

Research Projects:

The majority of my research projects involve affinity chromatography. Affinity chromatography uses the interactions of biological ligands. By immobilizing these ligands onto a solid support, an affinity column can be made. These columns are capable of extracting analytes out of solution and/or measuring binding project. Brief descriptions of some basic projects can be seen below.

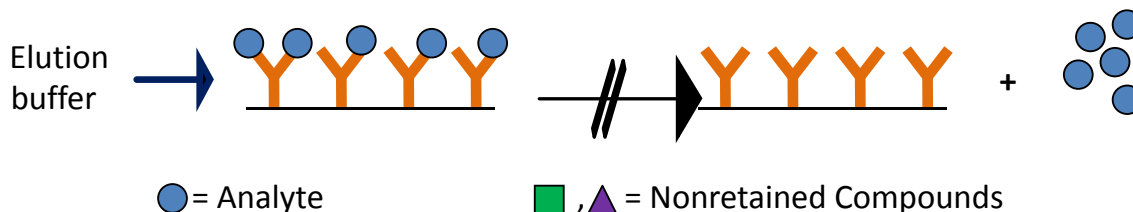
1) Immunoassay Development

Is there something in the environment that you would like to test? By immobilizing antibodies specific for that compound, you can create an affinity support which is capable of extracting that compound from a sample. Once extracted, the contaminant can be quantified using high performance chromatography. A schematic of this process is shown below:

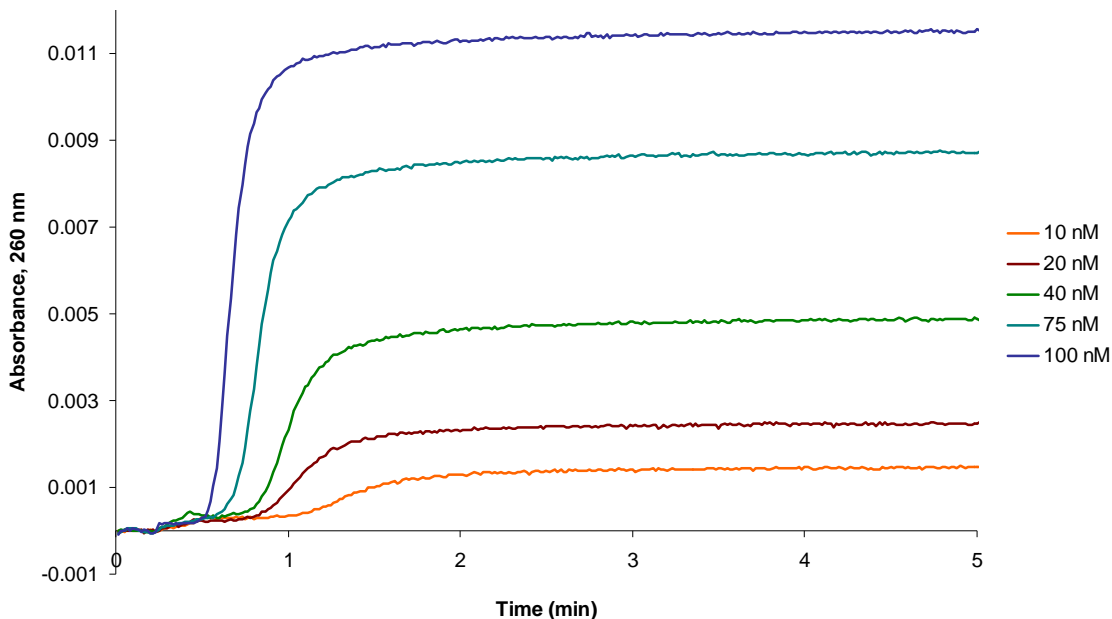
Step 1: Inject sample onto antibody column



Step 2: Elution and detection of retained analyte



2) Enzyme-Substrate Binding Studies In this project an enzyme is immobilized onto a solid support and the enzyme's substrate is passed through the column. As the substrate is applied to the column, it binds to the enzyme. As the enzyme binding sites are filled, the substrate begins to elute from the column creating a breakthrough



column (see figure below). Based on the time required for this breakthrough curve to appear when various concentrations of substrate are applied, a binding constant for the enzyme-substrate interaction can be determined. This project is in collaboration with Dr. Frank Kovacs.

3) Immunoextraction using MagnaBind® Beads

This project also makes use affinity ligands, but this time the antibodies are immobilized onto tiny magnetic particles. These particles can then be mixed with a solution containing an analyte and antibodies bind the analyte. The particles are then removed using a strong magnet. This technique is important in developing true 'blanks' for standard curve development and eliminates the need for standard addition.

4) Chemical Education

I am also interested in developing labs for analytical/instrumental chemistry lab courses. These projects vary from semester to semester and utilize various equipment in the department.

If you are interested in doing research in my group, please contact me!