

MOD1 – DNA ENGINEERING

Bevin Engelward, Agi Stachowiak, David Weingeist

Writing Instructor: Neal Lerner

Oral Presentation Instructor: Atissa Banuazizi

Spring 2008

Day 5

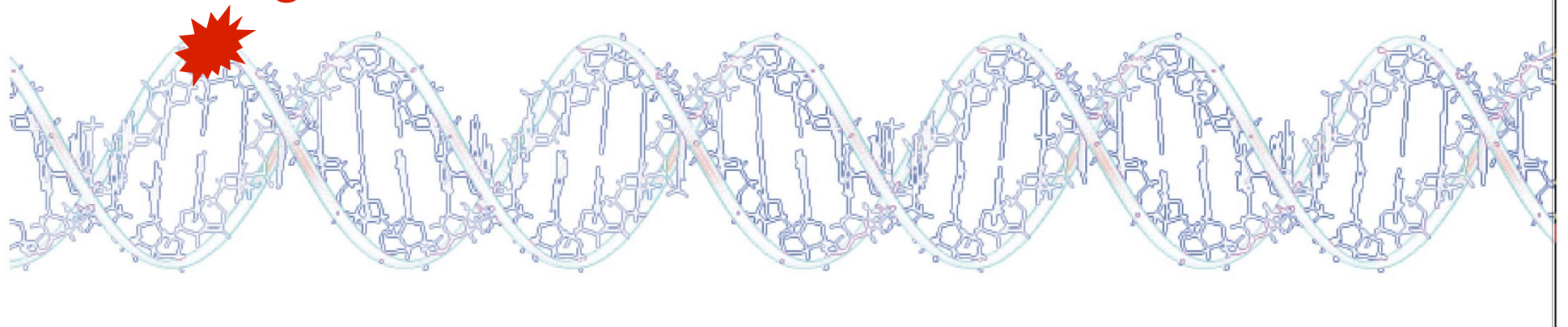
Why is HR important for preventing toxicity? HR's role in modulating the effects of chemotherapeutics.

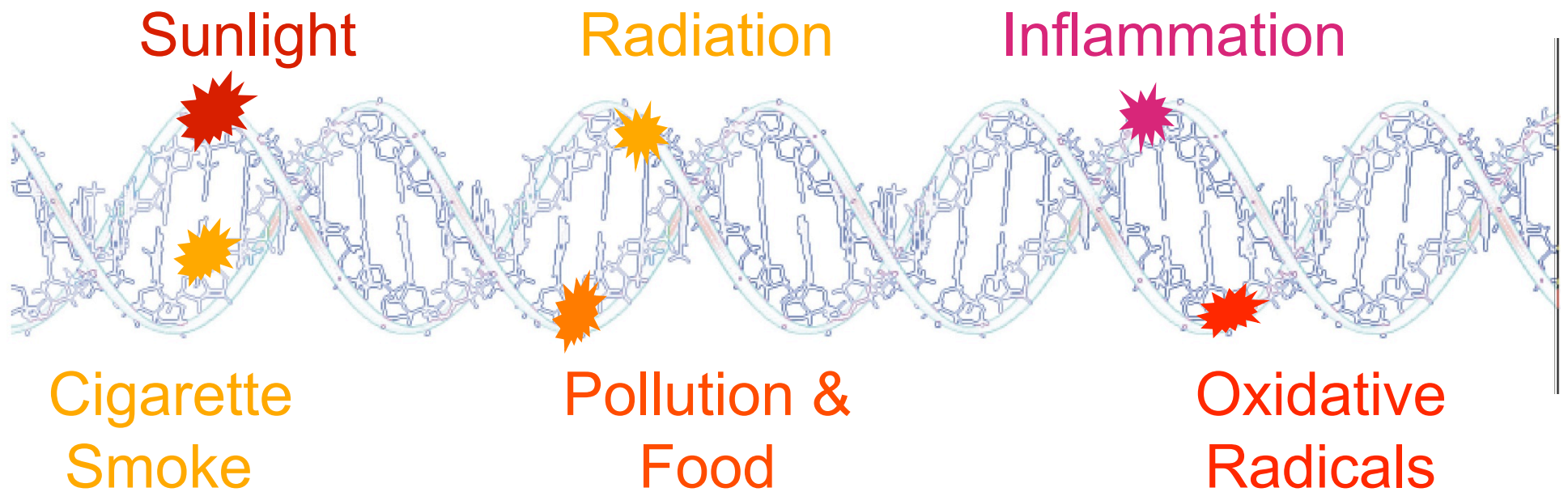
To help you understand the Rad51 paper:

**Tet On and Tet Off
Cell Cycle Basics**

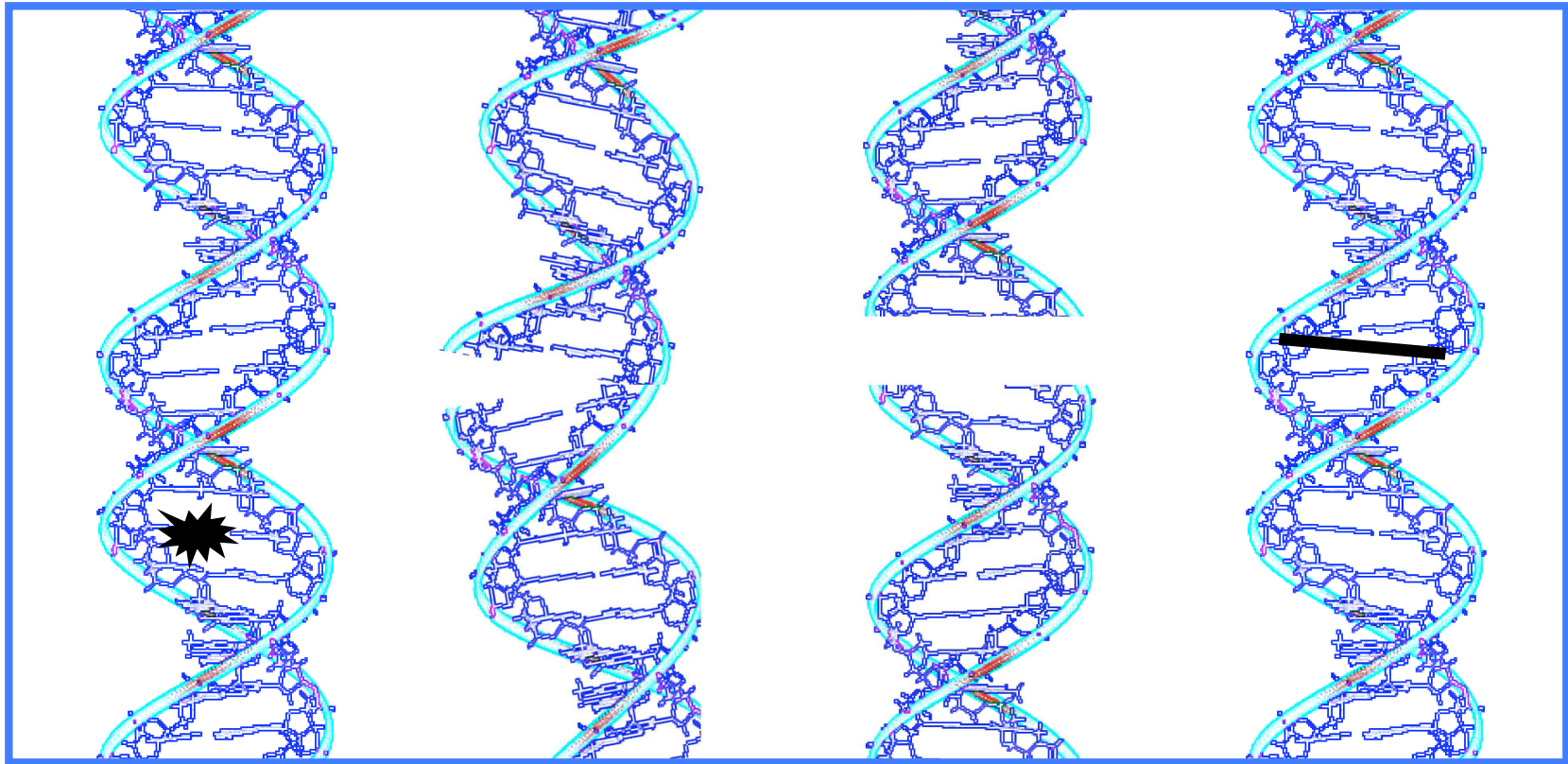
What you need to focus on when you read the Rad51 paper.

Sunlight





Frequency



Base
Damage

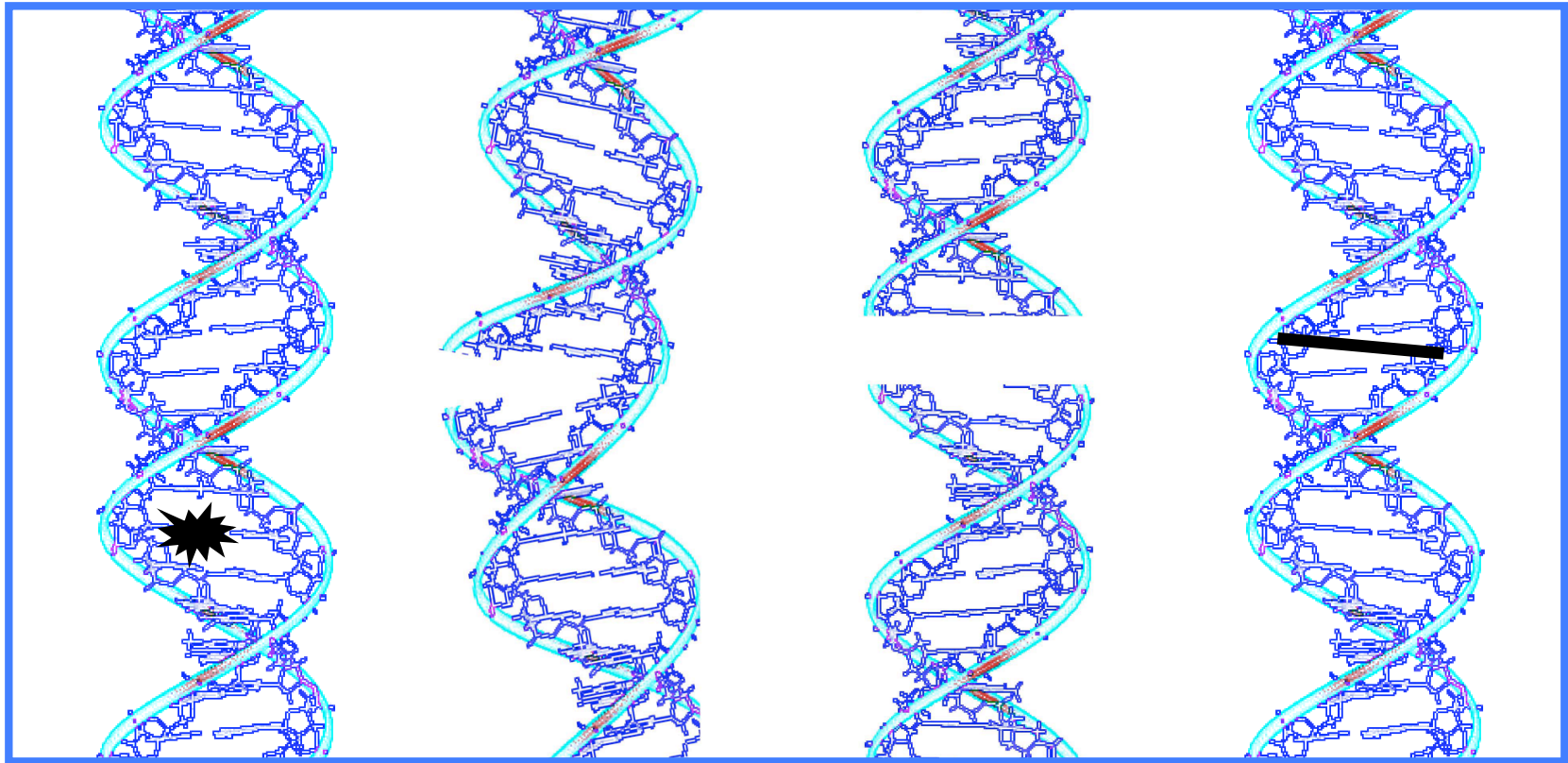
Single
Strand
Break

Double
Strand
Break

Interstrand
Crosslink

Homologous Recombination

Toxicity

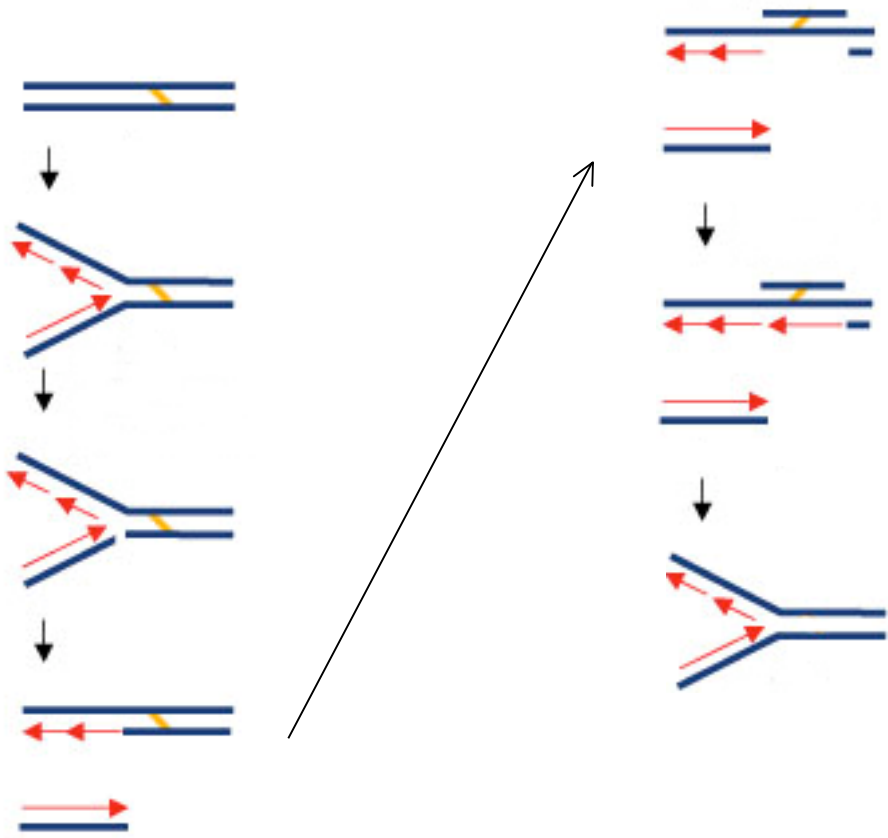


Base
Damage

Single
Strand
Break

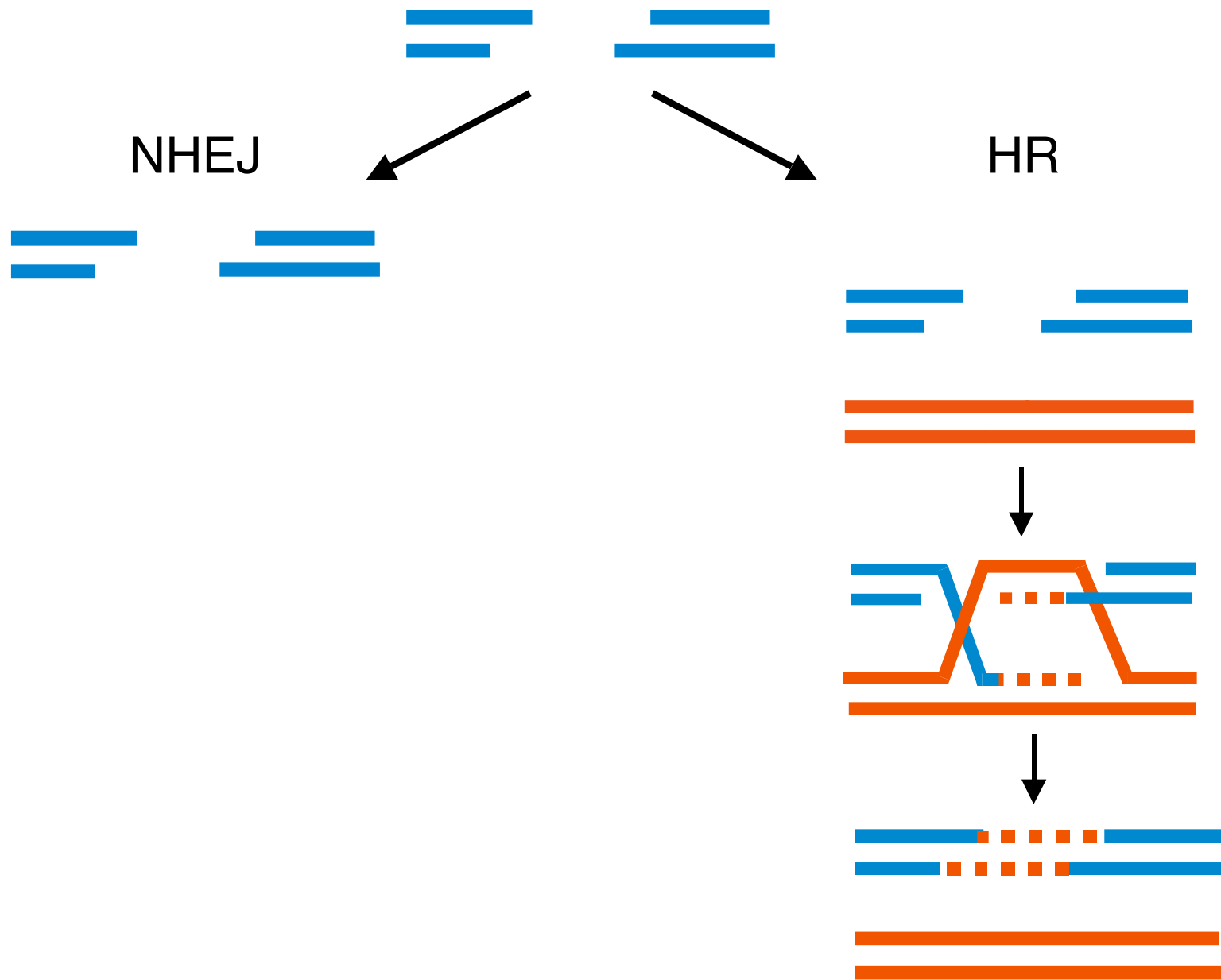
Double
Strand
Break

Interstrand
Crosslink



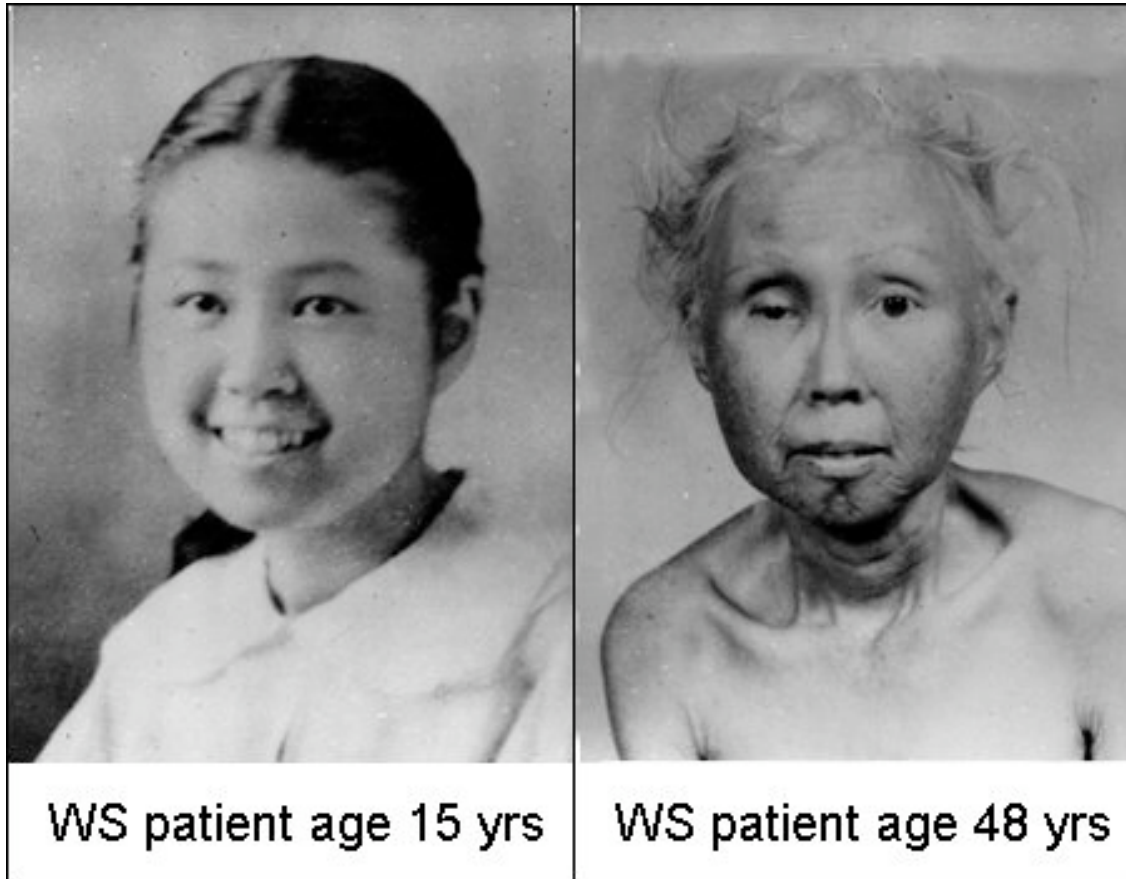
Replication Fork Animation
By Tet Matsuguchi

Double Strand Breaks



Why you owe Your Youthfulness to Homologous Recombination...

Loss of Helicase → Faulty Recomb.

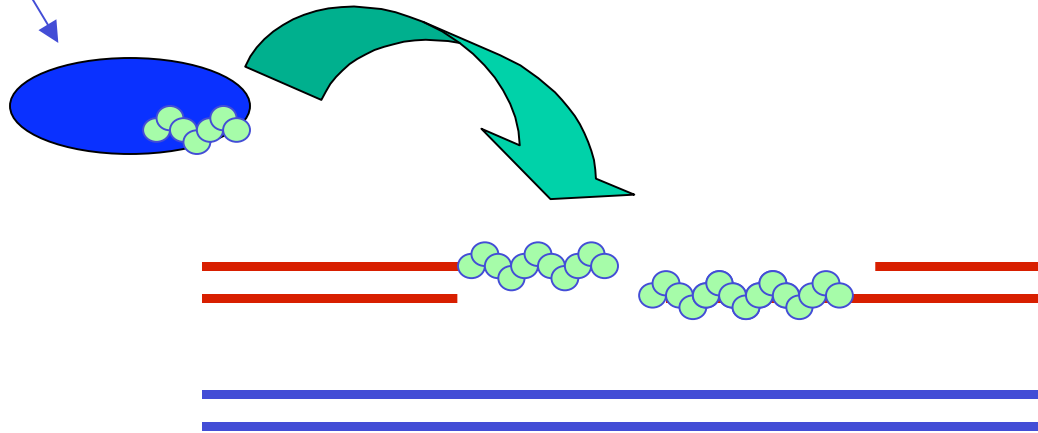


Werner's
Syndrome

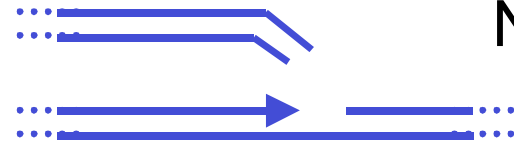
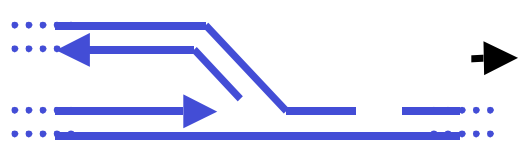
Roles of Homologous Recombination:

**Preventing Cancer
& Affecting Treatment**

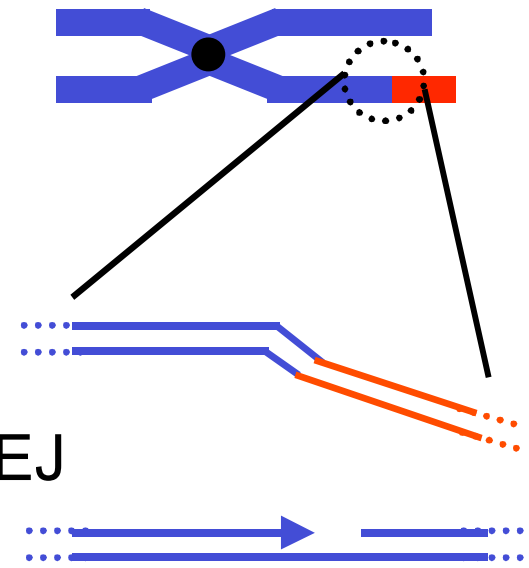
BRCA2



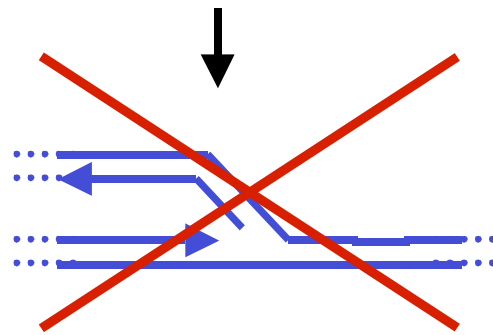
BRCA2 Loads Rad51



NHEJ



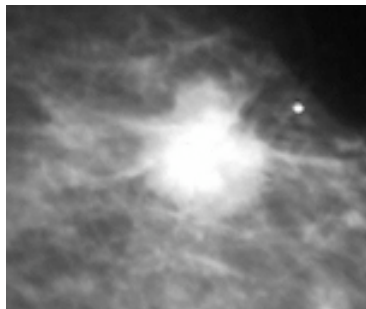
BRCA2-/-



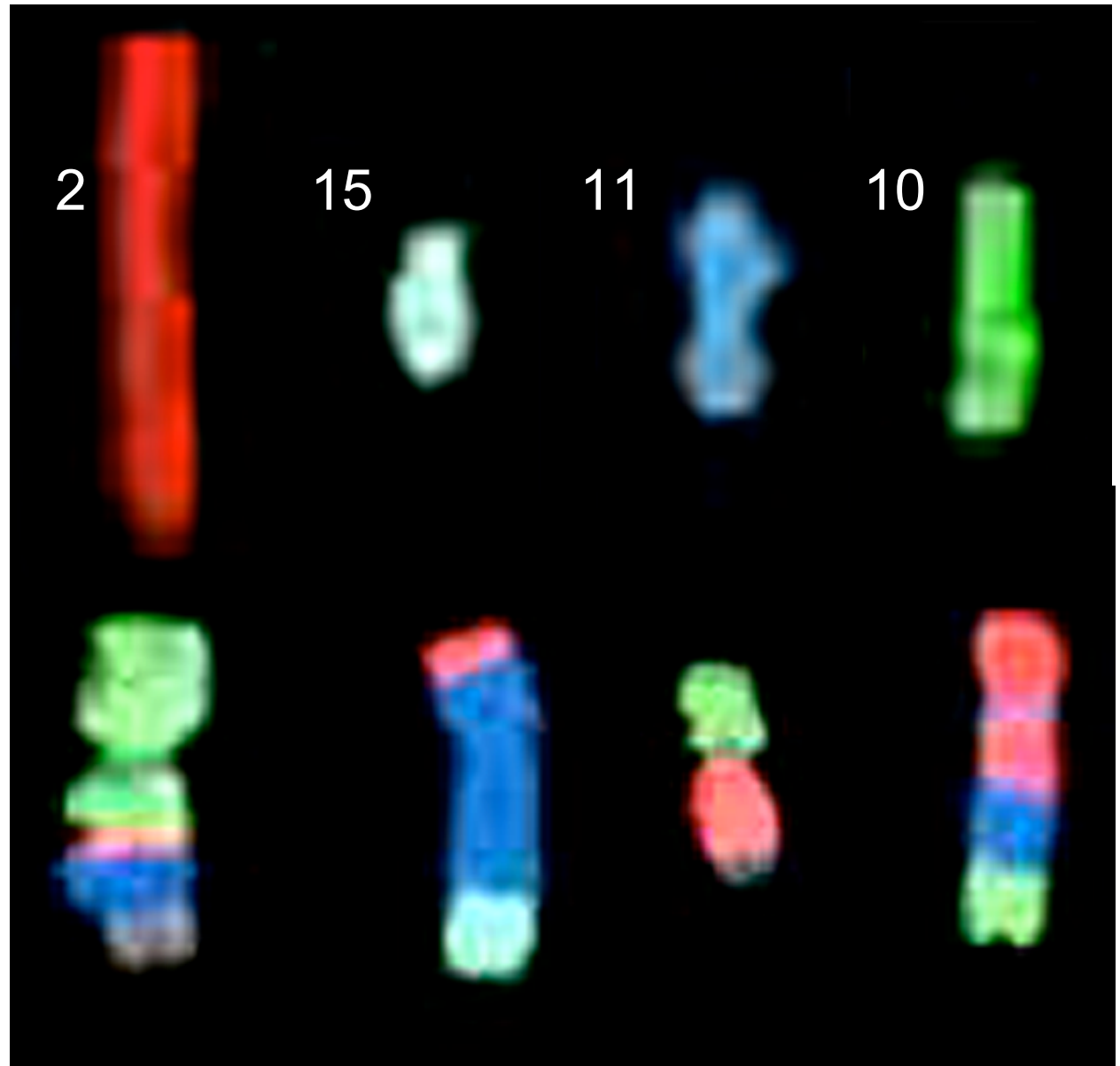
Normal Human
Chromosomes



BRCA2 -/-
Chromosomes



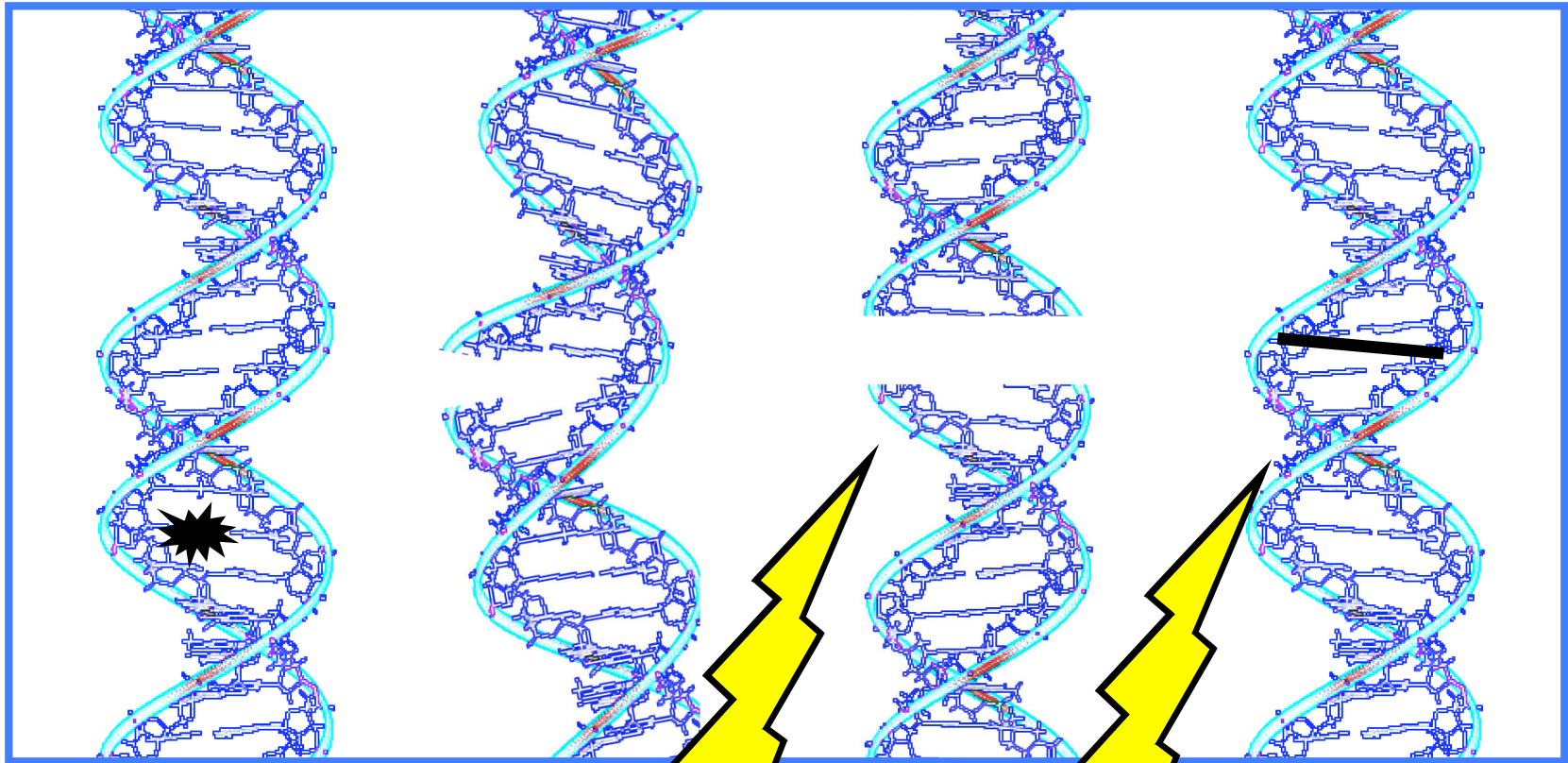
www.rctradiology.com



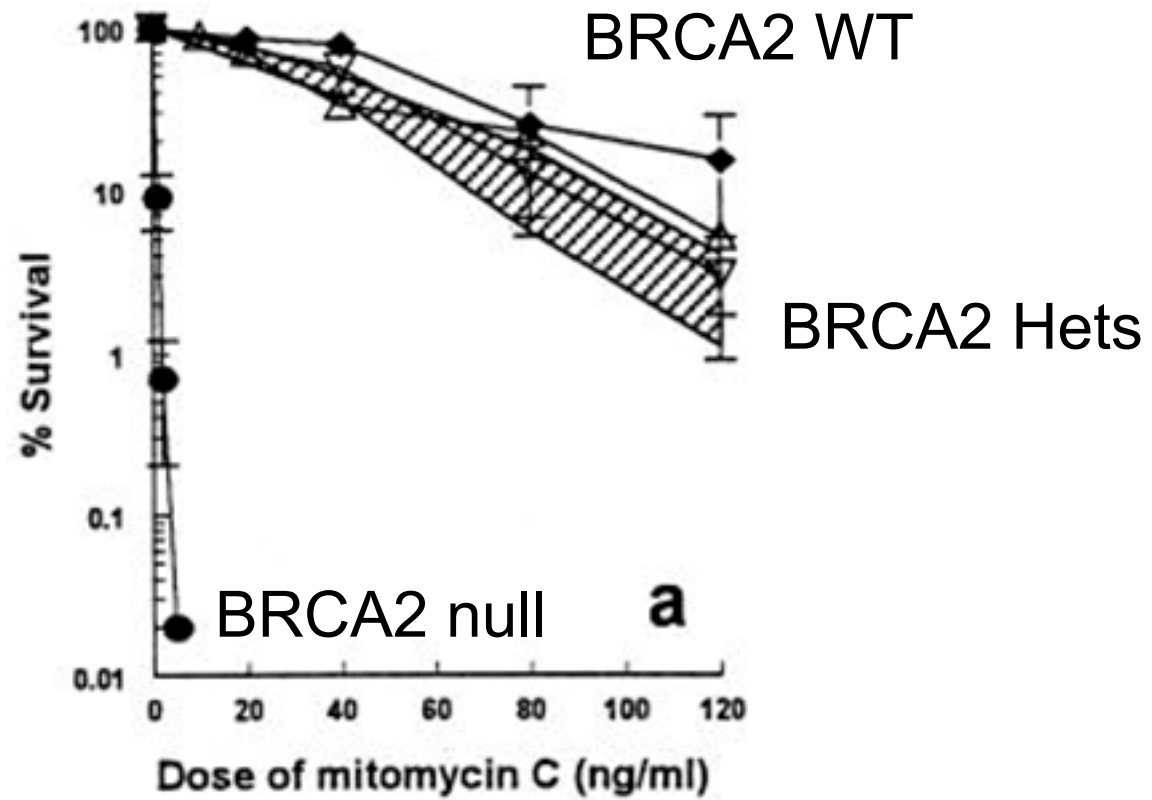
Raw data from Grigorova *et al.*, *Cytogen. and Gen. Res.* 104:333-340 (2004)

Homologous Recombination

Toxicity

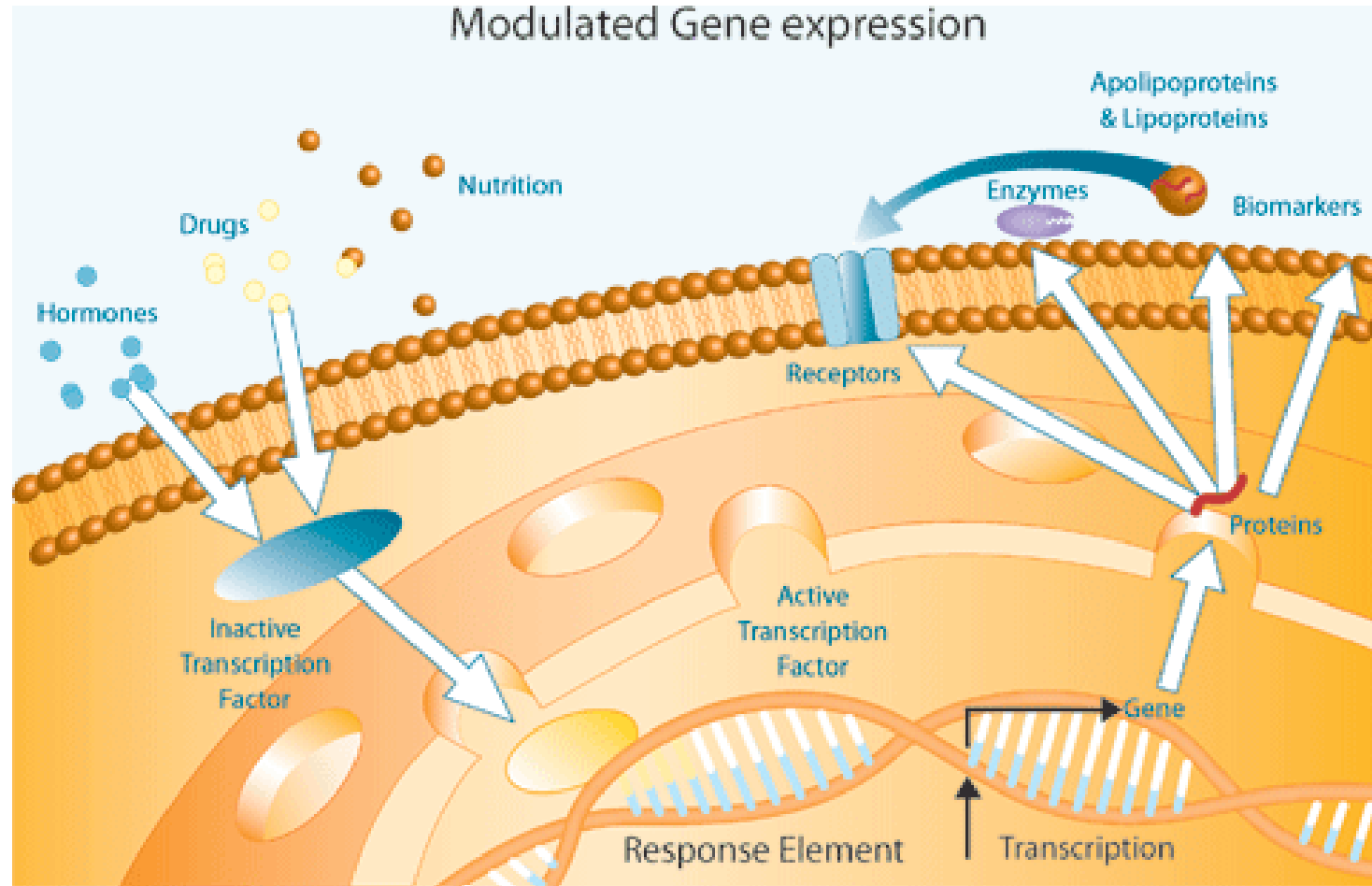


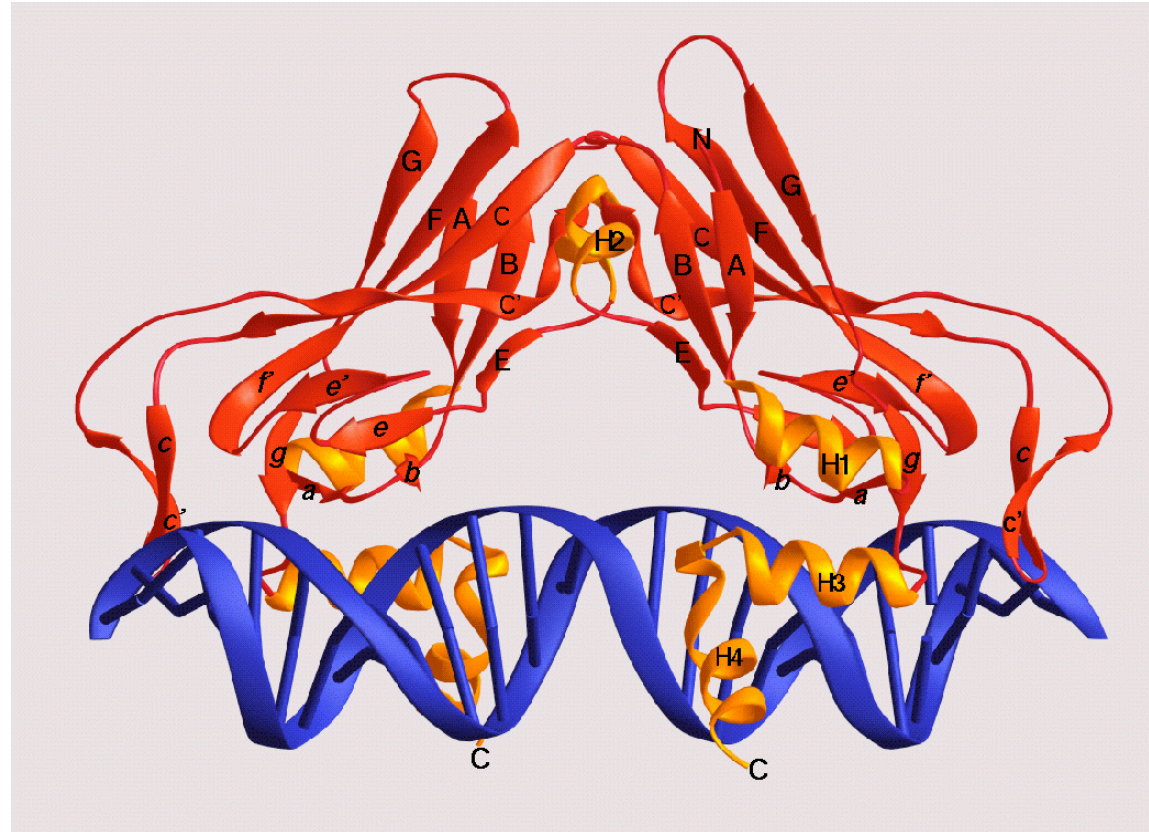
Radiation & Chemotherapy



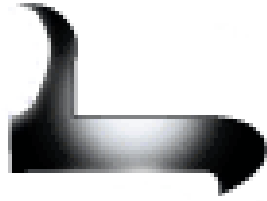
Tet-Repressible Expression

Modulated Gene expression

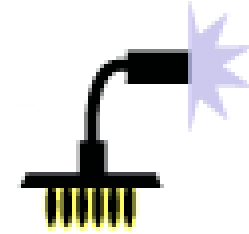




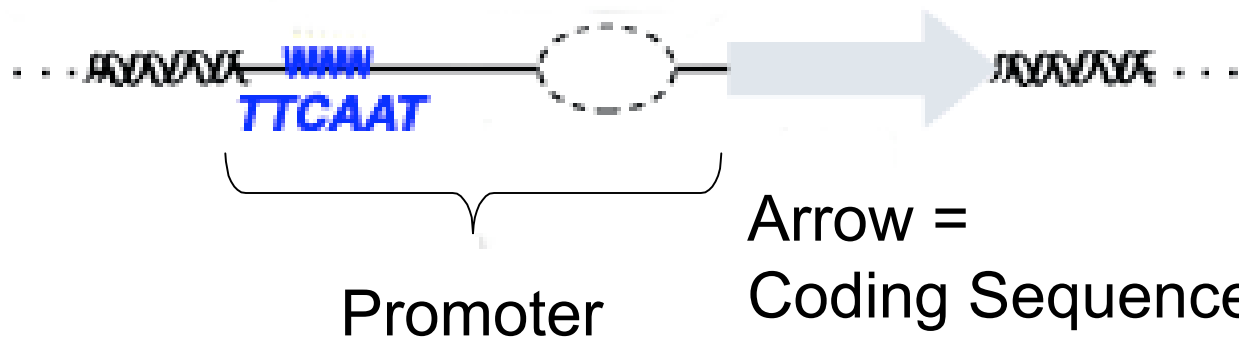
Tet-Repressible Expression



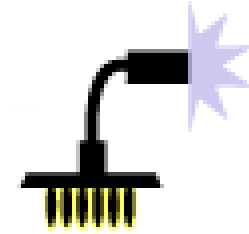
RNA Polymerase



Transcription Factor

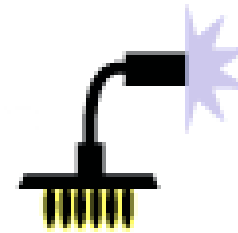
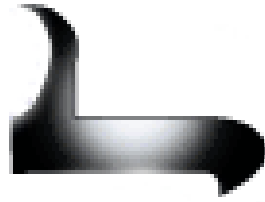


Tet-Repressible Expression



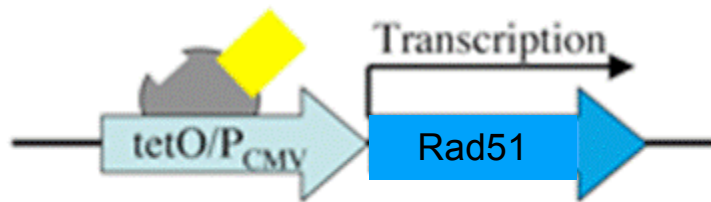
Expression is Off

Tet-Repressible Expression



Expression is On

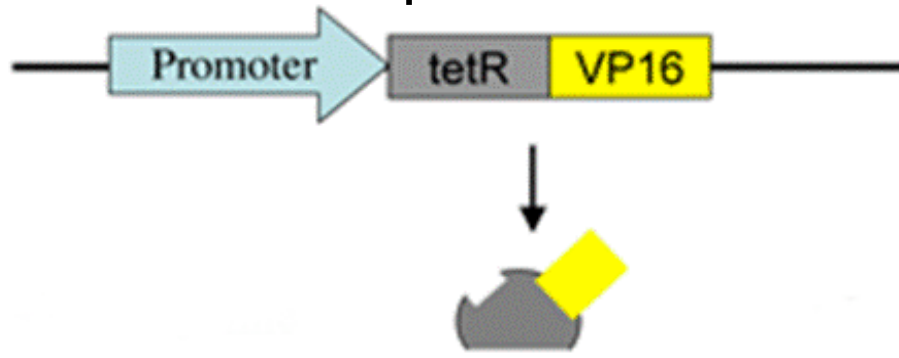
Tet-Repressible Expression



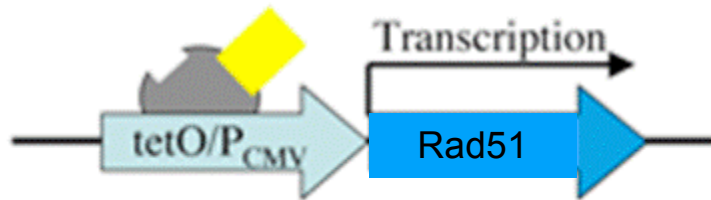
Expression On

Tet-Repressible Expression

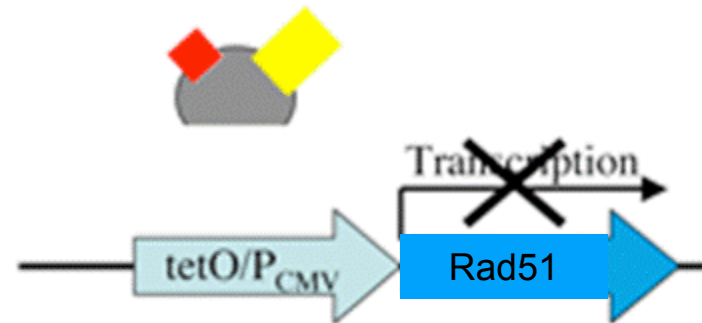
Vector for Expression of Transcription Factor



Add Doxycycline
(= a tetracycline analog)



Expression On



Expression Off

Reading the Sonoda Paper

Focus on pages 598-601 (Figures 1-3)

You should understand the logic behind the sequence of steps shown in Figure 1.

You should understand how the experiments were done to generate the data shown in Figure 2A and 2B.

Why is HR important for preventing toxicity? HR's role in modulating the effects of chemotherapeutics.

To help you understand the Rad51 paper:

**Tet On and Tet Off
Cell Cycle Basics**

What you need to focus on when you read the Rad51 paper.