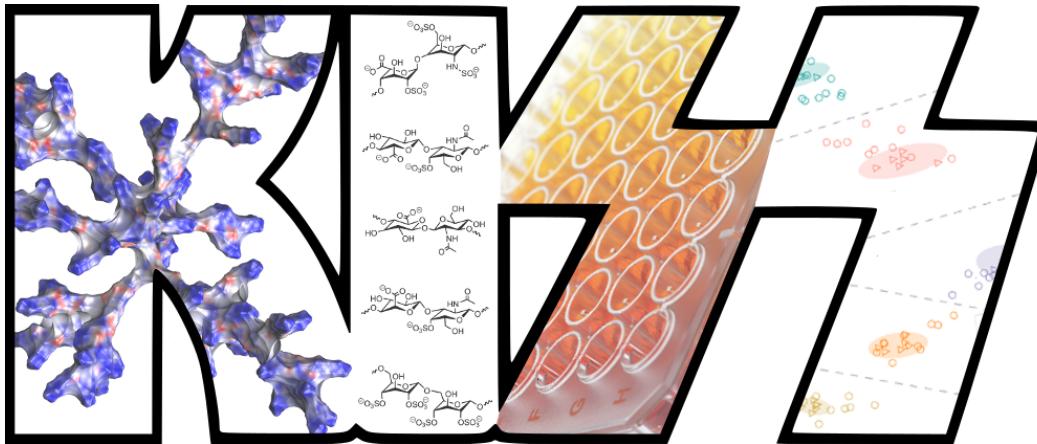
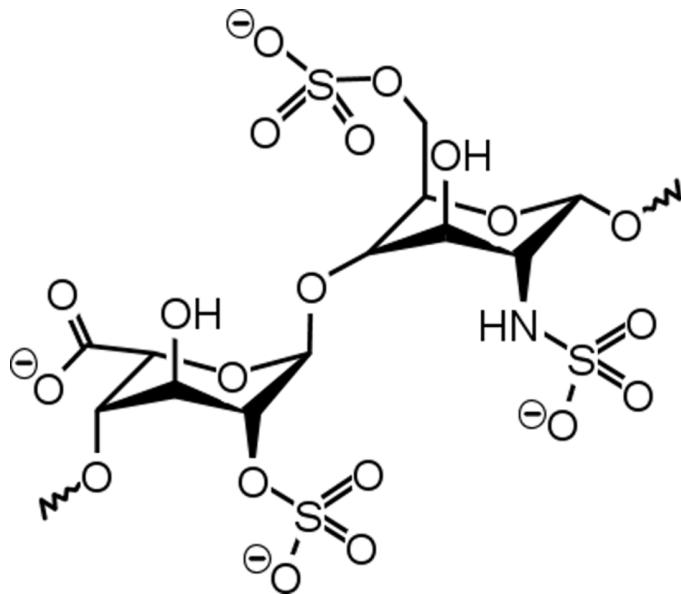


KISS (Keep It Simple, Sensor)



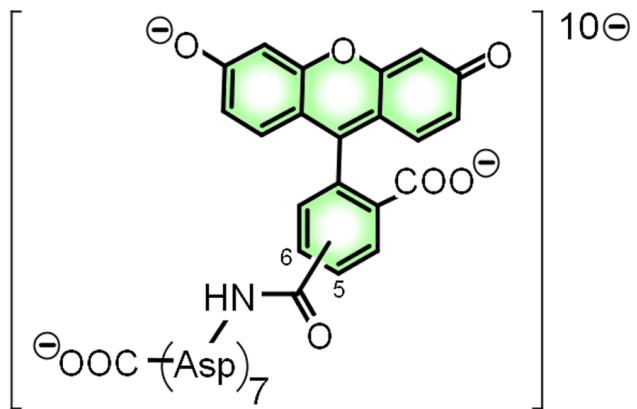
Jean-Patrick Francoia

Monitoring heparin in complex media

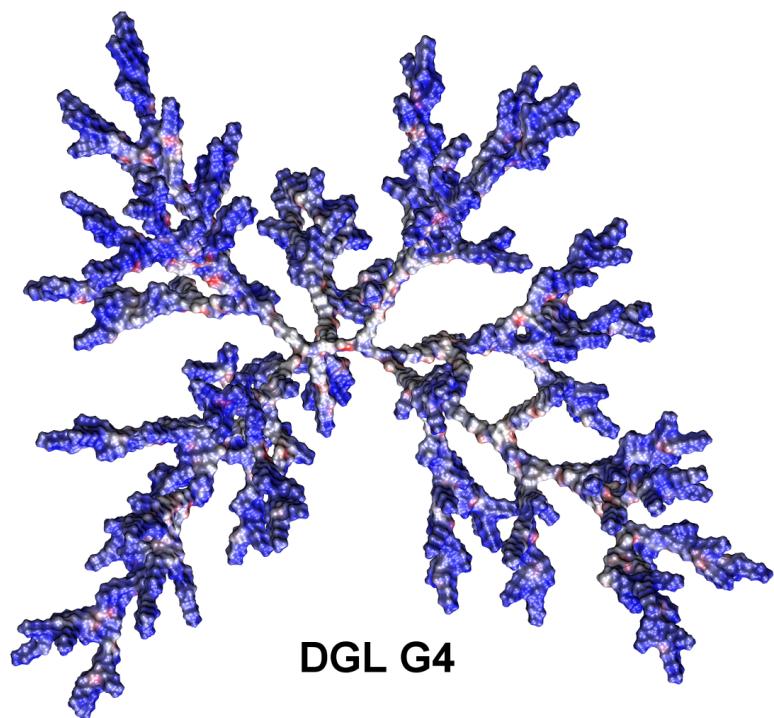


- Widely used as an anticoagulant
- One of the most highly charged polymer in biological fluids (> DNA)

A simple concept

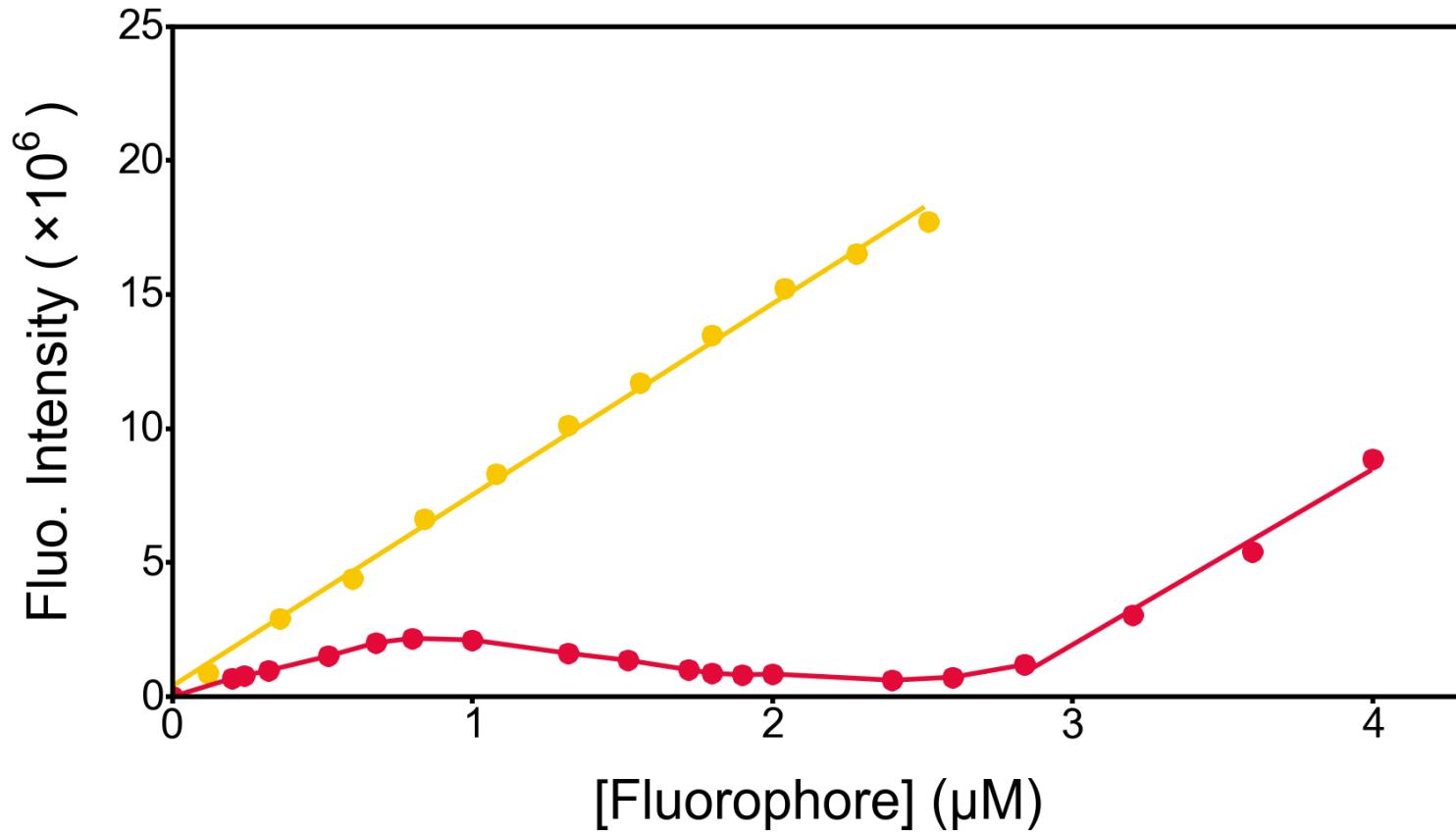


D7CF



DGL G4

Titration of the receptor

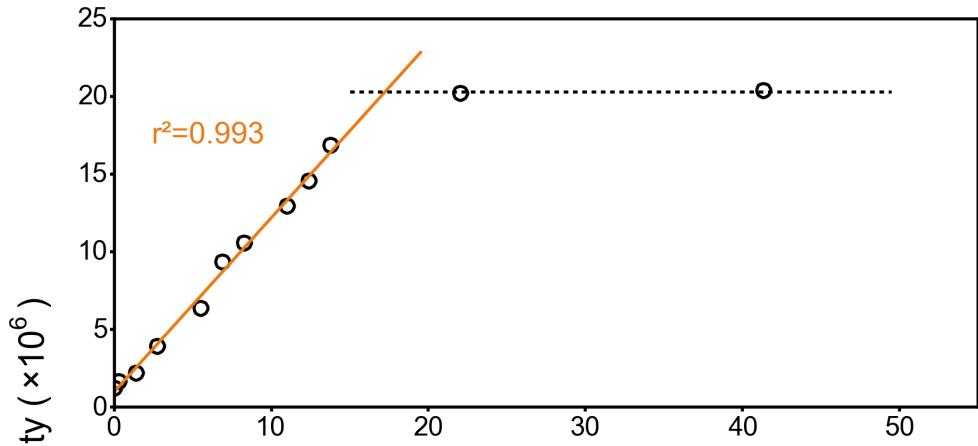


HEPES buffer, 10 mM, pH 7.8

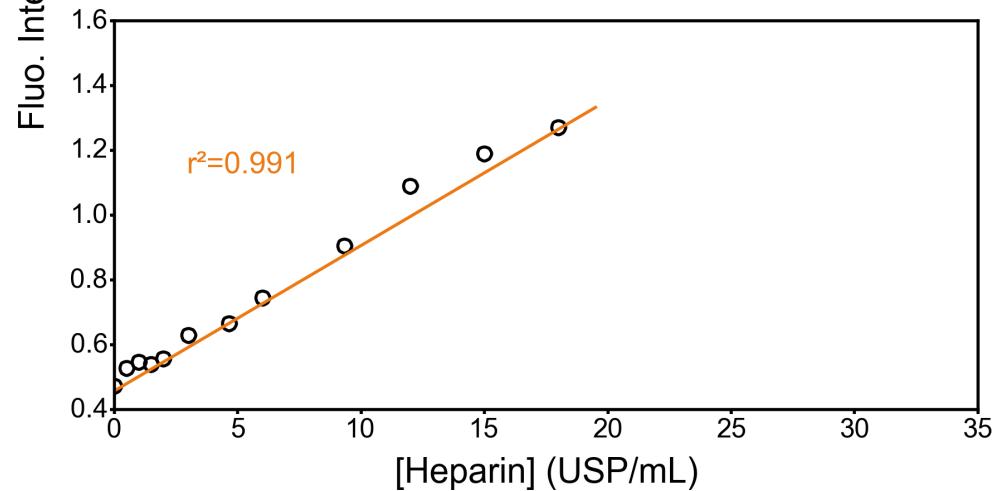
[G4]=55 nM ([Lys]=20 μM)

For the "bell-shaped" profile, see: *Chem. Commun.* 2015, 51, 1953

Heparin titrations

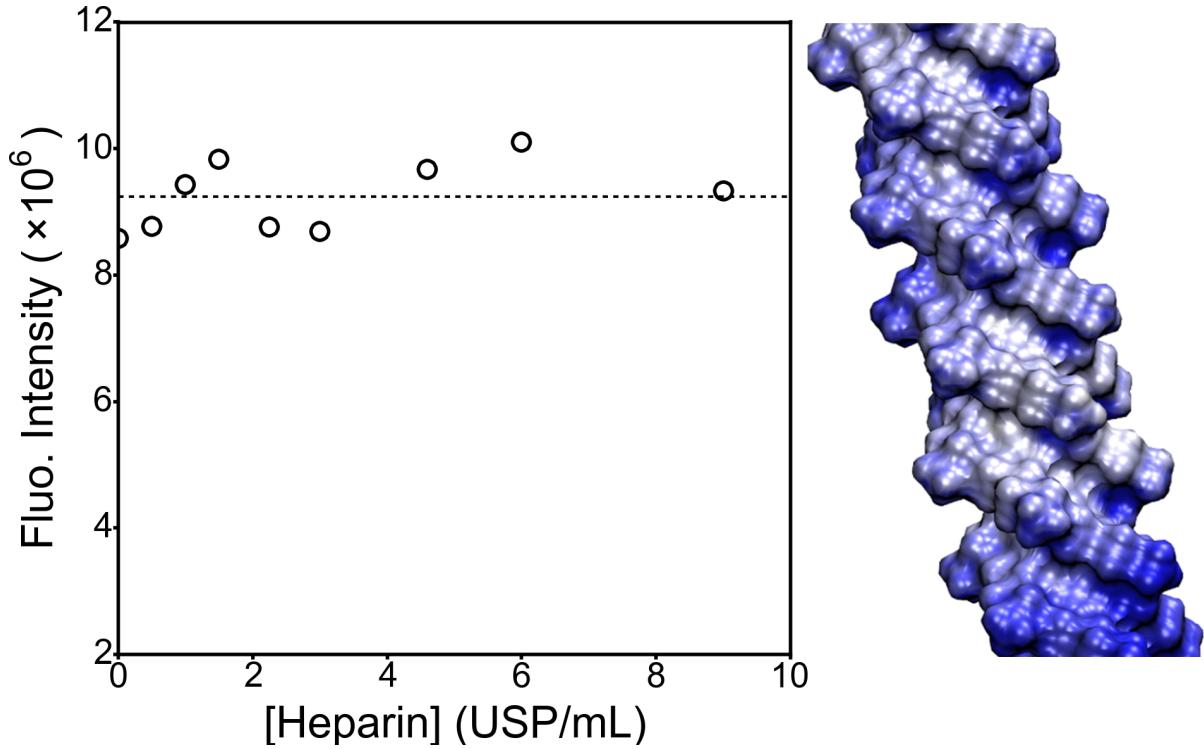


Heparin titration
HEPES, 10 mM, pH 7.8
[G4]=55 nM, [D7CF]= 2.84 μ M



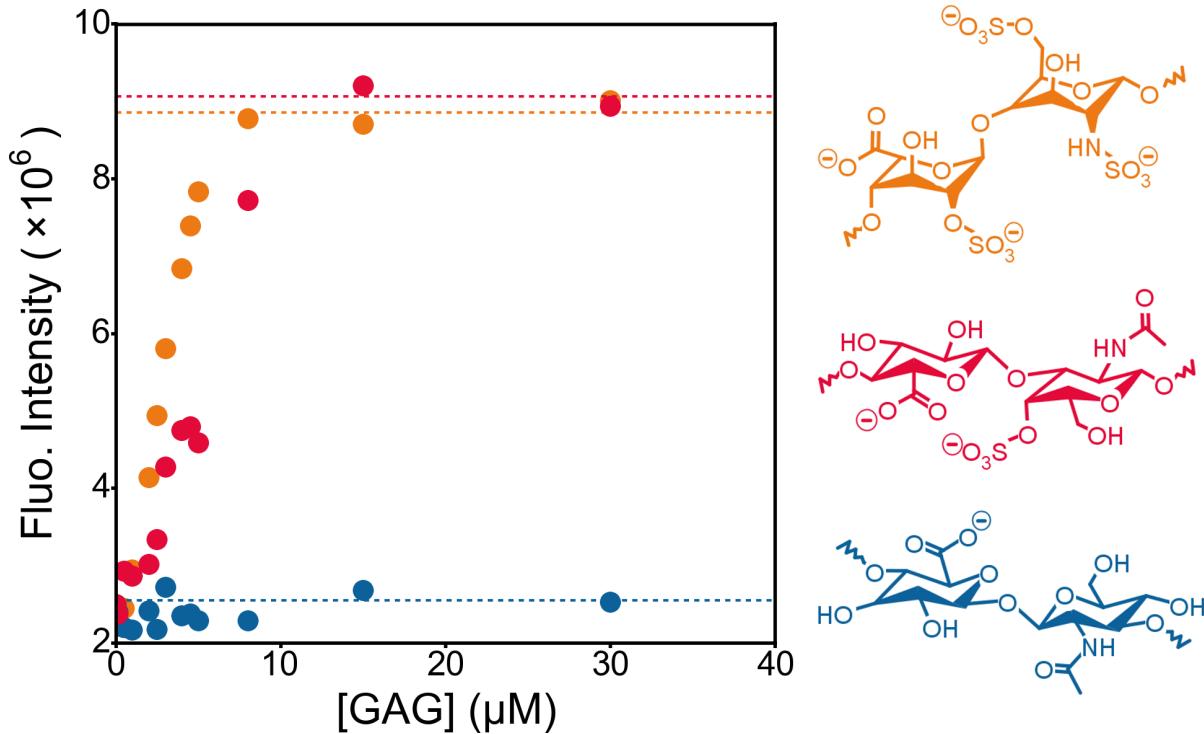
Heparin titration in blood
HEPES, 10 mM, pH 7.8
5% human blood
[D7CF]=1.52 μ M

Control experiment

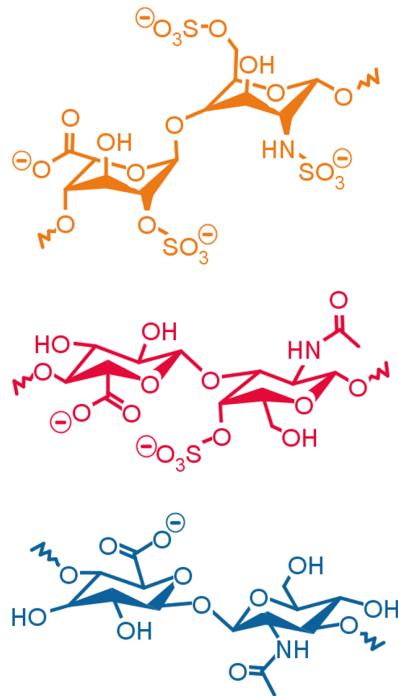


HEPES, 10 mM, pH 7.8, 5% sheep serum
[PLL₄₀₀]=50 nM ([Lys]=20 μ M), [D7CF]=1.52 μ M

Selectivity among GAGs



HEPES, 10 mM, pH 7.8, 5% sheep serum
[G4]=55 nM ([Lys]=20 μM , [D7CF]=1.52 μM)
From top to bottom: heparin, chondroitin sulfate A, hyaluronic acid

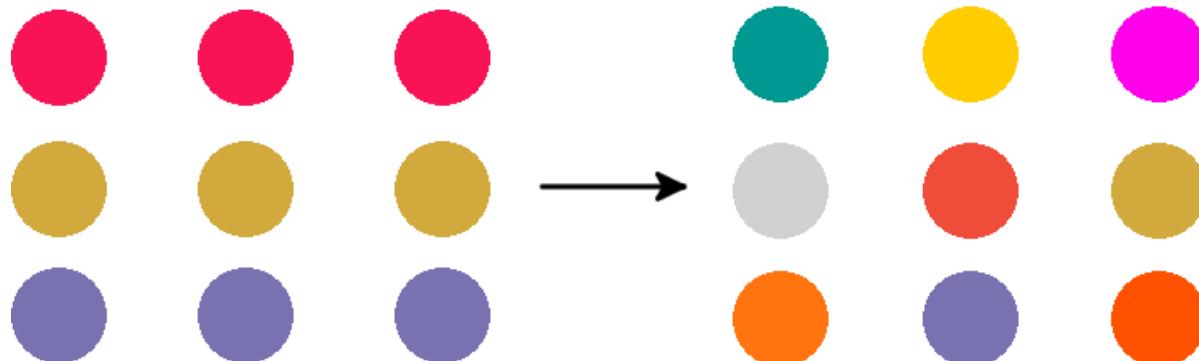


What is a sensor array ?

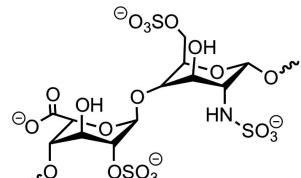
Single analyte



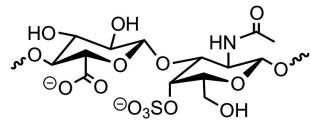
Multiple analytes



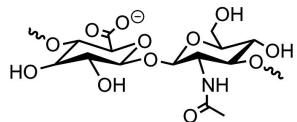
The players



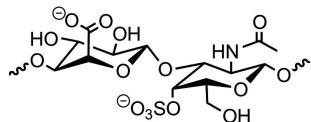
heparin



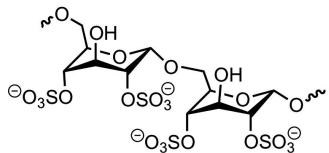
chondroitin sulfate A



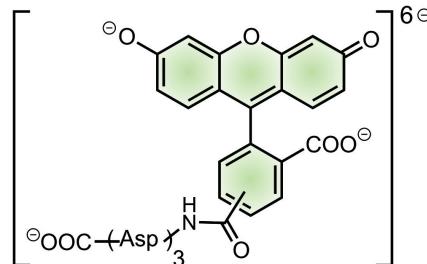
hyaluronic acid



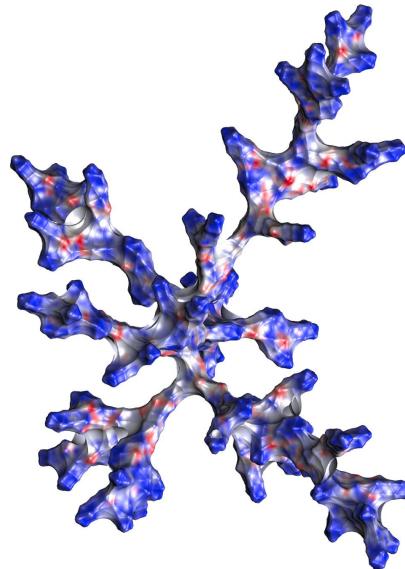
chondroitin sulfate B



dextran sulfate

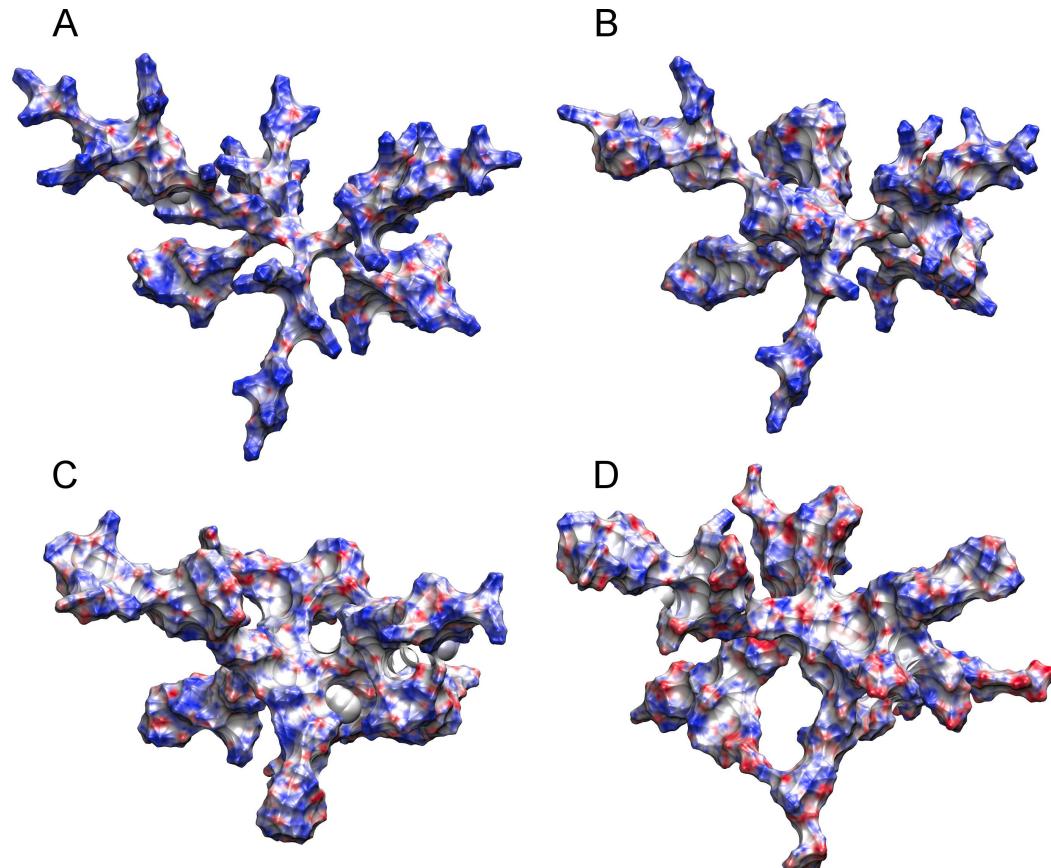


D3CF



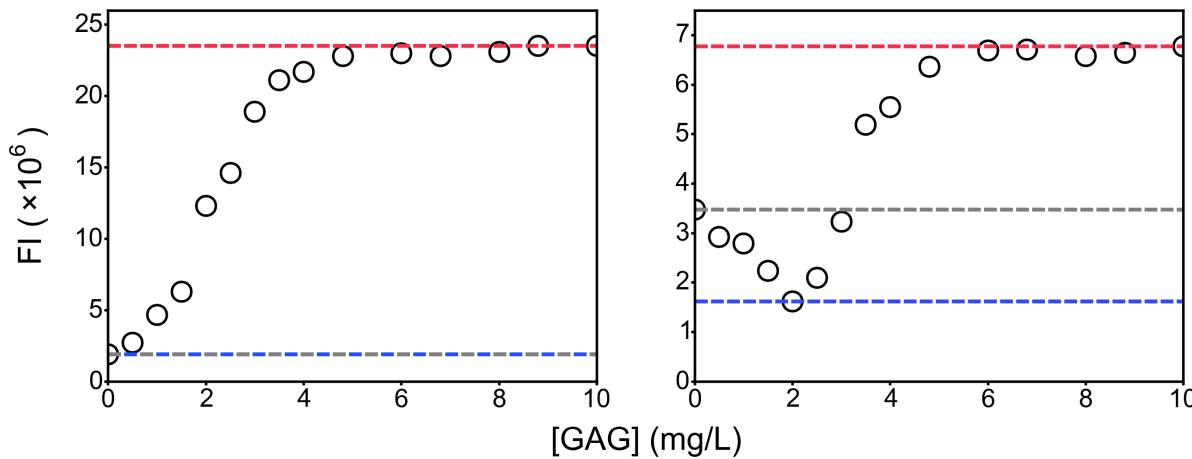
DGL G3

A differential array

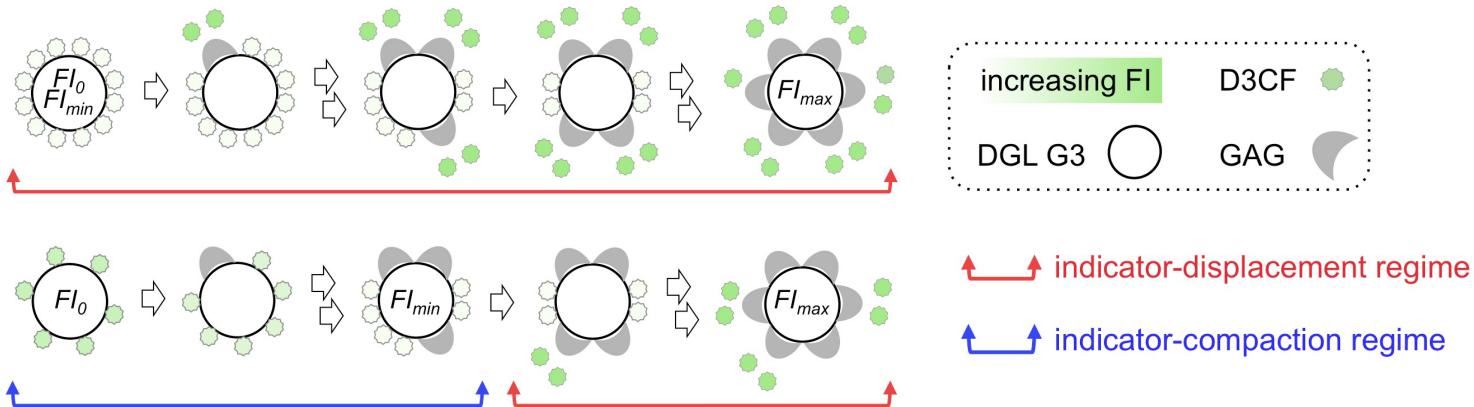


Electrostatic potential maps for G3-D3CF complexes:
A) 25% loading, B) 50% loading, C) 75% loading, D) 100% loading

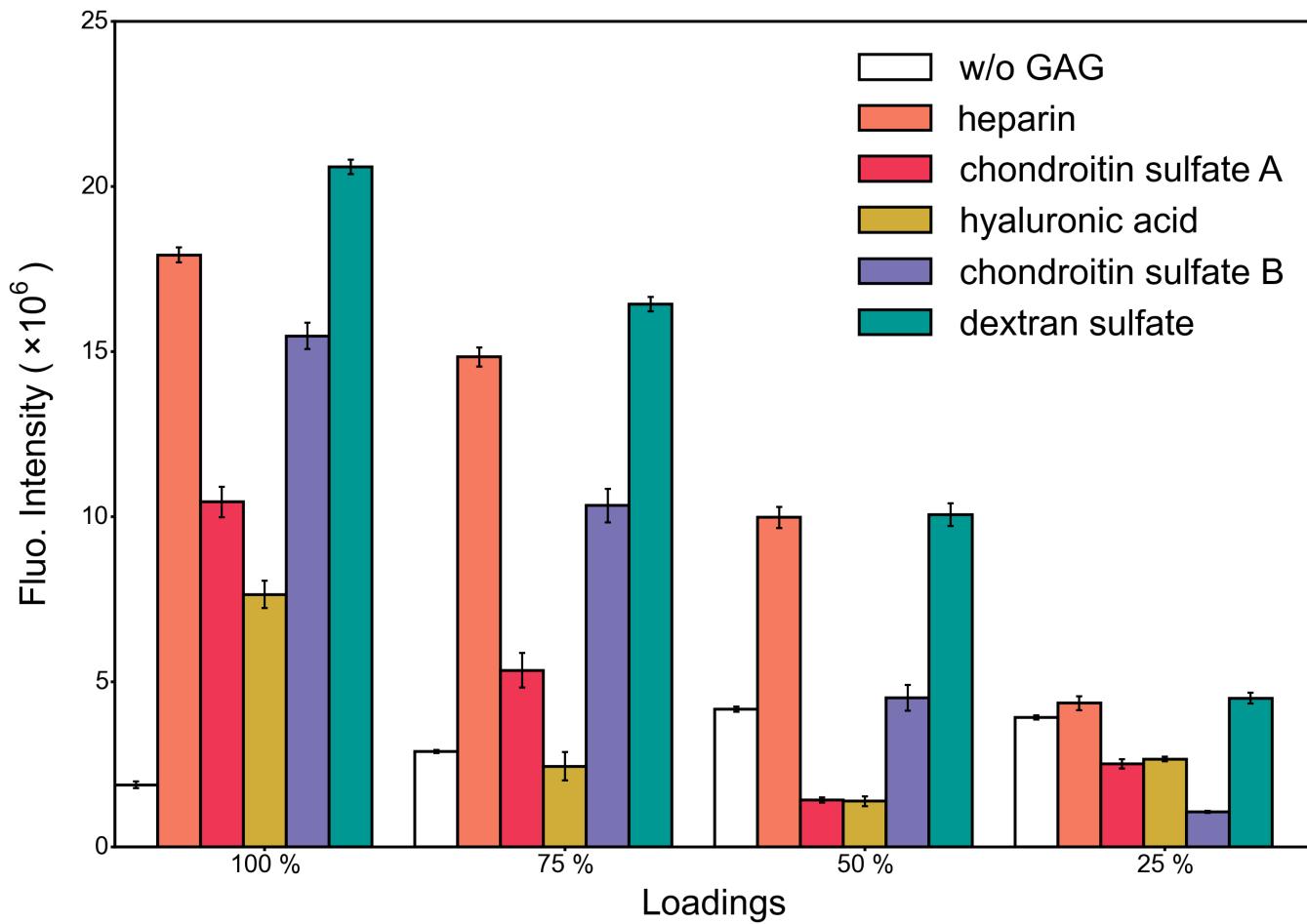
Compaction/displacement-indicator assay



Left: 100% loading, right: 25% loading, HEPES buffer, 10 mM, pH 7.8



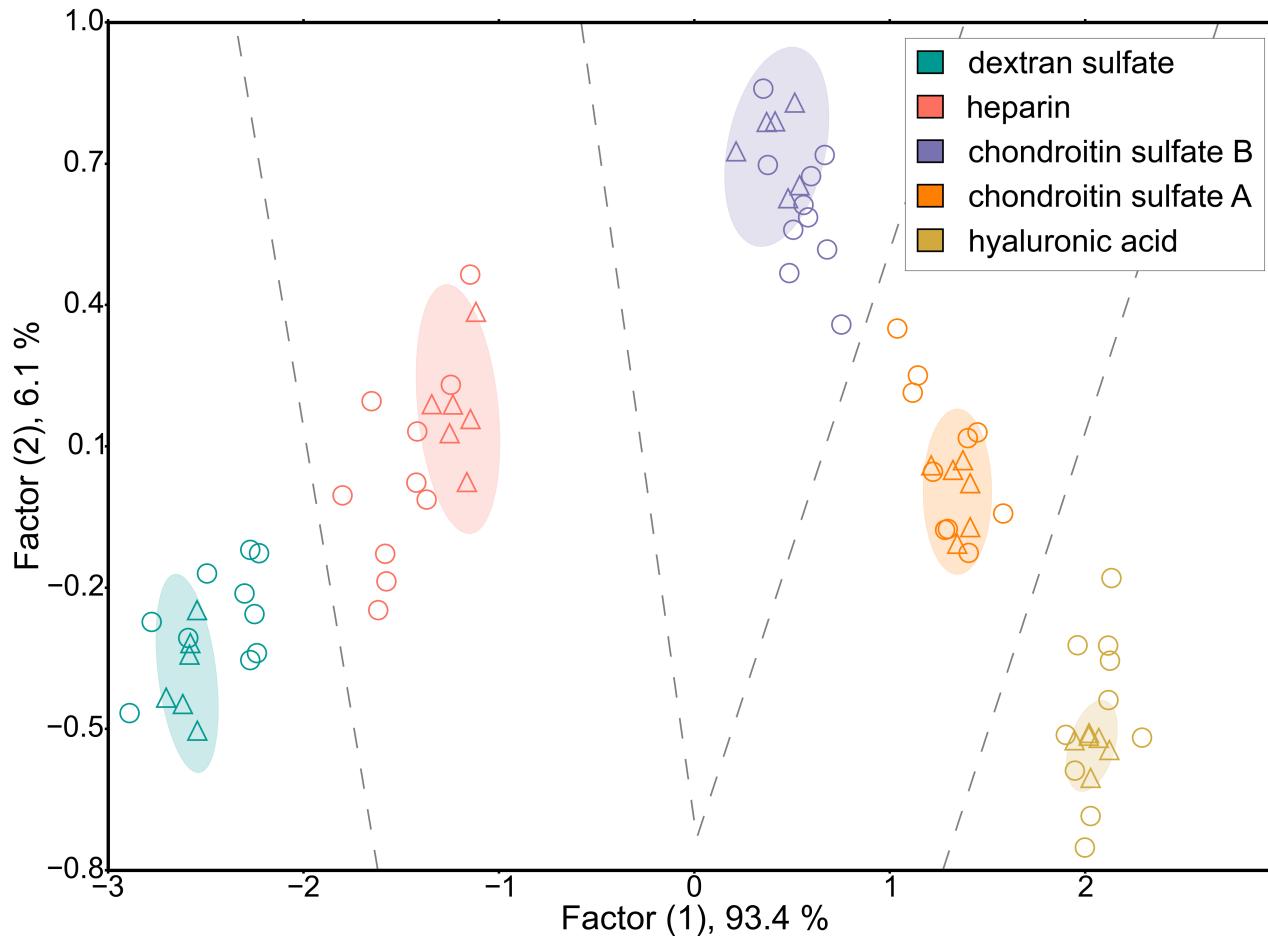
The KISS array in action



10 mM HEPES buffer, pH=7.8

[G3]=163nM ([lysine]=20mM), [GAG]=3.5 mg.mL⁻¹

Linear Discriminant Analysis



Dashed lines: decision boundaries, triangles: training set, circles: blind tests,
ellipses: confidence limits at 99% for the training set

Attempted murder ! Now honestly, what is that ? Do they give a Nobel Prize
for "attempted chemistry" ? Do they ?

Sideshow Bob, The Simpsons (Season 6, Episode 1)