

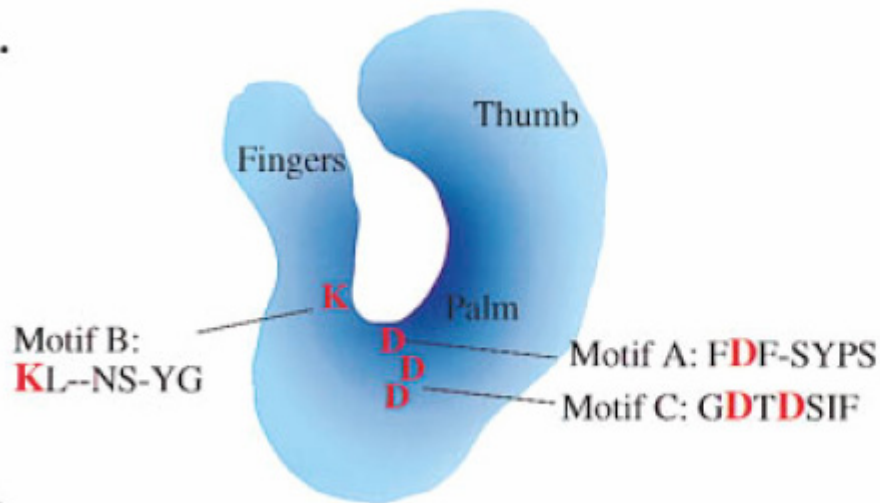
Figure 5-3 Alberts

Table 5-1. The Three Steps That Give Rise to High-Fidelity DNA Synthesis

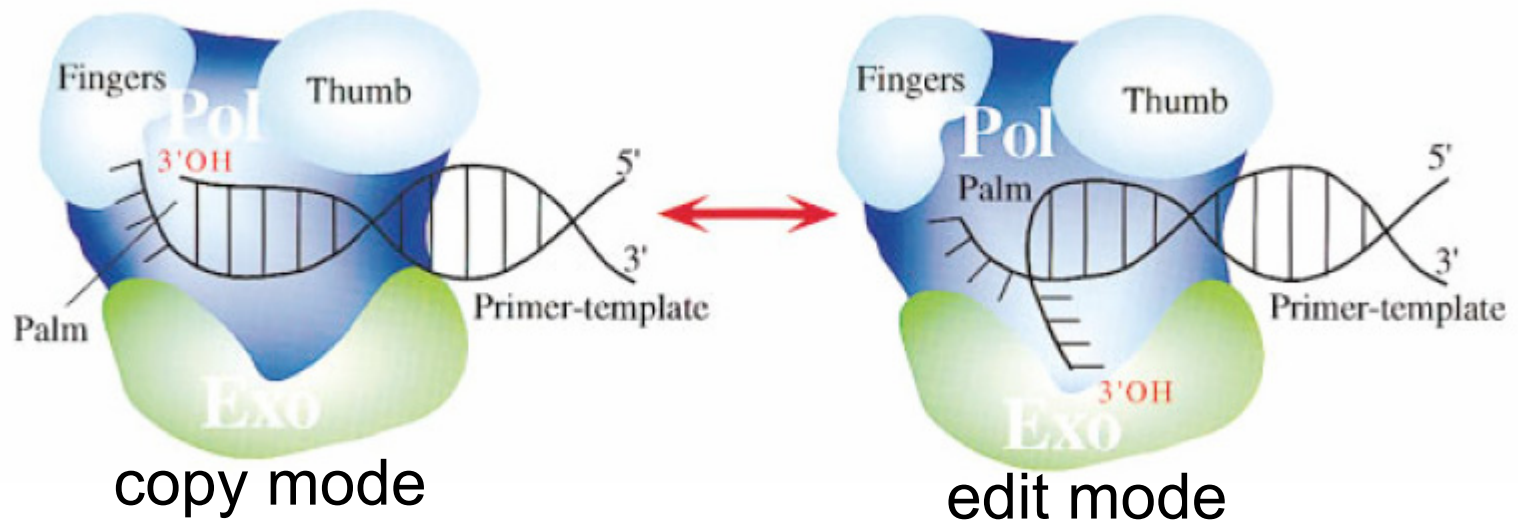
REPLICATION STEP	ERRORS PER NUCLEOTIDE POLYMERIZED
5'→3' polymerization	1×10^5
3'→5' exonucleolytic proofreading	1×10^2
Strand-directed mismatch repair	1×10^2
Total	1×10^9

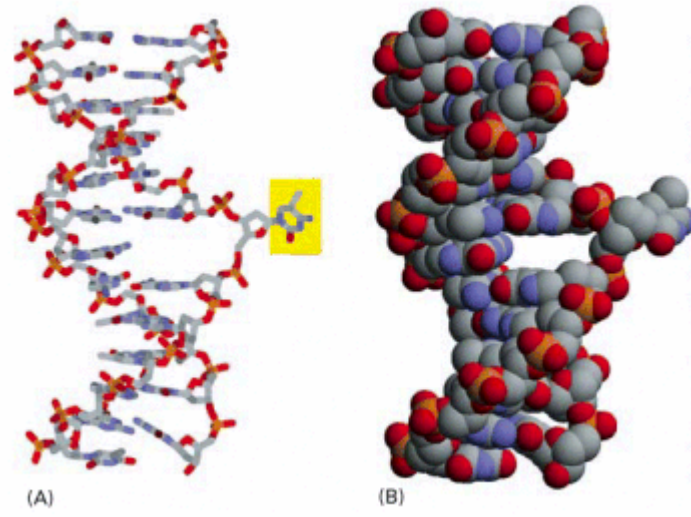
Part of the reason replication is high fidelity: Proof-reading

A.



B.





Alberts Figure 5-51

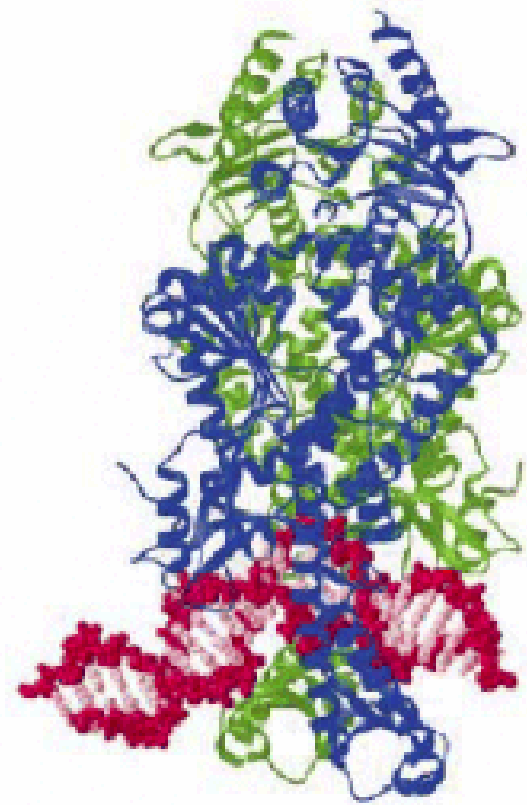
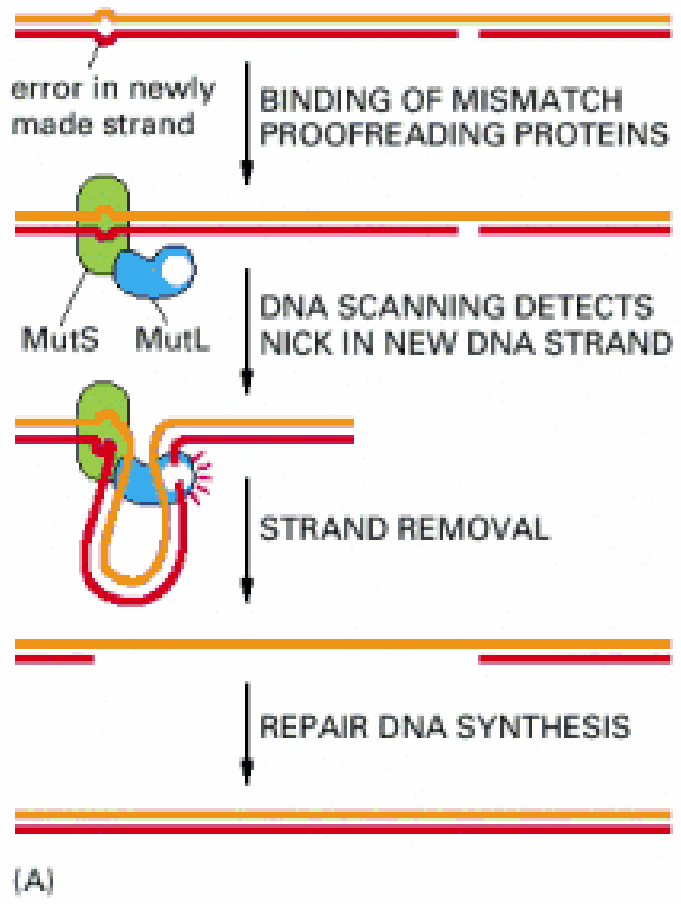
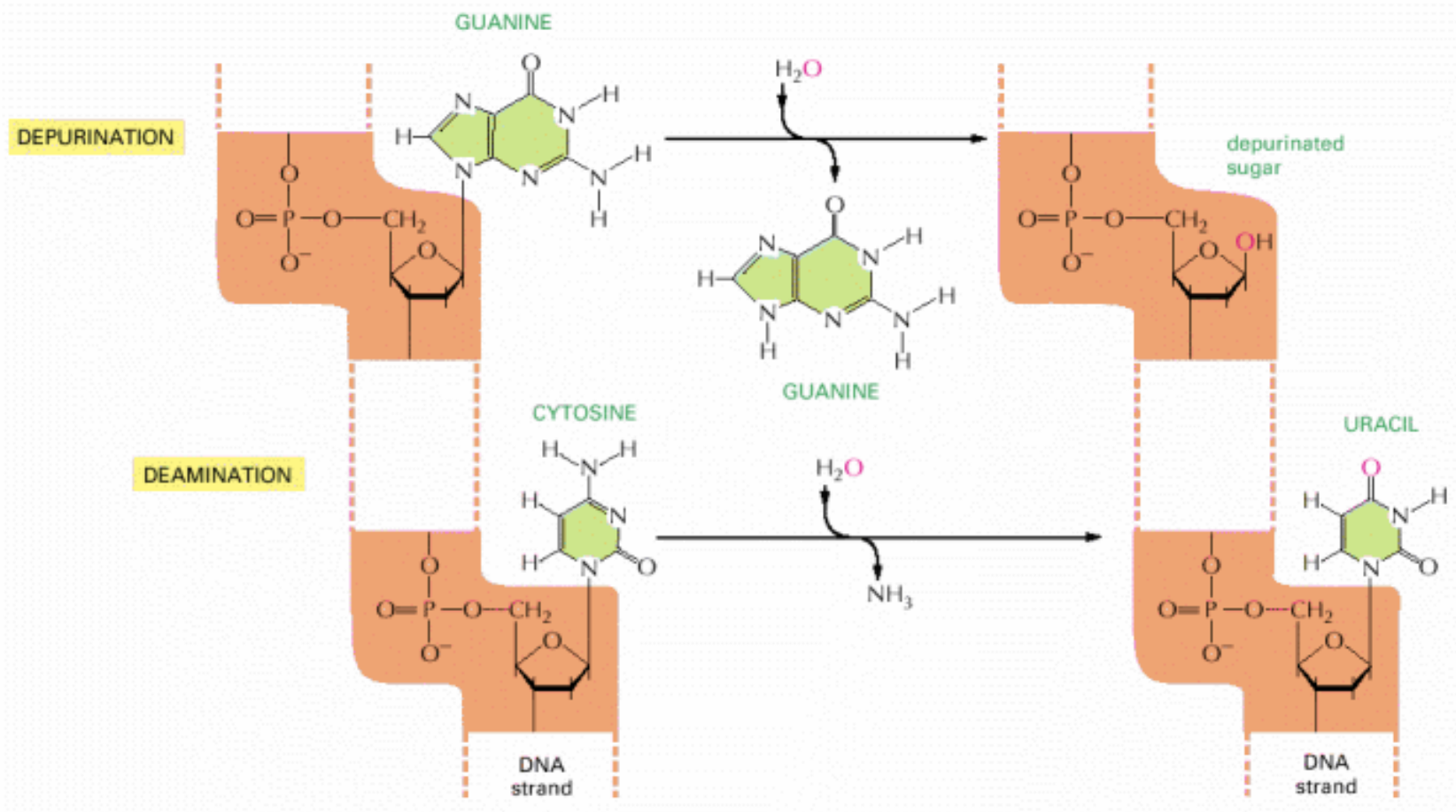
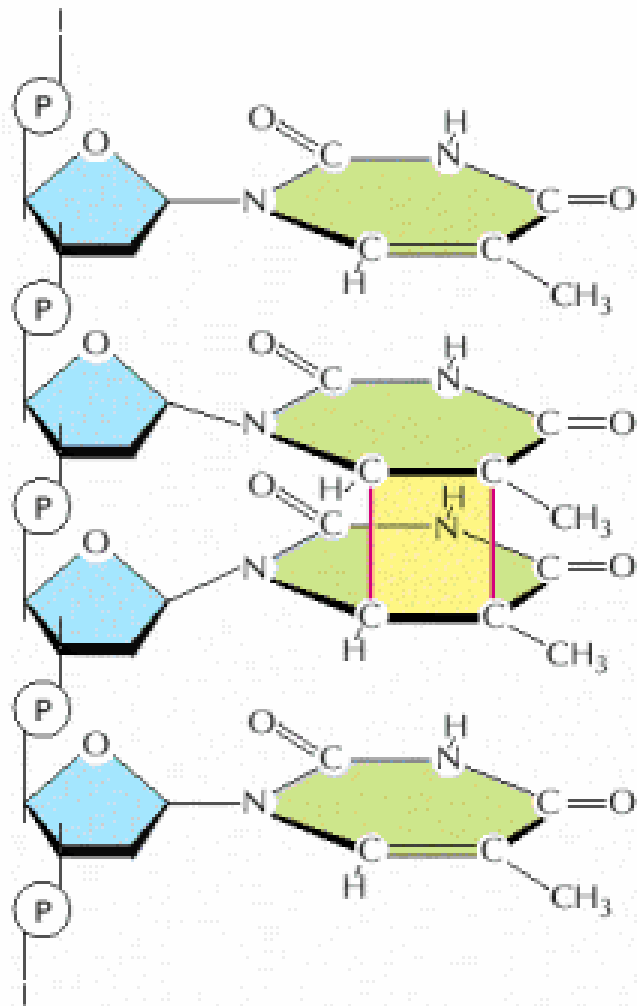


Table 5-2. Inherited Syndromes with Defects in DNA Repair

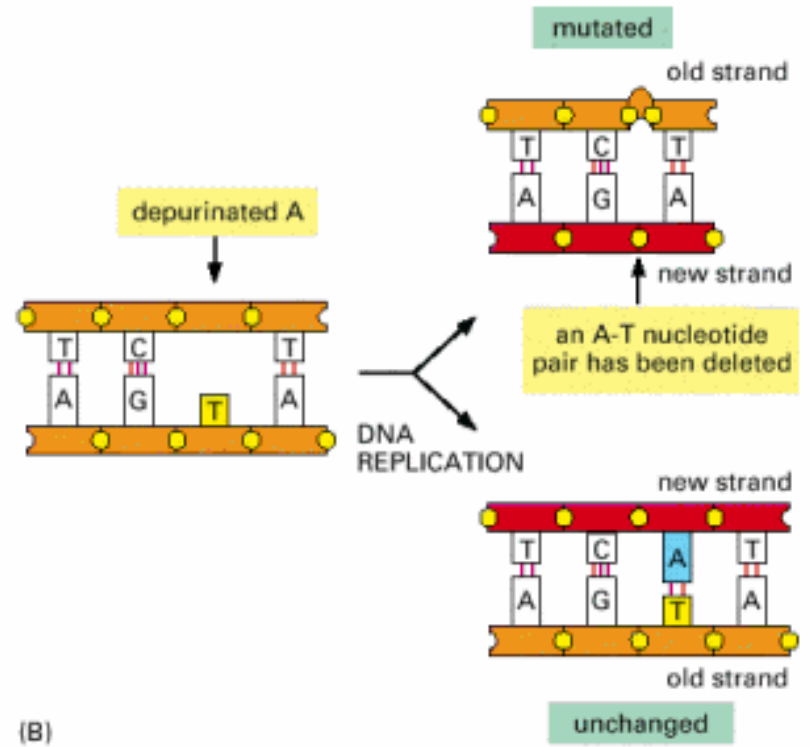
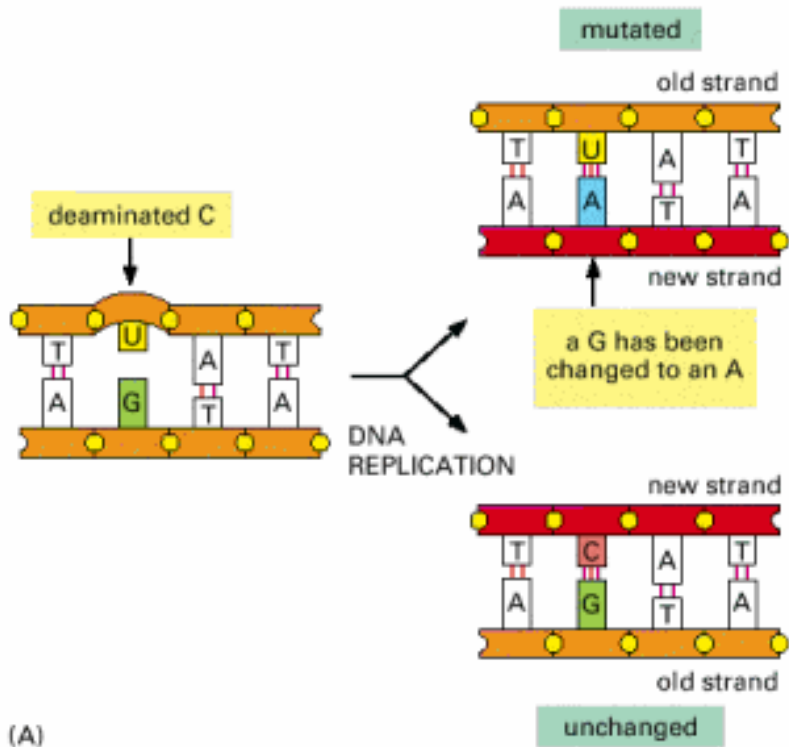
NAME	PHENOTYPE	ENZYME OR PROCESS AFFECTED
MSH2, 3, 6, MLH1, PMS2	colon cancer	mismatch repair
Xeroderma pigmentosum (XP) groups A–G	skin cancer, cellular UV sensitivity, neurological abnormalities	nucleotide excision-repair
XP variant	cellular UV sensitivity	translesion synthesis by DNA polymerase δ
Ataxia–telangiectasia (AT)	leukemia, lymphoma, cellular γ -ray sensitivity, genome instability	ATM protein, a protein kinase activated by double-strand breaks
BRCA-2	breast and ovarian cancer	repair by homologous recombination
Werner syndrome	premature aging, cancer at several sites, genome instability	accessory 3'-exonuclease and DNA helicase
Bloom syndrome	cancer at several sites, stunted growth, genome instability	accessory DNA helicase for replication
Fanconi anemia groups A–G	congenital abnormalities, leukemia, genome instability	DNA interstrand cross-link repair
46 BR patient	hypersensitivity to DNA-damaging agents, genome instability	DNA ligase I



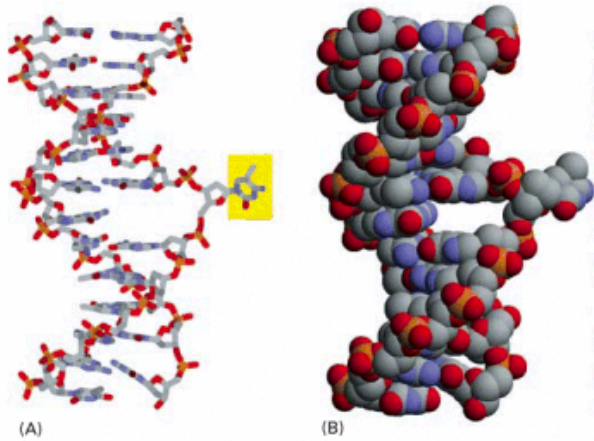
Alberts Figure 5-47



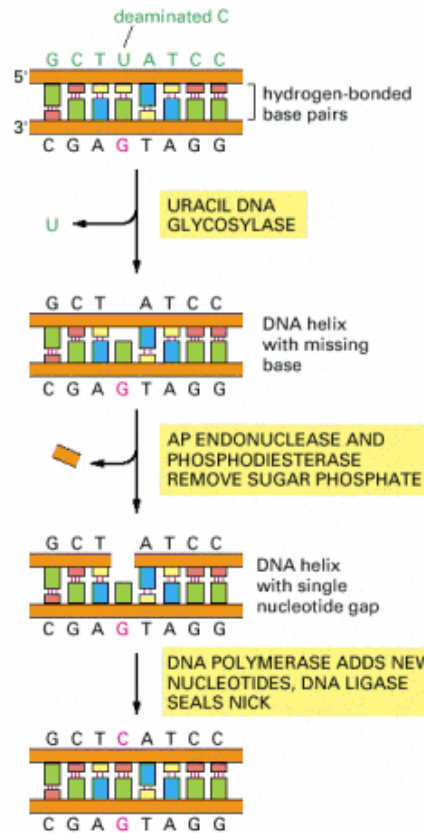
Alberts Figure 5-48



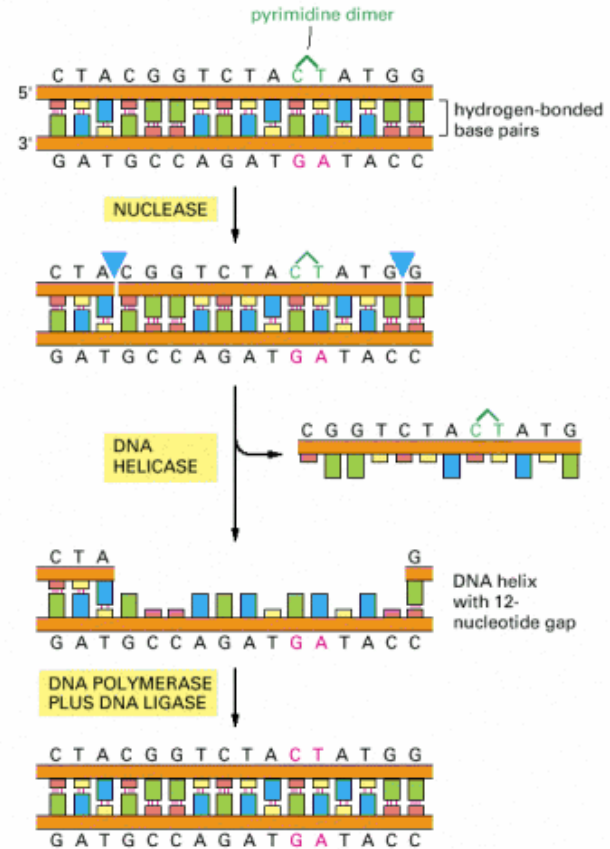
Alberts Figure 5-49



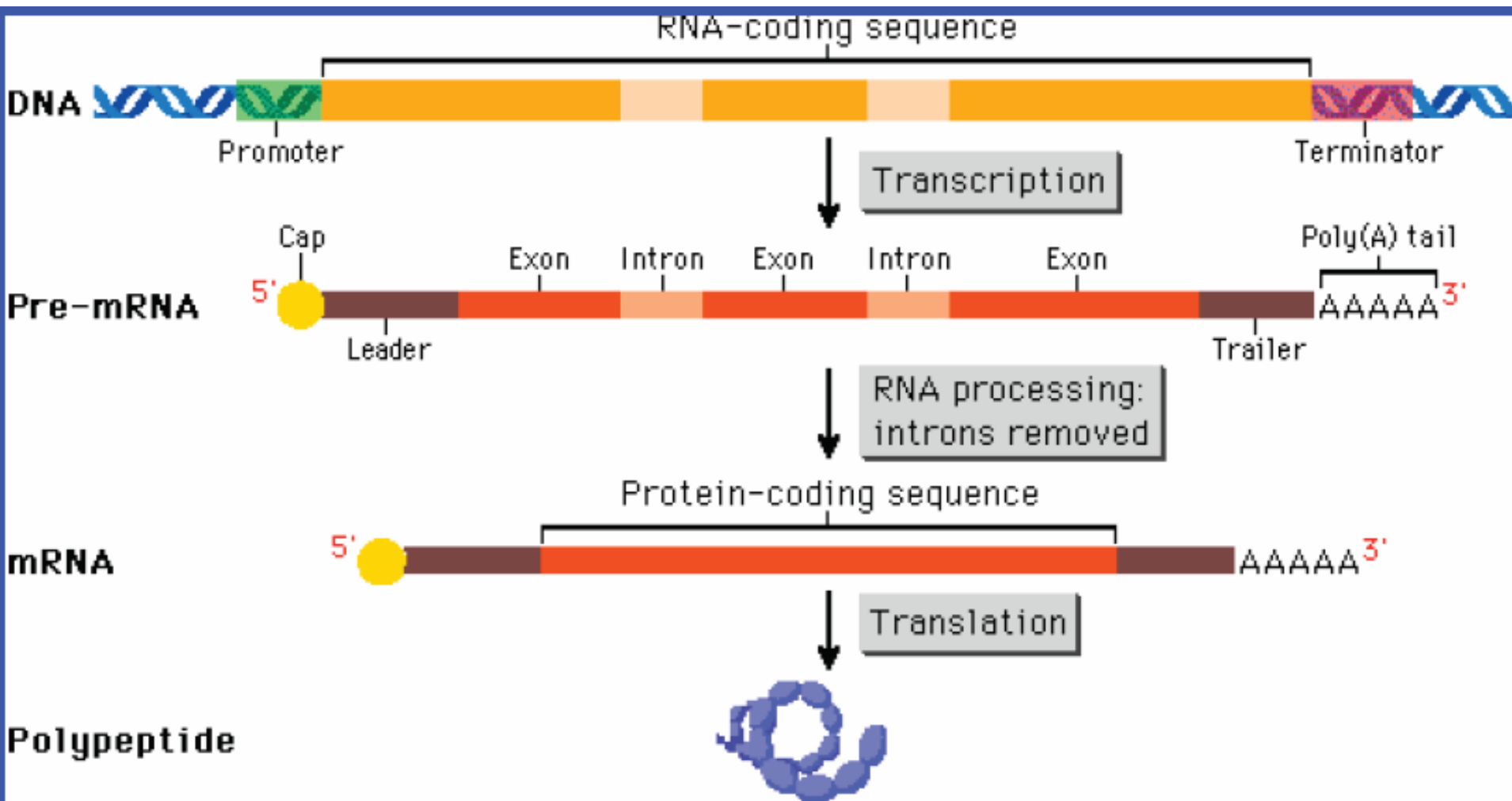
(A) **BASE EXCISION REPAIR**



(B) **NUCLEOTIDE EXCISION REPAIR**

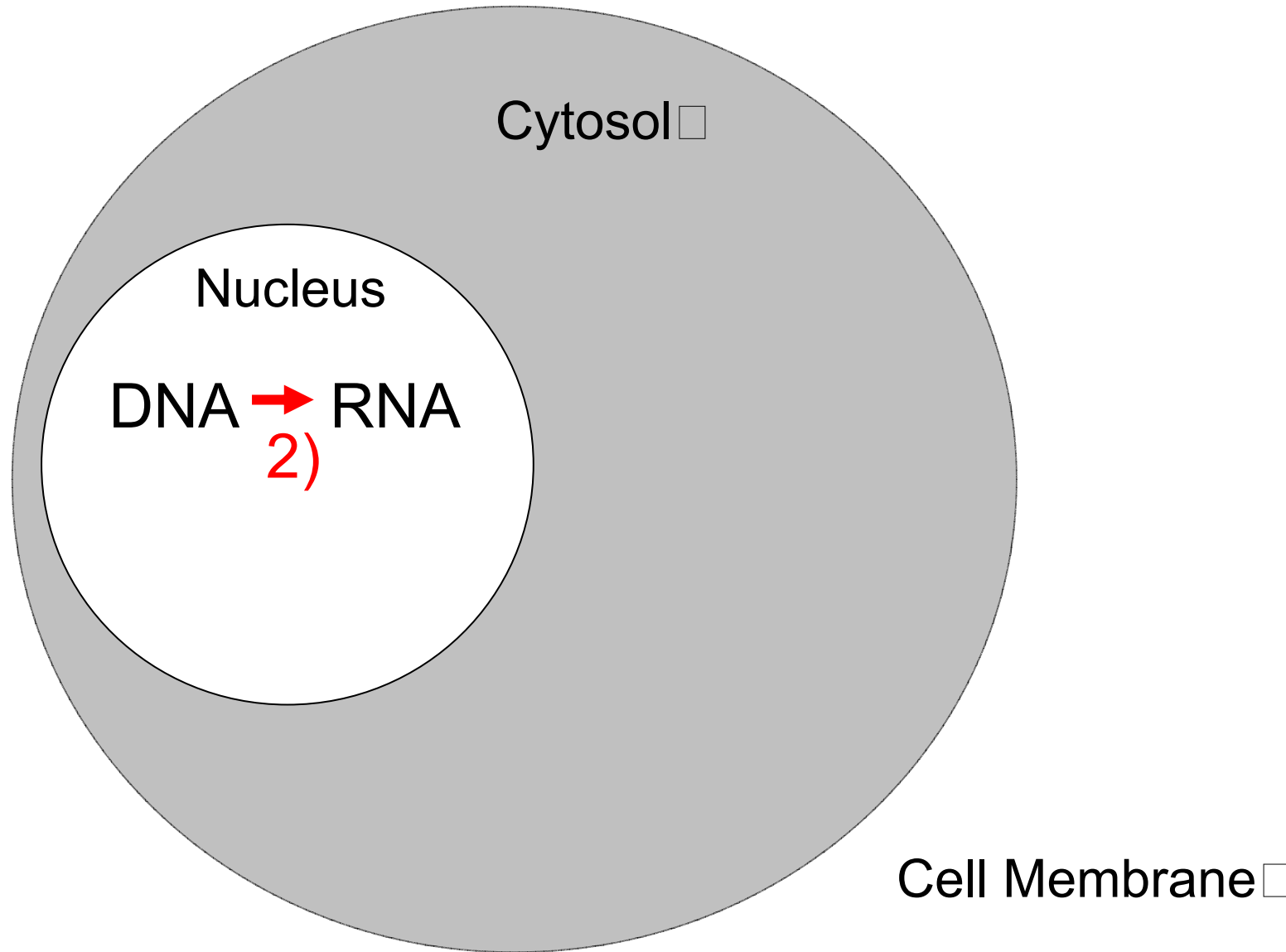


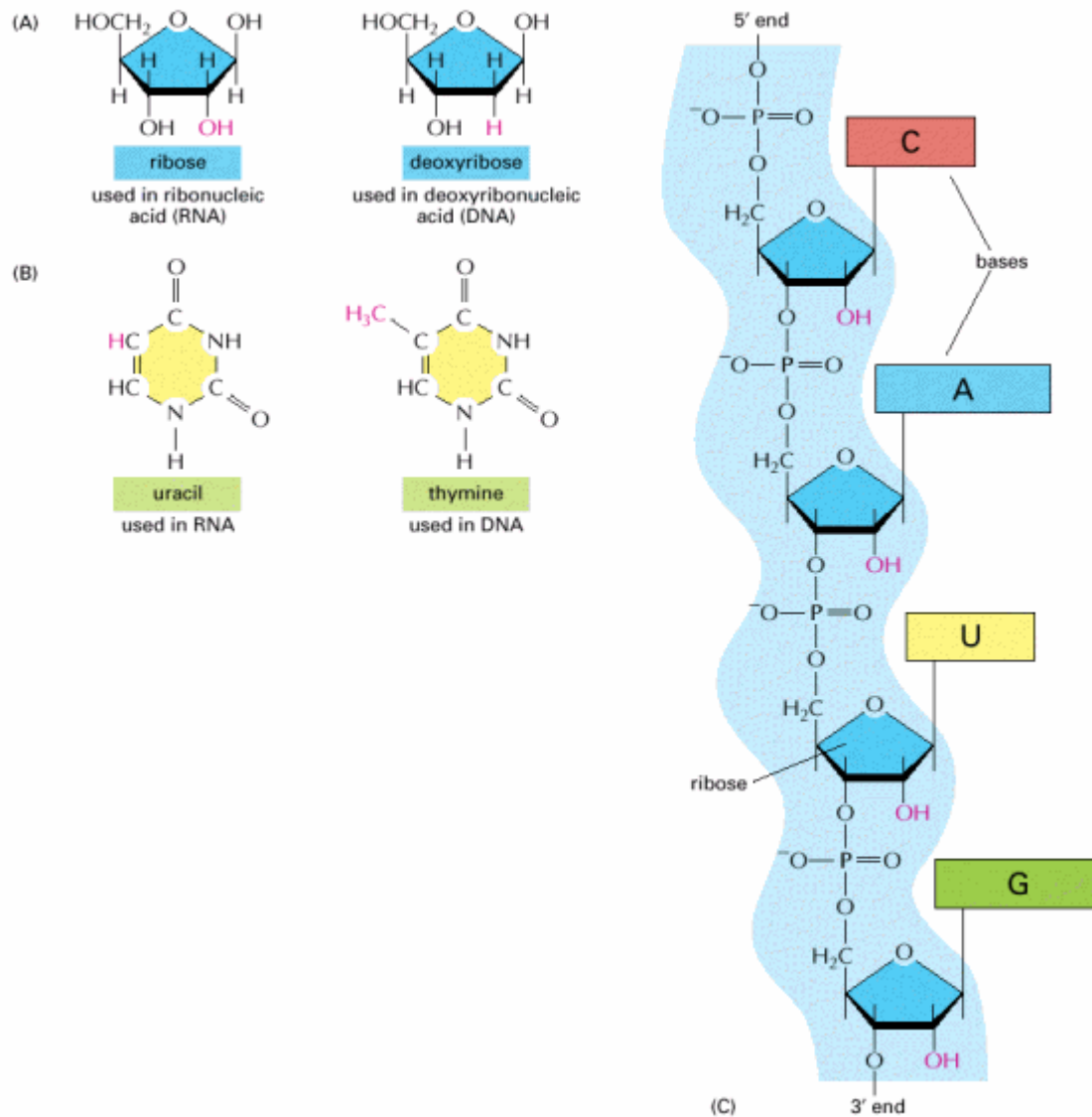
REVIEW



Courtesy of David Haussler

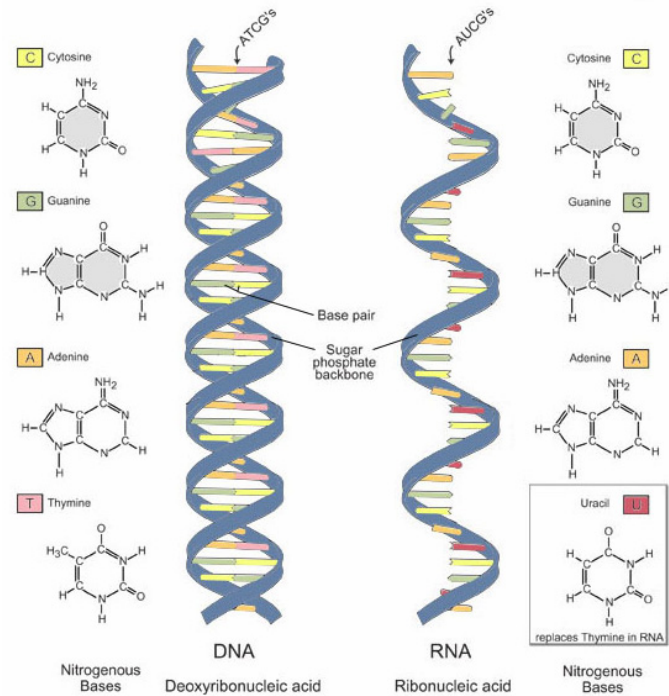
2) Transcription





Alberts Figure 6-4

RNA Basics: Read about it online at EMBL website!



DNA

Image adapted from: National Human Genome Research Institute. Talking Glossary of Genetic Terms. Available at: www.genome.gov/

RNA

Essentially identical
in all cells of an
individual

Varies with cell type,
time, stimuli

Transcription

(Using DNA as a Template to Make RNA)

(movie)

QuickTime™ and a
Animation decompressor
are needed to see this picture.

<http://www.dnai.org/a/index.html>



Transcription factors bind
at recognition site



Recruits RNA polymerase
(the enzyme that makes RNA)



Activator proteins bind to
Enhancer region and start
RNA polymerase

Transcription

(Using DNA as a Template to Make RNA)

(movie)

QuickTime™ and a
Animation decompressor
are needed to see this picture.

<http://www.dnai.org/a/index.html>

