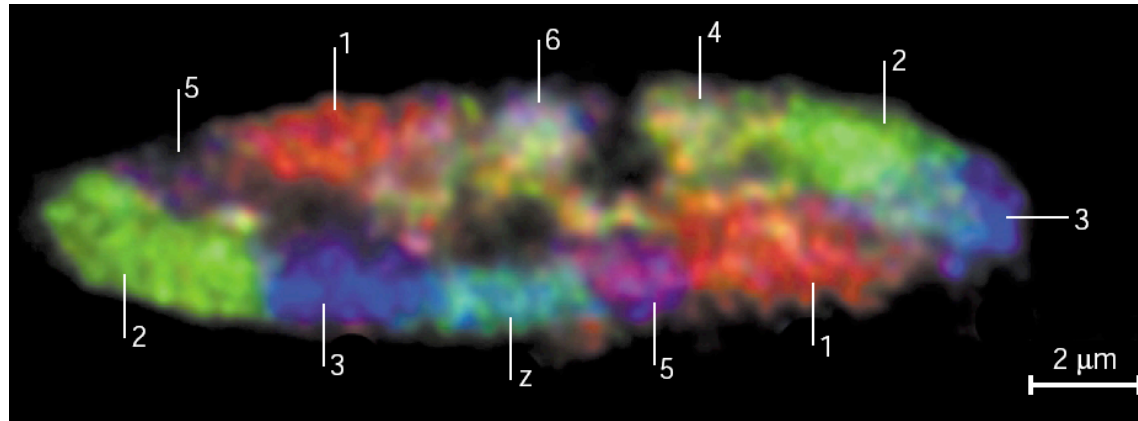


Chromosome Geography Lecture



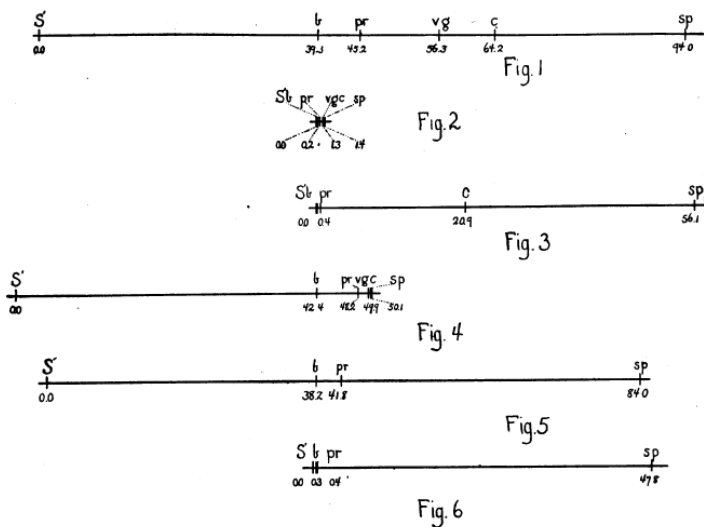
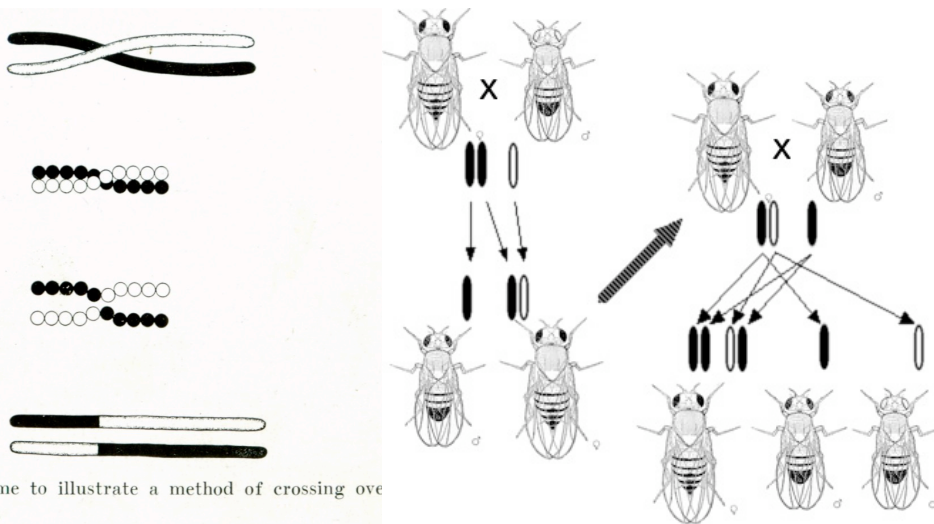
[Open Access Policy Available at](#)

Essay

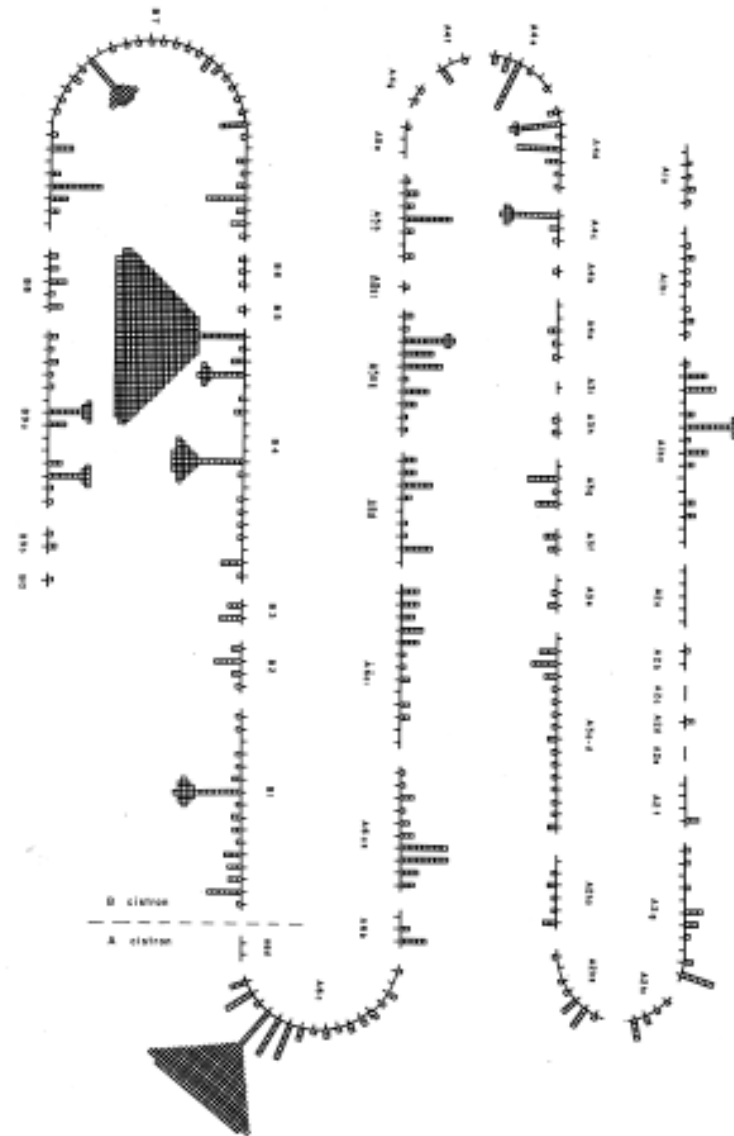
**Mathematics Is Biology's Next Microscope,
Only Better; Biology Is Mathematics' Next
Physics, Only Better**

Joel E. Cohen

Chromosome Geography @ Caltech

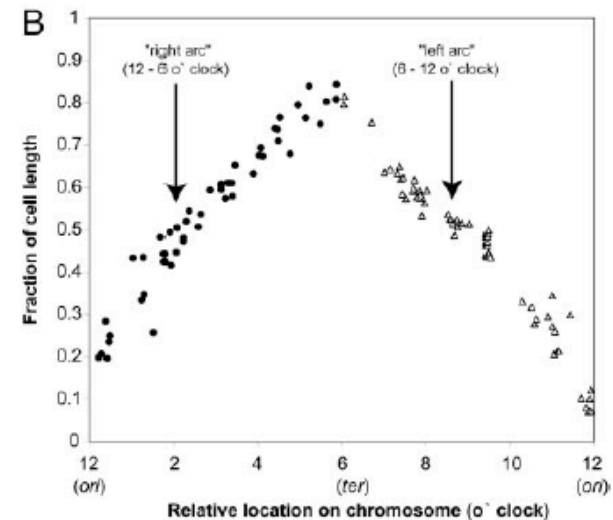
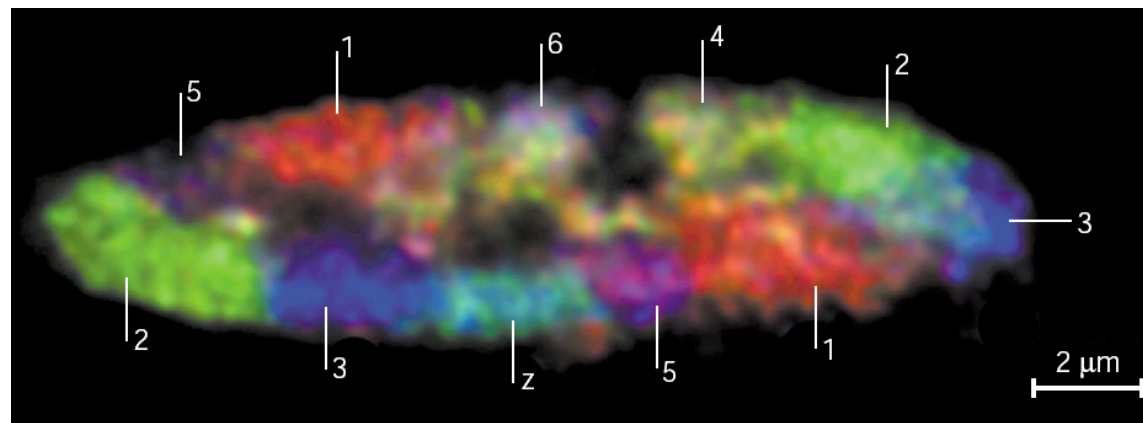
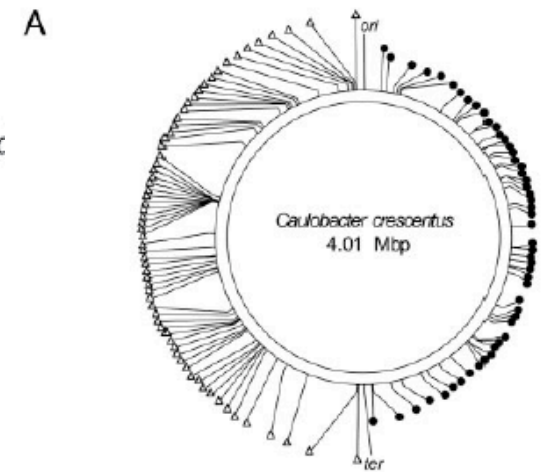
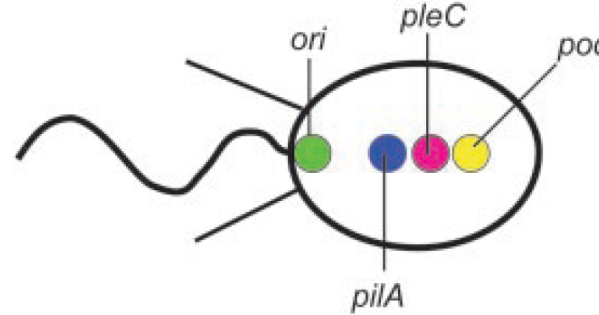
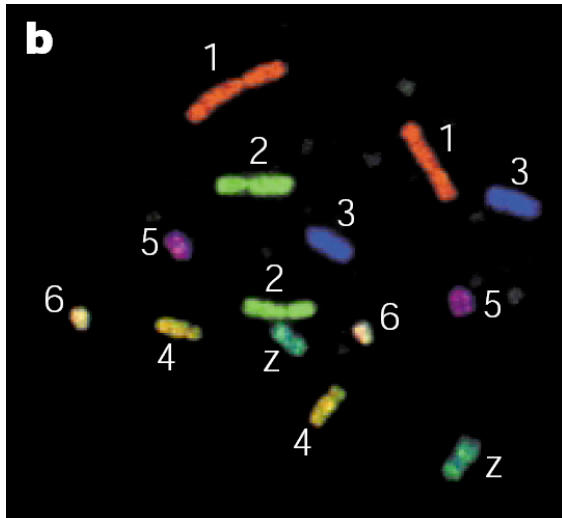


Sturtevant and Morgan



Benzer

Chromosome Geography: Genomic vs. physical position



Cremer and Cremer

Lucy Shapiro

Fluorescence In-Situ Hybridization (FISH)

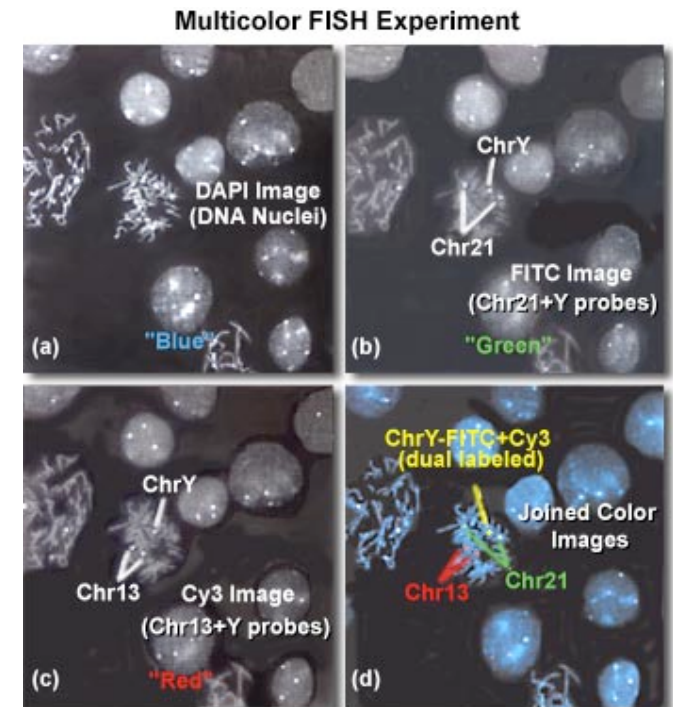
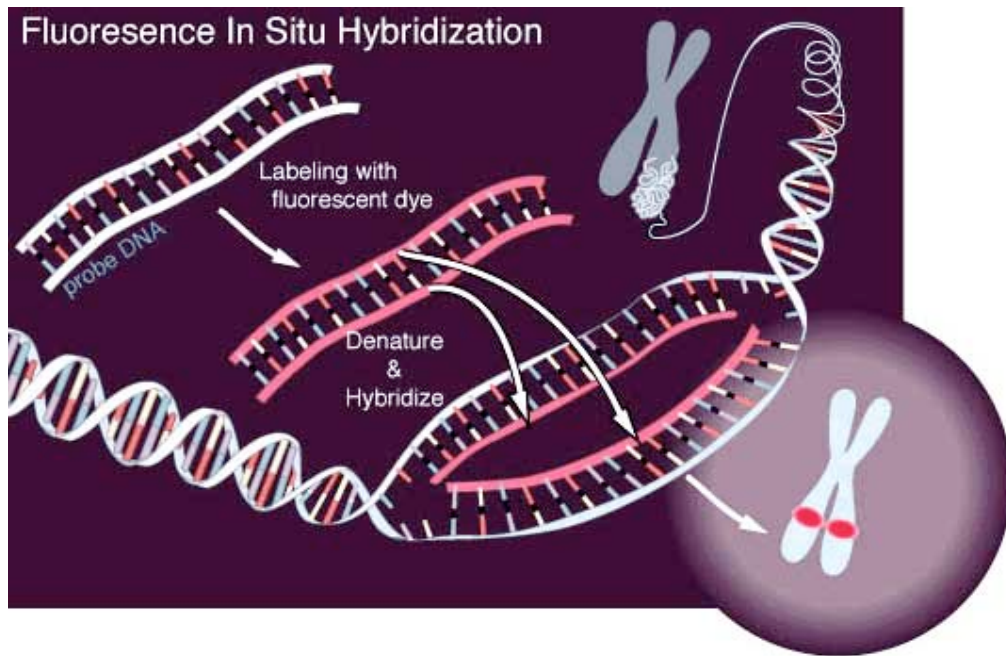
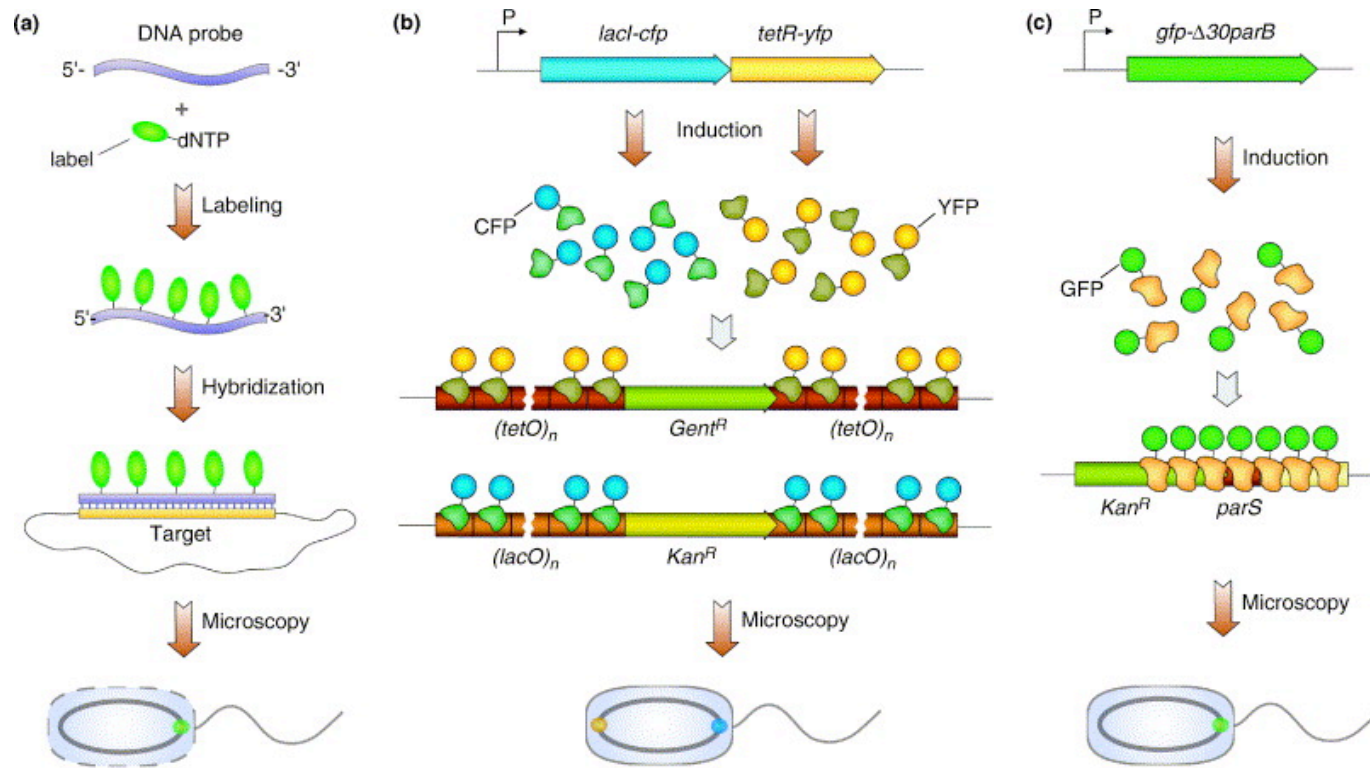


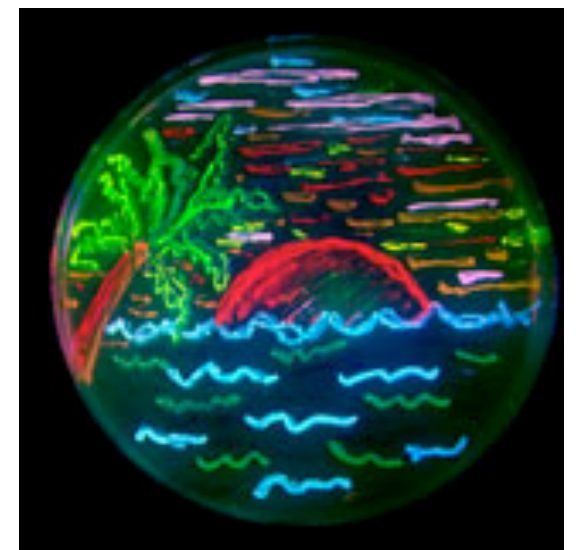
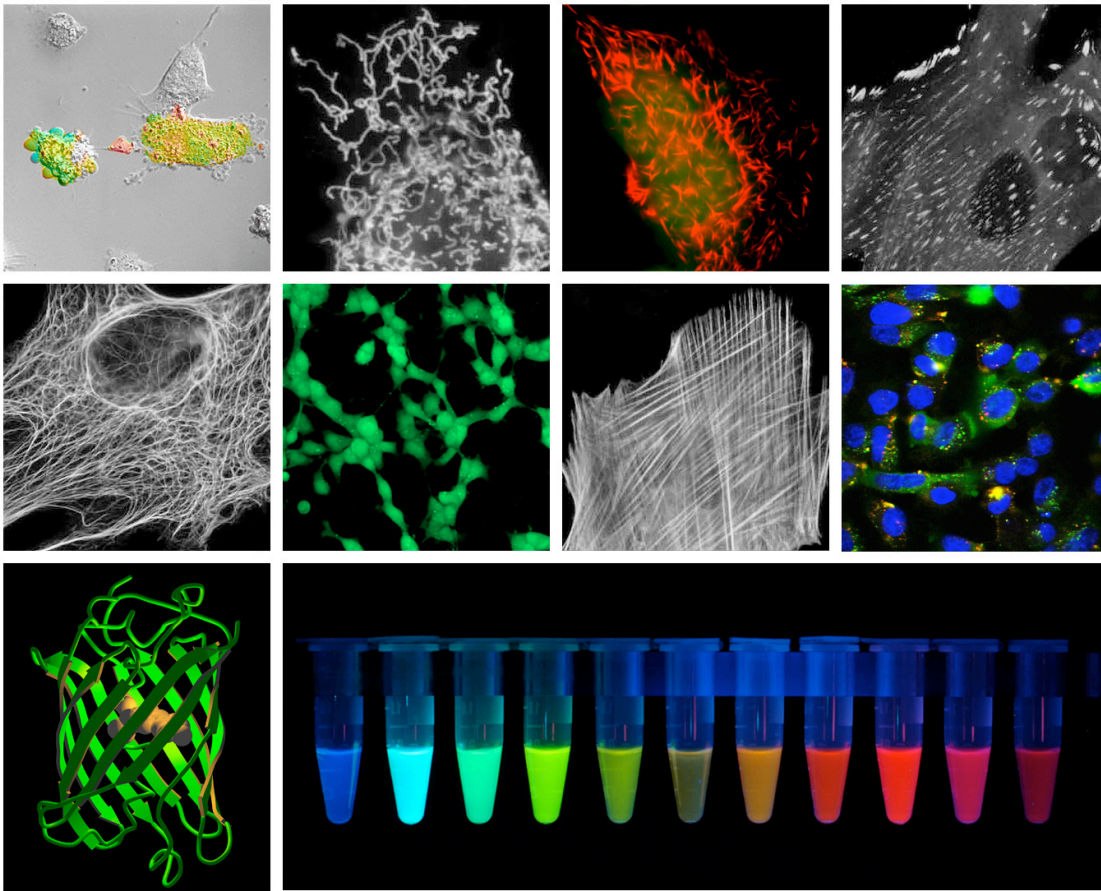
Figure 1

Schemes for Mapping Chromosome Geography

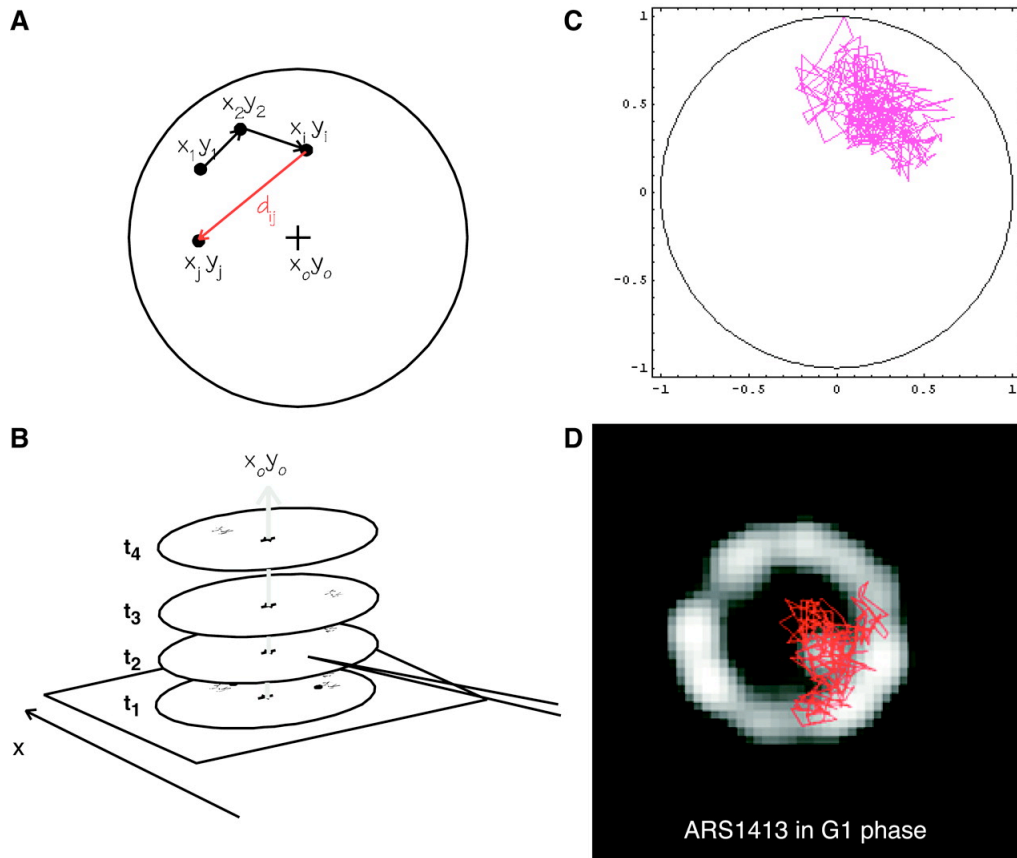


TRENDS in Microbiology

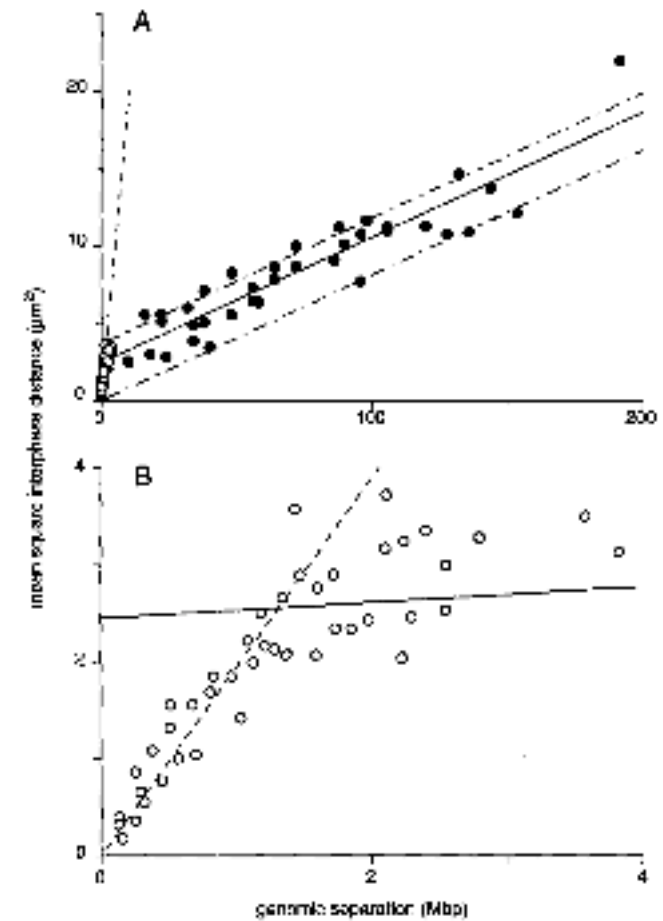
Fluorescent Proteins



Quantifying the Geography

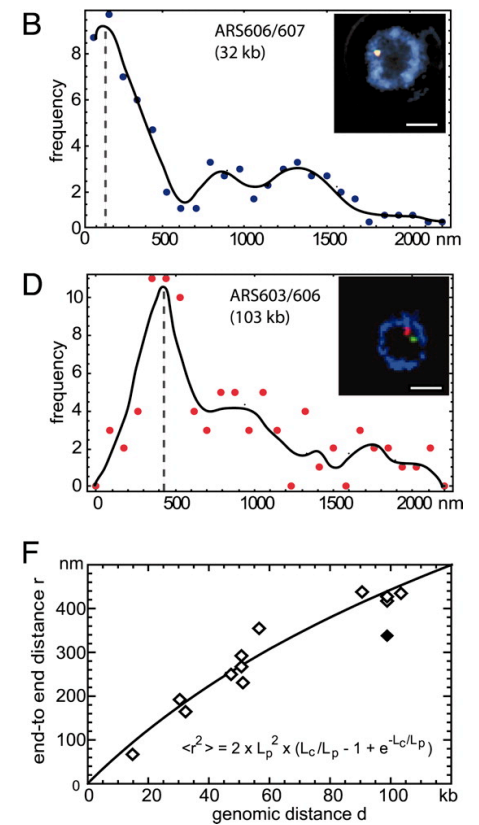
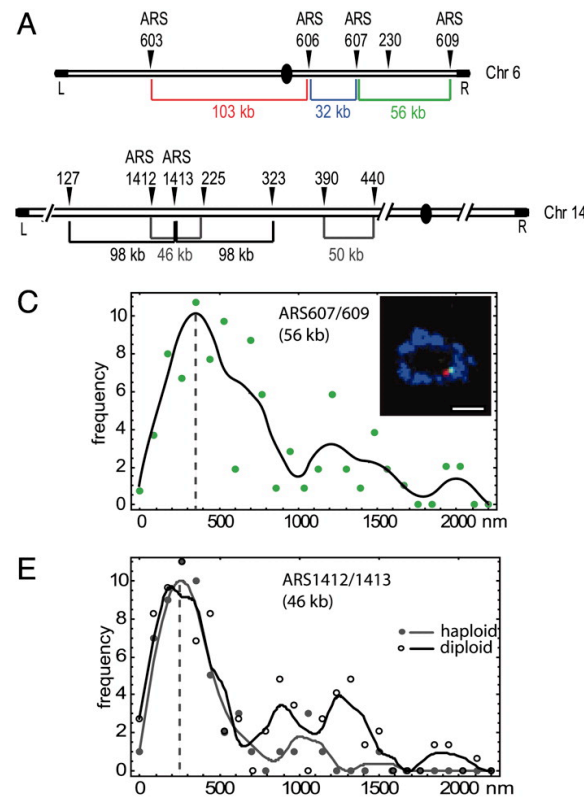
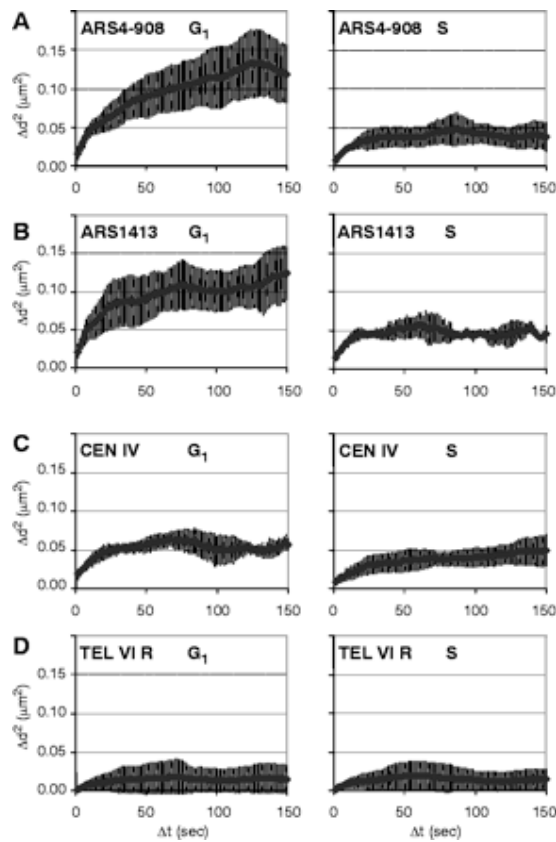


Gasser, Science 2002

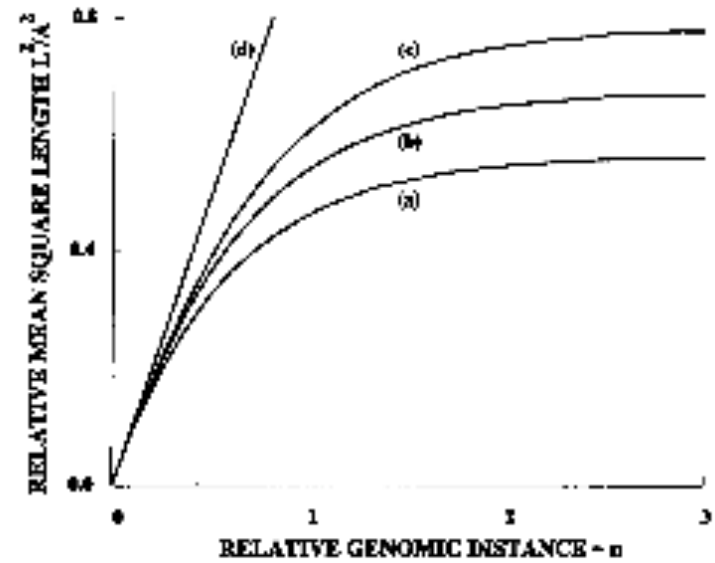
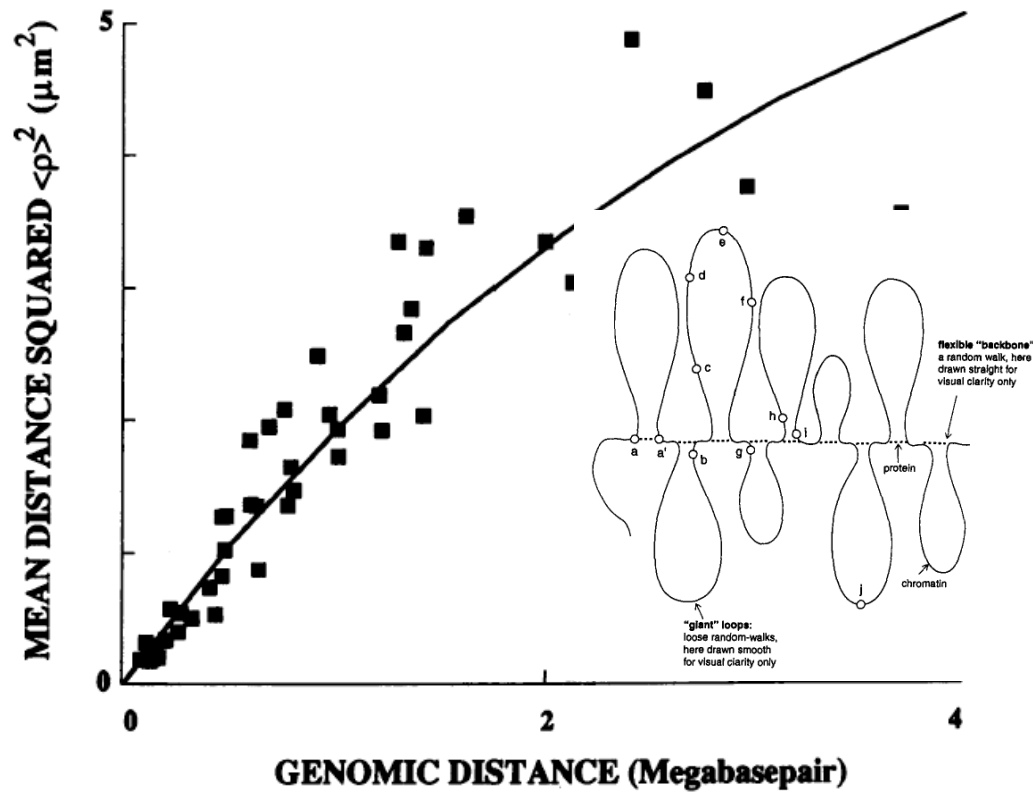


Yokota et al, 1995

Quantifying the Geography



Quantifying the Geography



The Immune System

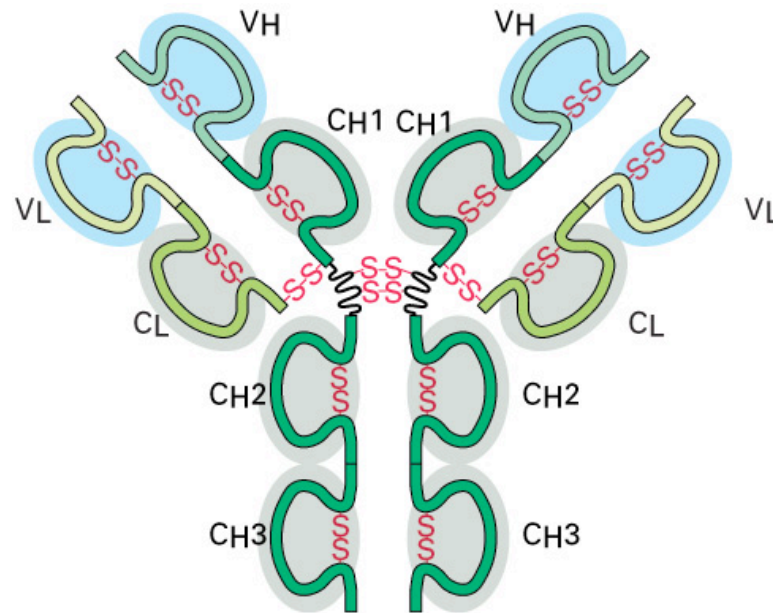
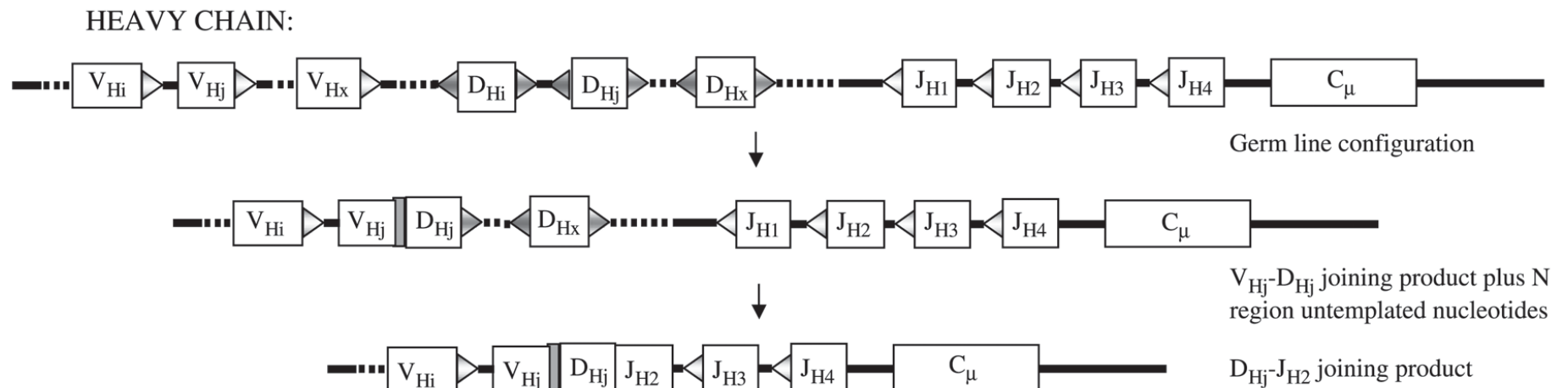
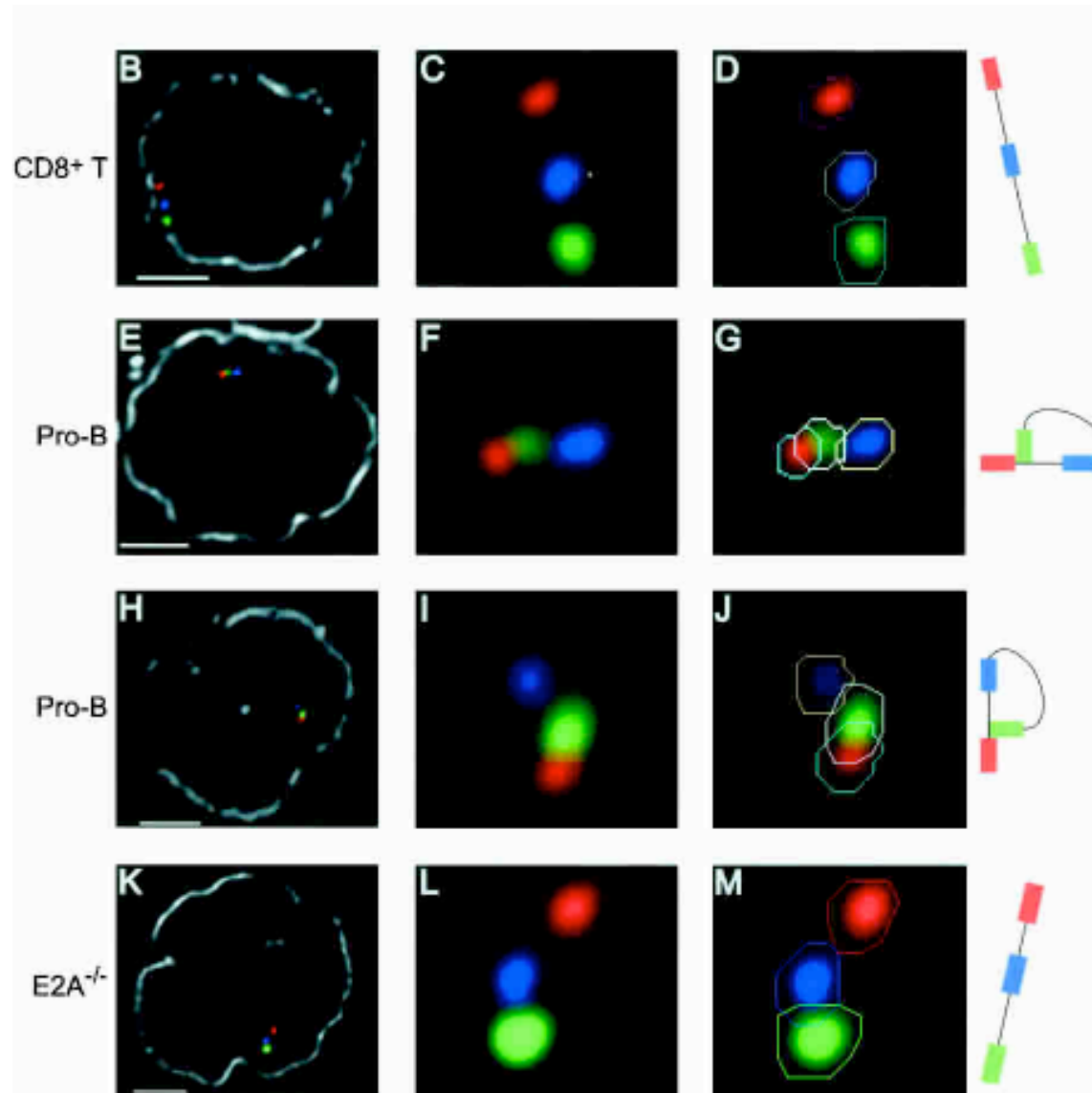


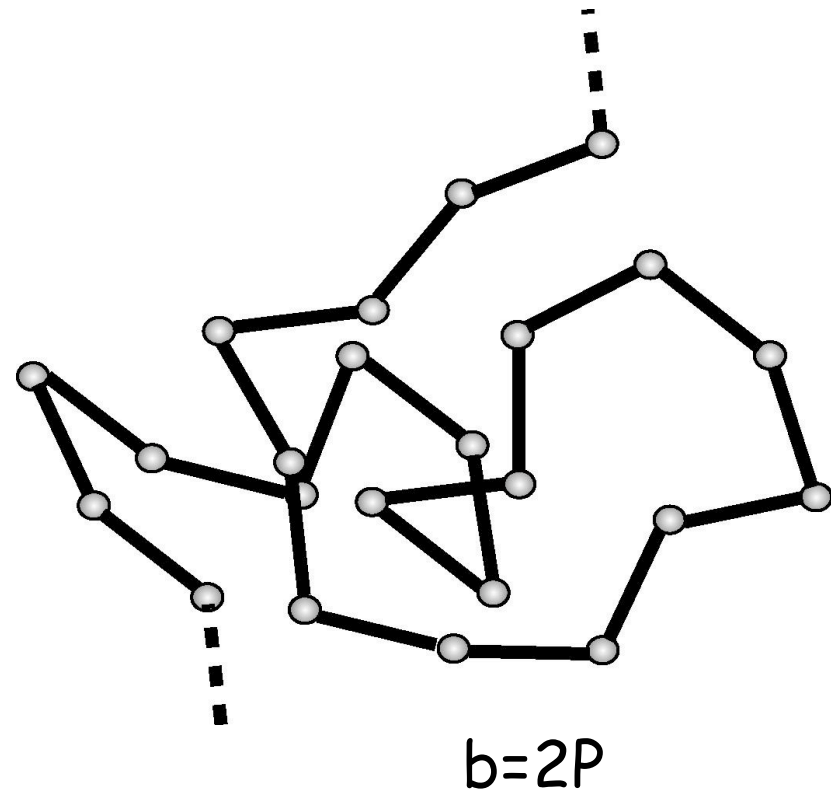
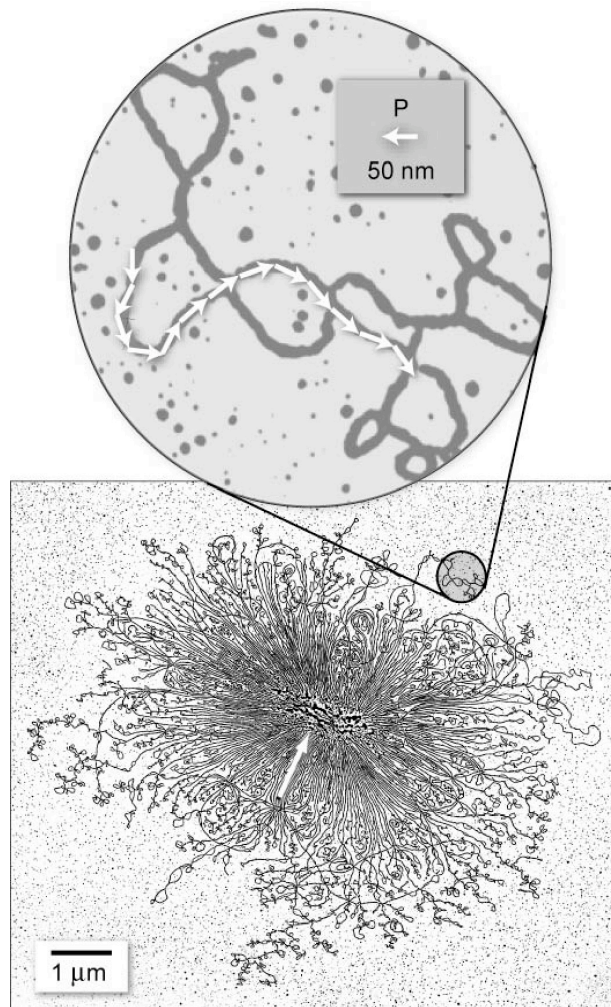
Figure 34-23 Molecular Biology of the Cell, 4th Edition



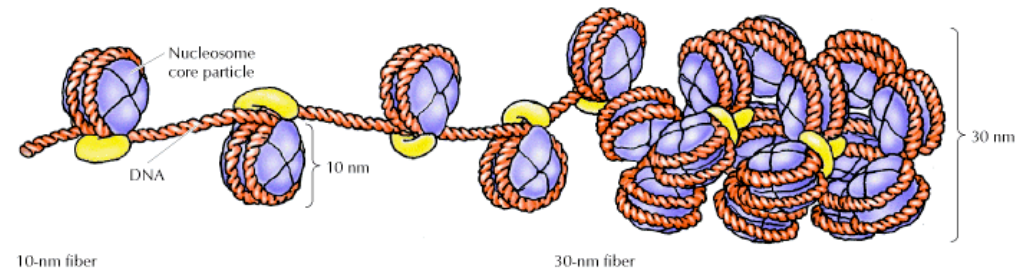
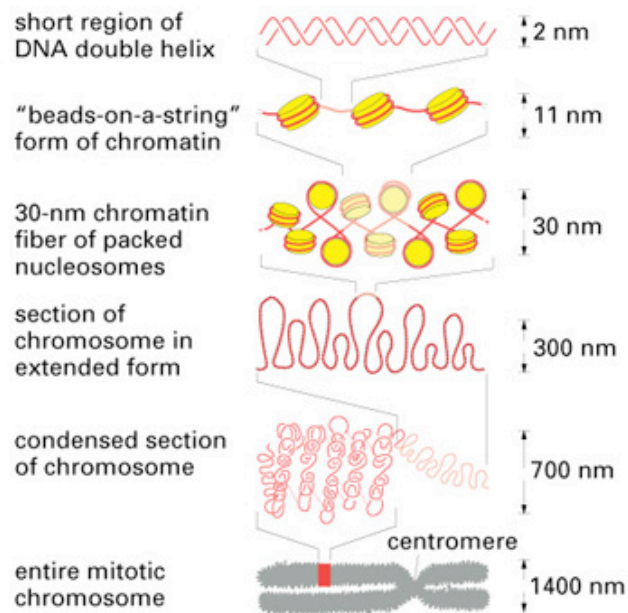
The Immune System



The Chromosome as a Polymer Blob



Higher Order Structure



NET RESULT: EACH DNA MOLECULE HAS BEEN PACKAGED INTO A MITOTIC CHROMOSOME THAT IS 10,000-FOLD SHORTER THAN ITS EXTENDED LENGTH

Atomic-Level Structure of the Nucleosome

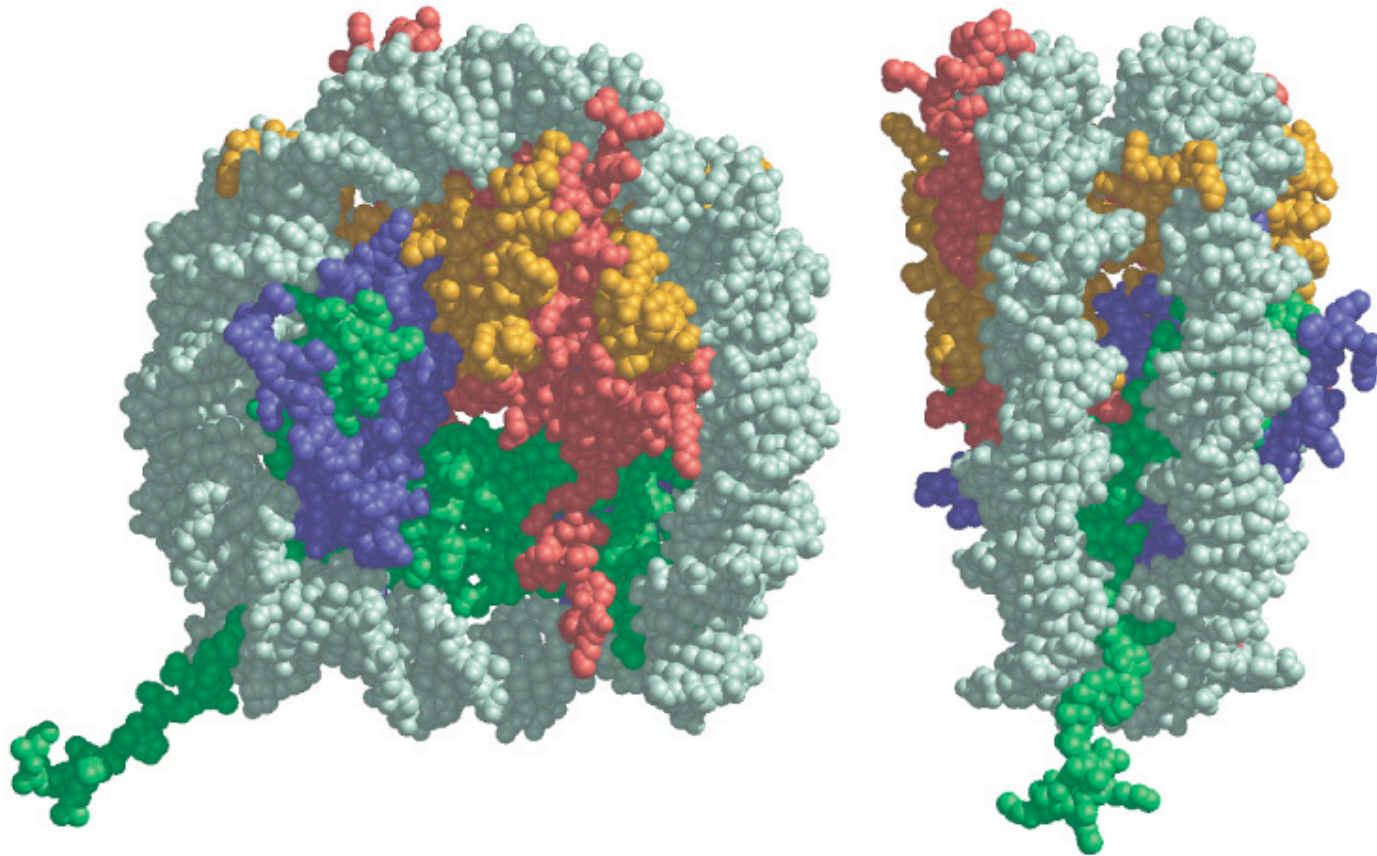
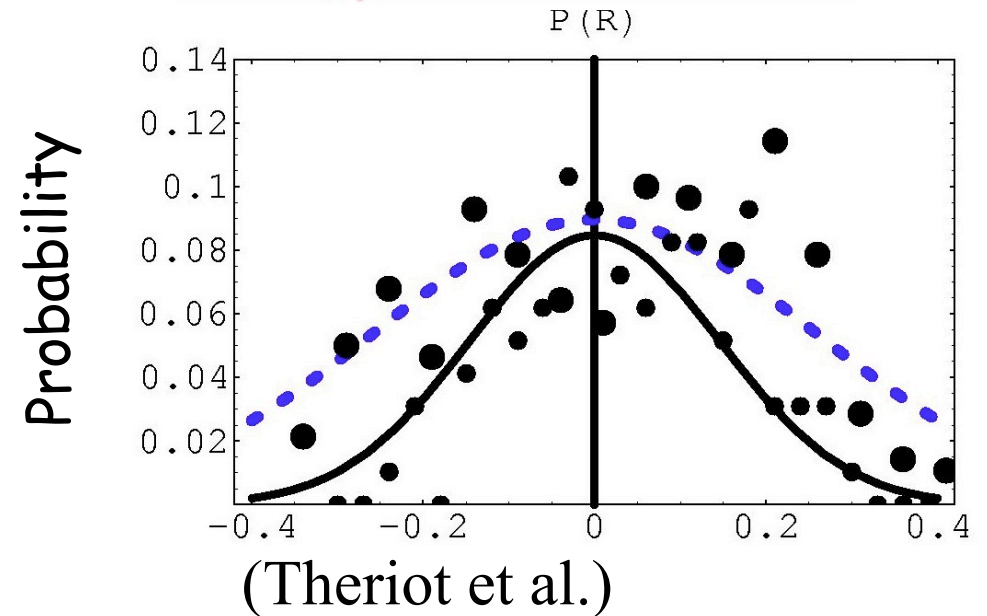
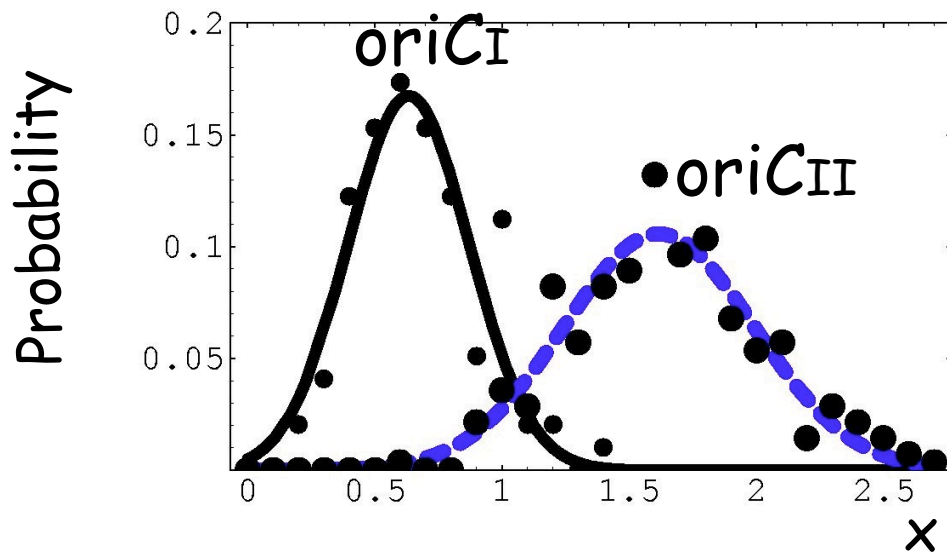
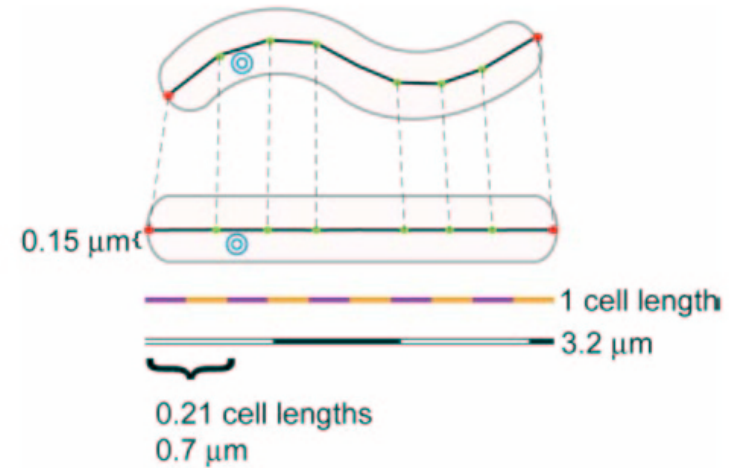
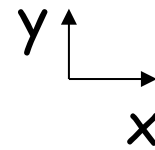
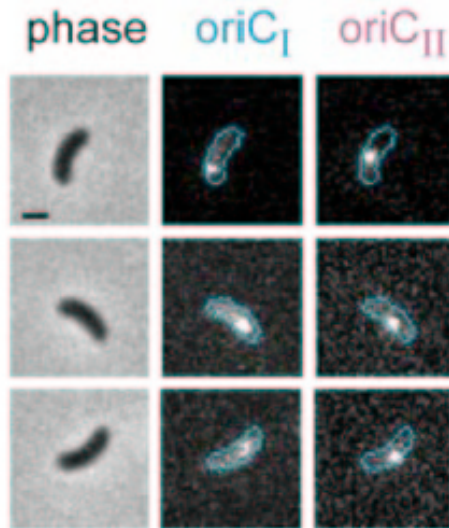


Figure 4–25. Molecular Biology of the Cell, 4th Edition.

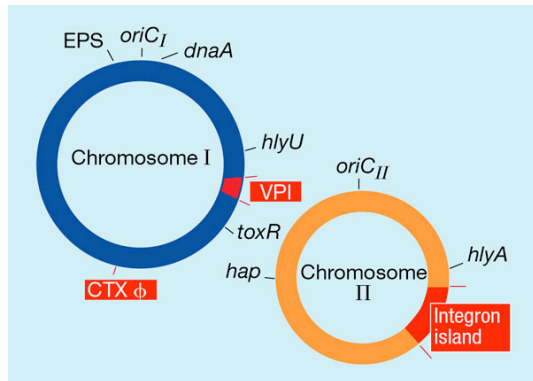
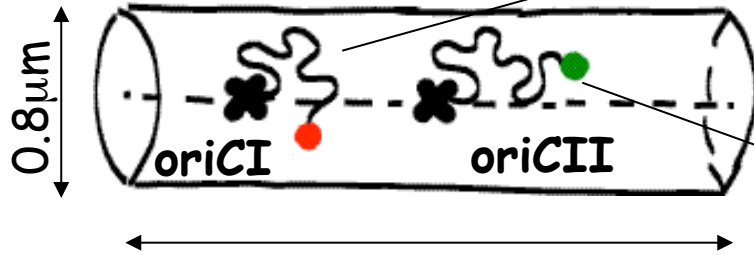
Chromosome Geography in *Vibrio*



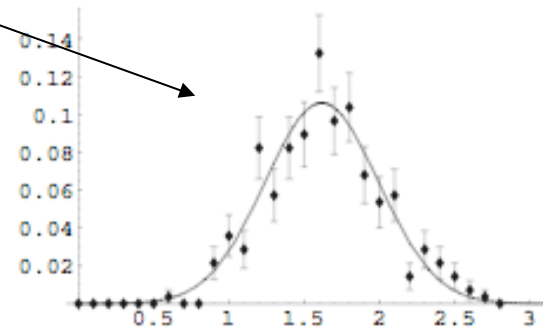
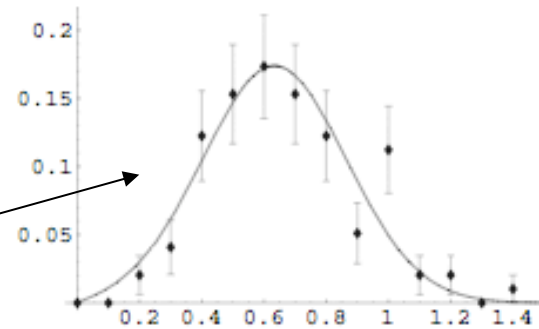
Replication origins are confined!

Vibrio Distributions: theory and experiment

Model: 



Long axis



Perpendicular direction

