LA-SiGMA

Louisiana Alliance for Simulation-Guided Materials Applications

Simulation:
The "CGI" of Science

Louisiana Tech University
Engineering & Science Day
4-10-13

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Click here for video!

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LED | LOUISIANA ECONOMIC DEVELOPMENT

KEY INDUSTRIES

Home > Key Industries

Key Industries

- ADVANCED MANUFACTURING
- AGRIBUSINESS
- AVIATION AND AEROSPACE
- CLEAN-TECH
- DIGITAL MEDIA AND SOFTWARE
- ENERGY
- ENTERTAINMENT
- SPECIALTY HEALTH CARE
- WATER MANAGEMENT

JOBS = MONEY!!

… but it's not just about the money.

Scientists MAKE A DIFFERENCE!

Home » Articles » 27 Science Fictions That Became Science Facts In 2012

27 SCIENCE FICTIONS THAT BECAME SCIENCE FACTS IN 2012

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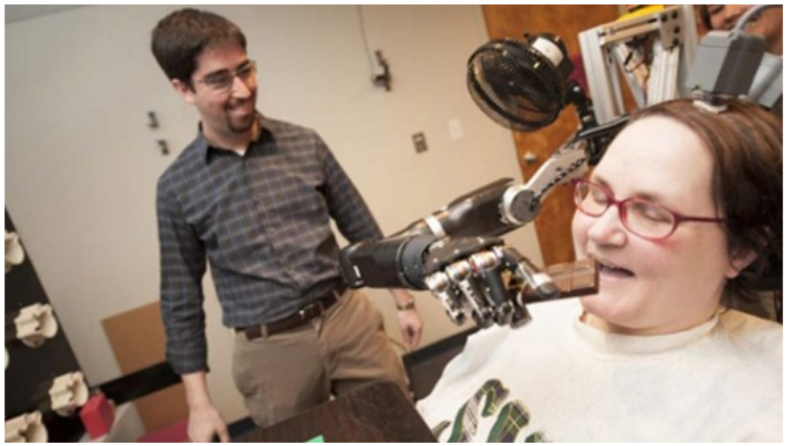
We may never have our flying cars, but the future is here. From creating fully functioning artificial leaves to hacking the human brain, science made a lot of breakthroughs this year.

1. QUADRIPLEGIC USES HER MIND TO CONTROL HER ROBOTIC ARM



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When you think of SCIENCE, which do you picture?

BOTH can be science!

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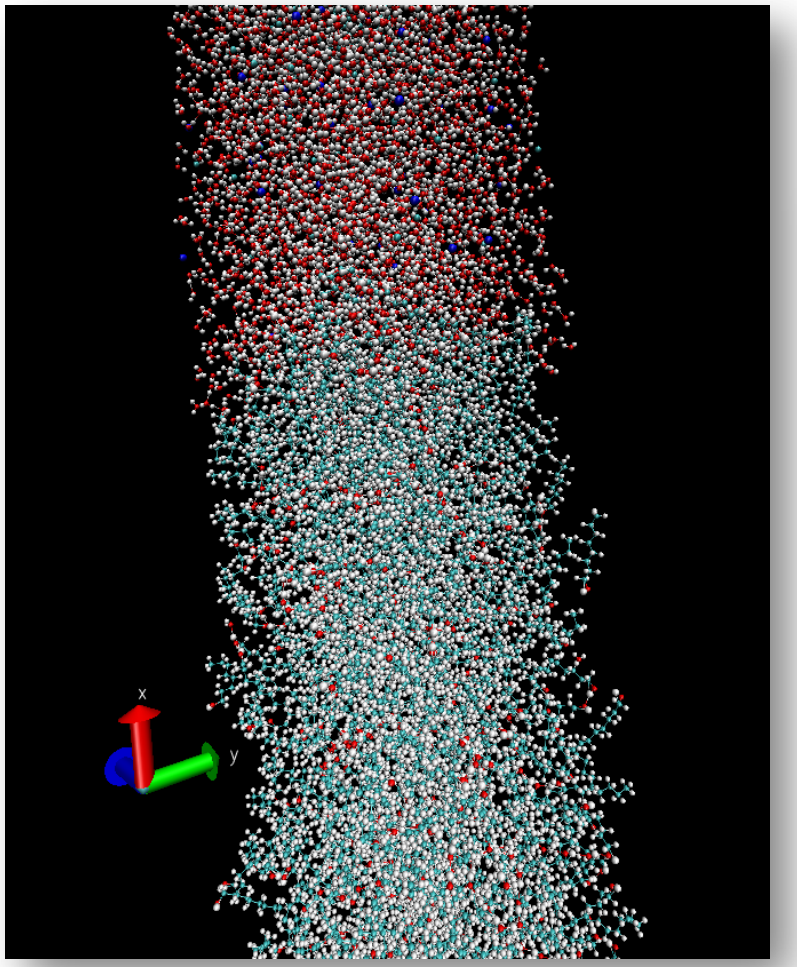

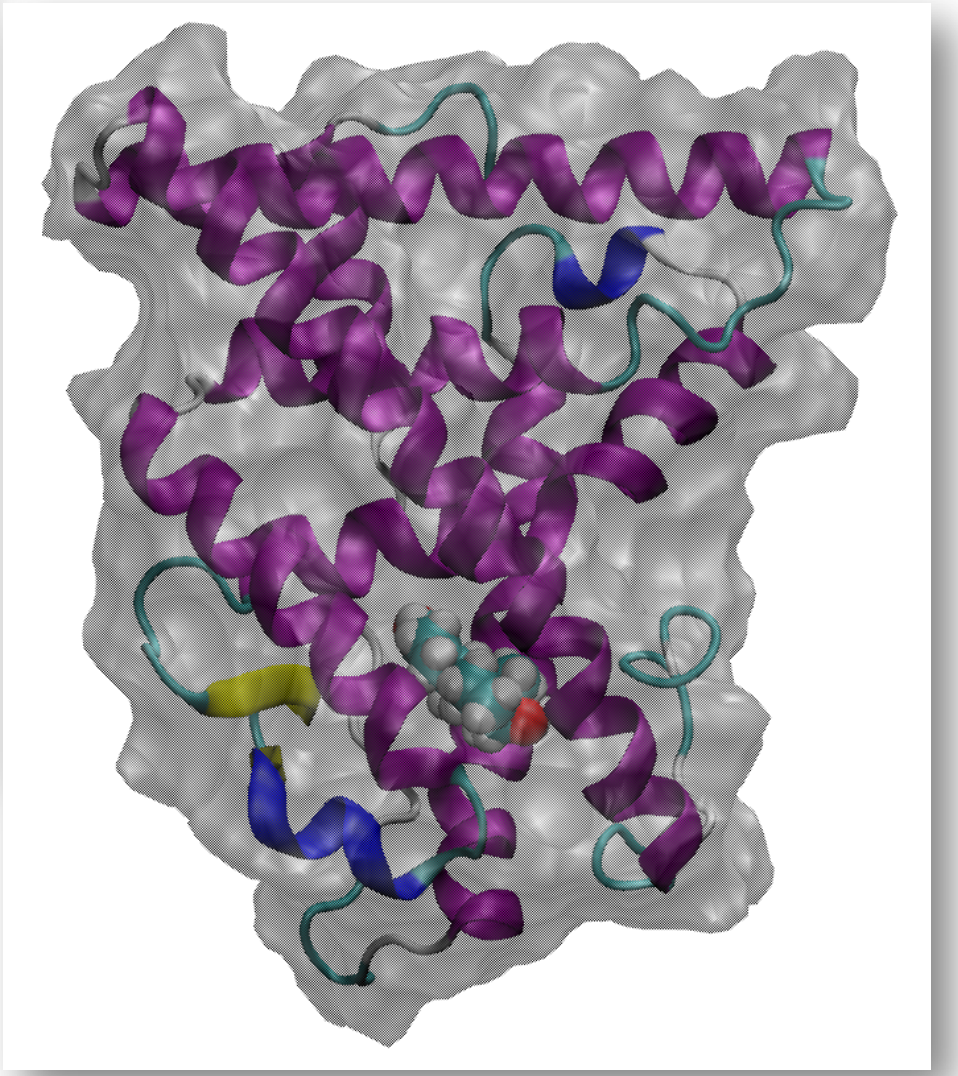

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Victoria Bamburg

Freshman at LA Tech

Chemical Engineering Major

Research on

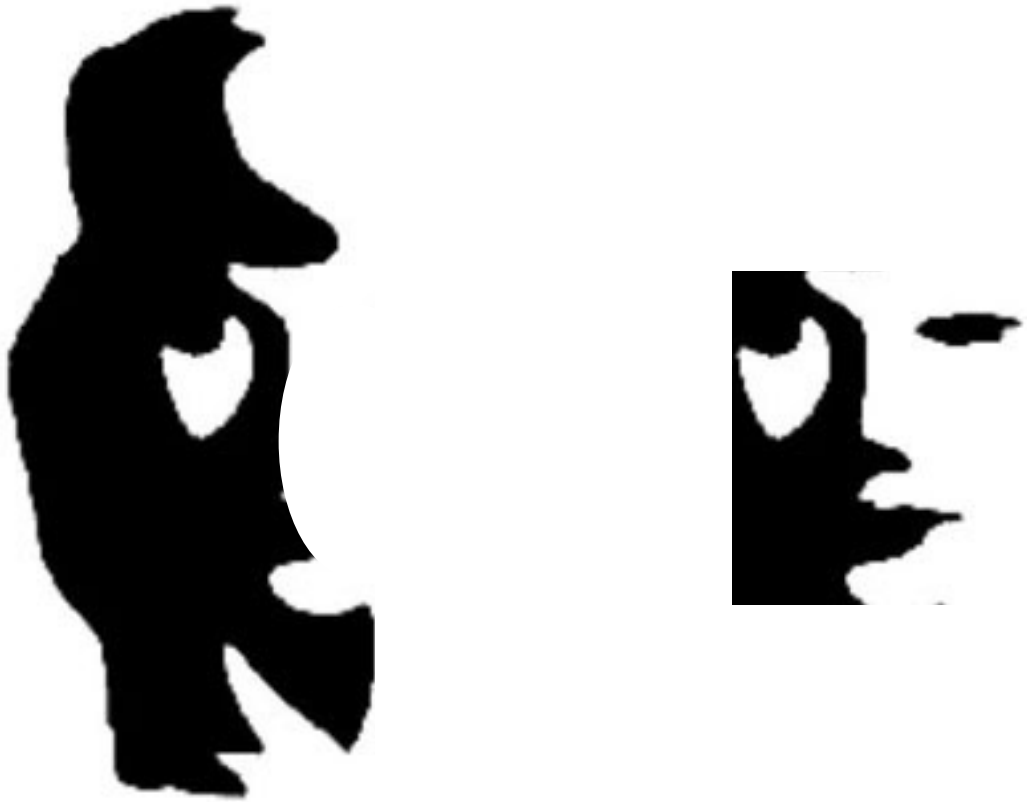
Nucleosome Exclusion Sequences

A picture is worth a 1000 words

Do you see a musician or a girl's face?

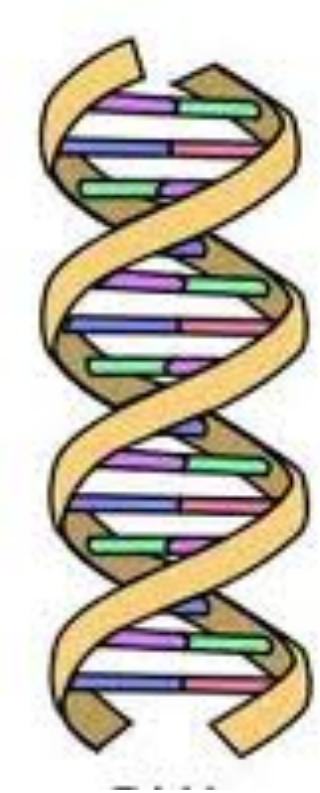
YourCoolProfile.com

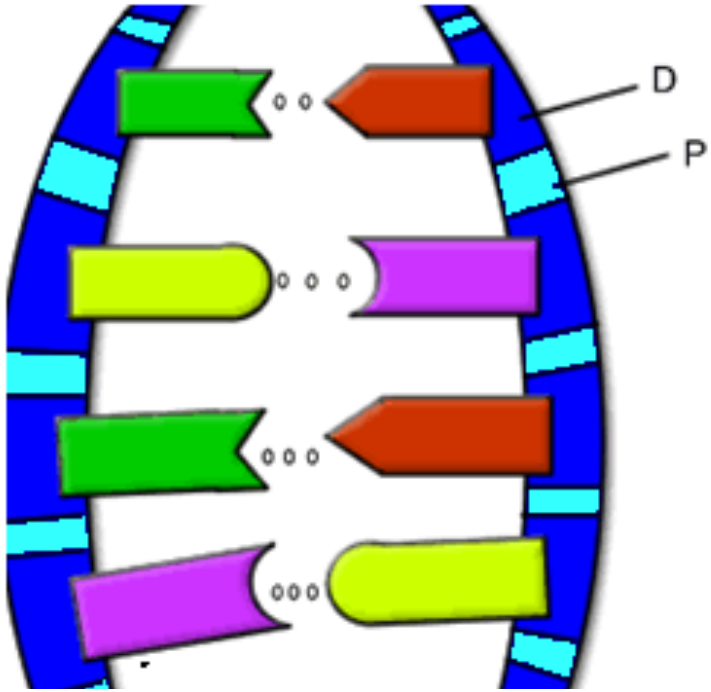
... or maybe a lot of arguments.



DeoxyriboNucleicAcid

DNA : The Genetic Stuff





Thymine

Adenine

Guanine

Cytosine

D = Deoxyribose (sugar)

P = Phosphate

Hydrogen Bond

How much DNA in a human cell?

Answer:

3,000,000,000 base pair in EVERY cell !

How long is the DNA?

Hint: Each base pair is

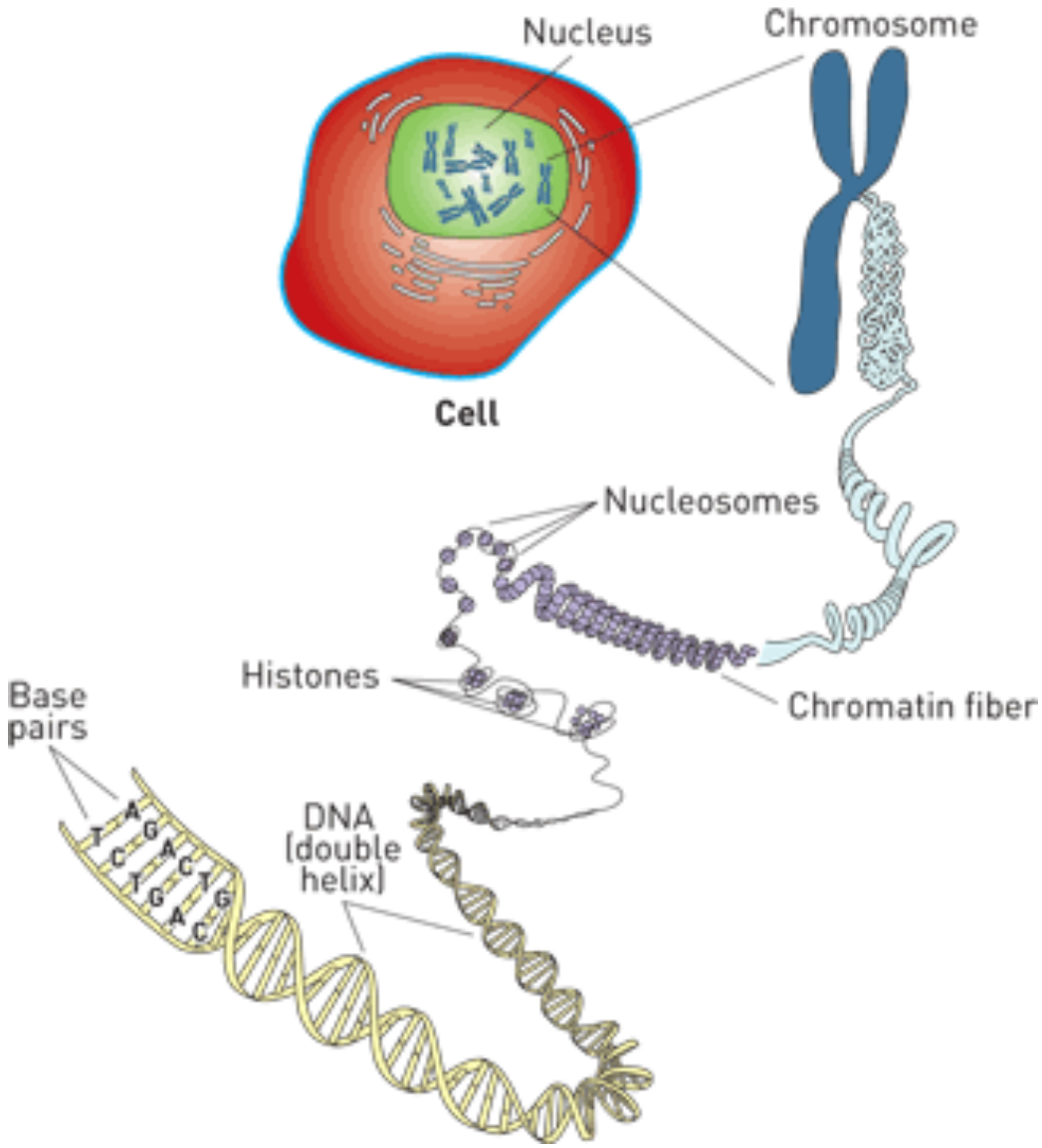
$\frac{1}{3{,}000{,}000{,}000}$ meters long

$$\frac{1\text{m}}{3{,}000{,}000{,}000} = \frac{1}{3}\,nm$$

How long is the DNA?

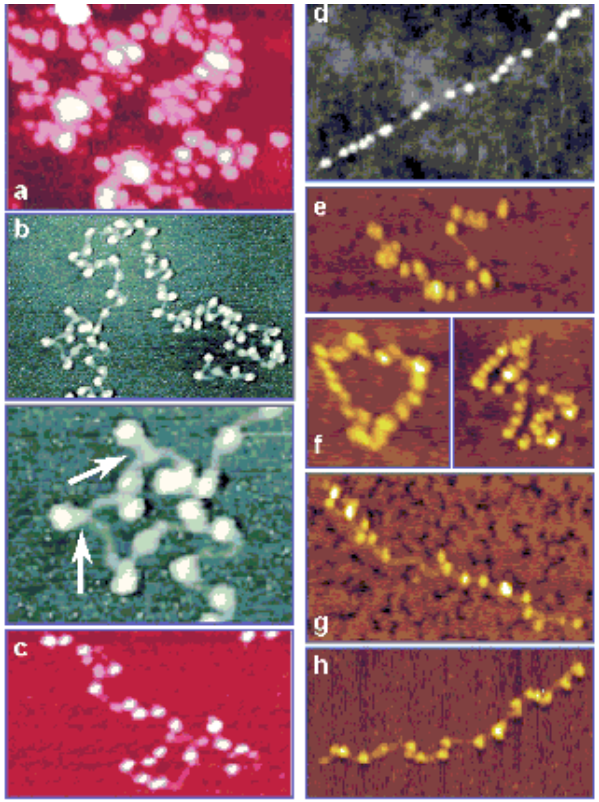
Answer:

$$3{,}000{,}000{,}000\,bp \quad x \quad \frac{1\,m}{3{,}000{,}000{,}000\,bp} \quad = \quad 1\,m$$

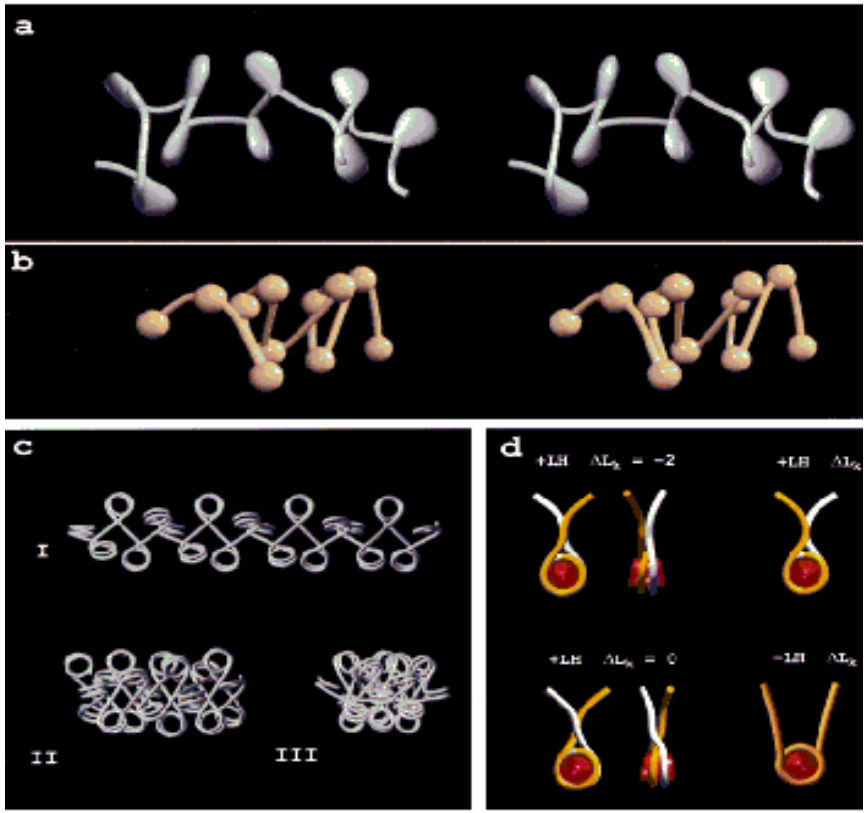


Chem. & Eng. News; July 17, 2006

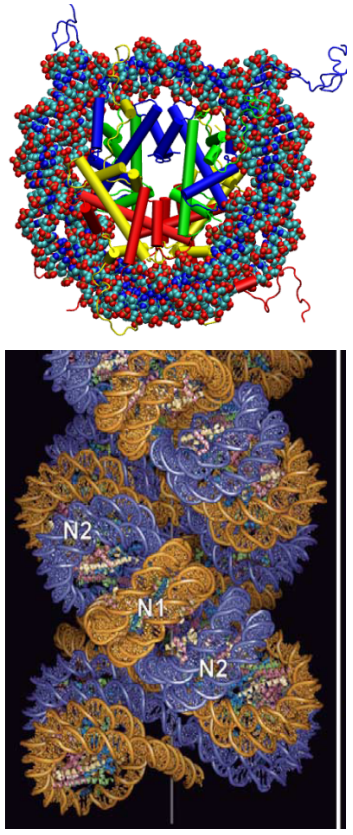
Biology 101
Nucleosomes and Chromatin



Zlatanova and Leuba
JMB 2003

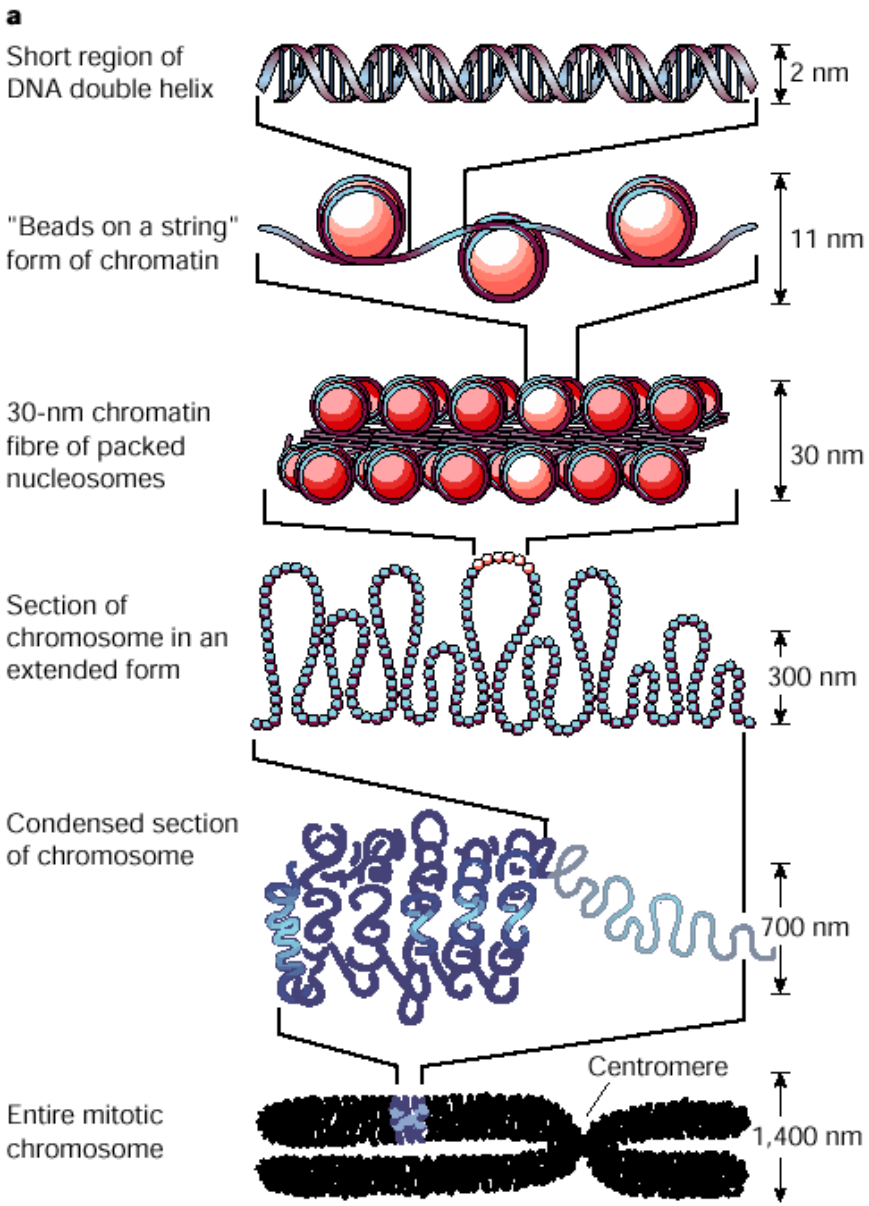


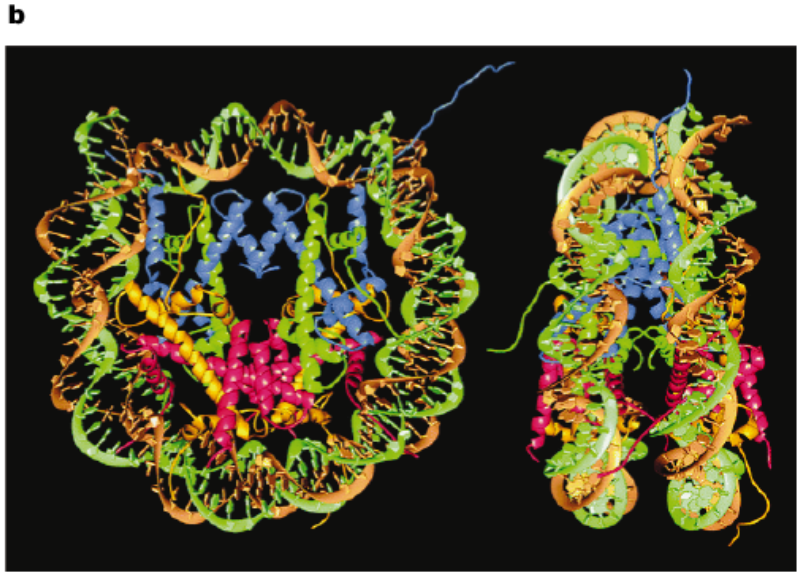
Bednar, PNAS 1998



Luger, 1997
Schalch Nature 2005

DNA Folding





Felsenfeld, Nat. 2003
Luger Nat. 1997

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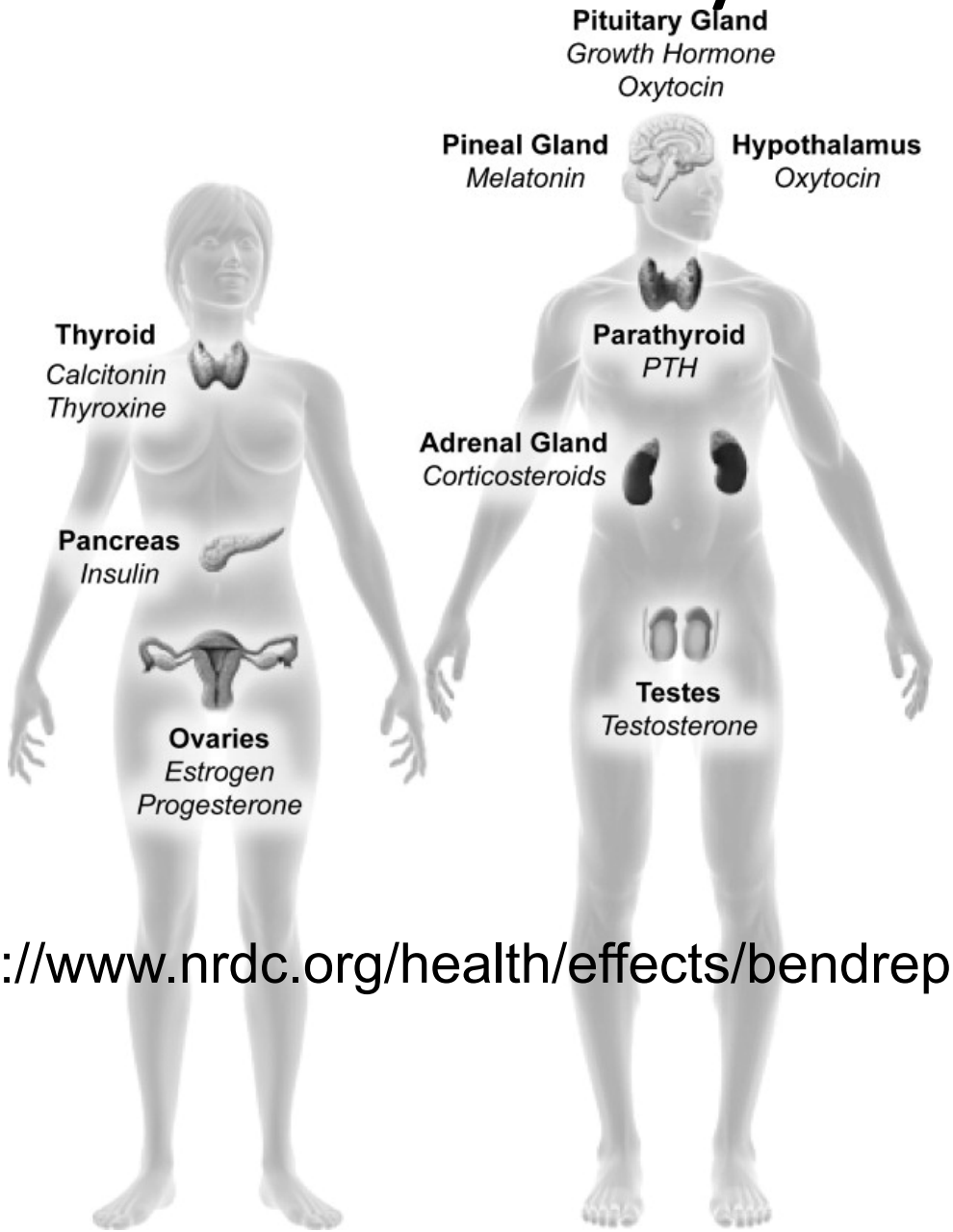
Today's Assignment

Make a model of the

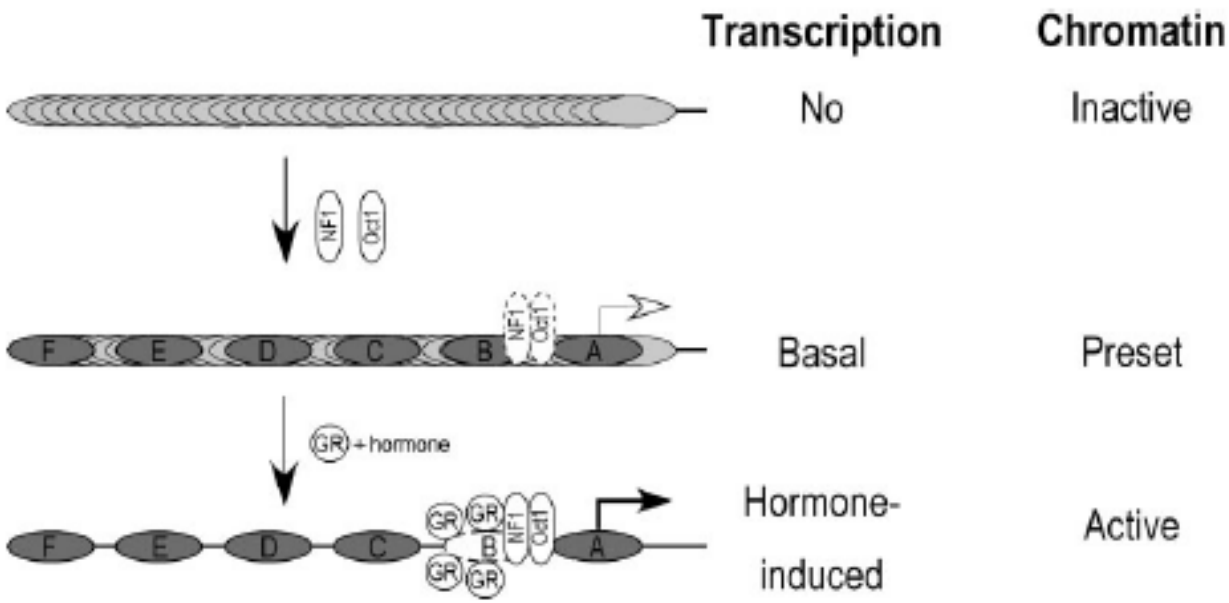
Mouse Mammary Tumor Virus Promoter Complex

The Endocrine System



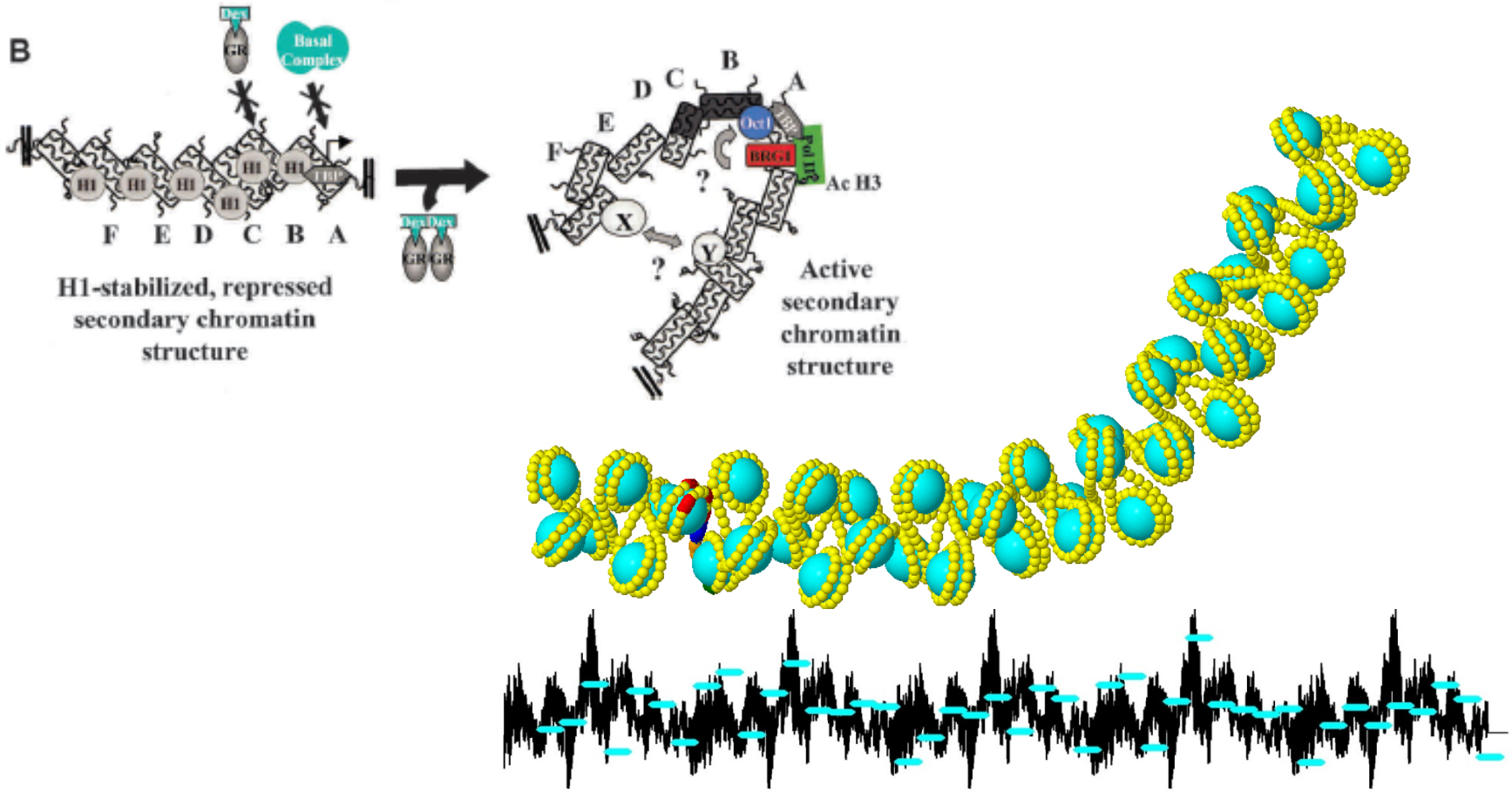
http://www.nrdc.org/health/effects/bendrep.asp

Hormone Receptor Mechanism: MMTV



Belikov JBC 2004

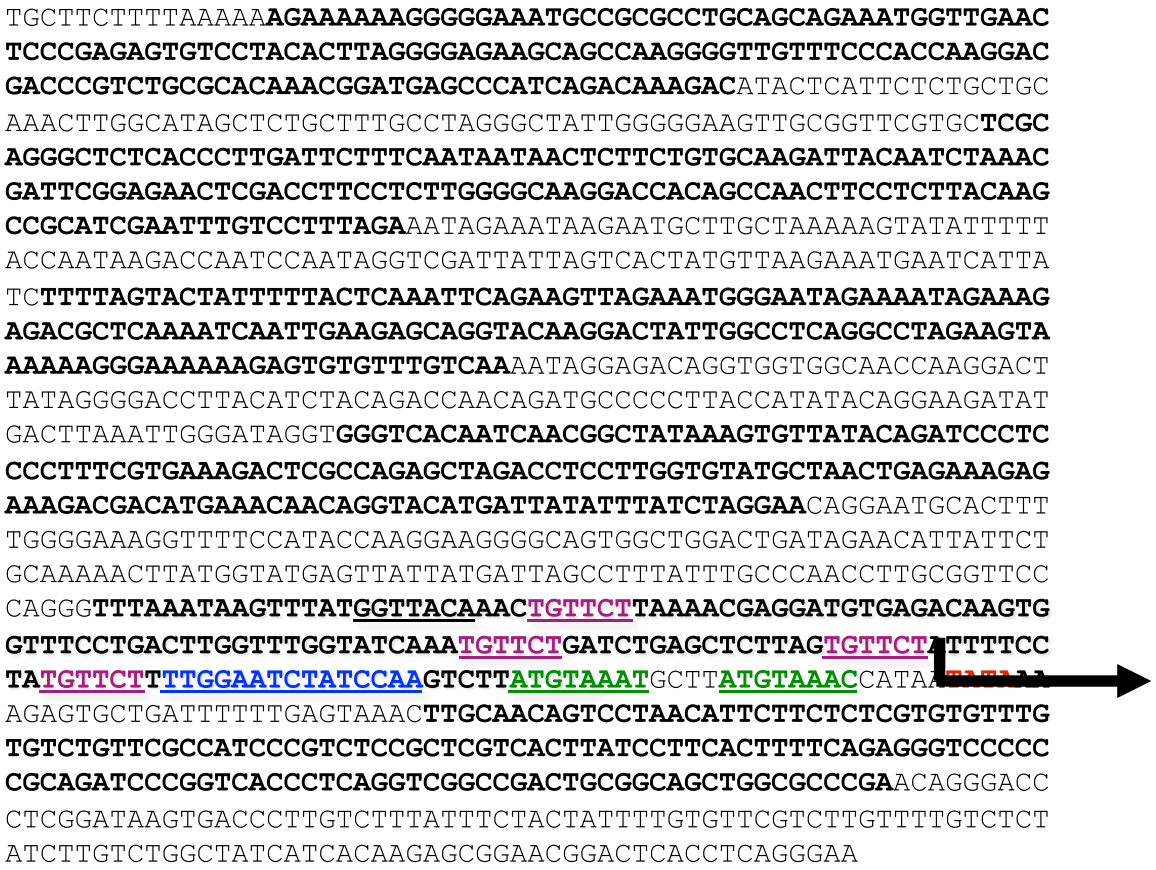
Tandem Repeats of MMTV Yields Bent Chromatin



MMTV Sequence Bioinformatics

GRE
NF1
OCT

TATA



Belikov JBC 2004

Interactive Chromatin Modeling

ICM ~ I see 'em

http://localhost/icm/

http://www.latech.edu/~bishop

Thank You!

This material is based upon work supported by the National Science Foundation under the NSF EPSCoR Cooperative Agreement No. EPS-1003897 with additional support from the Louisiana Board of Regents."

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