

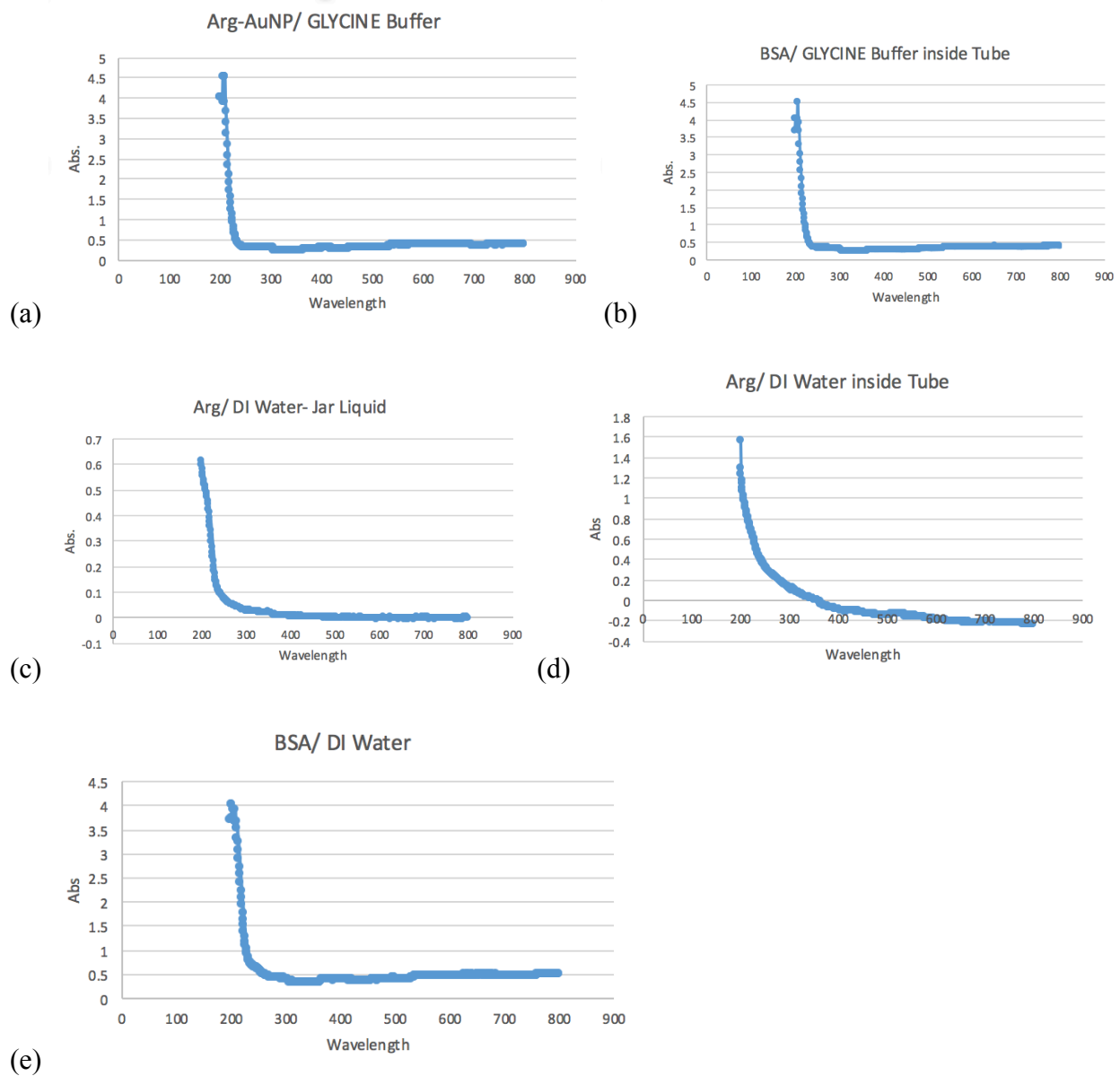
9/20/2017

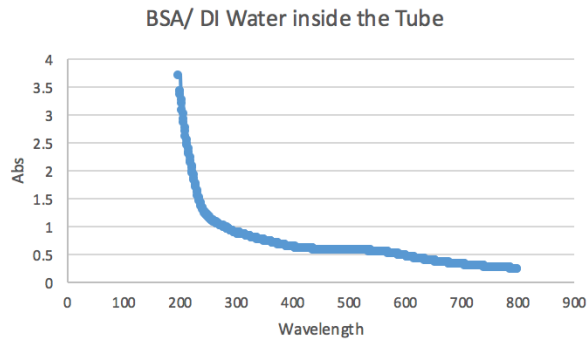
Tasklist:

- Finish up dialysis measurements from 9/19/2017 class
- Continuation of round-robin with fluorescence

➤ Dialysis Measurements for the 4 Exchanges

Figure 1: Dialysis Measurement for 4 Exchange Dialysis Solutions





(f)

Figure 1 shows the dialysis measurements for the 4 exchange dialysis solutions. (a) shows the Arg-AuNP tube inside the glycine buffer. This measurement is for the jar solution. There is no apparent peak. Unfortunately, the UV/Vis for the solution inside the dialysis tube was not obtained. (b) shows the BSA tube inside the glycine buffer. This measurement was for the liquid inside the tube. There is no apparent peak. Unfortunately, the UV/Vis for the solution in the jar for the BSA/ Glycine buffer was not obtained. (c) shows the UV/Vis for the arginine AuNP inside DI Water solution. The measurement shows the jar water. There are no apparent peaks. (d) shows the UV/Vis for the tube of the arginine AuNP/ DI Water solution. There are no apparent peaks, and the graph goes into negative absorbance. (e) shows the UV/Vis for the BSA/ DI water in the jar solution. There are no apparent peaks. (f) shows the UV/Vis for the BSA/DI water in the tube solution. There is a slight peak around 550nm.

➤ Fluorescence

Purpose: To see if a photoluminescence band can be observed between 420nm and 450nm as appears in existing literature

-Step 1: Prepare 2 solutions of 10uM acridine orange and 10uM fluorescein

Calculations

-10uM Acridine Orange Solution

$$\frac{\text{moles}}{0.05L} = 10\mu\text{M Acridine Orange}$$

$$\text{moles} = 5 \times 10^{-7}$$

$$\frac{5 \times 10^{-7} \text{ moles}}{301.81 \text{ g/mol}} = \text{grams Acridine Orange needed}$$

1.509×10^{-4} grams Acridine Orange

-10uM Fluorescein Solution

$$\frac{\text{moles}}{0.05L} = 10\text{uM Fluorescein}$$

$$\text{moles} = 5 \times 10^{-7}$$

$$\frac{5 \times 10^{-7} \text{ moles}}{332.31 \text{ g/mol}} = \text{grams Fluorescein needed}$$

1.6615×10^{-4} grams Fluorescein

-Step 2: Prepare a serial dilution of both the Acridine orange and Fluorescein to prepare solutions ranging from 1uM-9uM

Calculations

-1uM solution

$$(1\text{uM})(5\text{mL}) = (10\text{uM})(V_2)$$

$$V_2 = 500 \text{ uL}$$

-2uM solution

$$(2\text{uM})(5\text{mL}) = (10\text{uM})(V_2)$$

$$V_2 = 1000 \text{ uL}$$

-3uM solution

$$(3\text{uM})(5\text{mL}) = (10\text{uM})(V_2)$$

$$V_2 = 1500 \text{ uL}$$

-4uM solution

$$(4\text{uM})(5\text{mL}) = (10\text{uM})(V_2)$$

$$V_2 = 2000 \text{ uL}$$

-5uM solution

$$(5\text{uM})(5\text{mL}) = (10\text{uM})(V_2)$$

$$V_2 = 2500 \text{ uL}$$

-6uM solution

$$(6\text{uM})(5\text{mL}) = (10\text{uM})(V_2)$$

$$V_2 = 3000 \text{ uL}$$

-7uM solution

$$(7\text{uM})(5\text{mL}) = (10\text{uM})(V_2)$$

$$V_2 = 3500 \text{ uL}$$

-8uM solution
 $(8\text{uM})(5\text{mL}) = (10\text{uM})(V2)$
V2= 4000 uL

-9uM solution
 $(9\text{uM})(5\text{mL}) = (10\text{uM})(V2)$
V2= 4500 uL

-Step 3: Take fluorescence of each stock solution using excitation wavelengths of 308nm, 440nm, and 490nm using the Perkin Elmer LS55 fluorescence spectrometer. The parameters were 8nm excitation and emission windows and a scan speed of 50nm/min. Unfortunately, we only have the graphs for the following samples.

Figure 2: Fluorescence of Acridine Orange Solutions

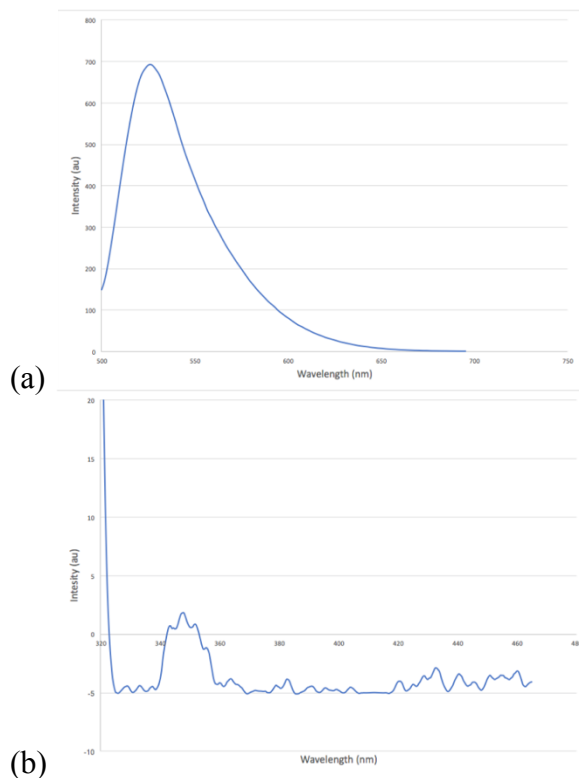


Figure 2 shows the fluorescence obtained for the acridine orange diluted solutions. (a) shows the fluorescence of the 1uM acridine orange solution at an excitation wavelength of 490nm. The peak is around 525nm. (b) shows the fluorescence of 3uM acridine orange solution at an excitation wavelength of 308nm and has an observed peak around 345nm.

Figure 3: Fluorescence of Fluorescein Diluted Solutions

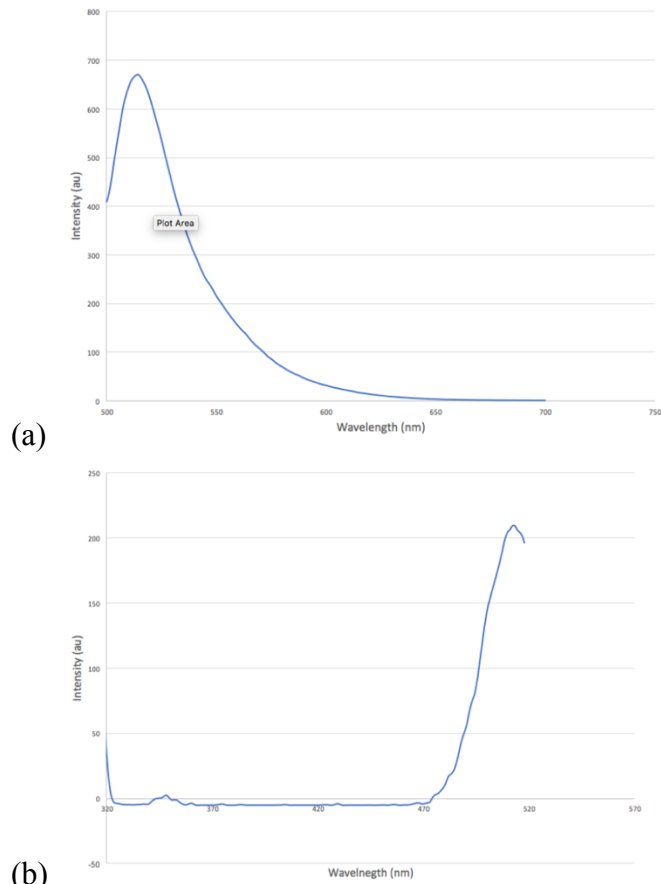


Figure 3 shows the fluorescence obtained for the fluorescein diluted solutions. (a) shows the fluorescence of the 1uM solution at an excitation wavelength of 490nm. There is a peak around 500nm. (b) shows the fluorescence of the 3uM solution at an excitation wavelength of 308nm. There is a peak around 512 nm.

Figure 4: Fluorescence of 10uM Acridine Orange Stock Solution

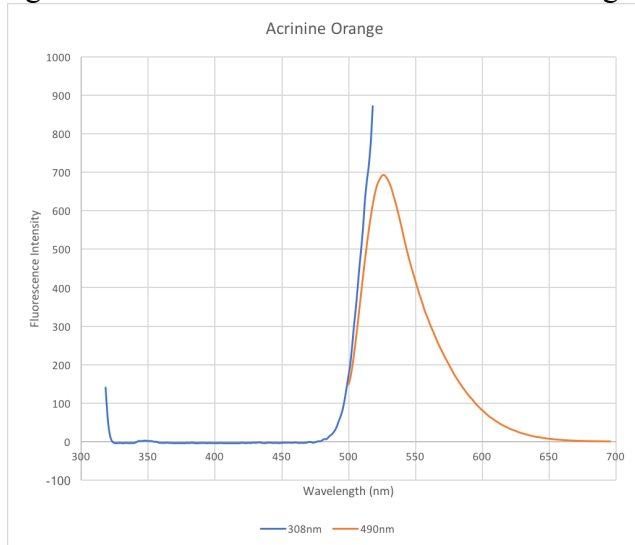
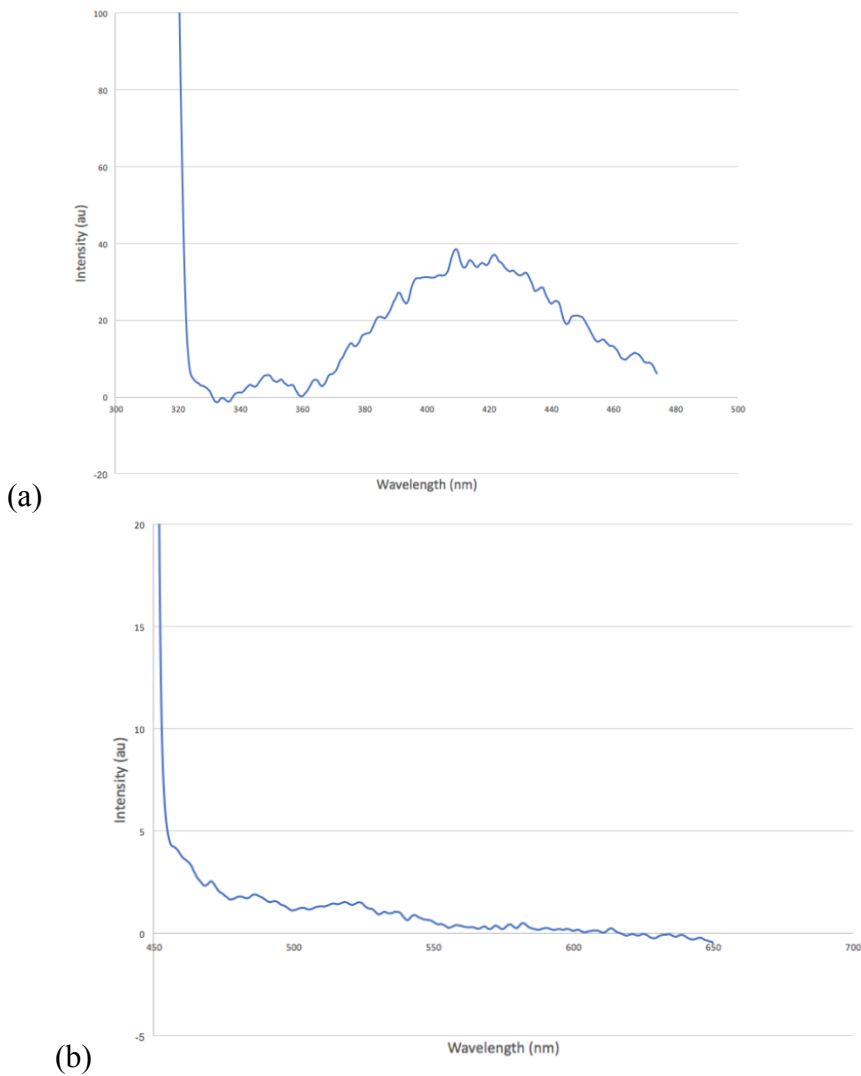
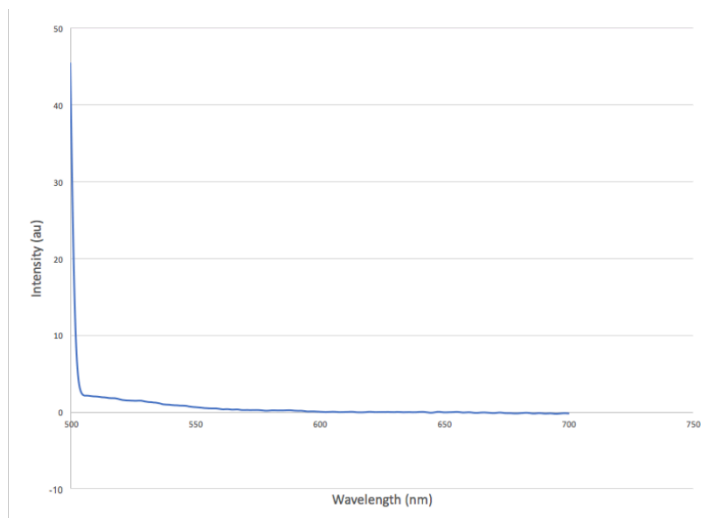


Figure 4 shows two fluorescence graphs for the acridine orange stock solutions. The blue line was run at 308nm, and the orange line was run at 490nm. The blue line has a peak around 500nm, and the orange line has a peak around 525nm.

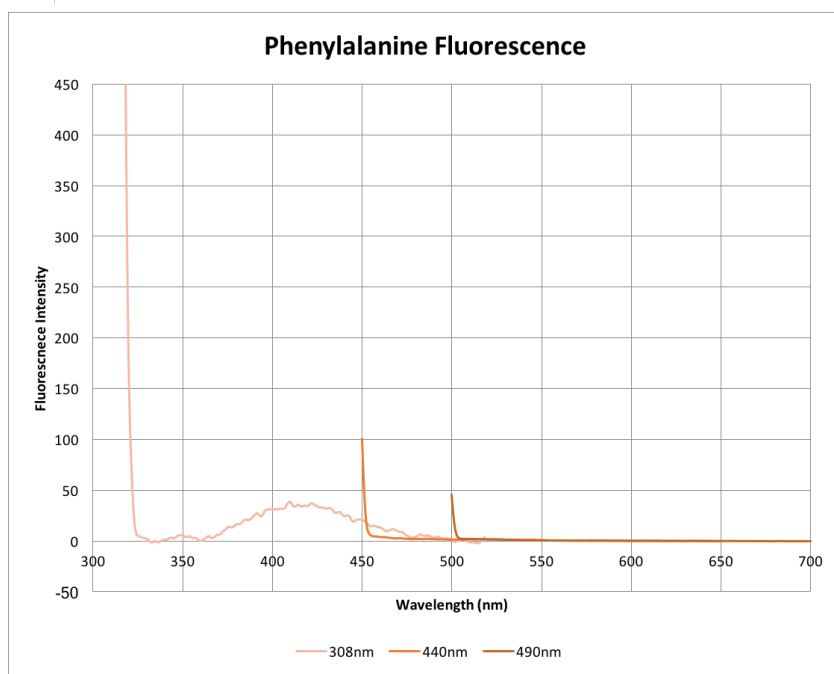
-Step 4: Take the fluorescence of the gold nanoparticle solutions using each amino acid and BSA using all three excitation wavelengths. Unfortunately, we do not have the fluorescence for the gold nanoparticles using isoleucine.

Figure 5: Fluorescence of Gold Nanoparticle Solutions of Phenylalanine





(c)



(d)

Figure 5 shows the fluorescence obtained for phenylalanine-stabilized gold nanoparticle. (a) shows the sample at an excitation wavelength of 308nm. There is a peak around 415nm. (b) shows the sample at an excitation wavelength of 440nm and with a slight peak around 520nm. (c) shows the sample at an excitation wavelength of 490nm. There is no peak in the spectrum. (d) shows a, b, and c all on one graph.

Figure 6: Fluorescence of Gold Nanoparticle Solutions of Arginine

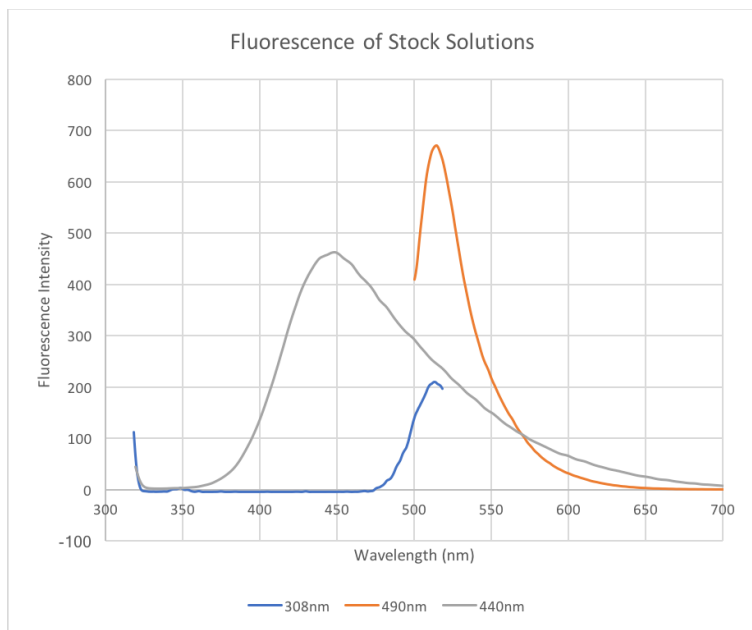


Figure 6 shows the fluorescence for the gold nanoparticles in arginine. The blue line was run at 308nm. The grey line was run at 440nm, and the orange line was run at 490nm. The blue line has a peak around 515nm. The grey line has a peak around 450nm, and the orange line has a peak around 525nm.