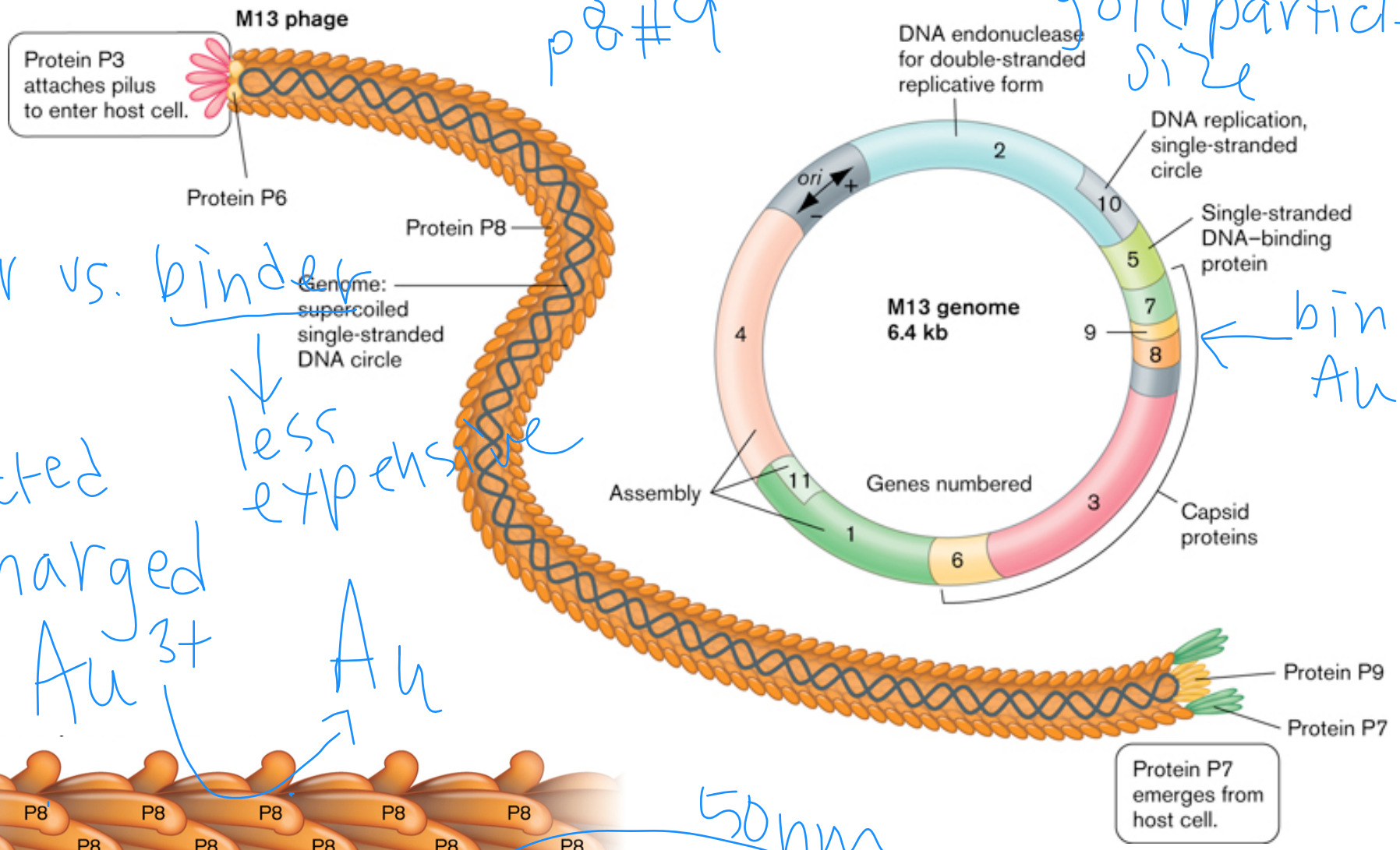
Mod 2 Report Office hours: 56-302

Shannon: Sunday 10am-12pm
Leslie: Sunday 2-4pm
Noreen: Sunday flexible times 12-2 After 4

Our biological nanomaterial is the M13 phage

flex in gold particle size

p8 #9



grower vs. binder

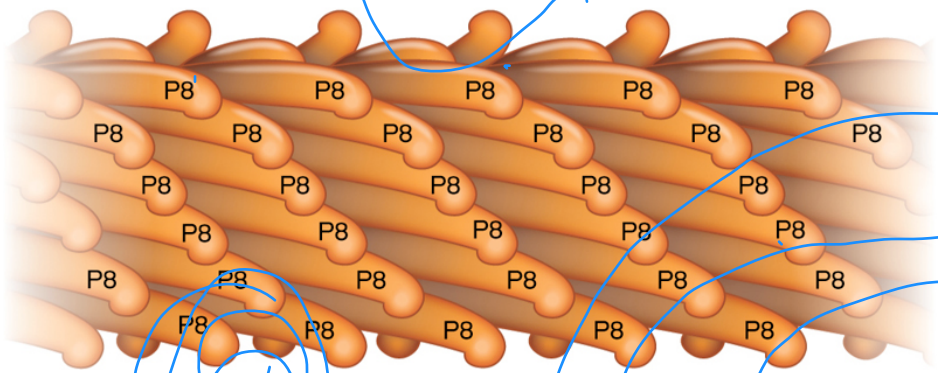
↓ not connected

↓ less expensive

← bind Au

charged Au^{3+}

Au



50nm

5nm

Engineering design choices — what would you do?

Engineering p3:

(+) long [accom. 20-30 peptides]

(+) on one end [pattern] / (-)

(-) only 5

(-) needed for replication

Engineering p8:

(+) 2700 copies

(-) short

(-) difficult to maintain fxn w/ new AA seq.

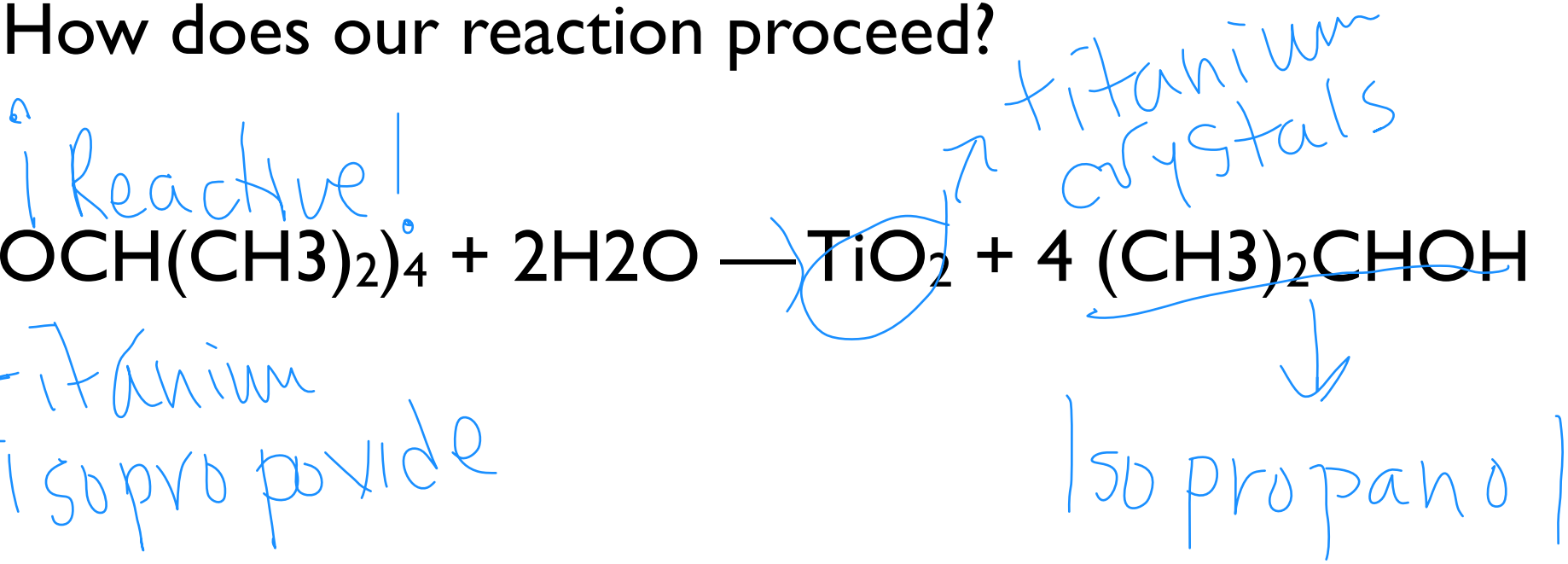
(+)

Making the nanowire composites for DSSC: Biotemplating

Why do it with biology?

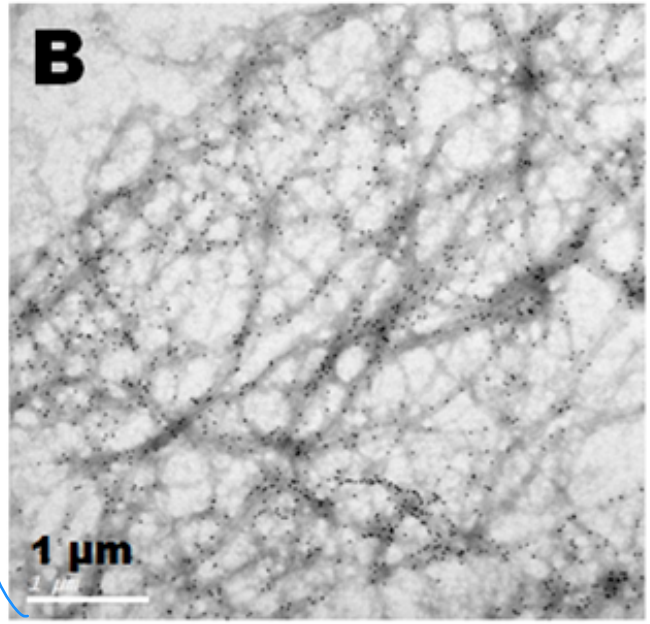
- lower pressure
- lower temp.
- low toxicity of product

How does our reaction proceed?

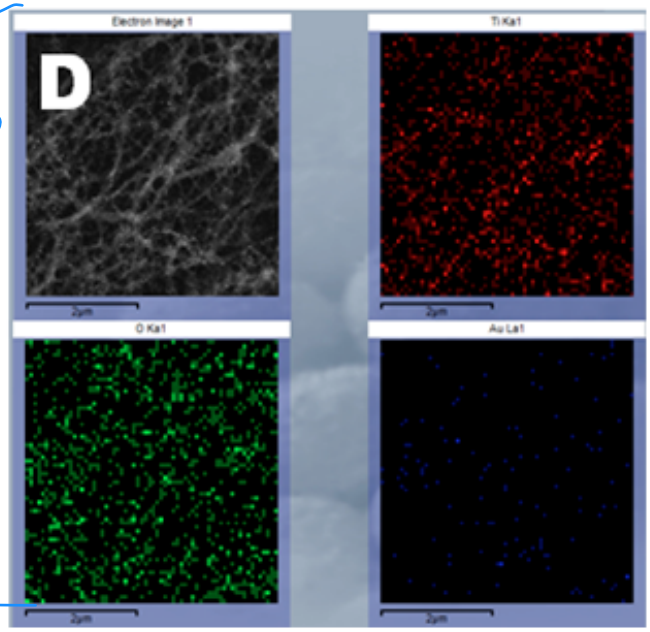


Preview of M3D3: images of your nanowires

TEM in Koch Institute



elemental analysis



Remember the dimensions of the M13 phage:

~200nm x 6.6nm

Research Proposal: Presentation

1. What is your area of interest?

2. What is the current state of the technology?

reviews

3. How can you address the shortcomings in the field?

11 + discussion primary lit.

4. Why is your approach novel and exciting?

11 + 11

5. What do you need to accomplish your goals?

assay + equipment

*Must be 109-related, but not related to your UROP project

CAN NOT BE Urop project

Today in the lab:

- Be careful today — the unreacted titania is quite dangerous — LAB COAT + EYE PROTECTION
- Pay attention to the side of your TEM grid

Calculate + 3 µl 1×10^{13} phage
total volume: 5m 2.5mL
12 92 µl
50 2.3mL

Next time in the lab (April 28th!!!):

- We'll split up for TEM time — everyone come at 1pm
- Start working on your research proposals