Hydrodynamic Properties of Macromolecules

Proteins are Hydrated in Solution

Viscosity

Force required to slide sheets past each other

Analytical Ultracentrifugation

\[ s = \frac{v}{\omega x} = \omega^2 \left( \frac{d \ln x}{dt} \right) \]
Forces on a Macromolecule in the Ultracentrifuge

Buoyant force
Frictional drag
Force due to radial acceleration

Analytical Ultracentrifugation: New Techniques for Data Analysis


The Sedimentation Coefficient Depends on Molecular Shape

\[
\frac{f}{f_0} = \left( \frac{a/b}{b/a} \right) \left( \frac{b^2 + a^2}{2b^2} \right) \ln \left( \frac{b^2 + a^2}{b^2 - a^2} \right)
\]

Calcium-Induced Conformational Change in Myosin
