

M3D2: Phage nanowires

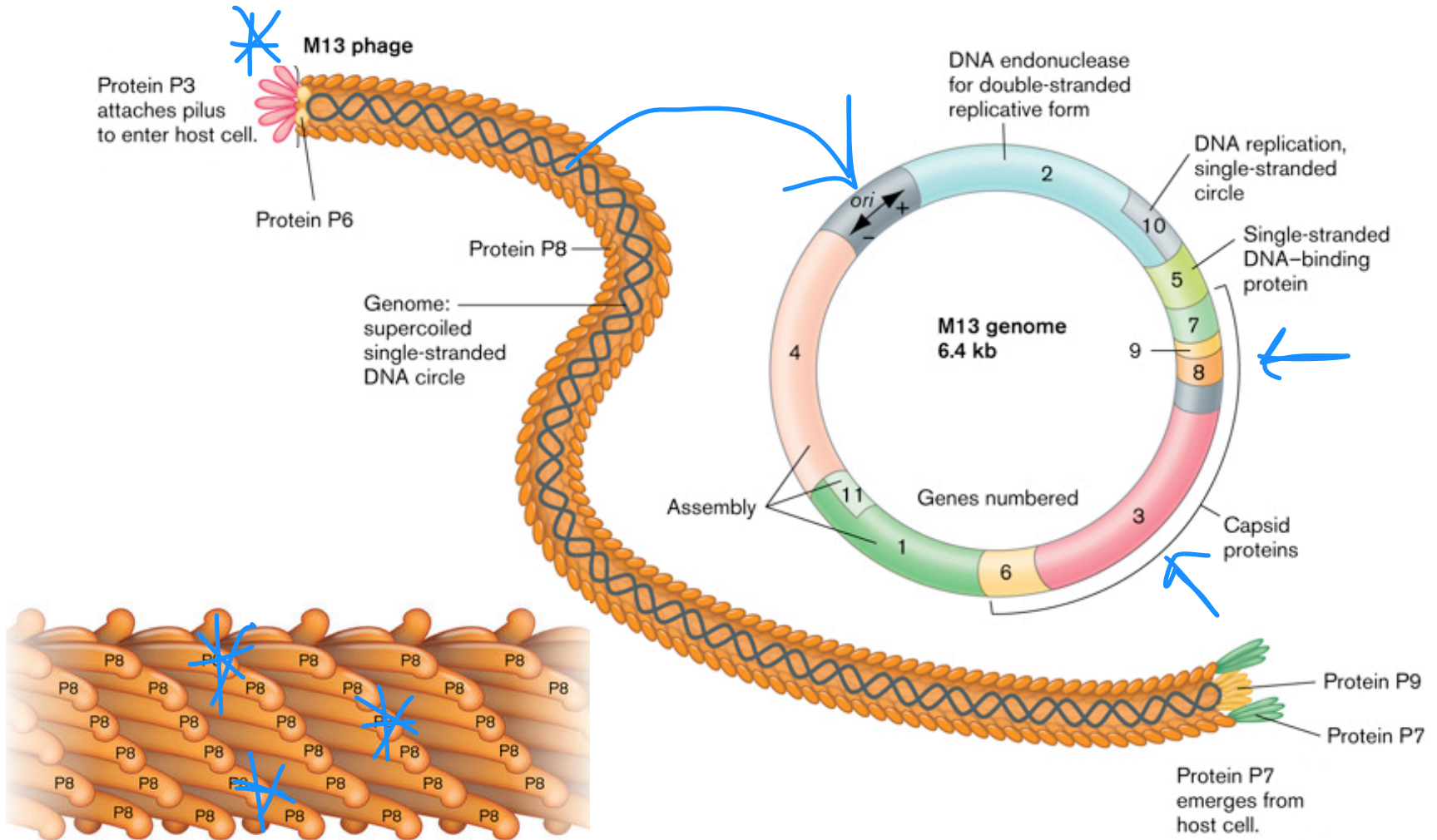
11/~~13~~/14
14

Lab business

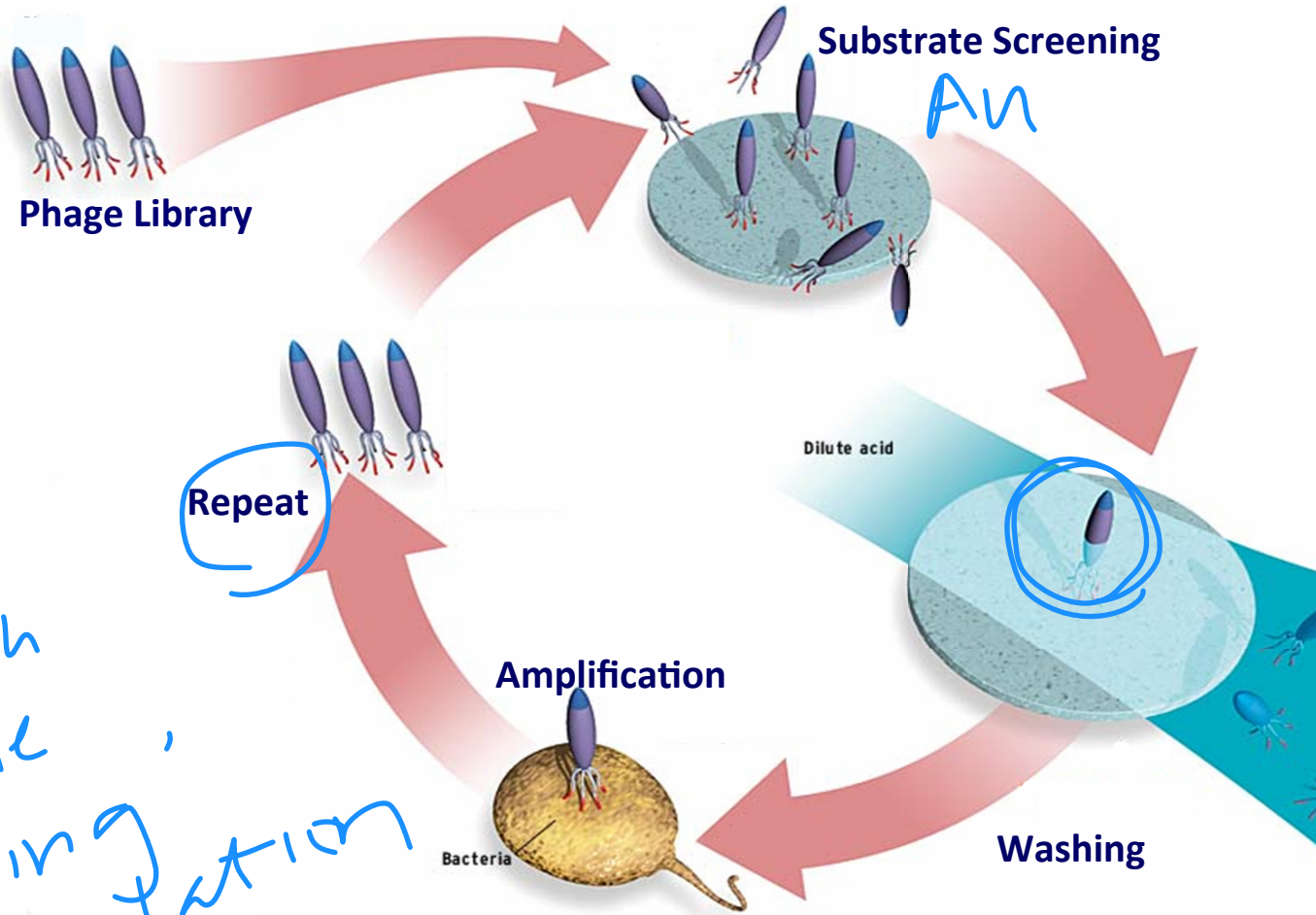
- Lab treat
- For next week...
 - Assignment due November ~~18~~ 19
- Module 2 research report
 - Rewrite due November 26 at 5p
- Module 3 assignments
 - Mini-report due December ~~4~~ 5
 - Research proposal presentation due December ~~9~~ 10



Engineering M13 phage



Phage display



An

enrich the binding population

Engineering design choices

- Phage display using p3...

- affect host binding

- ICCS Au coverage

- ICCS copies (units)

- + self assembly

- Phage display using p8...

- shorter seq (6-80a)

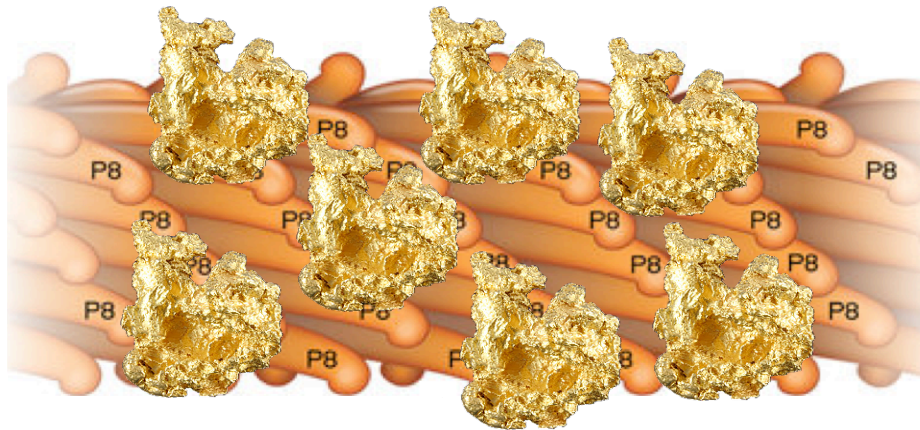
- + more copies (2700)

- bind to DNA

- + longer sequences (20-30a)

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?

Bioteemplated synthesis



- Environmental conditions
↓ temp, pressures
milder reagents
- Organization
unique structures
broader length scales
- M13 phage provides nucleation site for titanium isopropoxide to form titania

Transmission electron microscopy

- Electron beam

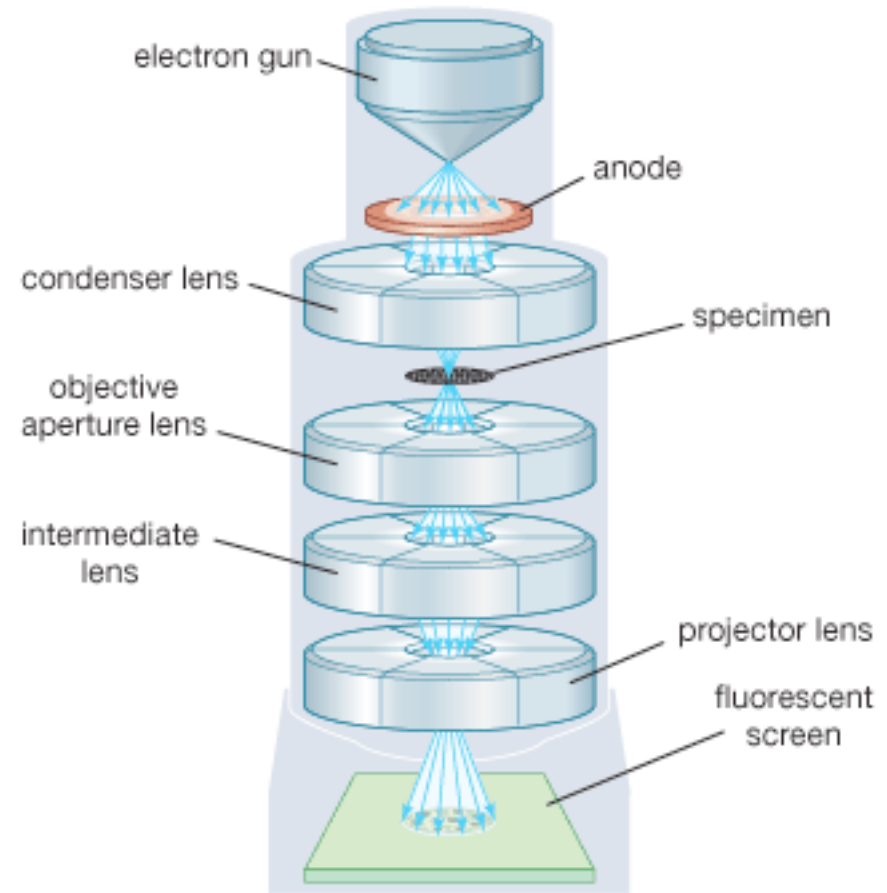
*view image
denser = darker*

- Electromagnets

*directs
beam*

- Vacuum

*e- absorbed by
molecules in air*



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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

