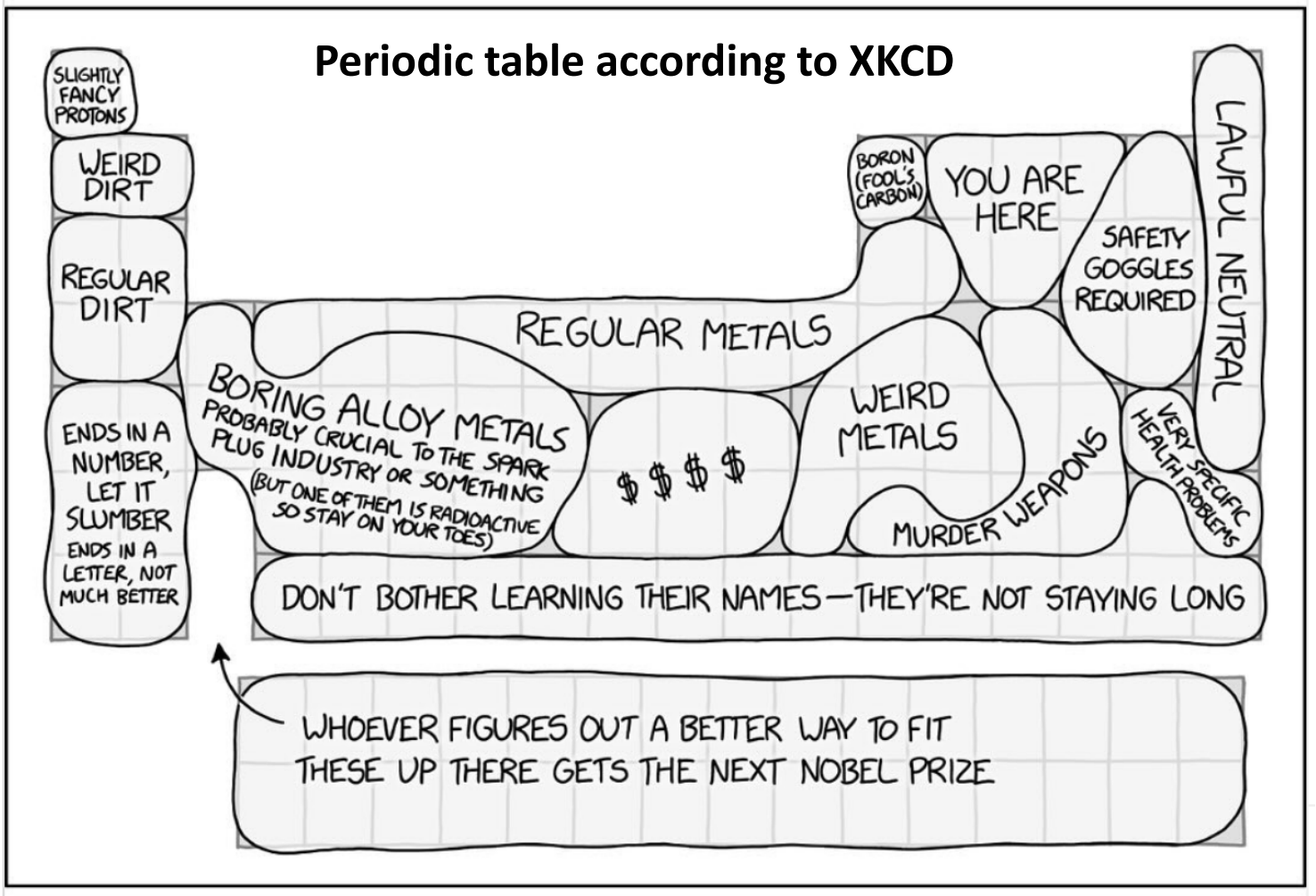
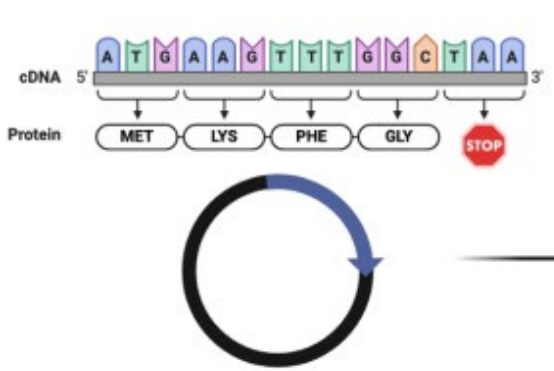
M2D7: Visualize cadmium sequestration and assess quality of cadmium sulfide production

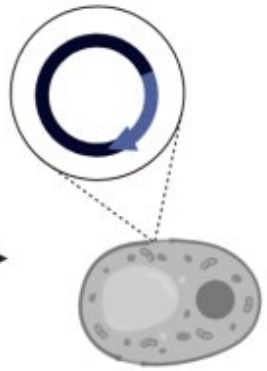
- Prelab
- Work in Belcher lab to examine samples with fluorimetry
- Data analysis!



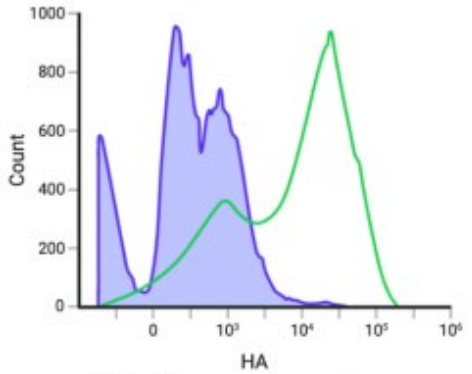
Mod2 overview



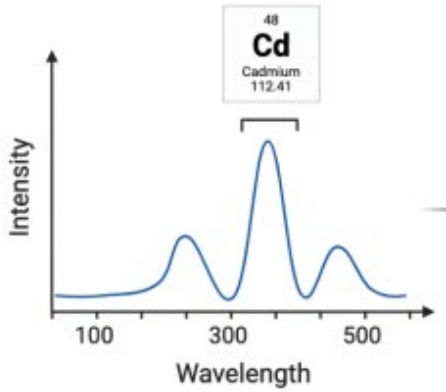
D1&D2: Insert DNA sequence for YSD peptide



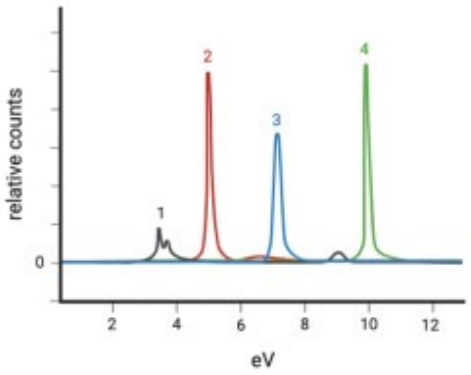
D3: M17 yeast transformation with plasmid



D5: Flow cytometry confirmation of cell surface expression



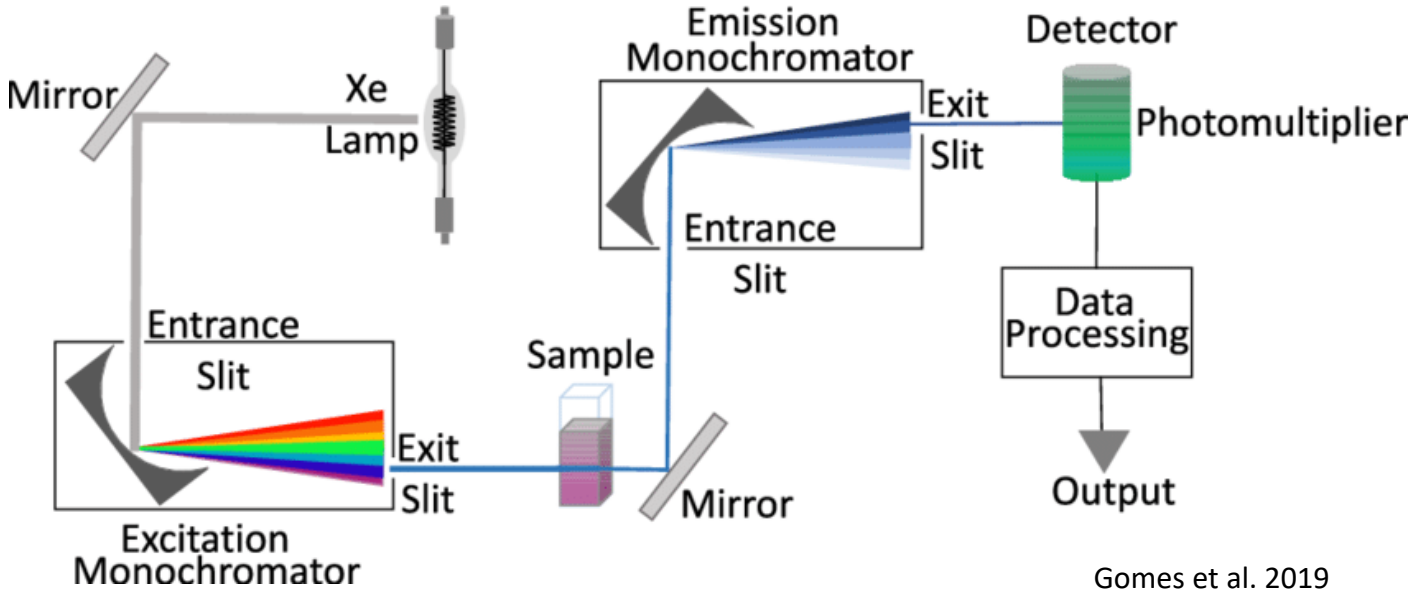
D6: ICP-OES analysis of heavy metal uptake



D7: Examine CdS sequestration pattern and fluorescence

Fluorescent spectroscopy (fluorimetry)

- Vortexed particles off of yeast
- Xe or Hg lamp
- Single wavelength excitation of sample
- Emission spectrum measured
- For data processing:
  - Use S1/R1 numbers
  - Signal (S) is corrected to account for background lamp signal (R) to produce more reliable emission data

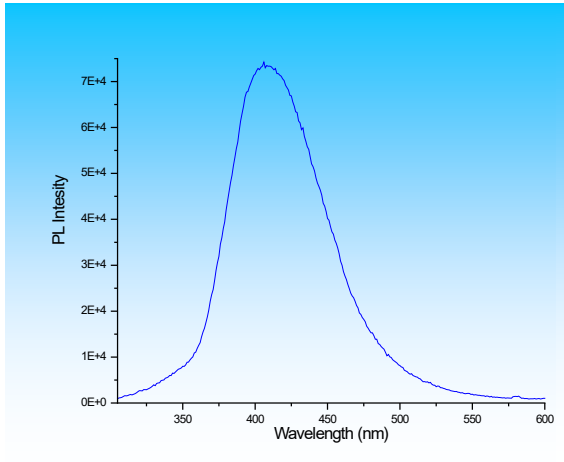


Gomes et al. 2019

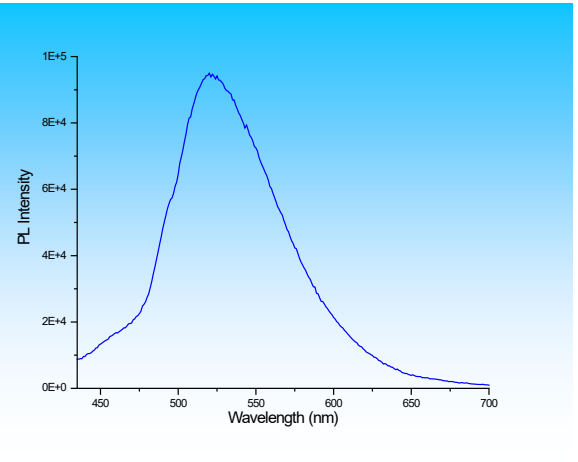
Example fluorimetry data

Excitation

λ_{ex} = 290 nm

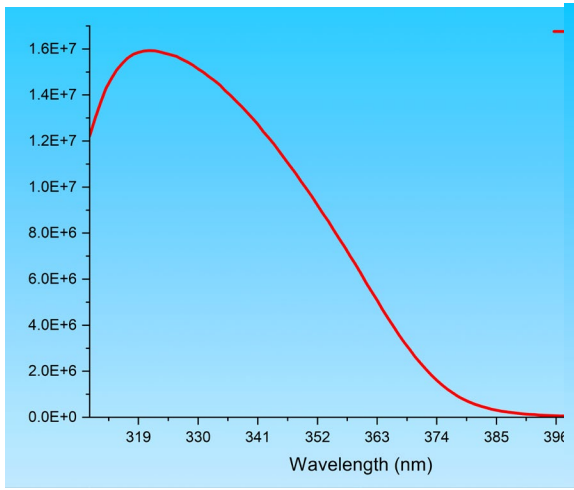


λ_{ex} = 420 nm

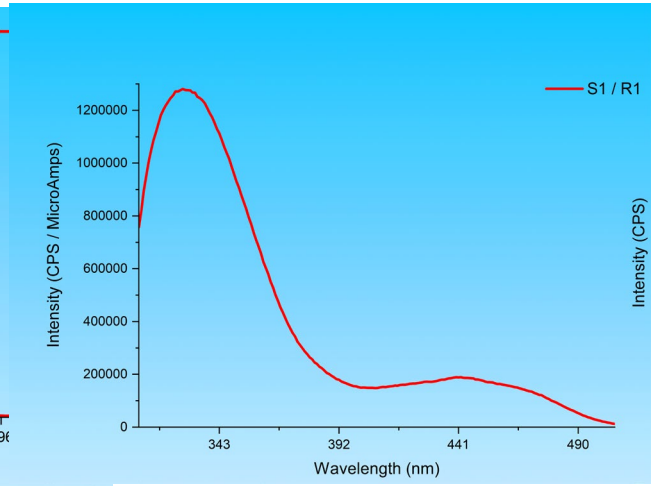


Emission

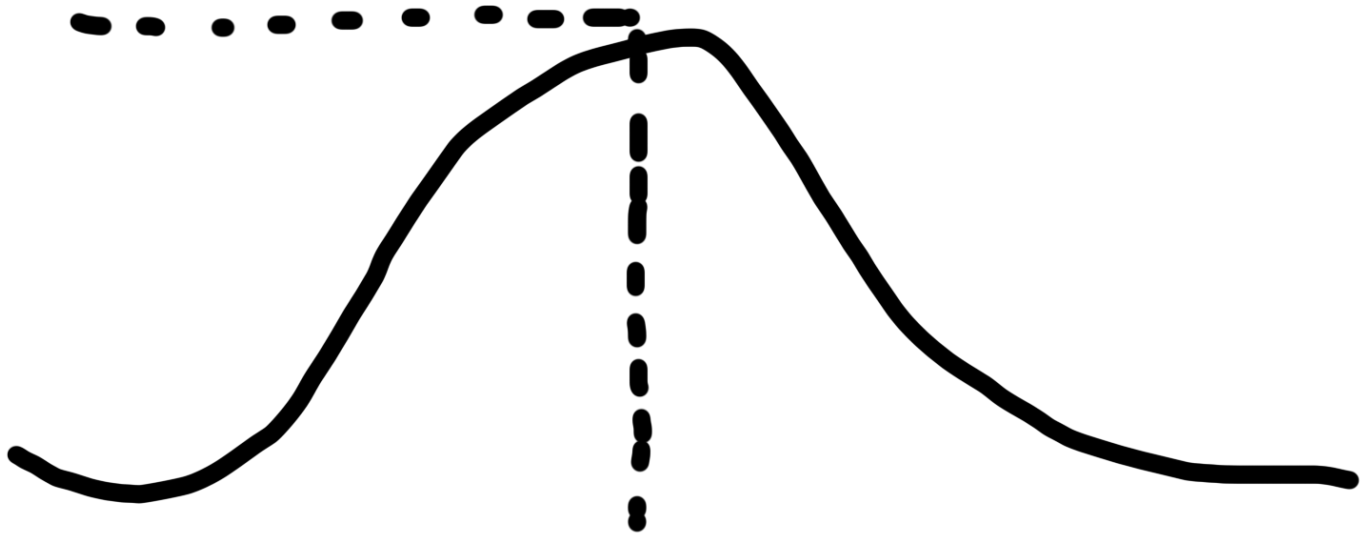
420 nm emission excitation spectrum



520 nm emission excitation spectrum



Important Parameters: Peak Intensity & Wavelength



Important Parameters: Full Width Half Max (height)

Data analysis today!
Experiment review: what is the goal of each experiment?

- Flow cytometry

Detect cell-surface expression of our peptide

- ICP-OES

Measures cadmium removal by yeast

- Fluorimetry

Quantitative assessment of Qdot quality

- TEM

Qualitative assessment of Qdot quality

For today

- First group meets Jifa at 1:30ish
  - We are all going over to the Koch led by Yichen
    - Red, Orange, Yellow, Green, Blue First
    - Pink Purple Teal Next
  - Take your laptop to keep notes for a lab notebook
  - Work on data analysis if your group is not processing samples

For M2D8

- Outline your RA discussion
  - Like Implications section of the Data Summary + data interpretation
  - Use placeholders for analysis that is not complete