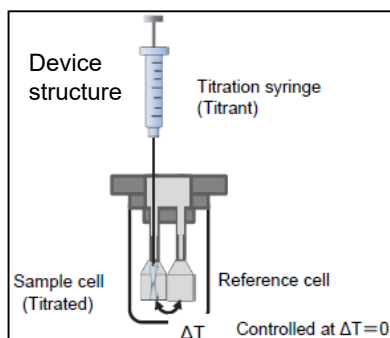


ITC measurements of biomolecular interactions

Isothermal Titration Calorimetry (ITC) measures heat change during biomolecular binding, determining binding constants (K_d), stoichiometry (n), enthalpy (ΔH), and entropy (ΔS). The thermodynamic profile enables prediction of the binding form between biomolecules.



Analyte

Small molecular drugs, Peptides, Nucleic acids, Proteins, Liposomes, etc.

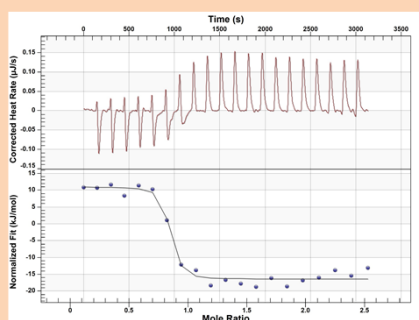
Characteristics

- Determination of the binding form
- No modification such as immobilization and labeling
- No limit on molecular weight
- nM to μ M (K_d) interactions can be measured.

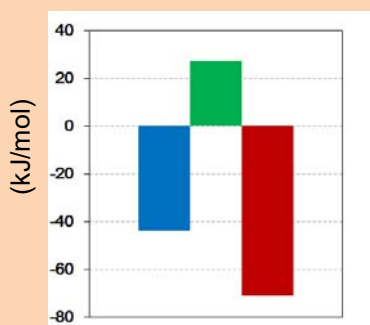
Application

Evaluation of the binding affinity
 Prediction of the binding form
 Drug Screening
 Optimization of lead compounds
 Enzyme kinetics
 Quality control of proteins
 Critical micelle concentration, etc.

1. Melittin and Calmodulin



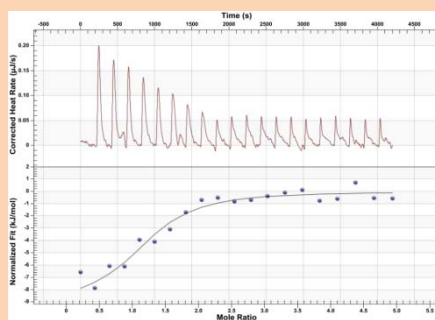
| | |
|-----------------------|----------------------|
| K_d (mol/L) | 2.1×10^{-8} |
| n | 0.8 |
| ΔG (kJ/mol) | -43.8 |
| ΔH (kJ/mol) | 27.4 |
| $-T\Delta S$ (kJ/mol) | -71.2 |



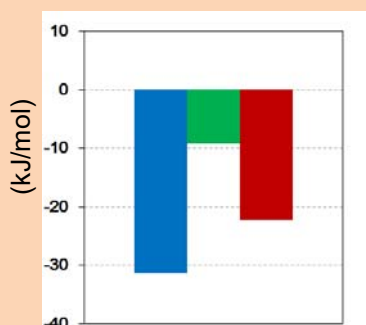
Superior ΔS

Hydrophobic interactions

2. Ibuprofen and Human Serum Albumin

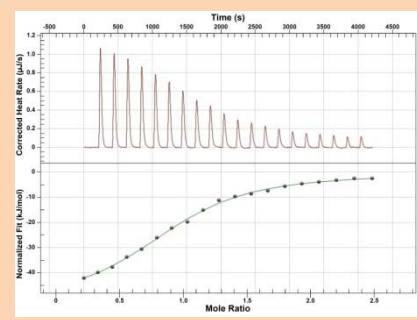


| | |
|-----------------------|----------------------|
| K_d (mol/L) | 3.2×10^{-6} |
| n | 1.2 |
| ΔG (kJ/mol) | -31.4 |
| ΔH (kJ/mol) | -9.2 |
| $-T\Delta S$ (kJ/mol) | -22.2 |

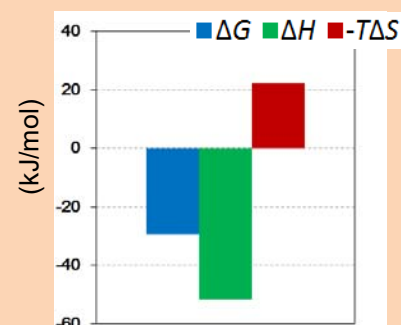


Both contribution

3. Tri-N-Acetyl glucosamine and Lysozyme



| | |
|-----------------------|----------------------|
| K_d (mol/L) | 6.5×10^{-6} |
| n | 0.9 |
| ΔG (kJ/mol) | -29.6 |
| ΔH (kJ/mol) | -51.7 |
| $-T\Delta S$ (kJ/mol) | 22.1 |



Superior ΔH

Hydrogen bond,
Electrostatic binding