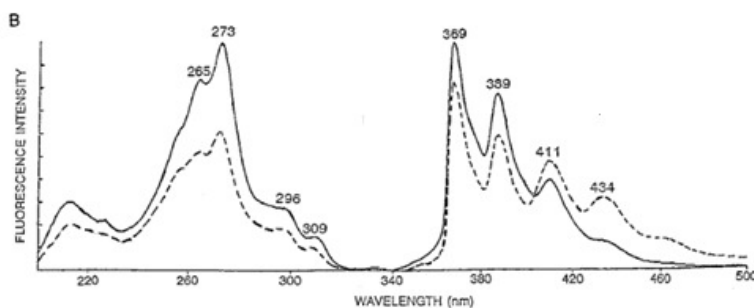


This Lab Quiz is due at noon on Tuesday Nov 5 at the start of lecture. It is open book, no discussion or help about this quiz from any person. Please place numerical answers in the space provided in the units given after the space and indicate basis of the answer when calculations are required (provide formulas, substitutions, etc.) - just the final numerical answer is not acceptable. e-mail or ask Chris by 11 pm Monday for clarification about these questions.

1. On the figure below, label the excitation spectrum and the emission spectrum for benzo(a)anthracene (BAA), a well known polycyclic aromatic hydrocarbon (or PAH) (note there is vibrational fine structure showing for both spectra). Reference: Schneider, J.; R. Grosser, K, Jayasimhulu, W, Xue, D. Warshawsky, Appl Environ, Microbiol. **1996**, 62 (1), 13-19.



2. (a) Report the DL for BAA based on the following seven fluorescence measurements for the blank (given in concentration units of $\mu\text{g BAA/mL}$):

0.1152; 0.1143; 0.1149; 0.1147; 0.1153; 0.1145; 0.1146

_____ $\mu\text{g BAA/mL}$

- (b) i. Report the RSD and %RSD for the blank measurements in (a). _____ RSD
 _____ % RSD

ii. Do you consider these blank measurements to be precise or not? Yes or No?

iii. Why?

- (c) You prepared and analyzed a sample of a grilled beef hot dog for BAA and using your calibration curve you found a value of $0.0134 \pm 0.0009 \mu\text{g BAA/mL}$ for the hot dog test solution. If you are going to publish this result, can you report with certainty that you found measurable BAA in this sample test solution for this hot dog? Yes or No (circle one). AND Why do you say this?

3. What component of the typical HPLC system (like the Agilent 1260 model you used in lab) guarantees that this technique is a highly precise technique when used properly?
4. Would you increase or decrease the time it takes to change the mobile phase gradient from 30% acetonitrile & 70% aqueous buffer to one that is 90% acetonitrile & 10% aqueous buffer if the goal is to elute the more less polar riboflavin with a shorter retention time using a C18 column? And Why?
5. Which of the following mobile phase mixtures, (1) or (2) is:
- a) the more hydrophilic mobile phase? _____
 - b) the more lipophobic mobile phase? _____
 - c) the more hydrophobic mobile phase? _____

Mobile Phase 1: 90% methanol/10% aqueous buffer:

Mobile Phase 2: 20% methanol/80% aqueous buffer

6. Which technique listed below has the best DL for vitamin B12 given the values for the DL shown here? Circle the correct answer.

HPLC, giving a DL = 3.0 $\mu\text{g/mL}$;

Fluorescence, giving a DL = 0.10 $\mu\text{g/mL}$;

Absorbance, giving a DL= 4.5 $\mu\text{g/mL}$.