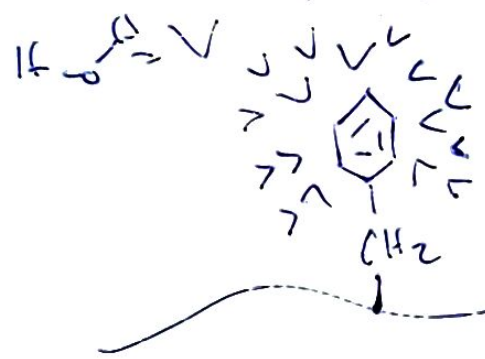




# Chronology of Protein Folding

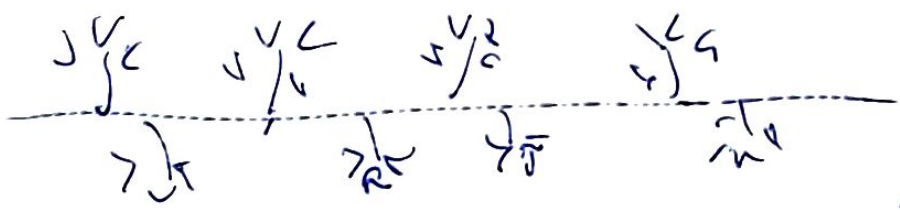
① clathrate cages form around hydrophobic residues.

Clathrate cages are ordered  $H_2O$  molecules that can't move.



ordered shell = water shell  
 ~ 3 molecules thick  
 - get more wobbly the further out you go

Clathrate cage = ↓  $\Delta S$



Water pushes the hydrophobics together  
Hydrophobic effect

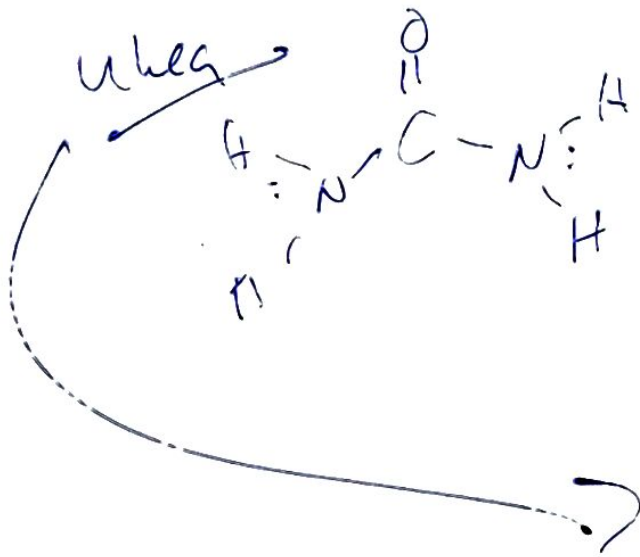
Clathrate cages break as a result of hydrophobic side chains coming together

H<sub>2</sub>O molecules play with other H<sub>2</sub>O molecules,  $\uparrow \Delta S$

Hydrophobic side chains make CDF interactions LOTS of THEM

First Step = Hydrophobic collapse

- (2) Form the Molten Globule State
- (3) Form 2° Structures
- (4) Multiple 2° structures interact to form 3° structures



Chaperone  
 H-bond donor  
 AND  
 H-bond acceptor  
 Breaks than in proteins

1<sup>o</sup> structure holds the information  
 for the 3<sup>o</sup> structure

Transition State  $\Delta G = \Delta G^\ddagger - \Delta G^{\text{TS}}$