

M3D2:
Phage nanowires

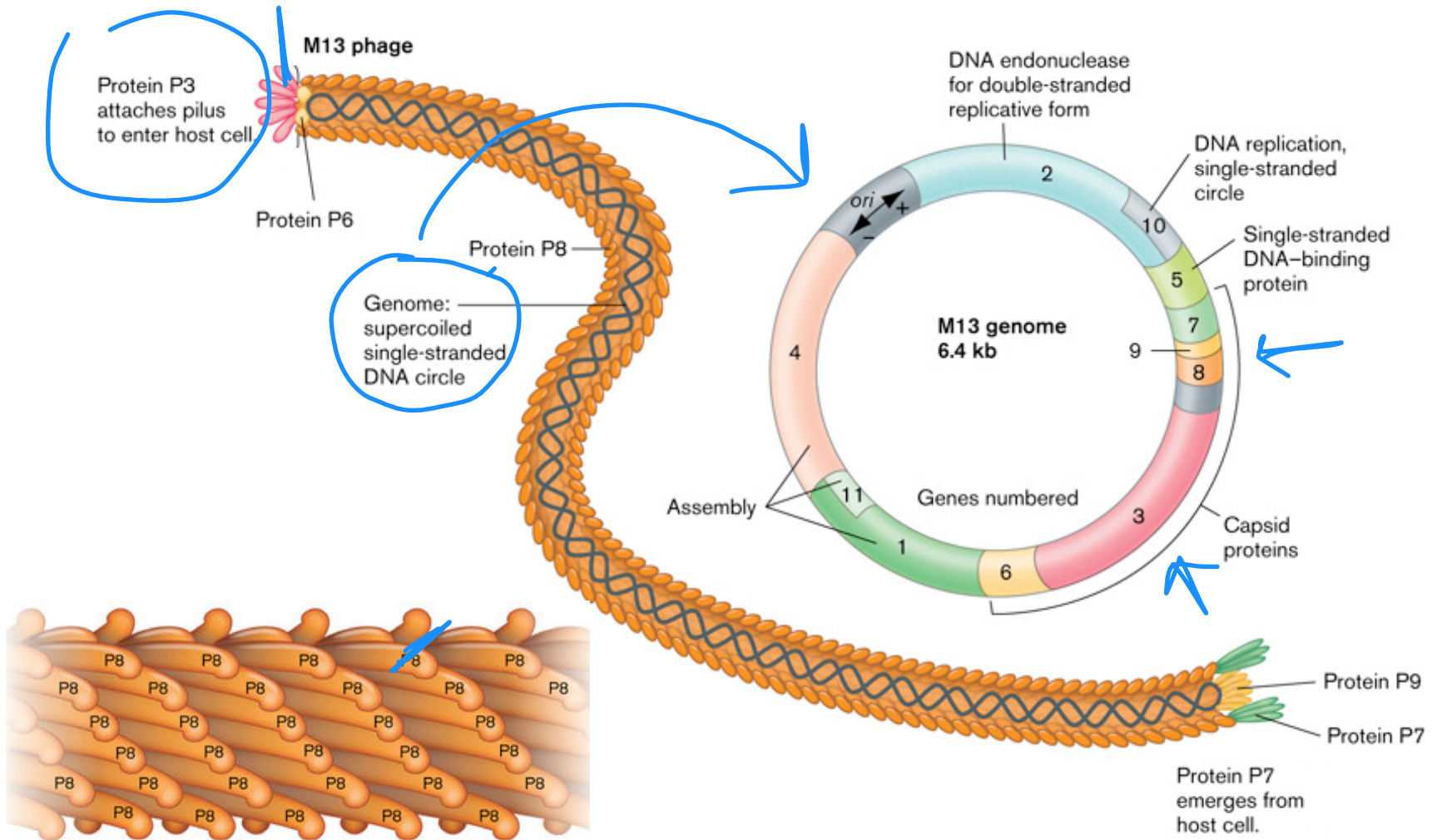
11/13/14

Lab business

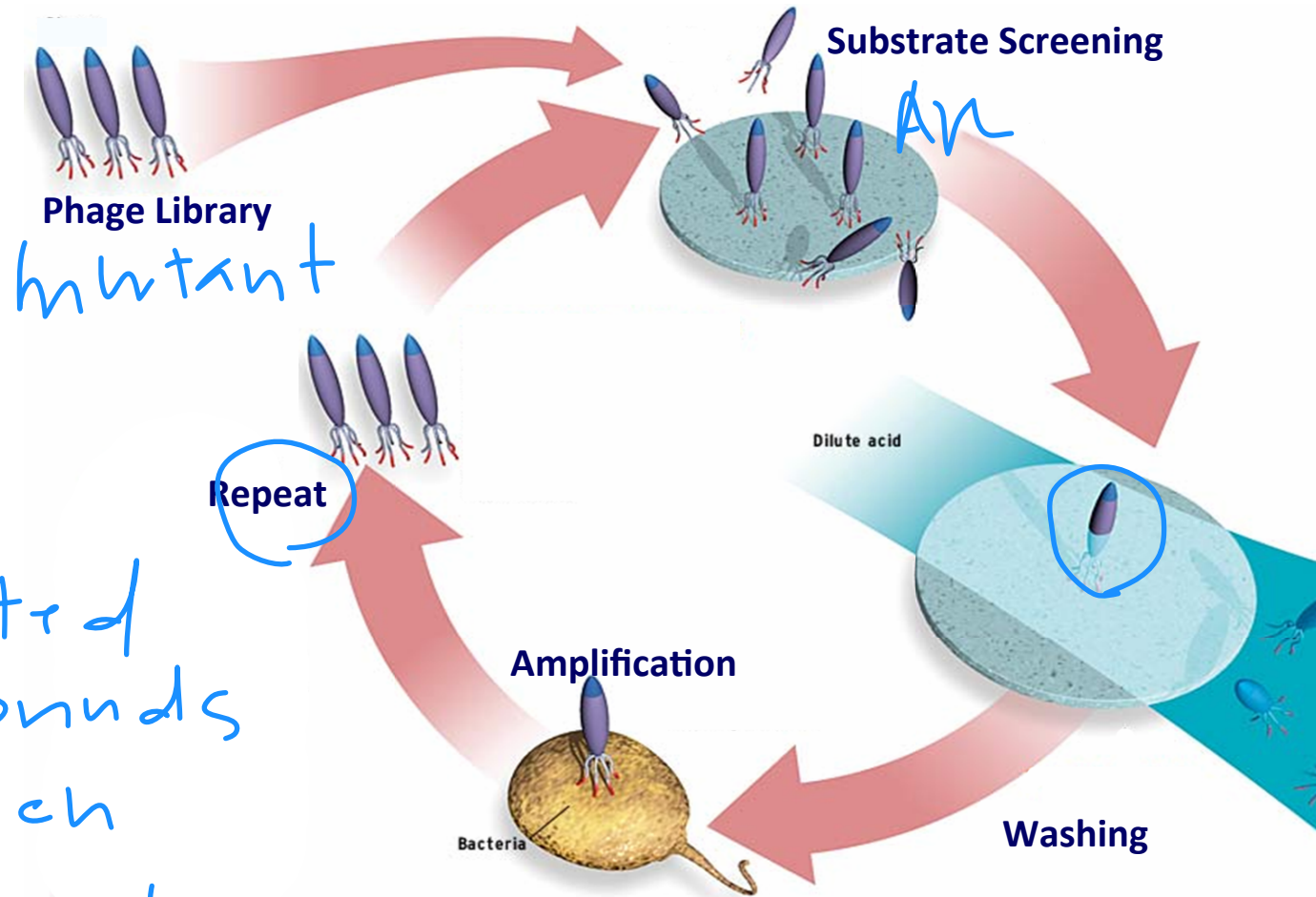
- Lab treat
- For next week...
 - Assignment due November 18
- Module 2 research report
 - Rewrite due November 26 at 5p
- Module 3 assignments
 - Mini-report due December 4
 - Research proposal presentation due December 9



Engineering M13 phage



Phage display



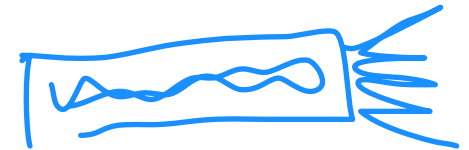
repeated rounds
enrich
for binders

Engineering design choices

- Phage display using p3...

← unable to amplify
- low copy (5)

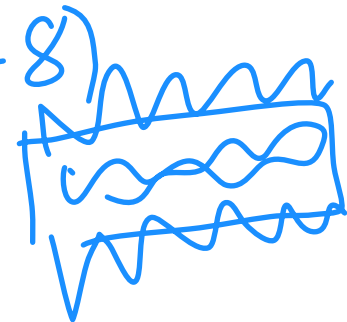
+ longer displays (20-30aa)



- Phage display using p8...

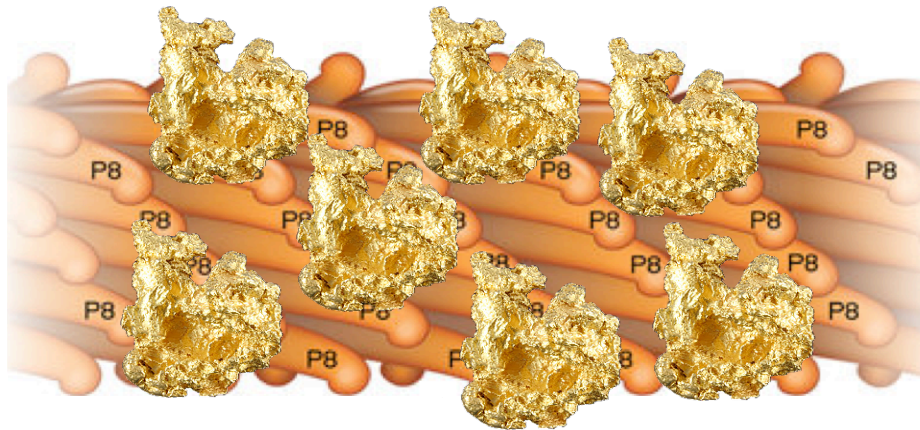
← shorter peptides (6-8)

+ high copy (2700)



What does this mean for us?

- M13 p8#9 displays VSGSSPDS, which binds Au



- Au generates plasmonic effect which increases efficiency of DSSC

Plasmonics and DSSC efficiency

- Light is scattered by metal nanoparticles
 - Increased scattering causes electrons to be excited and travel through solar cells creating a current



- How does Au nanoparticle size effect DSSC efficiency?

Biotemplated synthesis



- Environmental conditions
↓ temp. pressure
milder reagents
- Organization
unique ~~form~~ structures
varied lengths
- M13 phage provides nucleation site for titanium isopropoxide to form titania

Transmission electron microscopy

- Electron beam

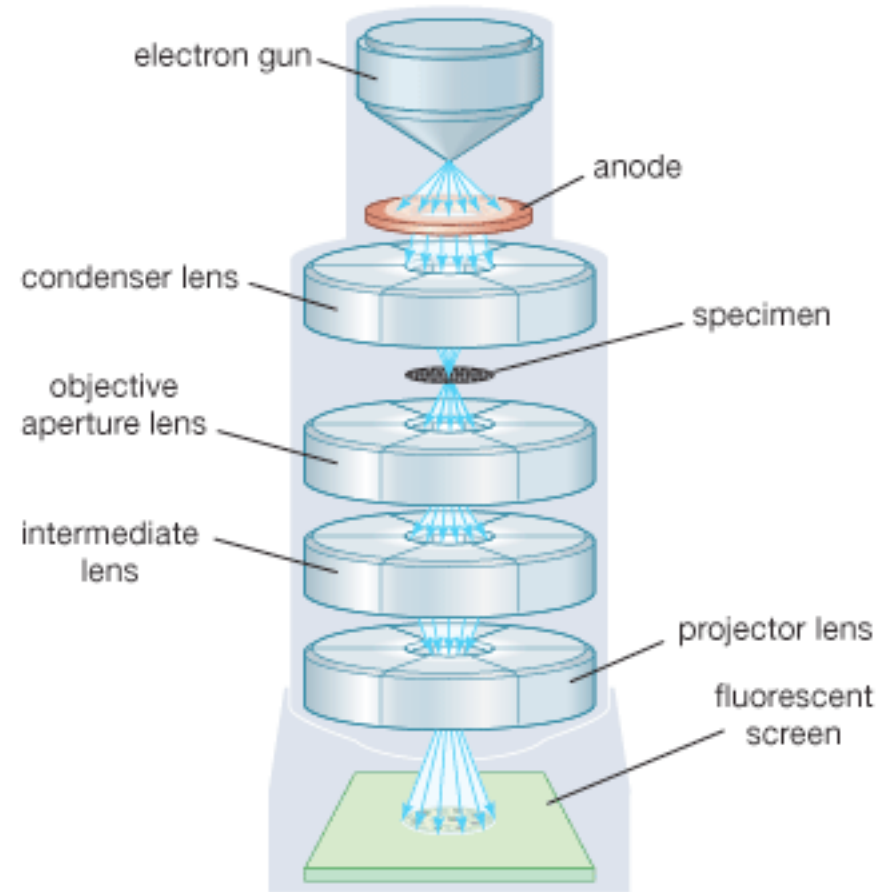
view image

- Electromagnets

focus beam

- Vacuum

prevents loss



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Today

1. React AuNP:phage with $\text{Ti}(\text{l-pro})_4$
 - Wear gloves, goggles, and coats at the fume hood!
 - 1×10^{13} phage (complexed with AuNP) was added to your samples...remember this when you do your calculations!!
2. Prepare grid for TEM
3. Wash AuNP:phage: TiO_2 nanocomposites

