

- Announcements
- Lab Quiz
- Pre-lab Lecture
 - ❖ Review p8#9 engineering
 - ❖ Nanowire synthesis
 - ❖ Intro to TEM
 - ❖ Today in Lab, FNT

Announcements

- Opportunity: TA for SEED program
 - Teaching synthetic biology to HS students
 - Spring, 10 Saturday commitment
 - NK is contact
- BE UG Board meeting
 - Thursday, 5¹⁵ pm, student center coffehouse
- Forest White giving the BE seminar this week
 - Thursday 4 pm, 32-141 *•rafts back next wed*
- TEM on Friday, then no lab till December!
 - Oral proposals Wed, Dec 9th
 - Lab discussion + party Thu, Dec 10th

Engineering M13 overview

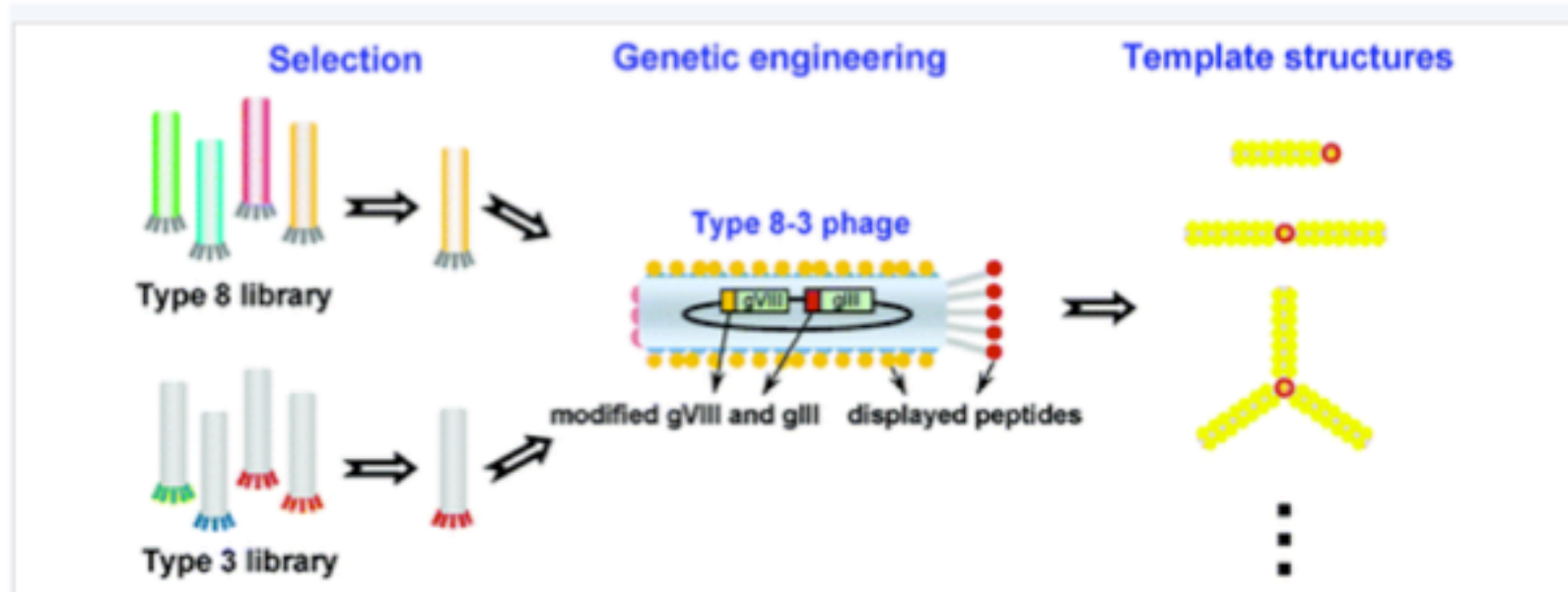


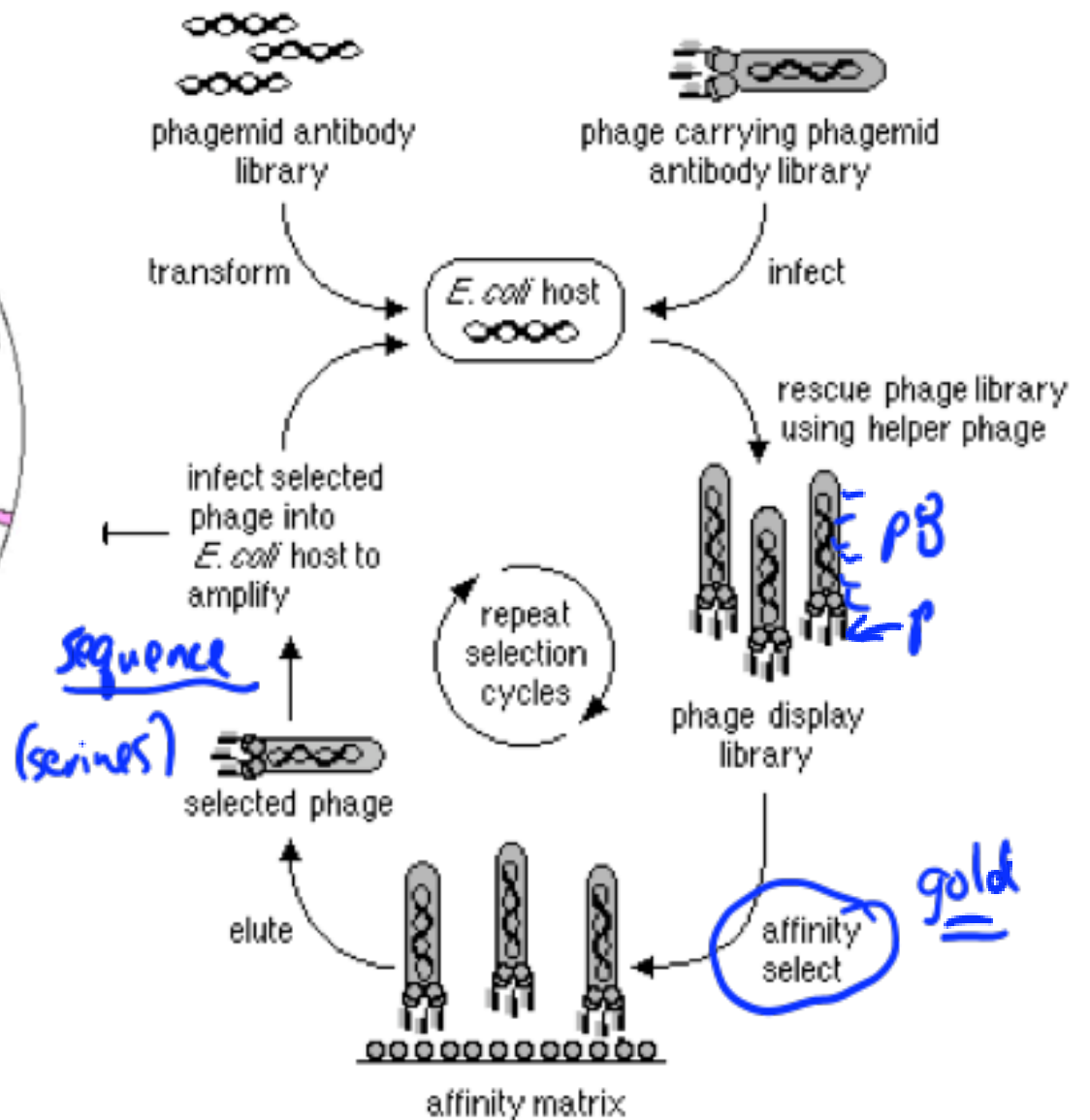
Image from Y. Huang et al., *Nano letters* **5(7)**:1429 (2005).

Phage don't normally bind gold. How did Angie's lab find the gold binding phage?



M13KE + 1 ph library

Slide from N. Kuldell




Nanowire synthesis: overview

- Goal: compare wires made w/varying Au:Ag
 - Sign up on Talk page: 2-3 groups per concentration
- Follow directions *exactly*



Dilute phage to 3.5×10^7 PFU/uL in 10 mL

Add CTAB: *Surfactant* 
lowers surface tension, γ , i.e. free energy cost of creating new surface

Add Au, incubate w/rocking 2 hrs



Add ascorbic acid: *reducing agent*



Add Ag, incubate until next time

↳ "catalyst"

TEM: foundations

- Very high resolution – why?

low λ of e^- compared to light λ
some scattered, some absorbed

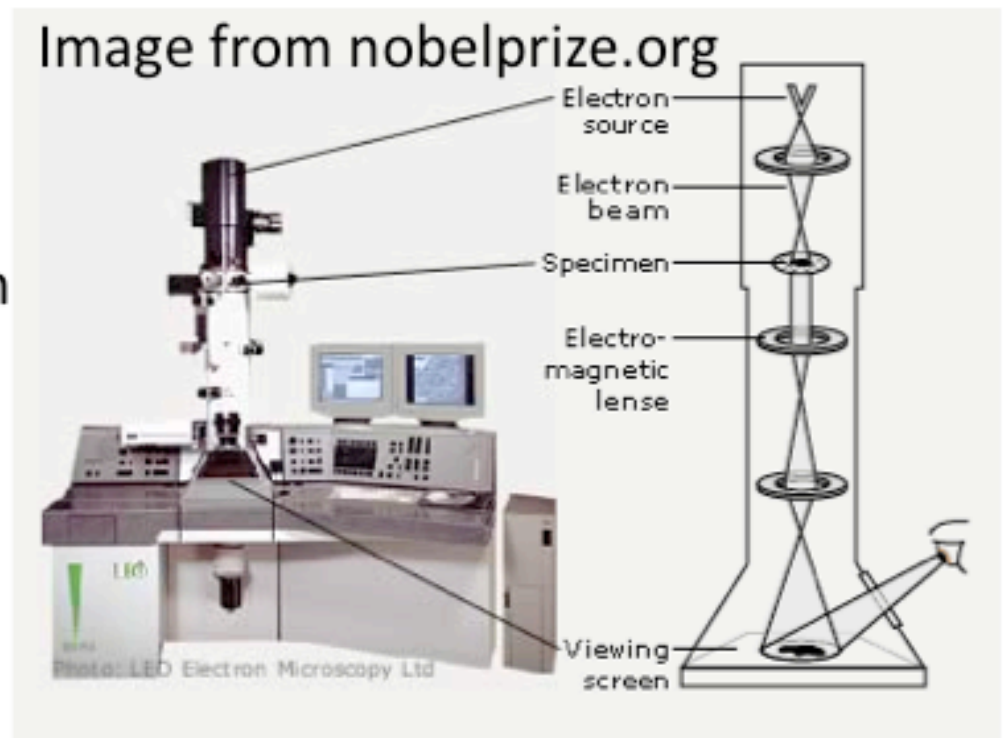
- EM lens to focus
- Sample preparation
– very thin, under vacuum
– can't image *in situ* bio.

*cryoTEM \rightarrow frozen more
in situ-like*

- Many imaging modes

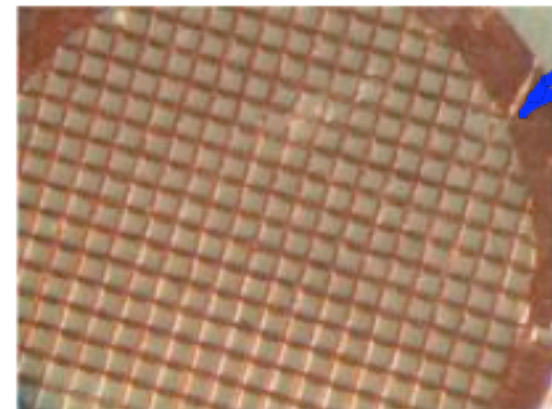
*scanning allows mapping
efficiency \uparrow , contrast \uparrow*

** Sample density*



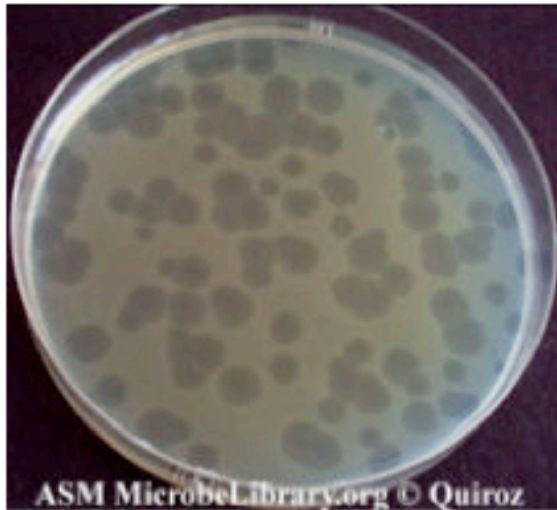
TEM: your experiment

- What will you learn at
 - Lower resolution? *overall look, wire length, conc. morphology*
 - Higher resolution? *wire diameters; lattice constants, domains of crystals (maybe elemental analysis)*
 - Protocol (see M2D3):
 - Disperse wires: vortex and sonicate *bed*
 - Collect and pool with other group(s) using same [Ag]
 - Wash and load onto Cu/carbon grid
 - Head to 13-1012, meet John Burpo *disperse energy*
- Grid is extremely delicate!*



Today in Lab

Plaque assay - why did we test multiple phage dilutions?



too much ϕ - clear

counting

too little ϕ - 0 or 1 or 2

interpretation

* Sharing *

Nanowire synthesis w/incubation

Meanwhile... Ryan's talk @ 2:30

Work on proposal

Name your page 20.109(F09):