

Wednesday,
Oct 7, 2009



The Nobel Prize in Chemistry 2009

"for studies of the structure and function of the ribosome"

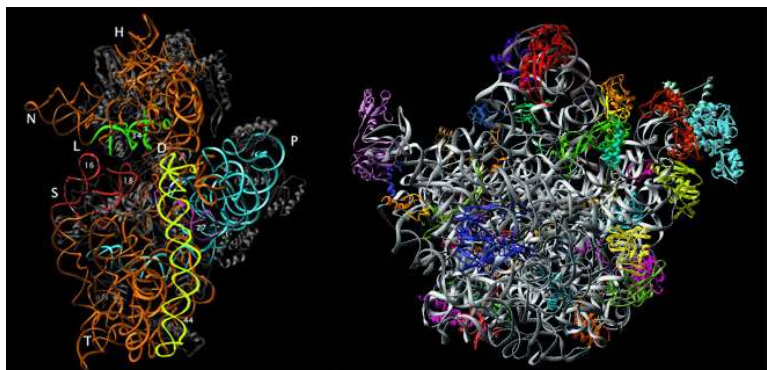


Photo: MRC Laboratory of
Molecular Biology

**Venkatraman
Ramakrishnan**

🕒 1/3 of the prize

United Kingdom

MRC Laboratory of
Molecular Biology
Cambridge, United
Kingdom



Credits: Michael
Marsland/Yale University

Thomas A. Steitz

🕒 1/3 of the prize

USA

Yale University
New Haven, CT, USA;
Howard Hughes Medical
Institute



Credits: Micheline
Pelletier/Corbis

Ada E. Yonath

🕒 1/3 of the prize

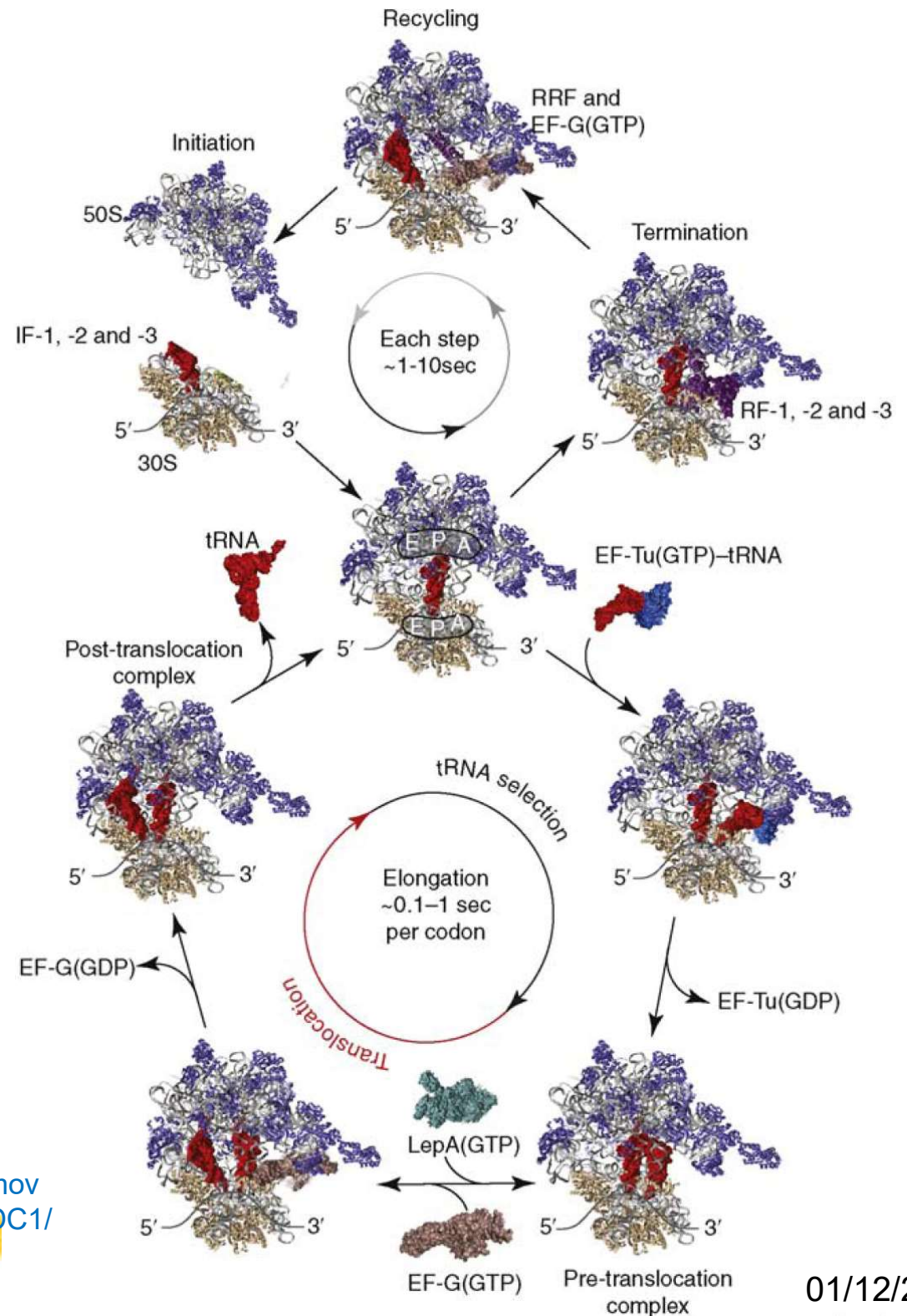
Israel

Weizmann Institute of
Science
Rehovot, Israel



The ribosome: A “big” example for long-range molecular motions

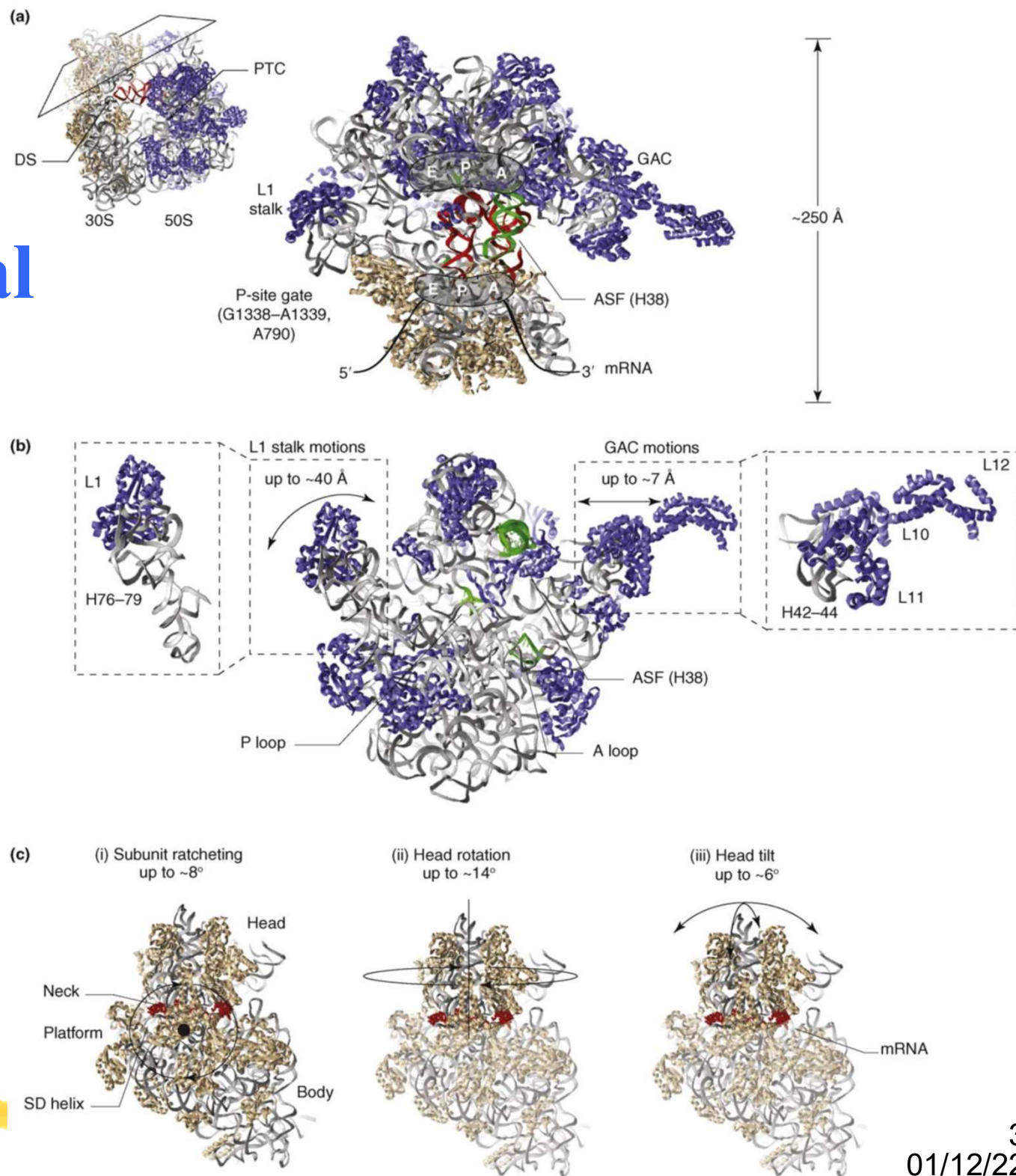
Munro, J.B., Sanbonmatsu, K.Y.,
Spahn, C.M.T. and Blanchard,
S.C. *Trends Biochem. Sci.* 34
(2009) 390-400



http://www.youtube.com/watch?v=q_n0lj3K_Ho
http://www.mrc-lmb.cam.ac.uk/ribo/homepage/movies/translation_bacterial.mov
<http://www.pnas.org/content/suppl/2005/10/17/0503456102.DC1/03456Movie1.mov>

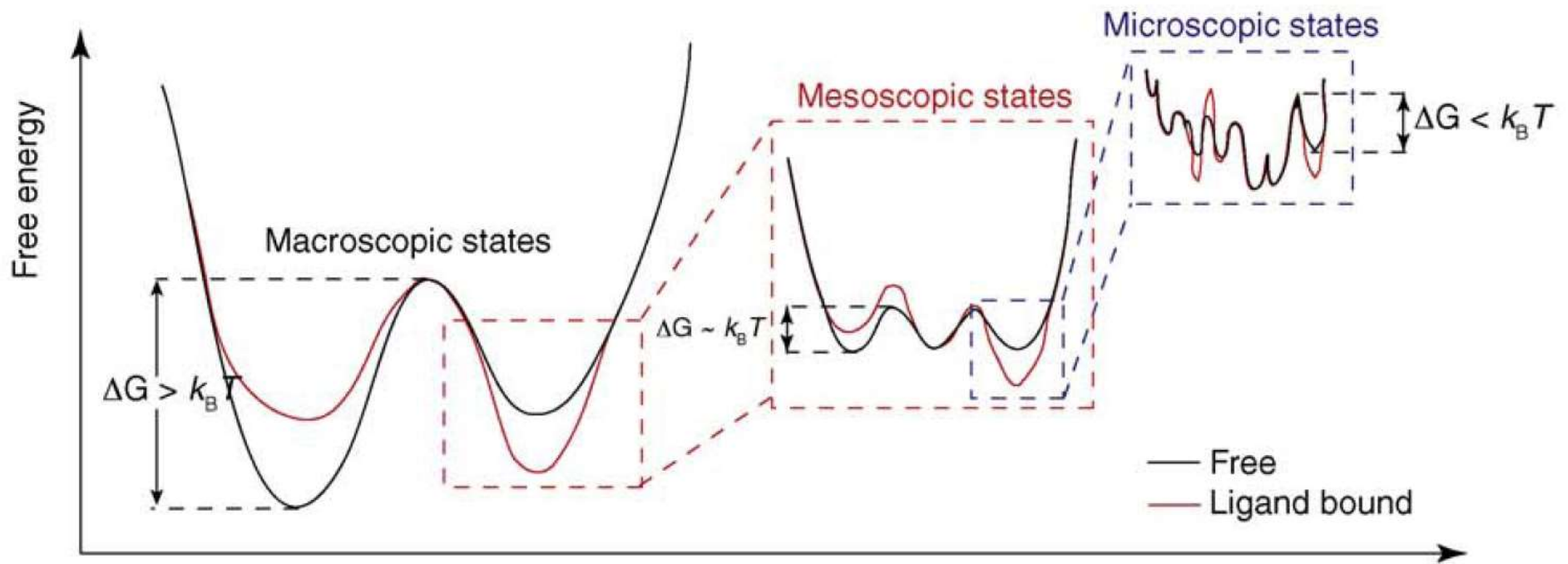
Conformational degrees of freedom

Munro, J.B., Sanbonmatsu, K.Y.,
Spahn, C.M.T. and Blanchard,
S.C. *Trends Biochem. Sci.* 34
(2009) 390-400

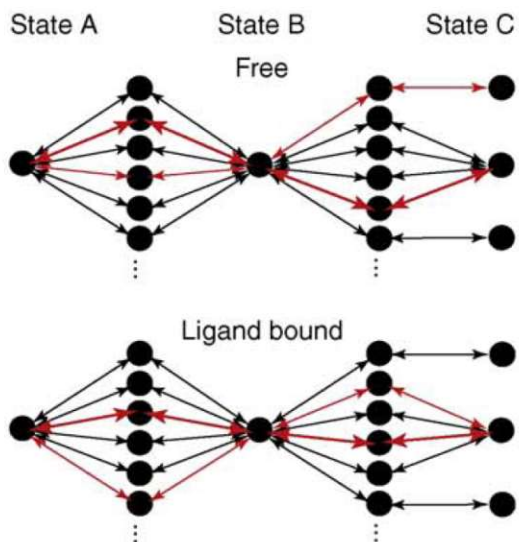


Ligand-induced modulation of a complex folding free energy landscape

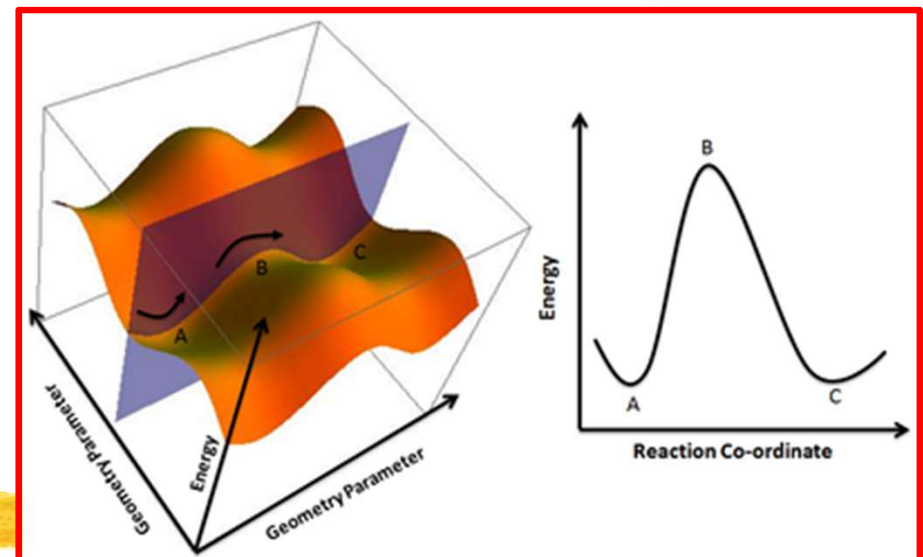
(a)



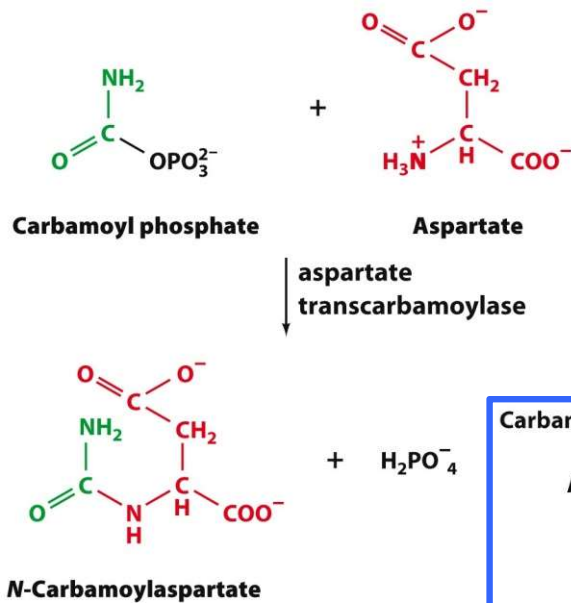
(b)



Munro, J.B.,
Sanbonmatsu, K.Y.,
Spahn, C.M.T. and
Blanchard, S.C. *Trends*
Biochem. Sci. 34 (2009)
390-400



Aspartyl transcarbamoylase (ATCase) as an example of dynamic allosteric control



Unnumbered 13 p475
© John Wiley & Sons, Inc. All rights reserved.

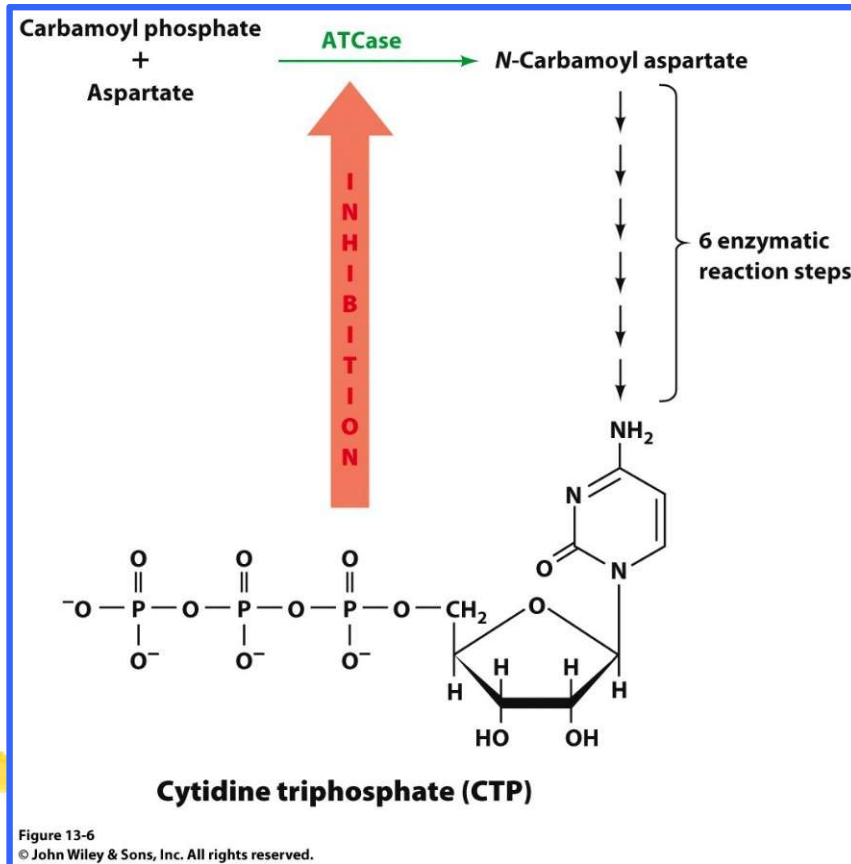
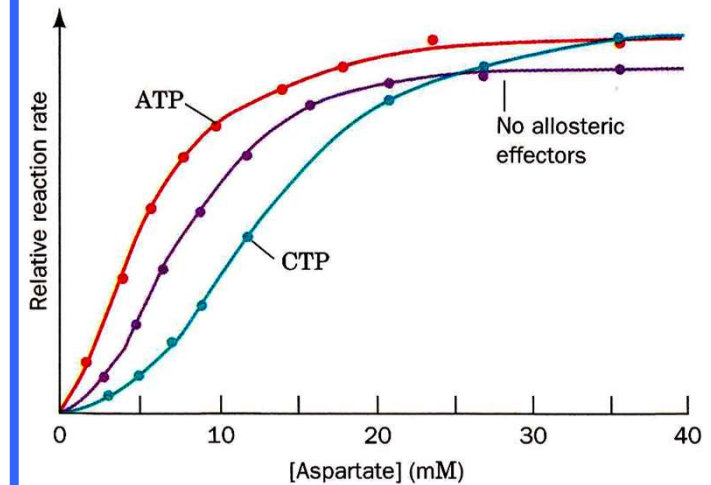


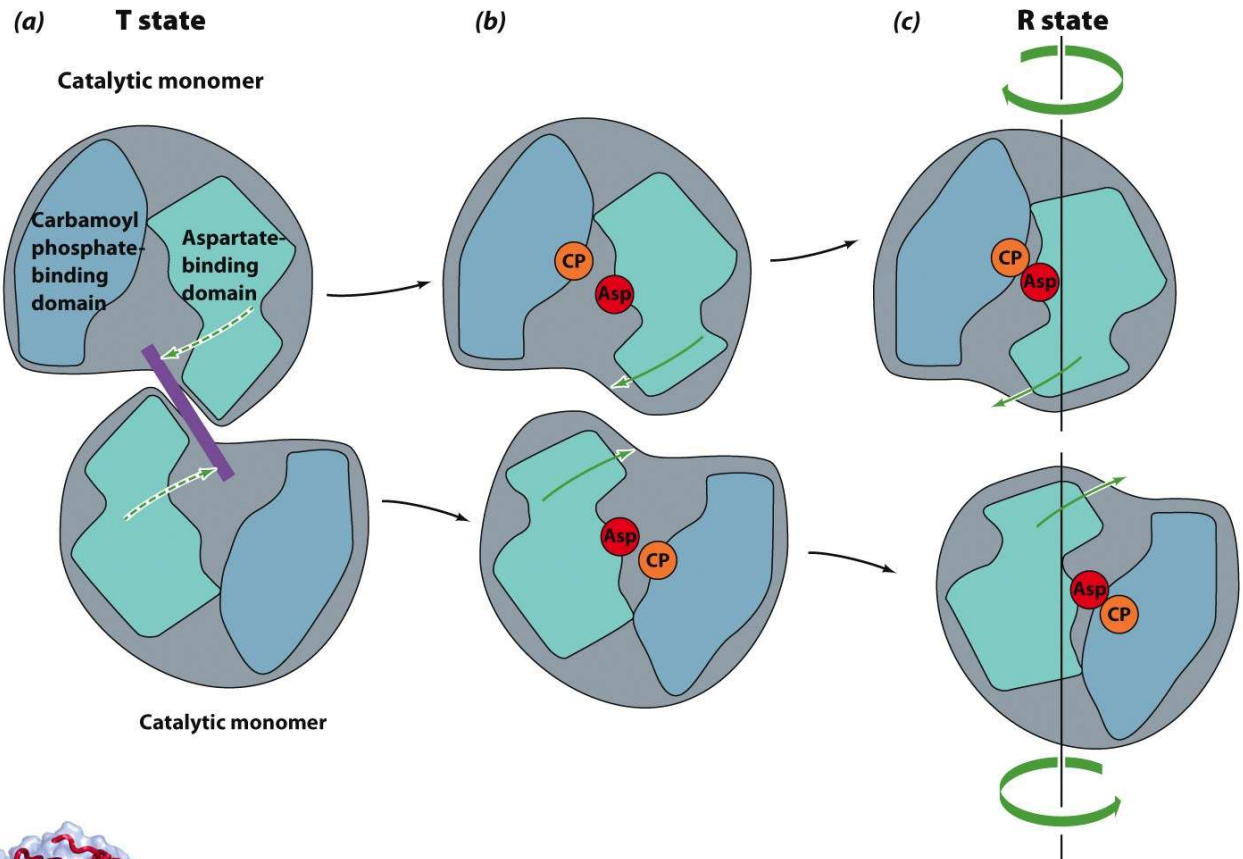
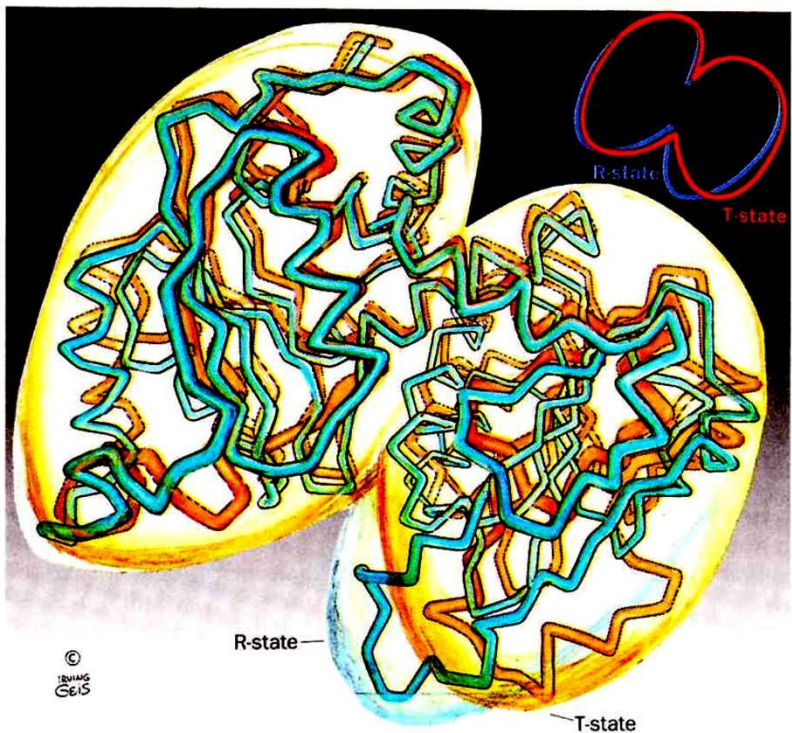
Figure 13-6
© John Wiley & Sons, Inc. All rights reserved.

Inhibition by CTP

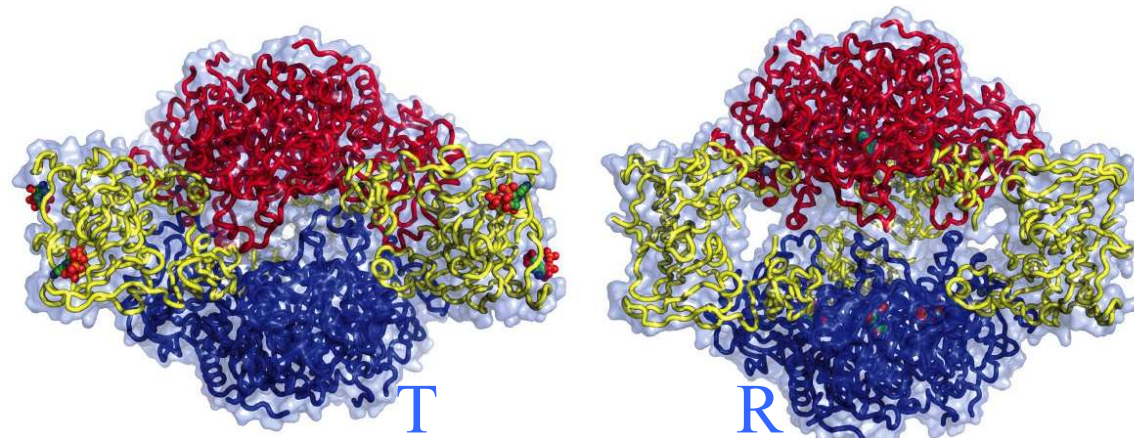


How does this work?

Dynamic long-range interactions (again)!



ig Geis Collection, Howard Hughes Medical Institute. Reprinted with permission.



Holoenzyme =
Catalytic Trimers +
Regulatory Dimers

Nils Walter: Chem 451

