

DNA Replication & Cell Cycle    pcarpenter@med-pathway.com



medpathwaymcat

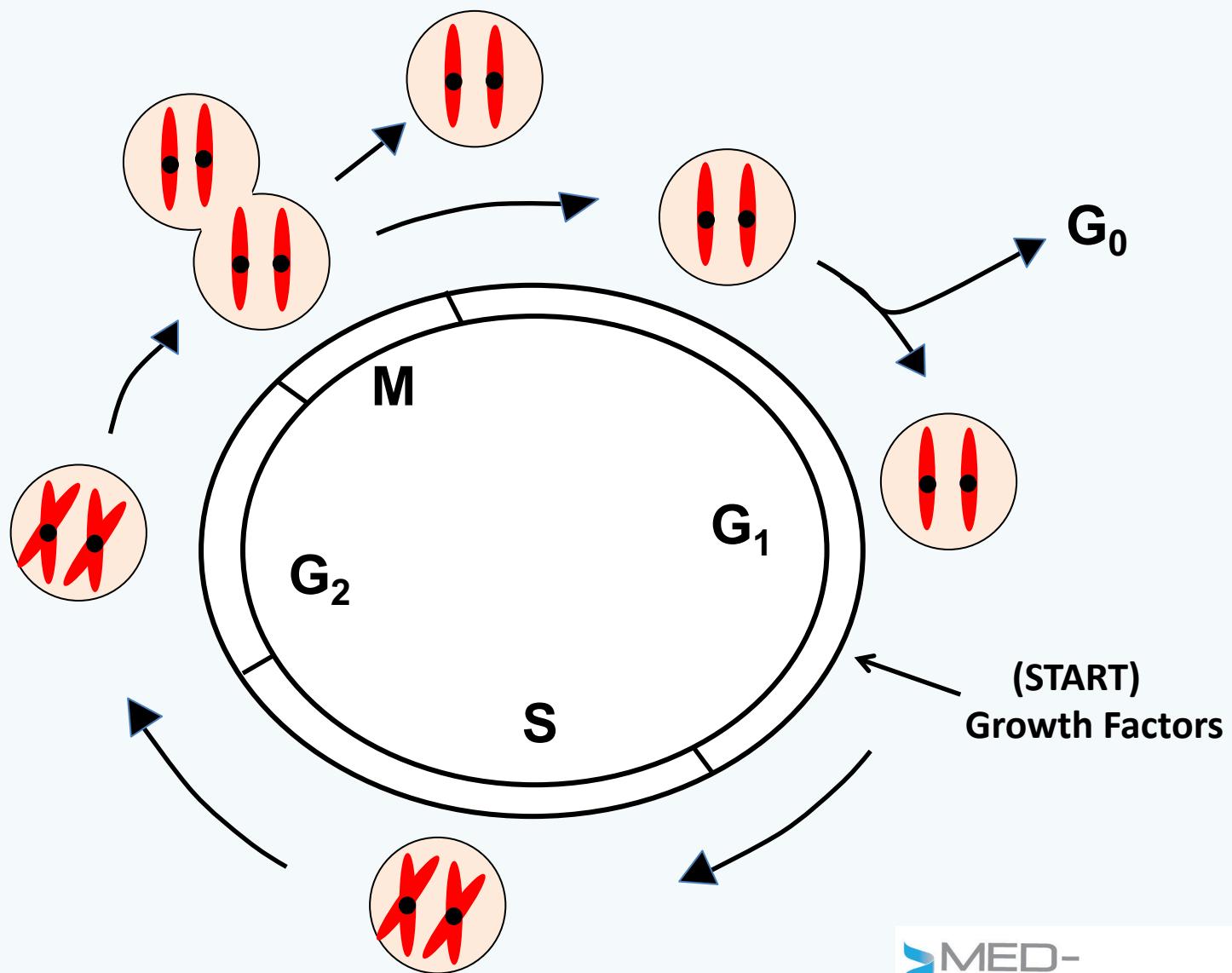


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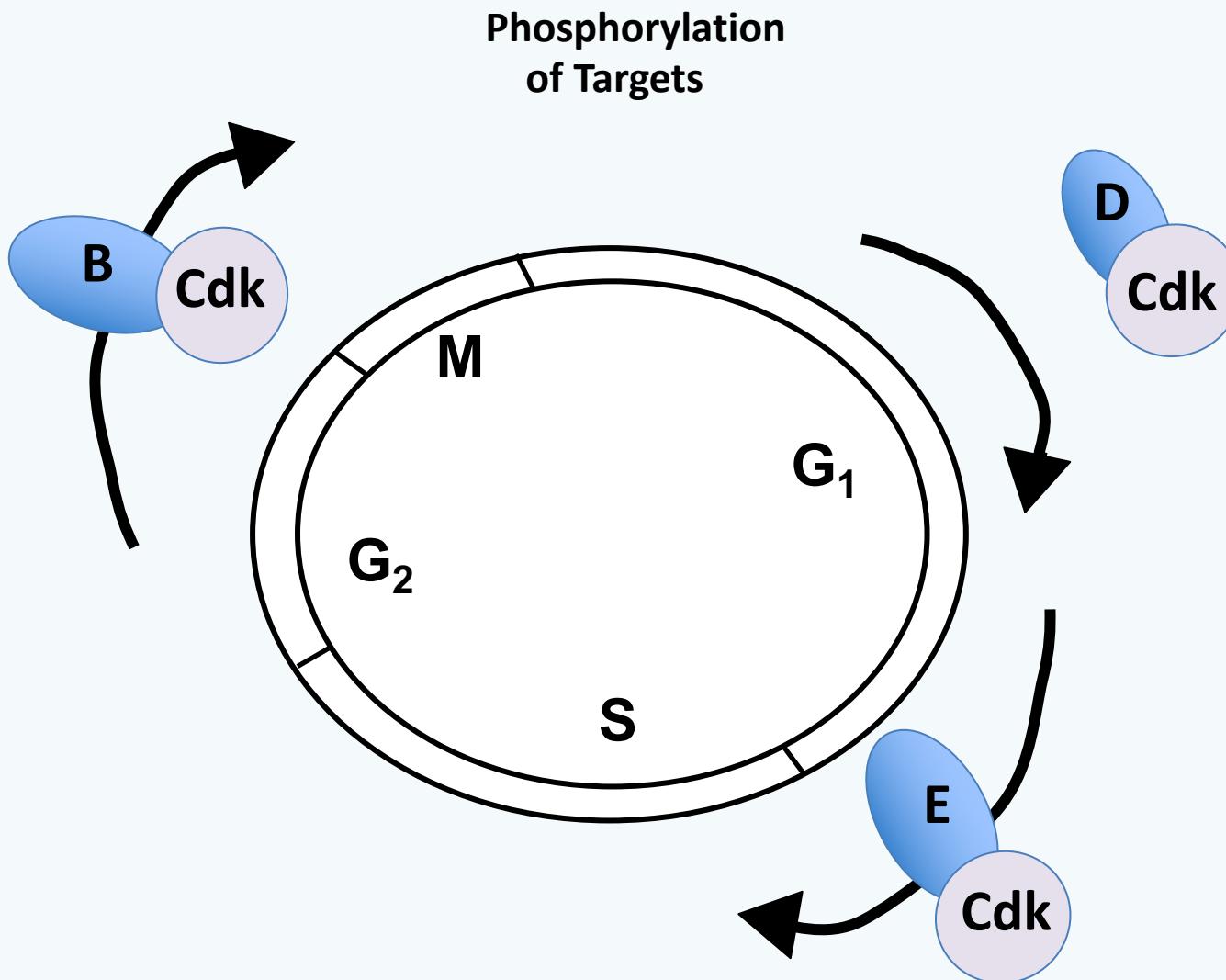


Your online MCAT Prep testing center developed  
by medical school professors

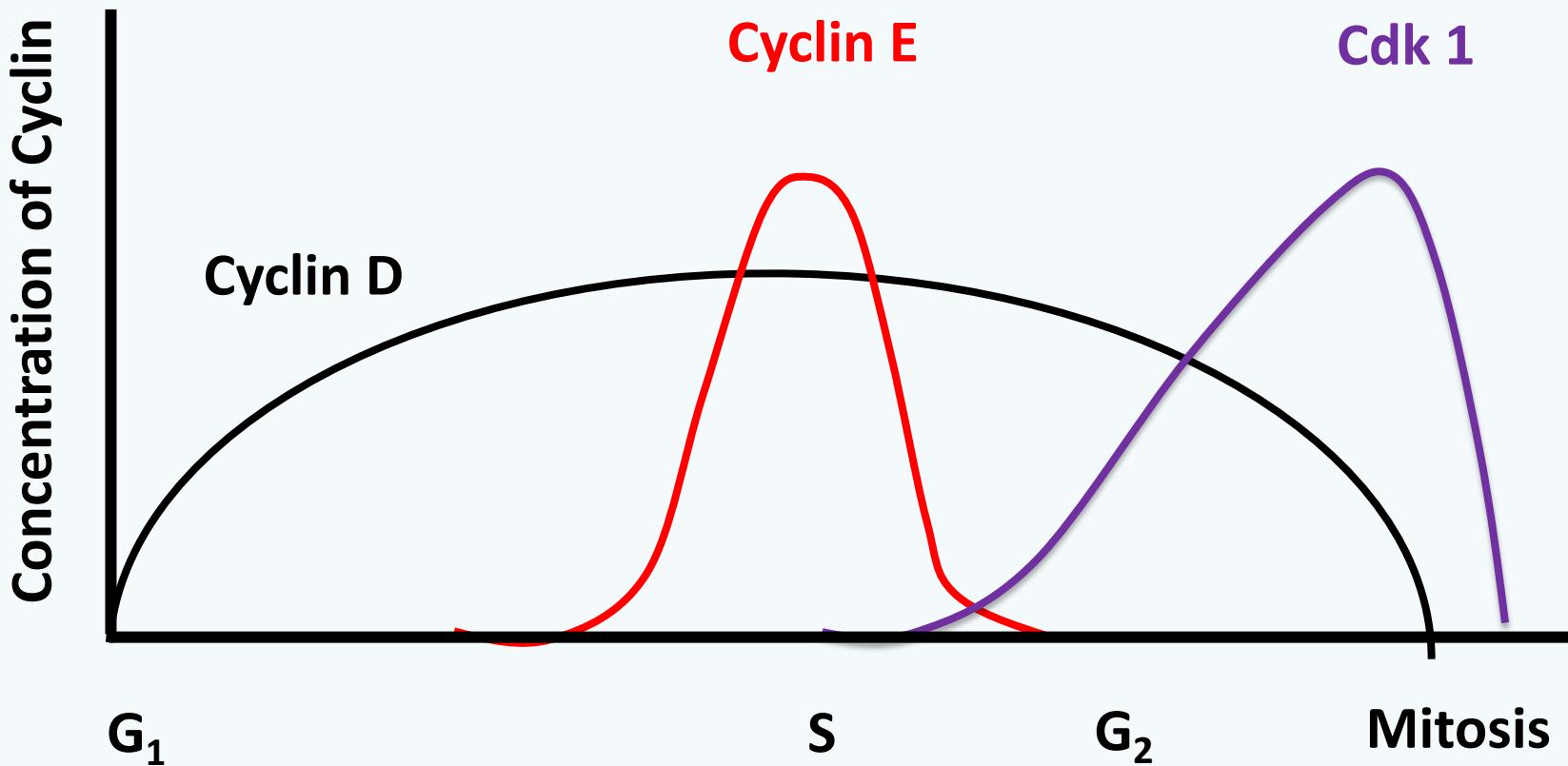
# The Cell Cycle



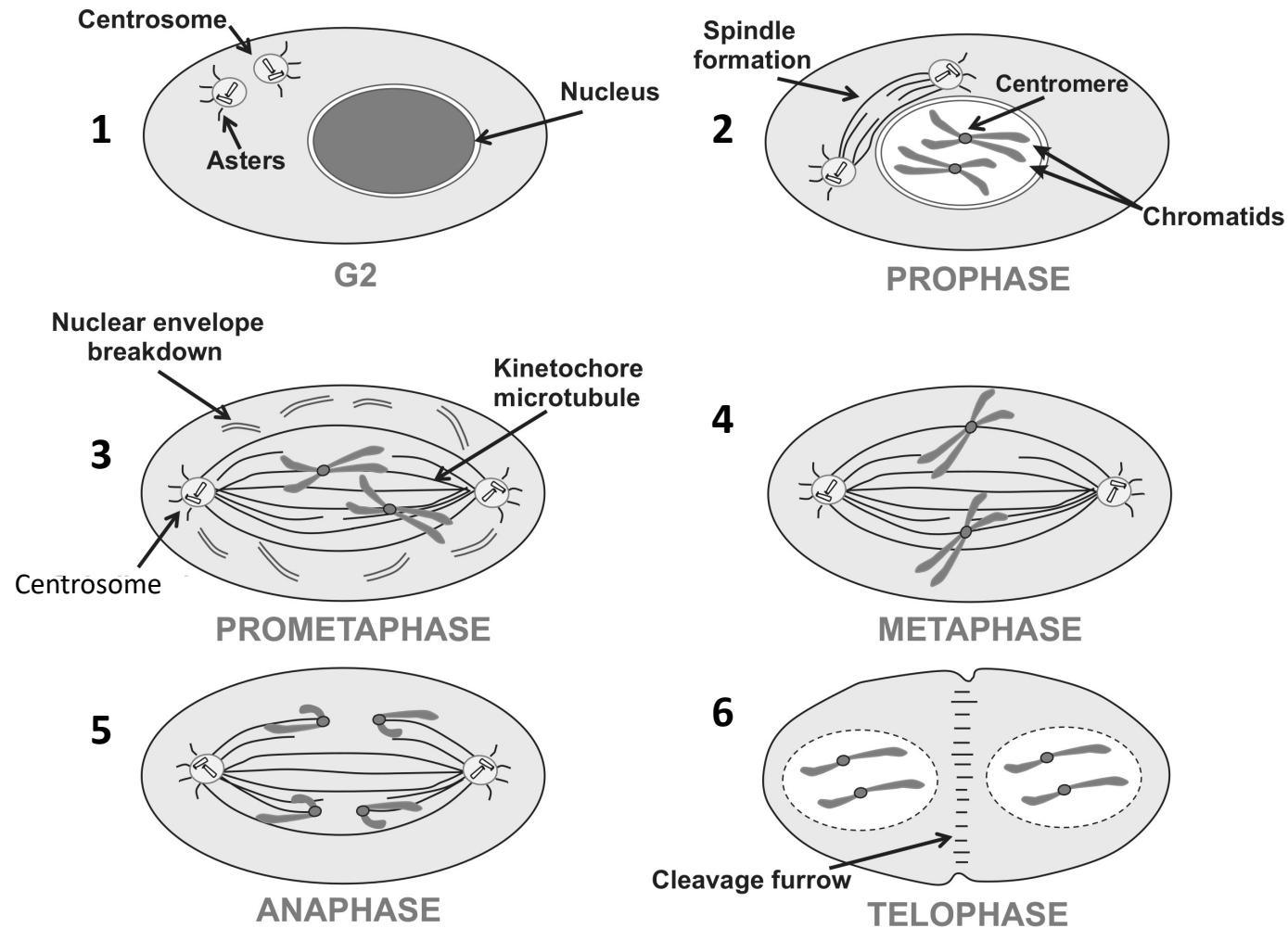
# Cyclin Dependent Kinases



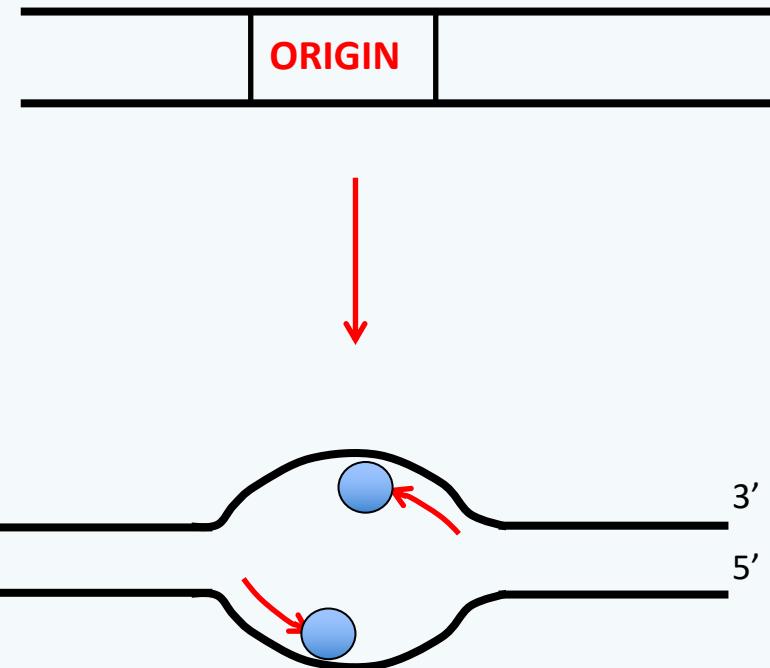
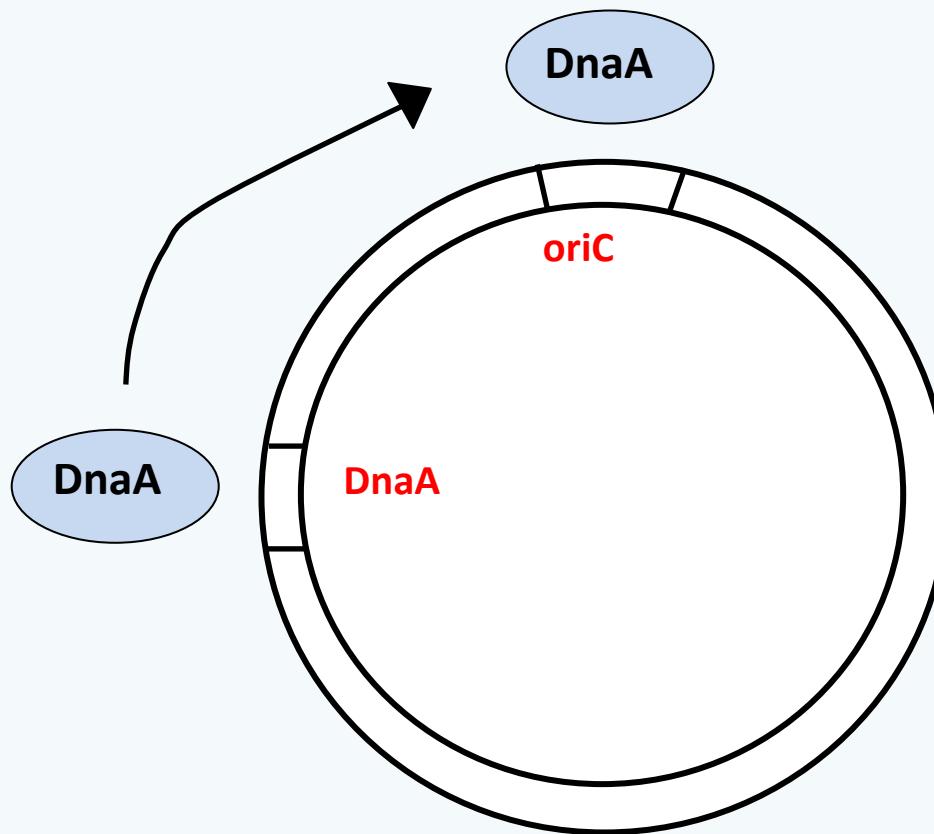
# Cyclin Dependent Kinases



# MITOSIS



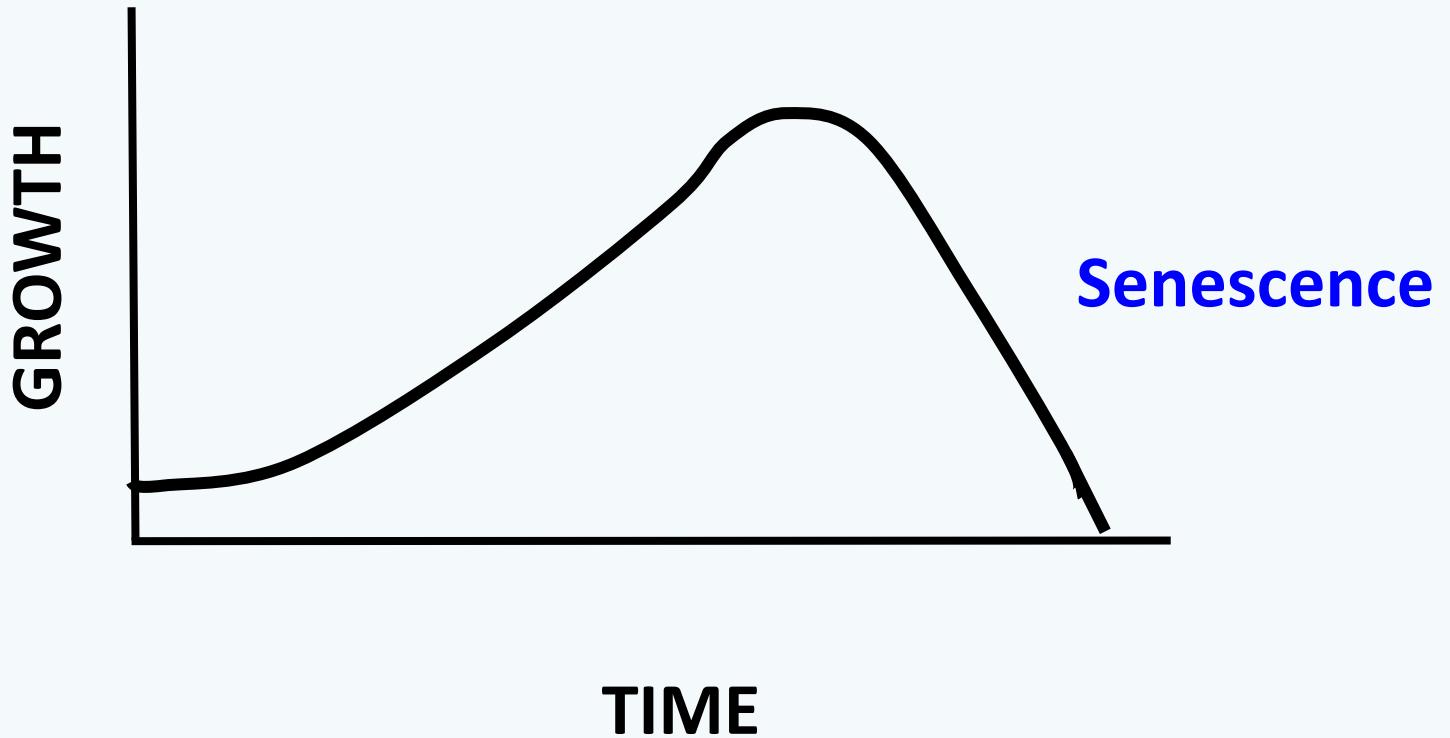
# ORIGINS OF REPLICATION



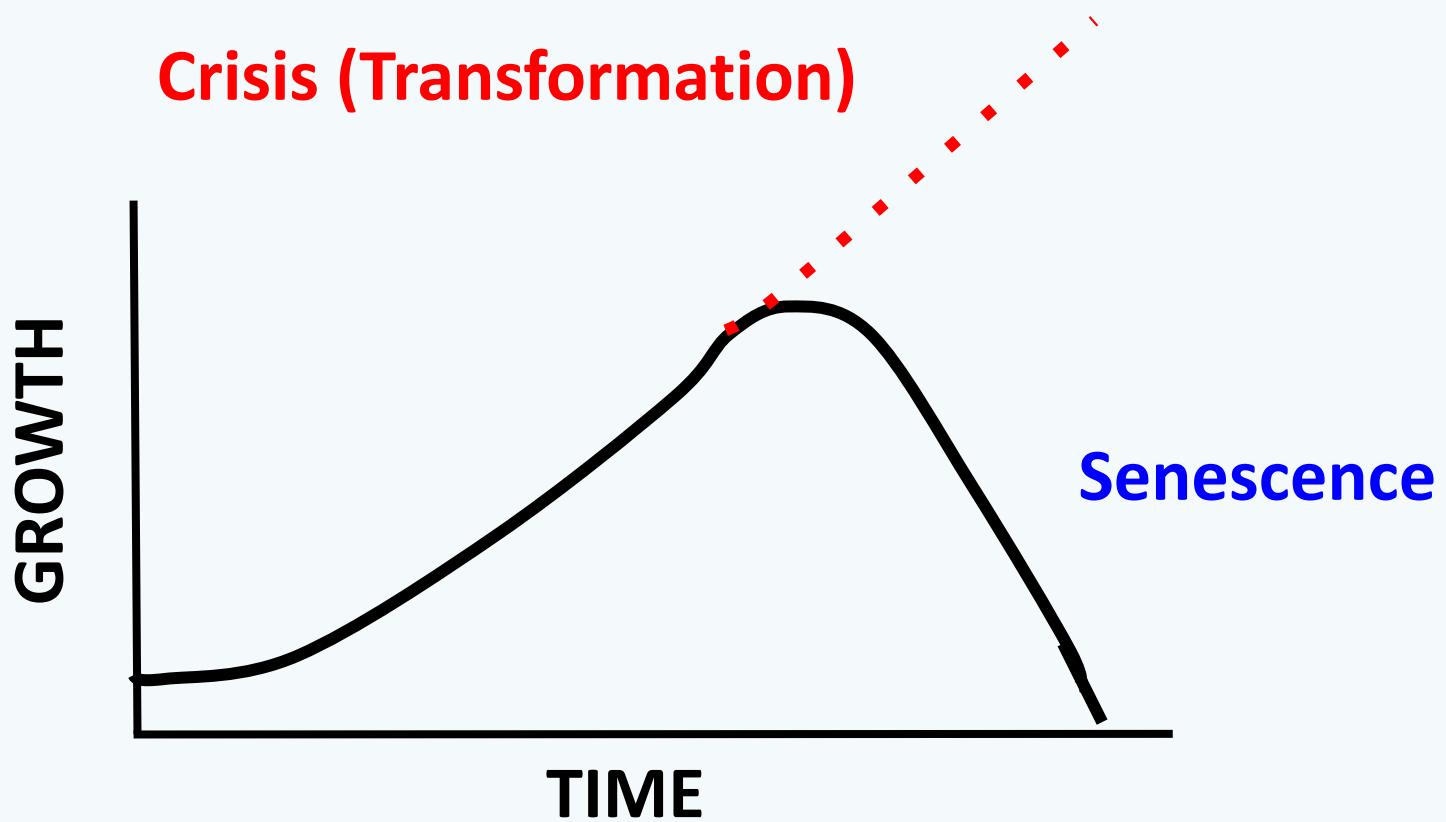
The Replicator Hypothesis

# The Hayflick Limit

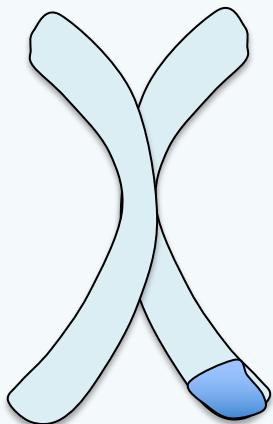
Finite Replicative Capacity of Cells



# Cellular Transformation



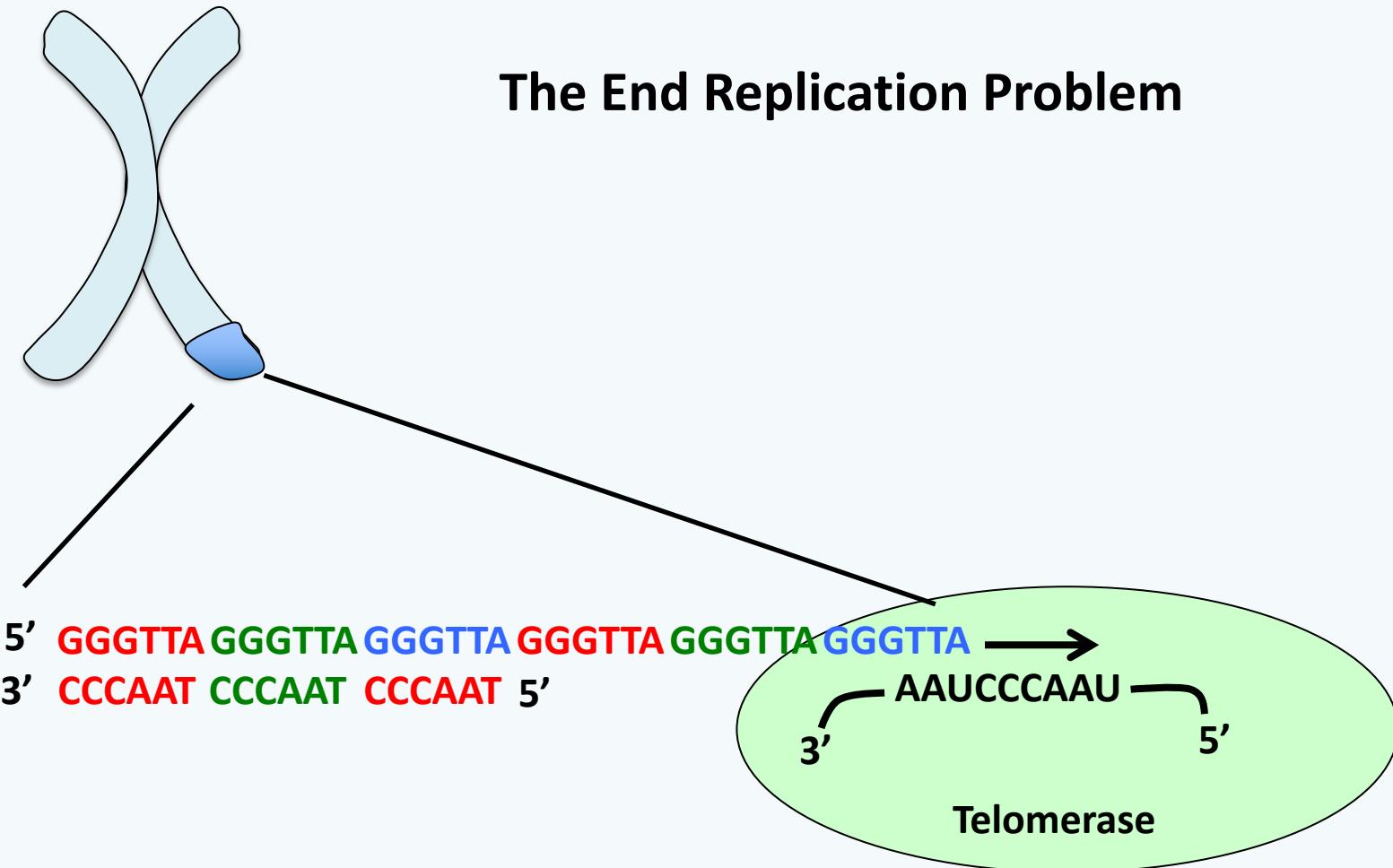
# TELOMERES



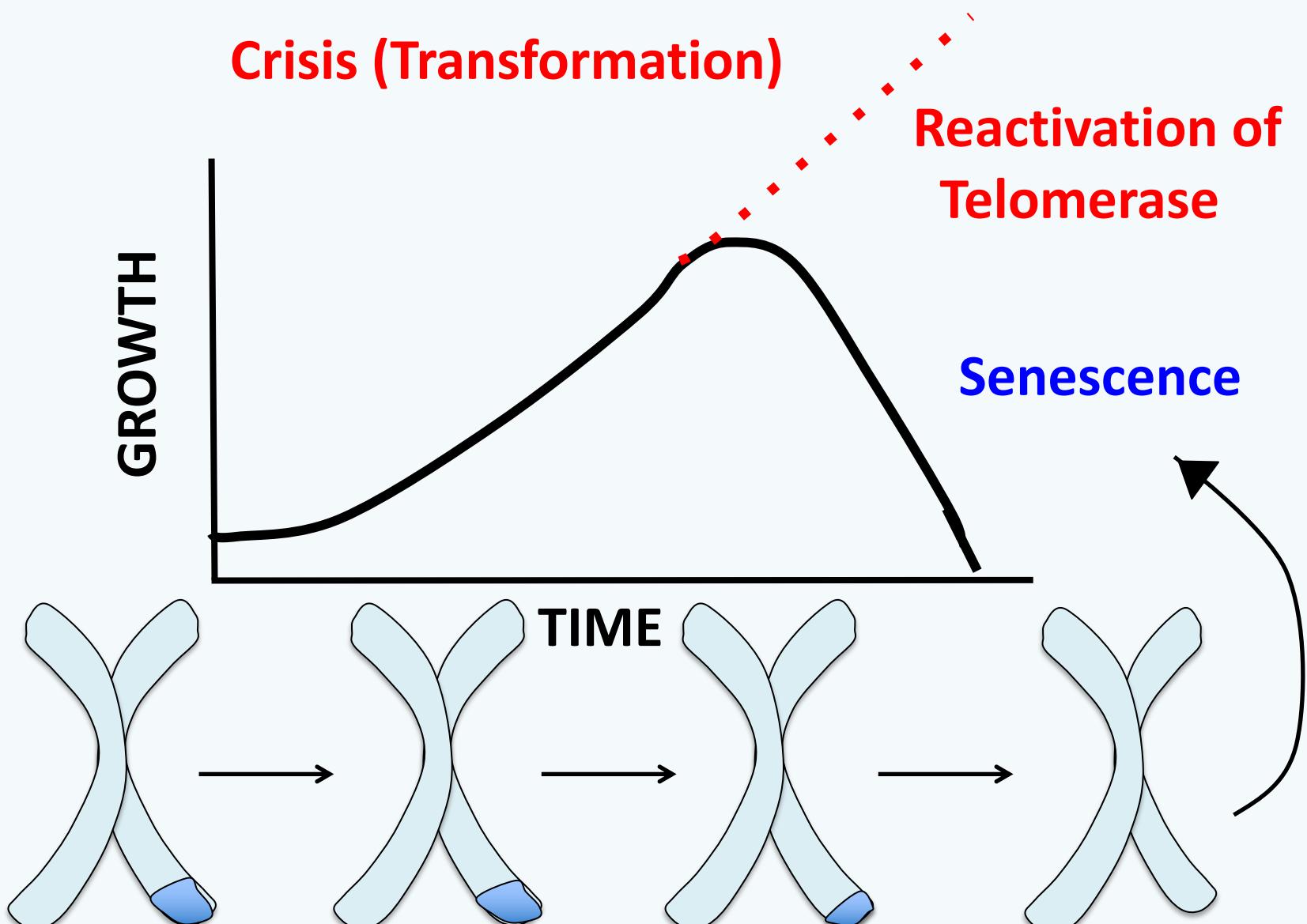
## The End Replication Problem

5' GGGTTA GGGTTA GGGTTA GGGTTA GGGTTA GGGTTA 3' →  
3' CCCAAT CCCAAT CCCAAT 5'

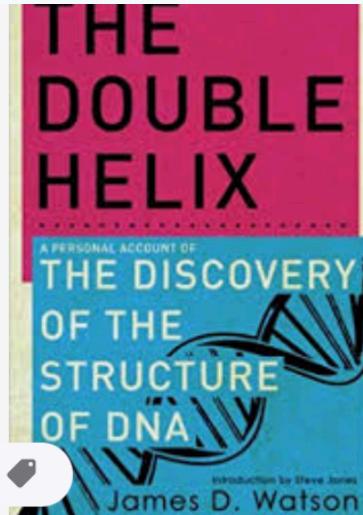
# TELOMERES



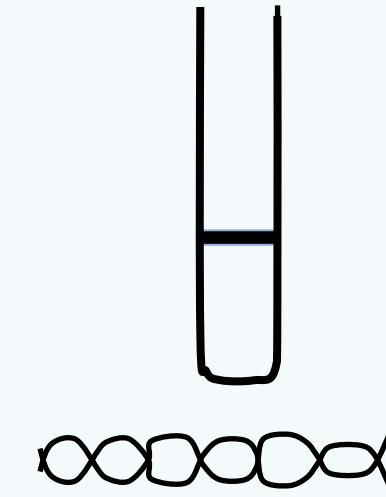
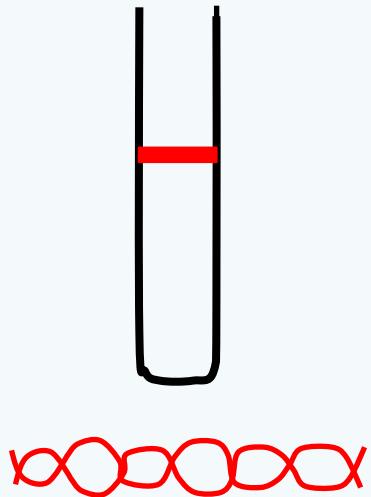
# Cellular Transformation



# Meselson Stahl Experiment

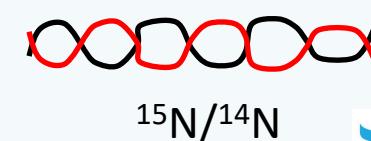
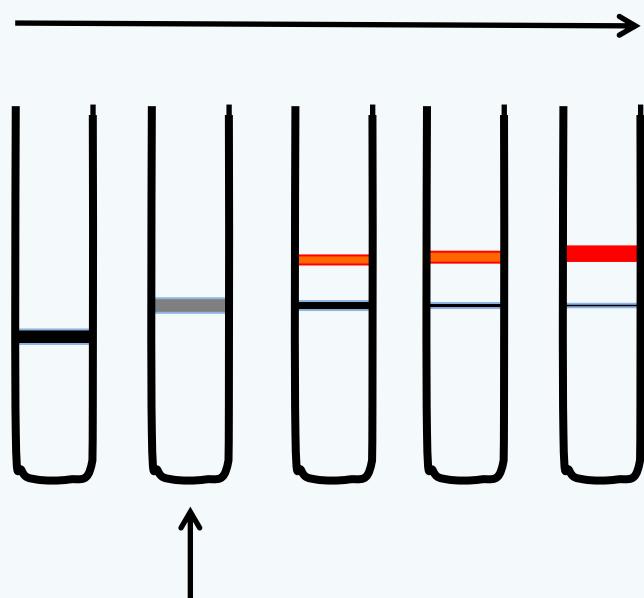


Semi Conservative Replication

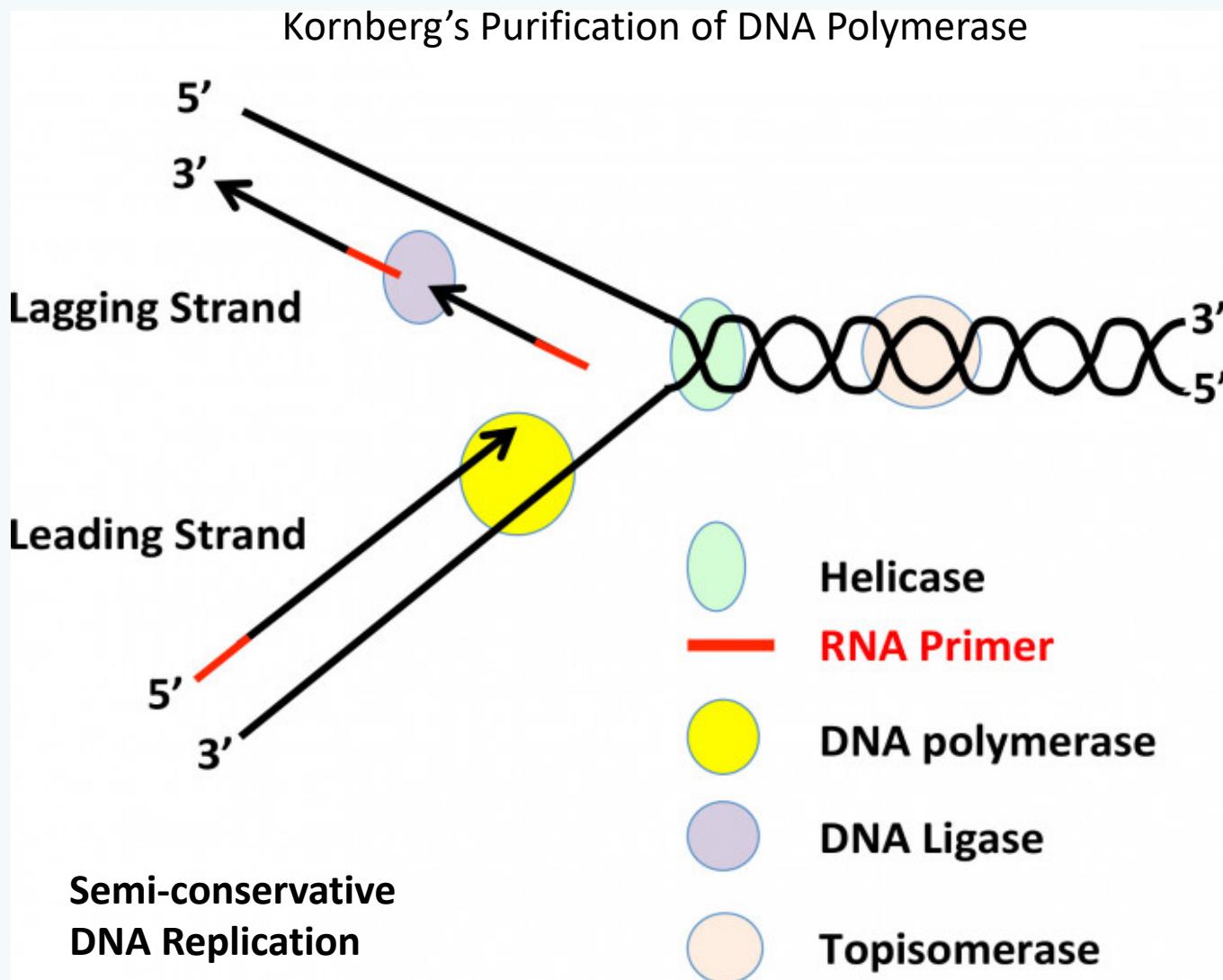


1. Grow Cells in  $^{15}\text{N}$  media
2. Transfer to  $^{14}\text{N}$  media and Monitor cell divisions

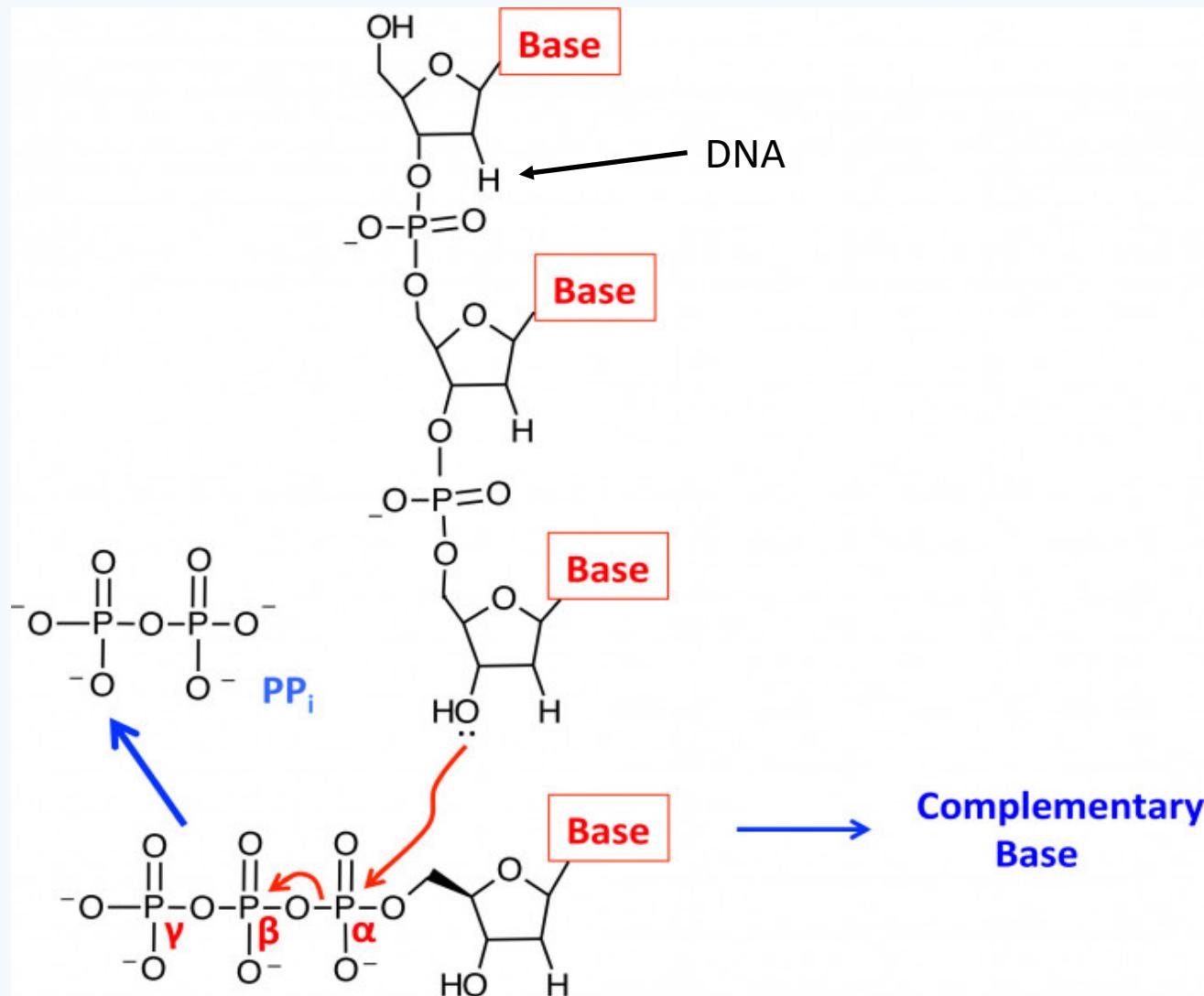
Time



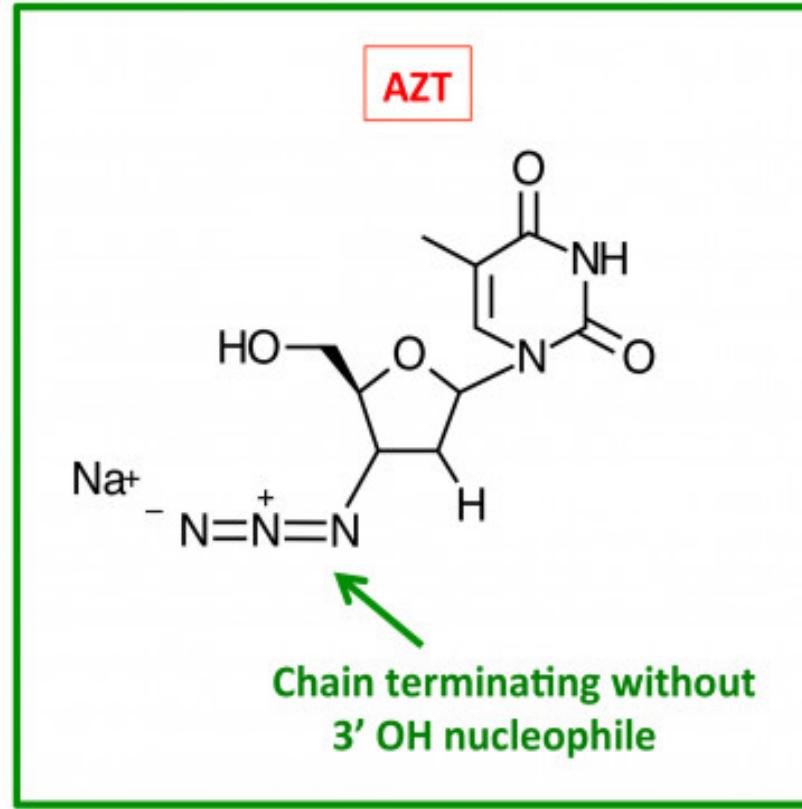
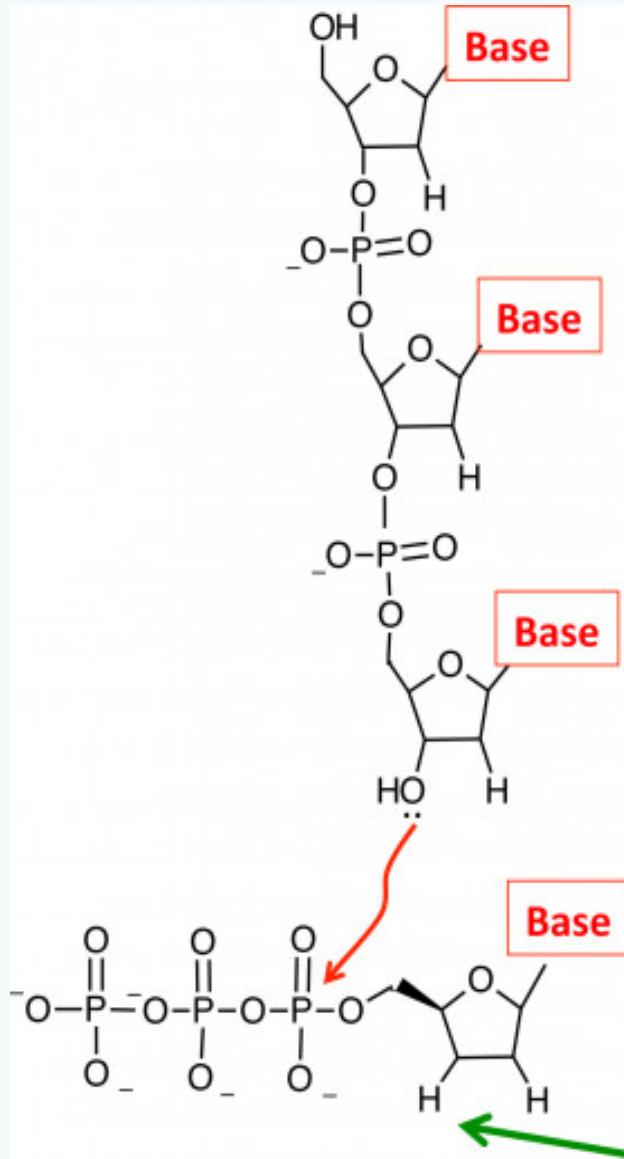
# DNA Replication Fork



# DNA Polymerization



# Chain Terminators



Complementary  
Base

Chain terminating without  
3' OH nucleophile

# Sanger DNA Sequencing

1.

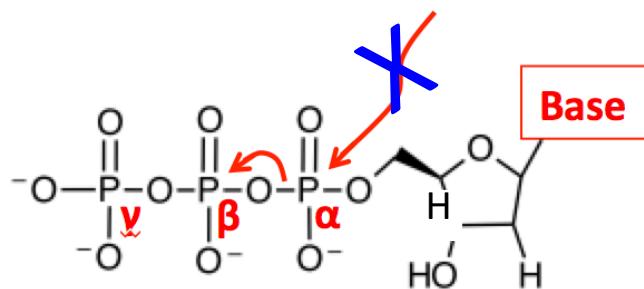
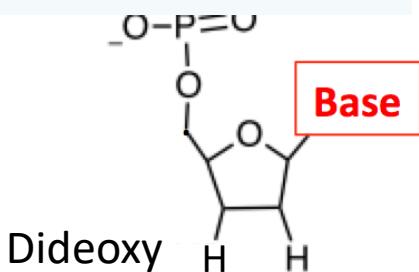
2.

Template  
DNA

DNA polymerase  
5' oligo primer  
dNTPs and buffer

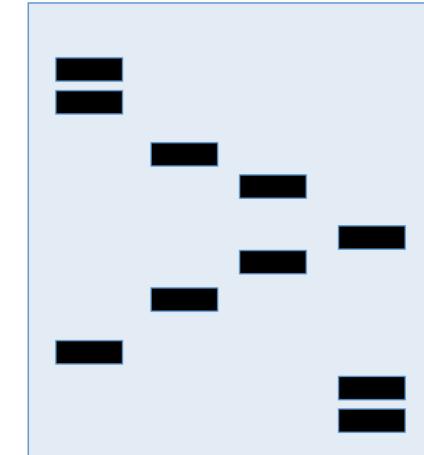
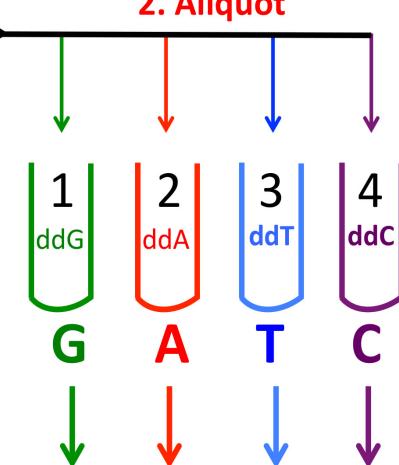
1. Mix

2. Aliquot

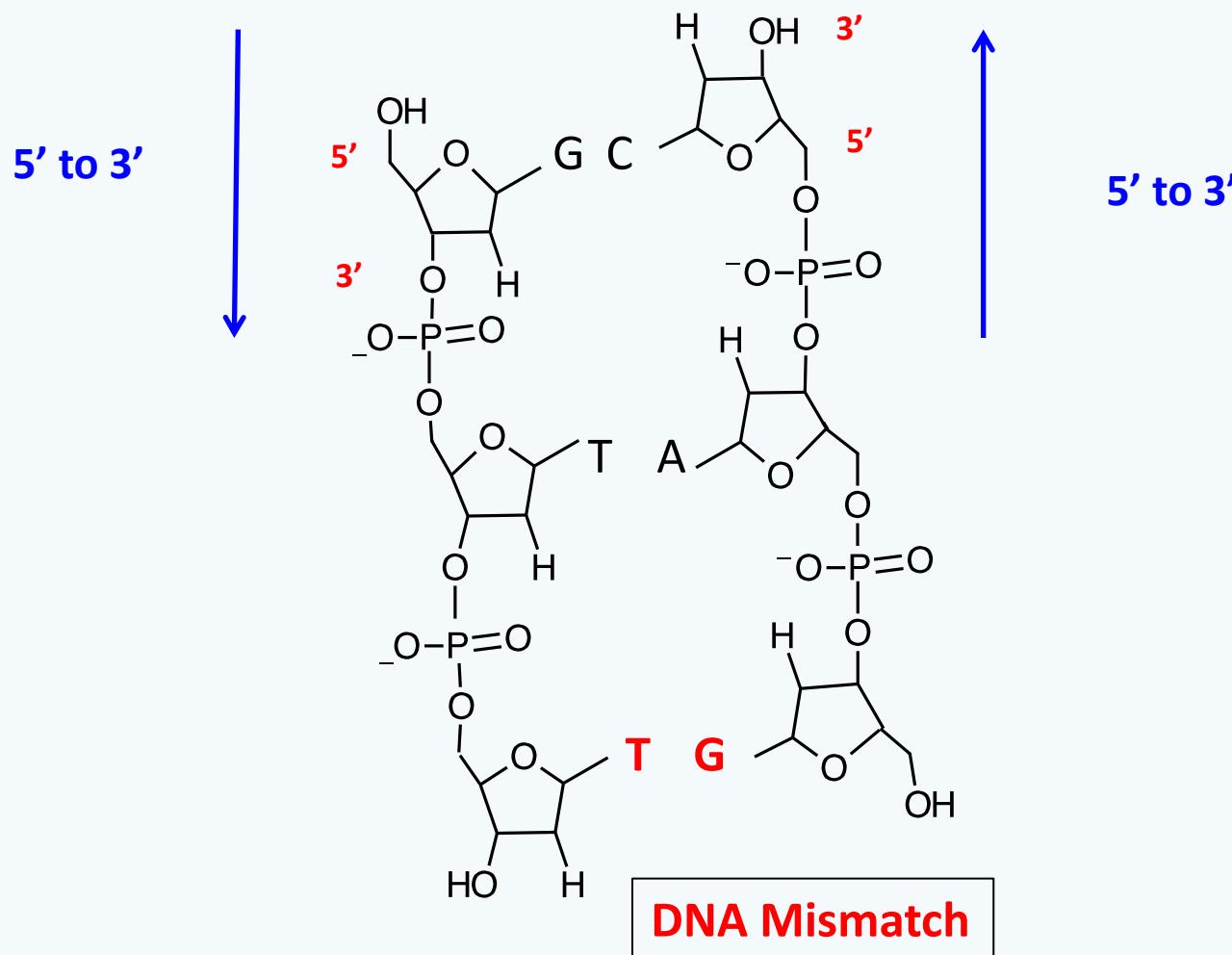


Nested fragments generated  
in Tubes 1-4

$5'**\text{-CCGATCTAGG-3}'$   
 $5'**\text{-CCGATCTAG-3}'$   
 $5'**\text{-CCGATCTA-3}'$   
 $5'**\text{-CCGATCT-3}'$   
 $5'**\text{-CCGATC-3}'$   
 $5'**\text{-CCGAT-3}'$   
 $5'**\text{-CCGA-3}'$   
 $5'**\text{-CCG-3}'$   
 $5'**\text{-CC-3}'$   
 $5'**\text{-C-3}'$

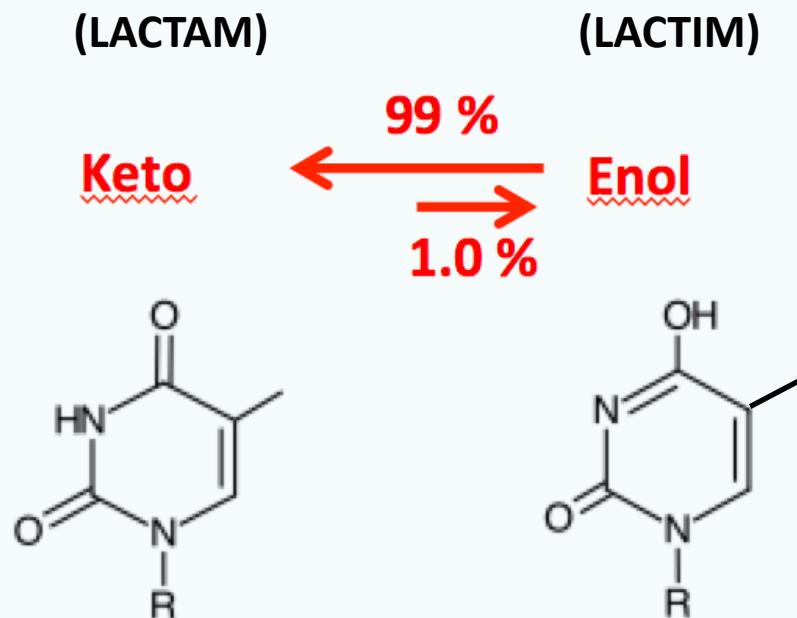


# DNA Structure & Mutation



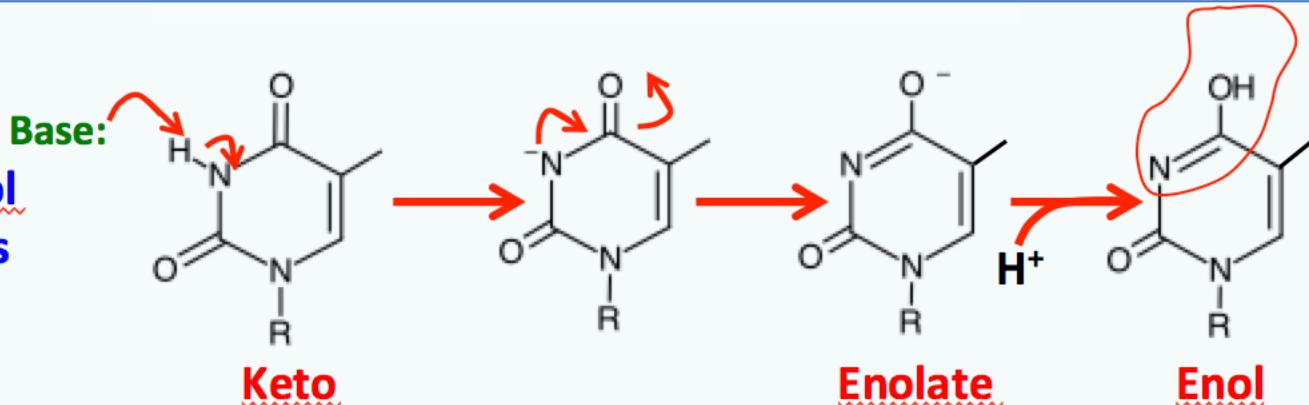
# DNA Structure & Mutation: Tautomers

## A. Equilibrium between keto and enol forms of Thymine

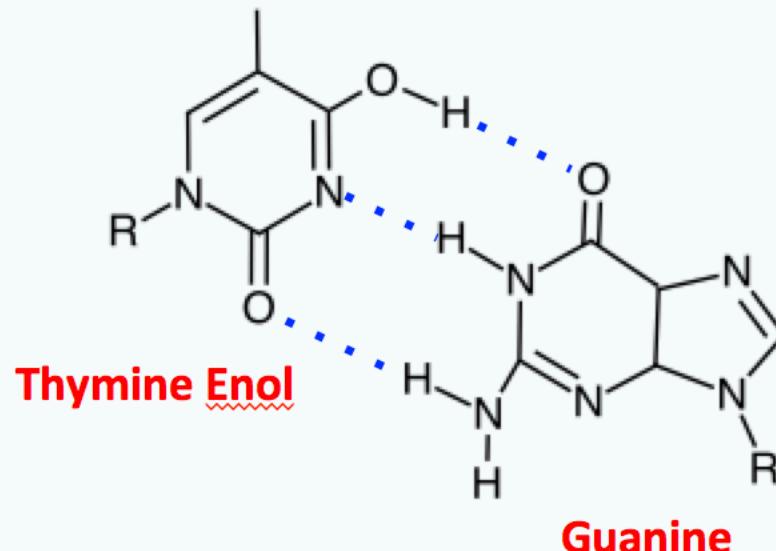


# Tautomers & Mutations

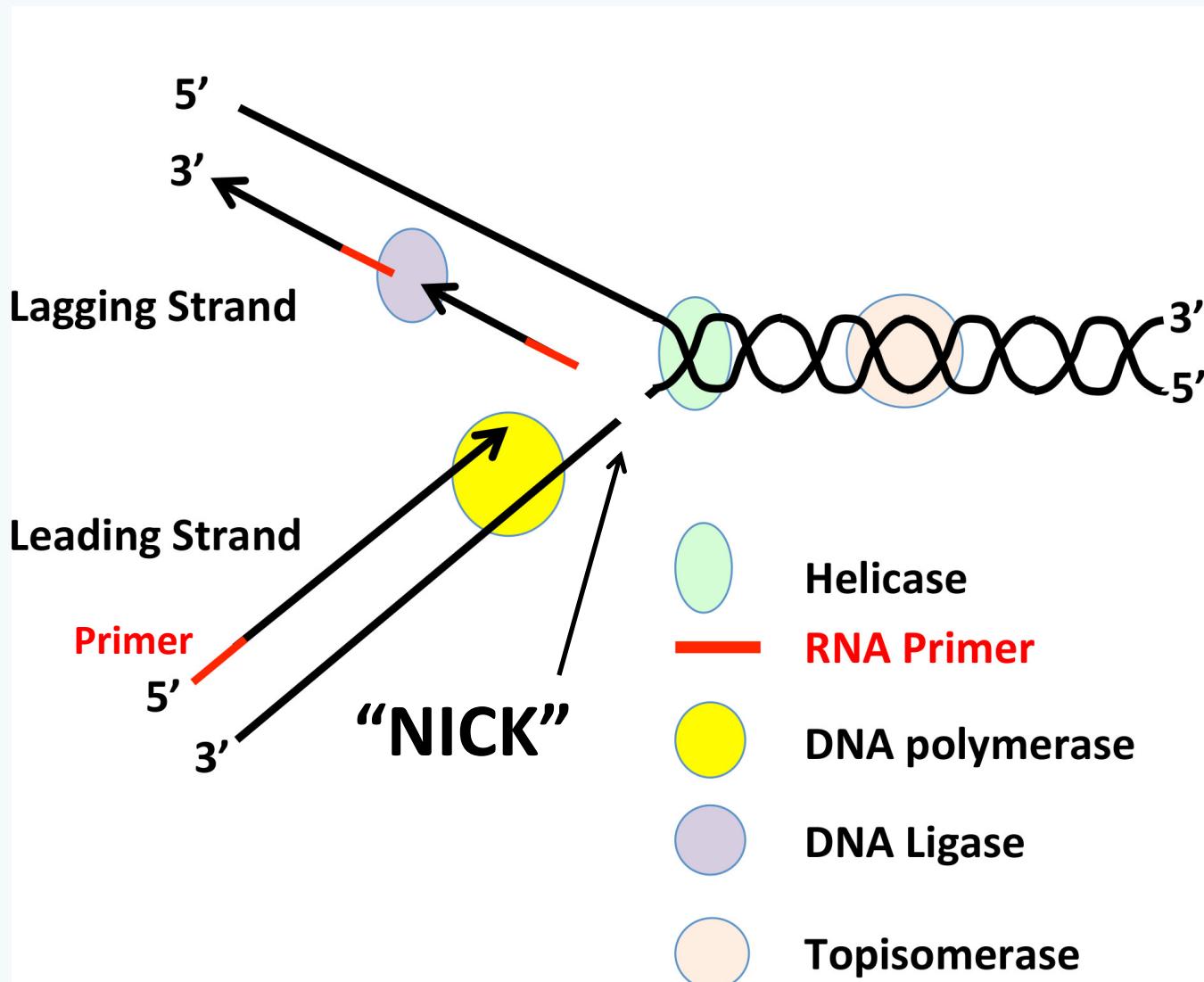
B. Mechanism of enol formation involves an acidic proton



C. Enol form of Thymine can H bond to Guanine and cause mutations

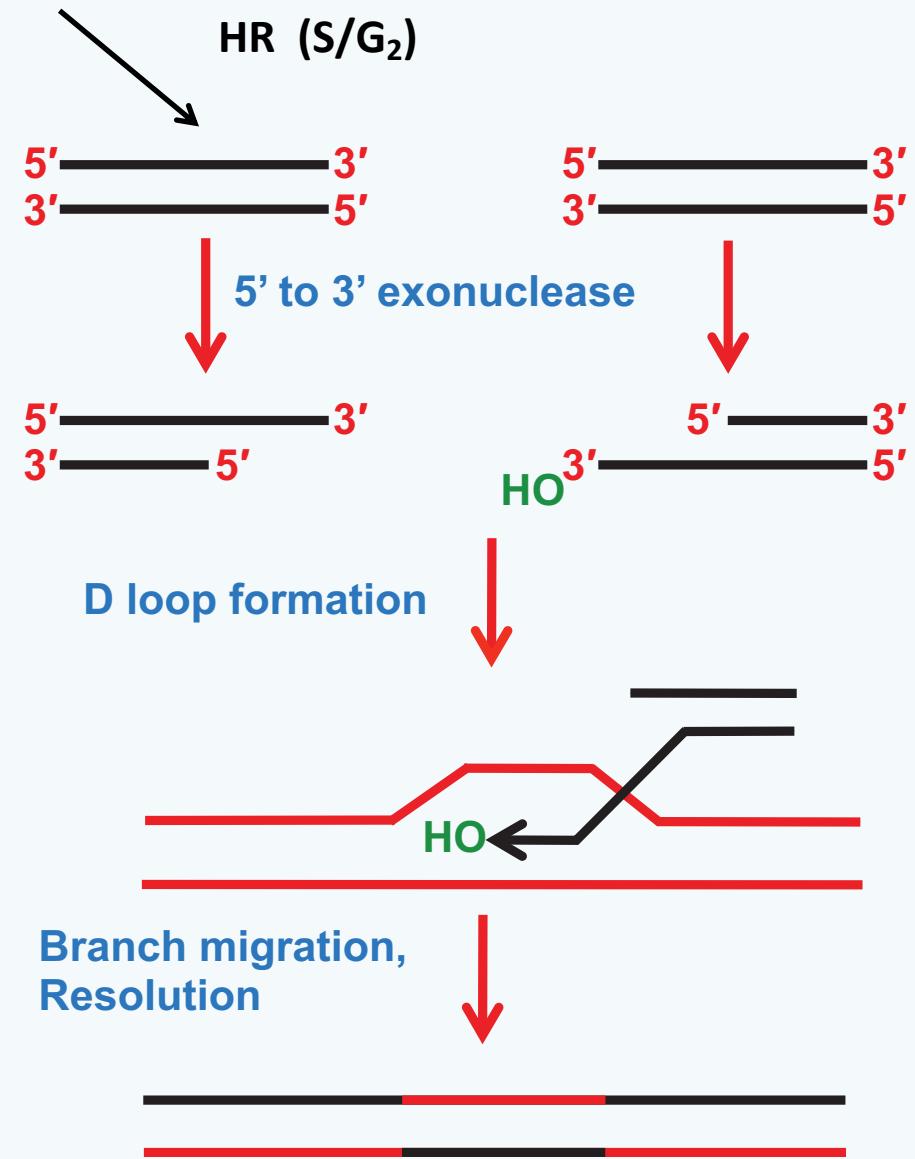


# DNA Replication & DNA breaks

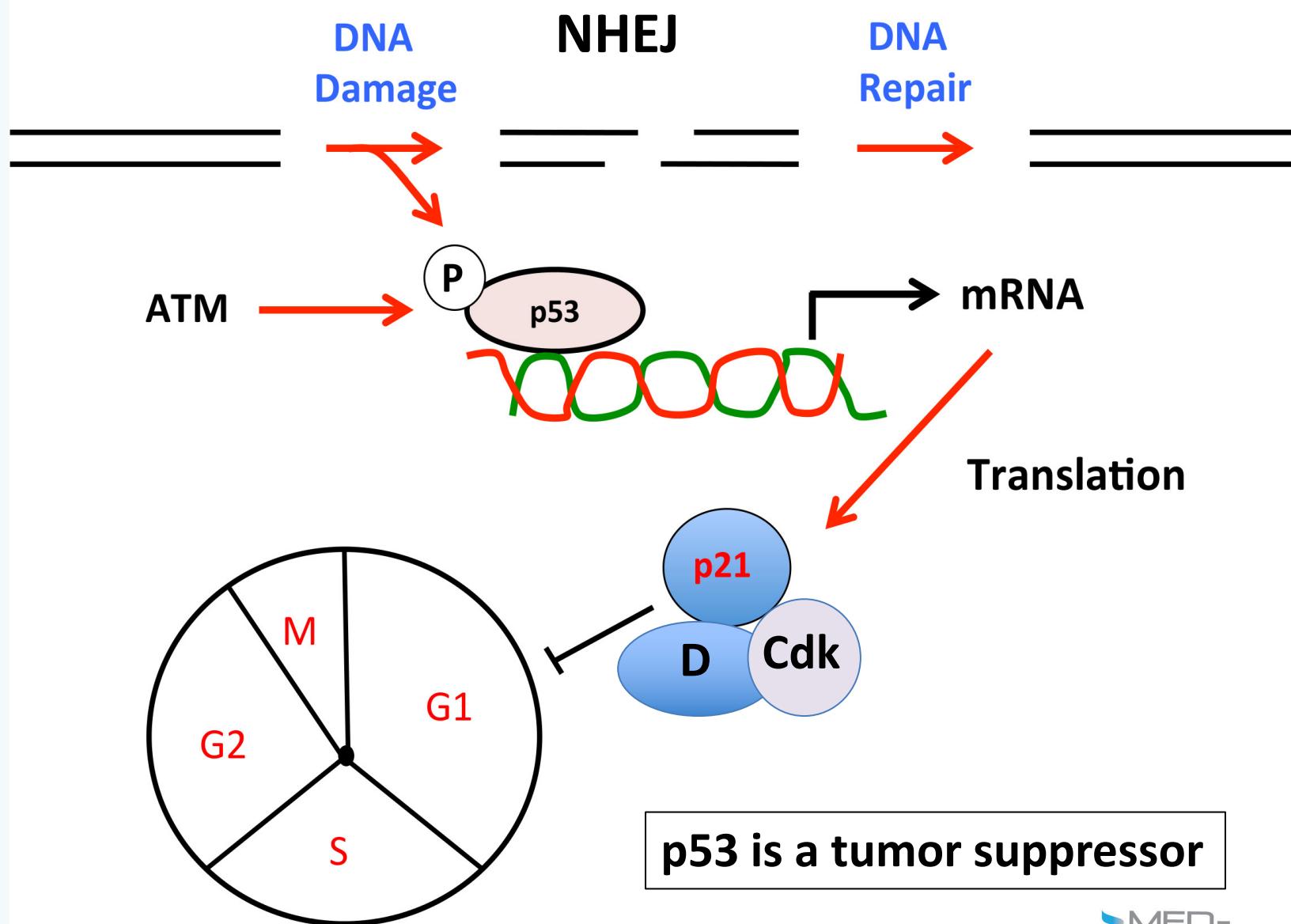


# Fixing The DNA Breaks (S/G<sub>2</sub>)

## DSB Repair

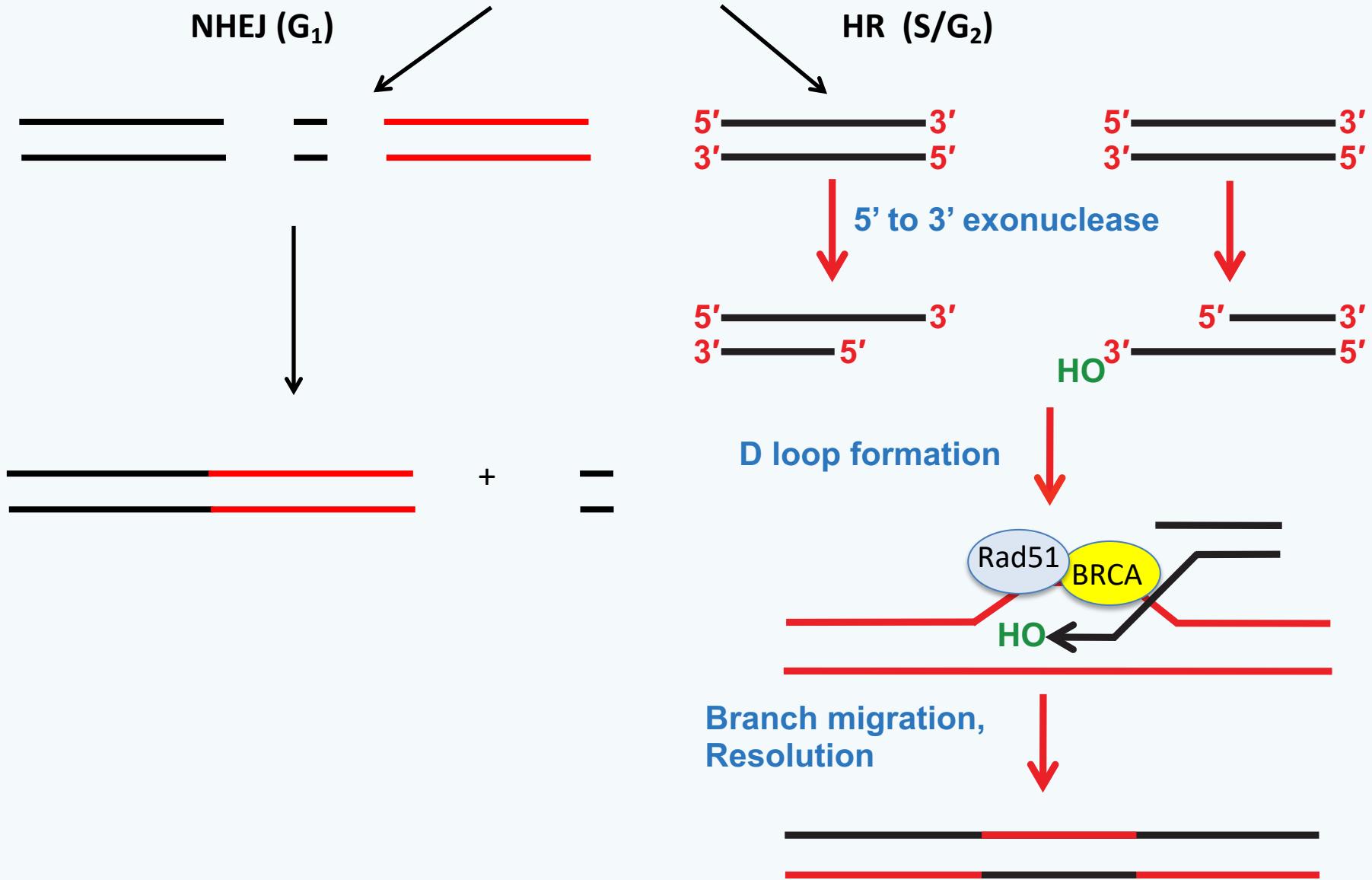


# Fixing The Break In G<sub>1</sub>



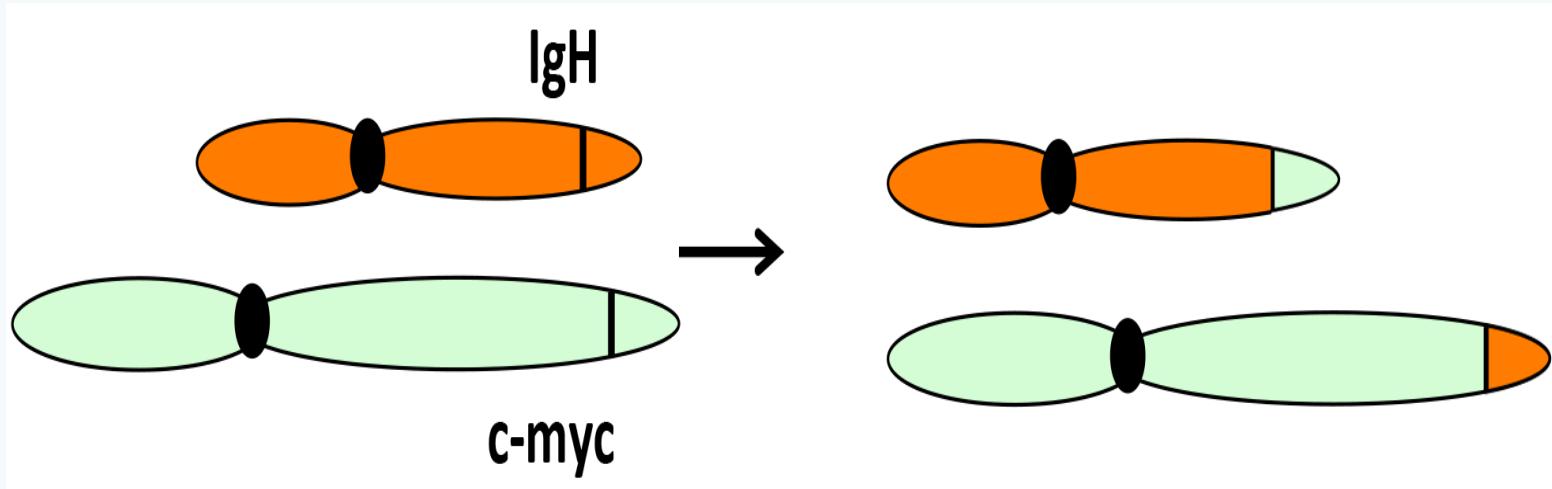
# Fixing The DNA Breaks

## DSB Repair

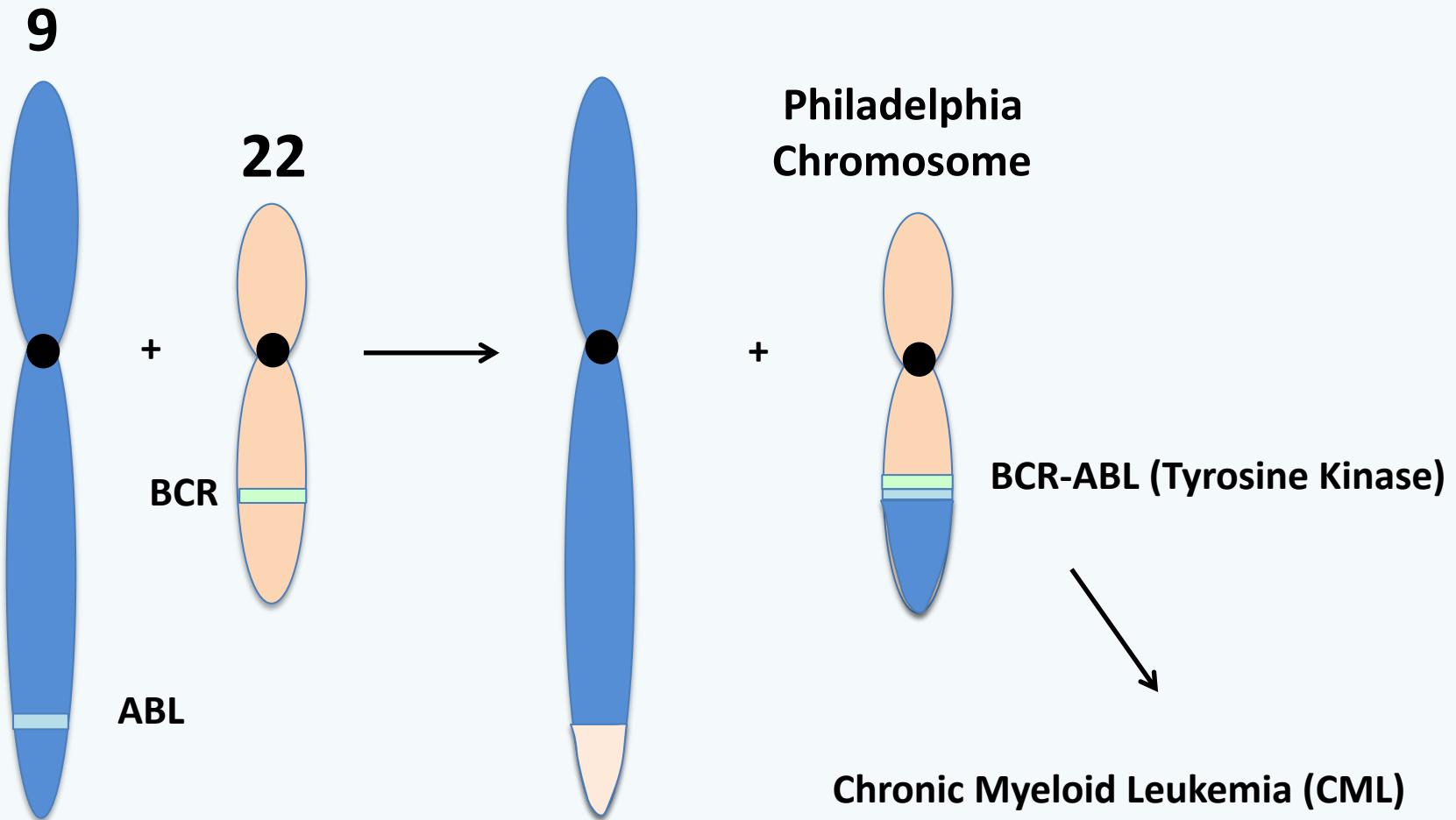


# Translocations Drive Oncogenesis

## Burkitt Lymphoma



# BCR-ABL



AA

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MY TESTS



AVAILABLE TESTS



WORKSHOPS



TEST RESULTS



MY ACCOUNT

