PRINT NEATLY *** **USE A BLACK PEN** *** **DO NOT STAPLE**

Course 565/665 Lecture Number ____ Date 4/25/03

Lecturer Dr. Silvia Cavagnero Note Taker Eric Fulmer

Exam #2 Thursday April 19

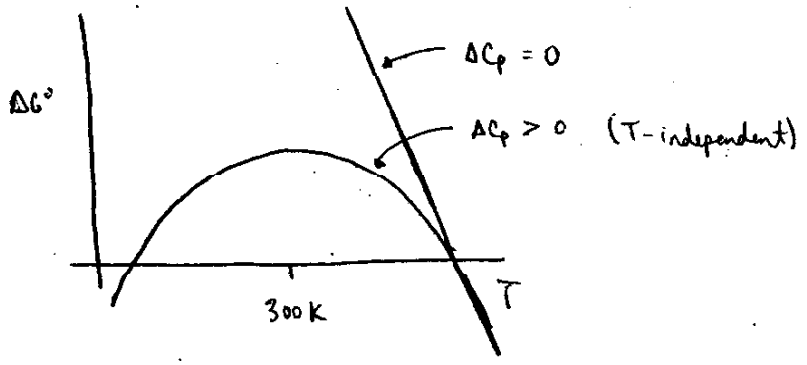
5:00 - 7:00 pm - Room #1315

Chapters 10-16, Protein Stability

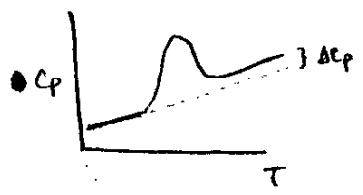
Chapter 12

$\sigma^2 = kT^2 C_v$ Important Chapters: 10, 13

$$\Delta G^\circ = \Delta H_m^\circ \left(1 - \frac{T}{T_m}\right) + \Delta C_p \left(T - T_m - T \ln\left(\frac{T}{T_m}\right)\right)$$



ΔCp (Heat Capacity Change)



As these flatten out, they assume a constant slope.

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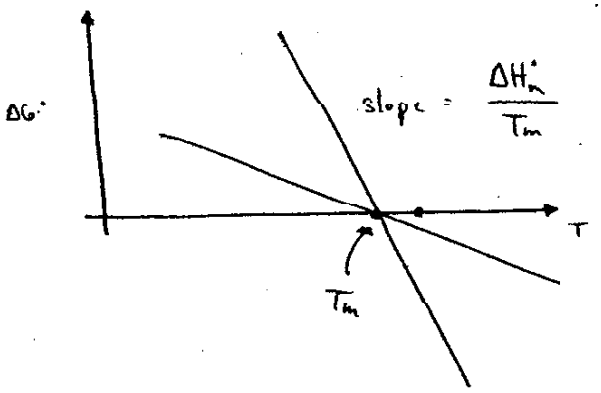
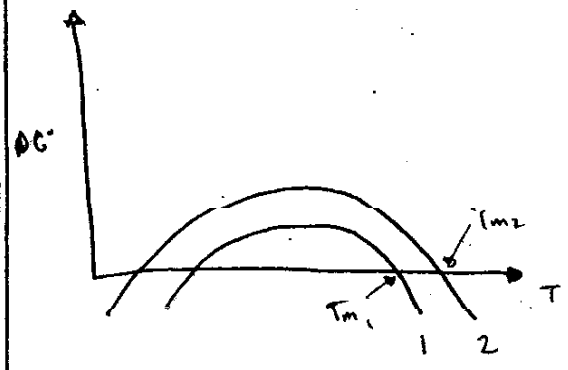
Macromolecule Stability

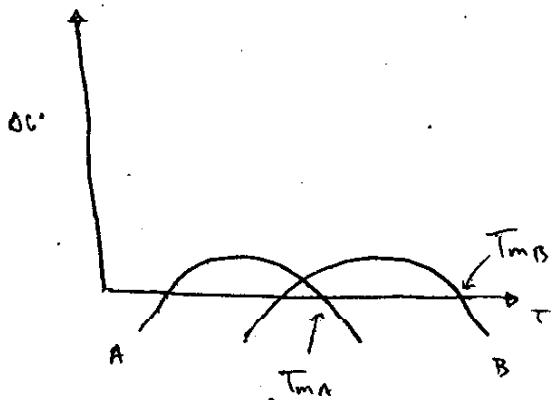


The system with the steeper slope will be a more stable species in terms of folding. At a given T less than T_m, the ΔG° will be much more positive, meaning $-RT \ln K_{eq} = -RT \ln \left(\frac{x_D}{x_N}\right)$

Thus, $x_D < x_N$ and more native state will be present in the steeper sloped species.

Protein Stability Change





The melting T is not necissarily a measure of protein stability. ΔG° is the measure of stability. In the first

plot, we see that species (2) is more stable than (1) for all T, and much more Native state is populated.

In the second plot, however, (A) and (B) have similar maximum Native State populations, but they have different populations at different T.

$N \rightleftharpoons U$ $\boxed{\Delta C_p > 0}$ for proteins.

$$\Delta C_p \equiv C_{pU} - C_{pN} > 0$$

$$C_{p,U} > C_{pN}$$

Hydrophobic Effect

See p. 581-2 for more.