EMORY UNIVERSITY

Emory Glycomics and Molecular Interactions Core

Emory Integrated Core Facilities

Welcome to EGMIC Monthly Newsletter Jun 2025

https://www.cores.emory.edu/egmic/news/

Technology Highlight

Optimize your SPR assays on Biacore X100

Our core facility houses the **Biacore X100** from Cytiva. Surface Plasmon Resonance (SPR) is considered the gold standard for studying molecular interactions. In an SPR assay, a ligand is immobilized on a sensor chip, and analytes at varying concentrations are flowed over the surface. The resulting binding affinity is characterized by two key parameters: the **on-rate** (driven by molecular recognition) and the **off-rate** (governed by complex stability). This detailed kinetic analysis provides valuable insights into molecular interactions and biological processes.

On April 25, we hosted a one-hour Zoom seminar featuring Dr. Eric Roush, a Field Application Scientist from Cytiva. He shared valuable insights with our Biacore users on troubleshooting and optimizing SPR assays. Here are some key tips from his presentation:

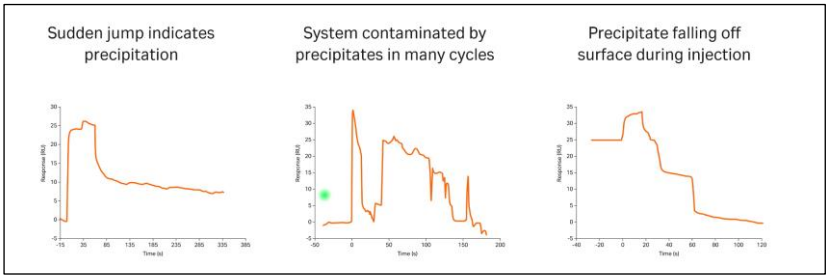
(1) To design the reference surface
   a. Unmodified surface is acceptable, or immobilize the surface with "dummy" ligand, a protein that doesn't bind the analyte
   b. To reduce non-specific binding from the analyte, decrease the negative charge on the surface or immobilize the capture molecule to the reference surface

(2) Dealing with nonspecific binding
   a. A modified buffer with additional salt, detergent, pH, soluble carboxylmethyl dextran.
   b. An alternative sensor surface.
   c. A different blocking reagent likr ethylenediamine or PEG-amine.
   d. Check analyte quality (aggregates and contaminants).

(3) Analyte binding assessment: reasons of why responses are lower than expected
   a. Low affinity interaction (test higher concentration)
   b. Ligand purification needed
   c. Ligand activity low (avoid freezing and thawing)
   d. Binding site affected by coupling method

(4) Analyte binding assessment: reasons of why responses are higher than expected
   a. Nonspecific binding (check the reference)
   b. Aggregation (centrifuge stock prior the dilution)
   c. Stoichiometry is not correct
   d. Indiscriminate binding (low affinity sticking onto the ligand)

(5) Unexpected sensorgram: check sample quality



Cytiva sells different type of sensor chip and capture kits. Visit their website for more details and application note.

GST Capture Kit for GST-fusion proteins

His Capture Kit for His-tagged proteins

Sensor Chip NTA for His-tagged proteins

Biotin CAPture Kit for reversible capture of biotinylated molecules

Sensor Chip SA for irreversible capture of biotinylated molecules

Mouse Antibody Capture Kit for Mouse IgG antibodies

Human Antibody Capture Kit for Human IgG antibodies

When judging your data, compare observed response with the theoretical Rmax

$$R_{max} = (MW_A / MW_L) * R_L * S_m$$

R_L = Immobilization level
MW_A = Molecular weight of analyte
MW_L = Molecular weight of ligand
S_m = Stoichiometric ratio

New and upcoming event

New staff

Welcome Golden Chen

Golden joined our core facility as a Research Specialist Lead in May. He will be assisting with general laboratory operations, instrument maintenance, service projects, and training. Golden earned his B.S. in Chemistry from Georgia State University. Before joining us, he worked at a biotechnology company, where he focused on glycan purification using HPLC and structural analysis using mass spectrometry.

Please say hello when you see him around, and feel free to reach out if you need assistance while using our facilities!

Website update

LCMS application notes in the "Resources" section

As part of our core optimization efforts, we have updated several sections of our website. New LC-MS application notes have been added under **"Resources" → "Method and Application Notes"**. These notes provide workflow guidelines and instrument settings to help you effectively use LC-MS for analyzing various sample types, including proteins, peptides, glycopeptides, glycans, oligonucleotides, lipids, and small molecules.

https://www.cores.emory.edu/egmic/resources/methods.html

LC-MS conference

73rd Conference on Mass Spectrometry and Allied Topics, June 1-5, 2025

This year annual conference for American Society for Mass Spectrometry (ASMS) will be held in Baltimore from June 1-5, 2025. Our scientific director, Dr Blaine Roberts has been invited to speak in this conference.

https://asms.org/conferences/annual-conference/annual-conference-homepage

LC-MS Conference

2025 AMS Conference, July 20-23, 2025

This biennial conference for Advancing Mass Spectrometry (AMS) for Biophysics and Structural Biology will be held locally in Georgia Tech, from July 20-23, 2025. Our scientific director, Dr Blaine Roberts has been invited to speak in this upcoming conference.

https://advancingms.org/