Science 8B   Austin Horner

Ms Castillo   April 14, 2022

DNA MUTATIONS NOTES

SUMMARY: **DNA of the body's 100 trillion cells are repaired by polymerase enzymes.**
1 in a billion base pairings has an error. Some mutations like better camouflaged moth color, are beneficial.

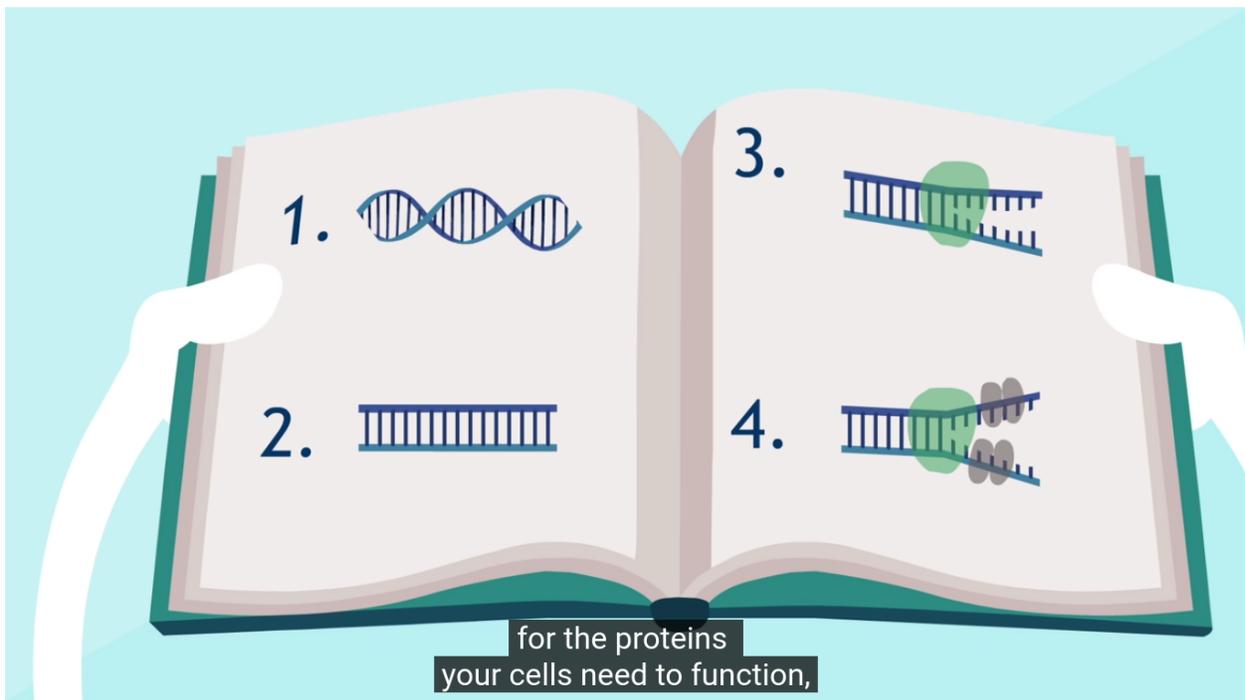Each cell in body damaged 10,000 X / day   100T cells
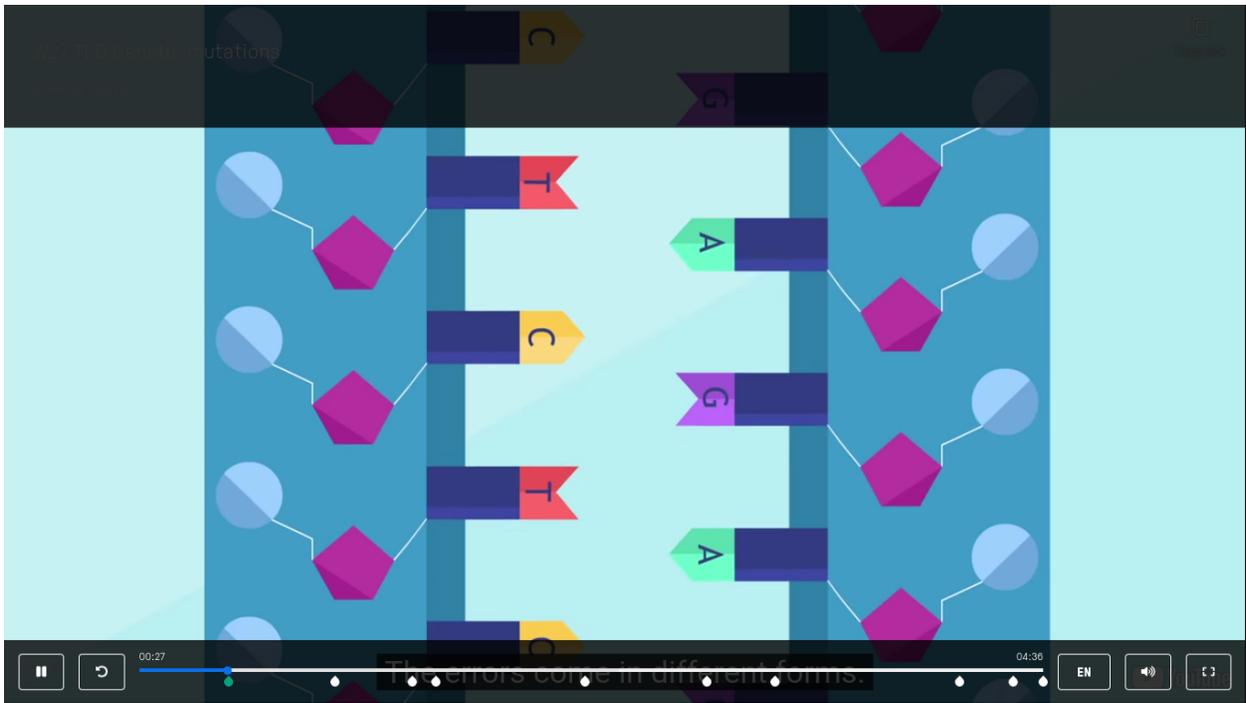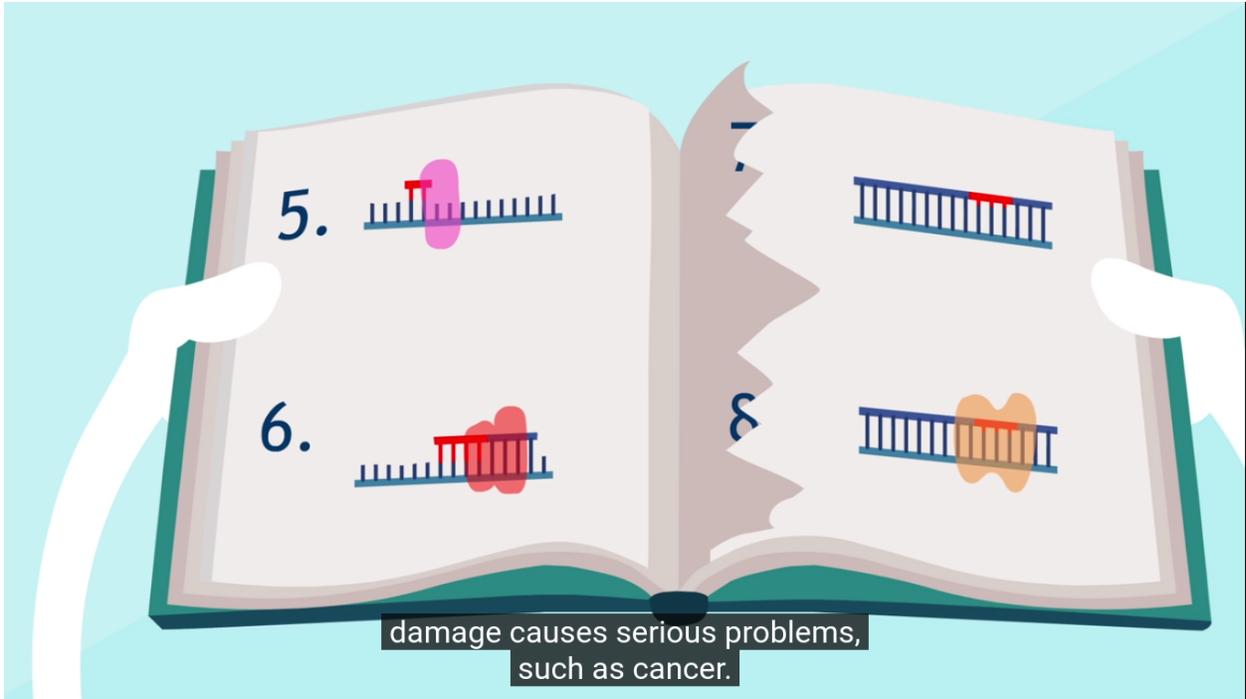
Body has 100 trillion cells

Quintillion DNA errors / day 10^18

Million = m number of the LION?

DNA = instructions in the cell

Error cause problems like cancer

for the proteins
your cells need to function,

damage causes serious problems,
such as cancer.

The errors come in different forms.

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Nucleotides get damaged
Sometimes nucleotides matched incorrectly   damage 4
Nicks DNA strands INTERFERE with DNA replication
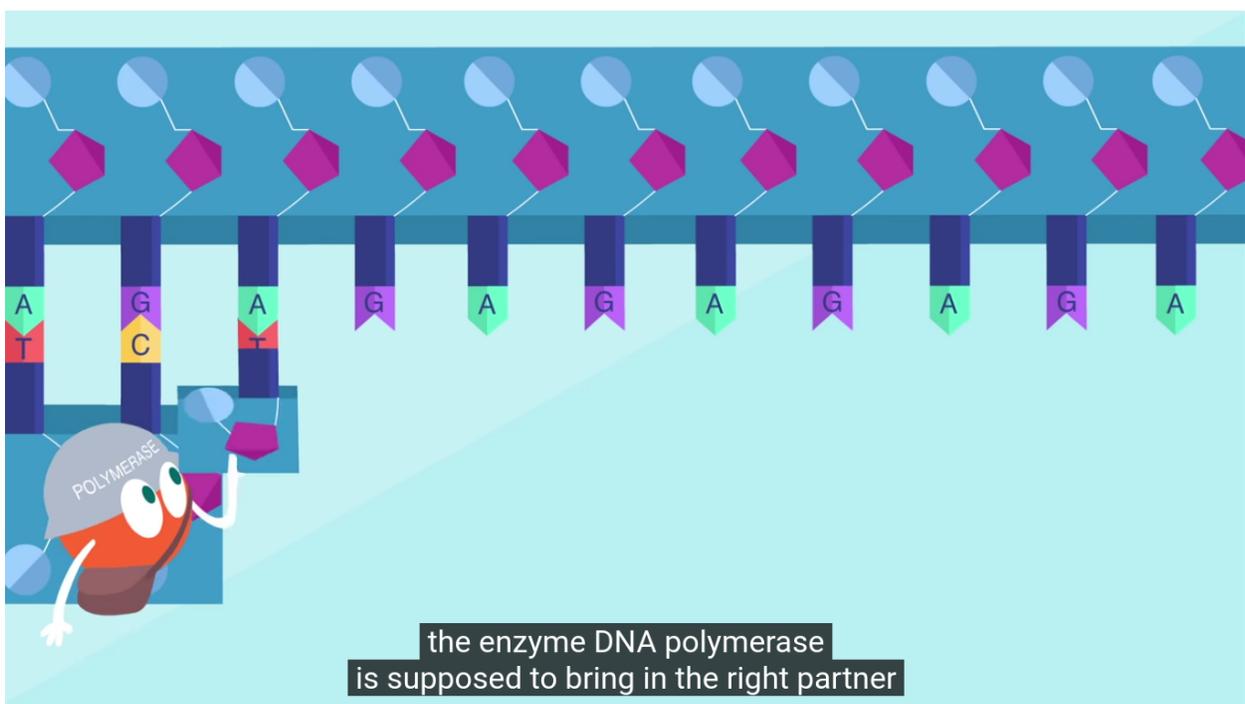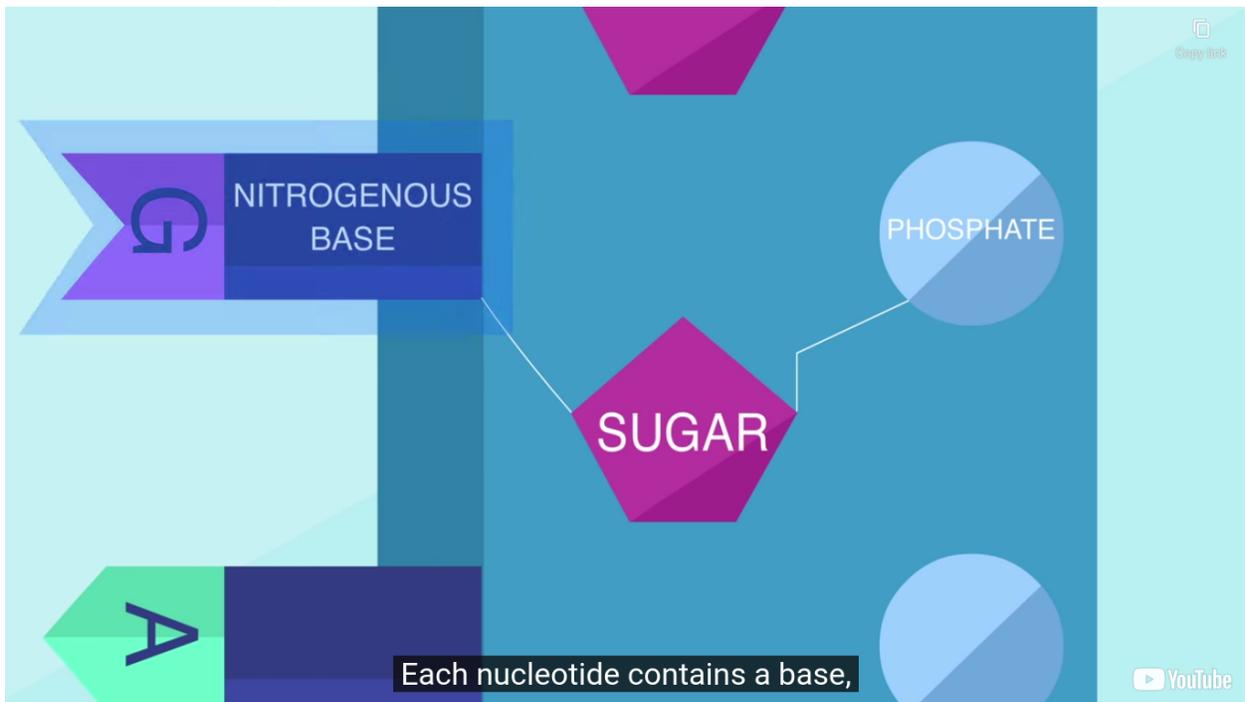Cause whole sections to get MISMATCHED   nuQ nick match

Specialized enzymes repair damage   enzymes repair
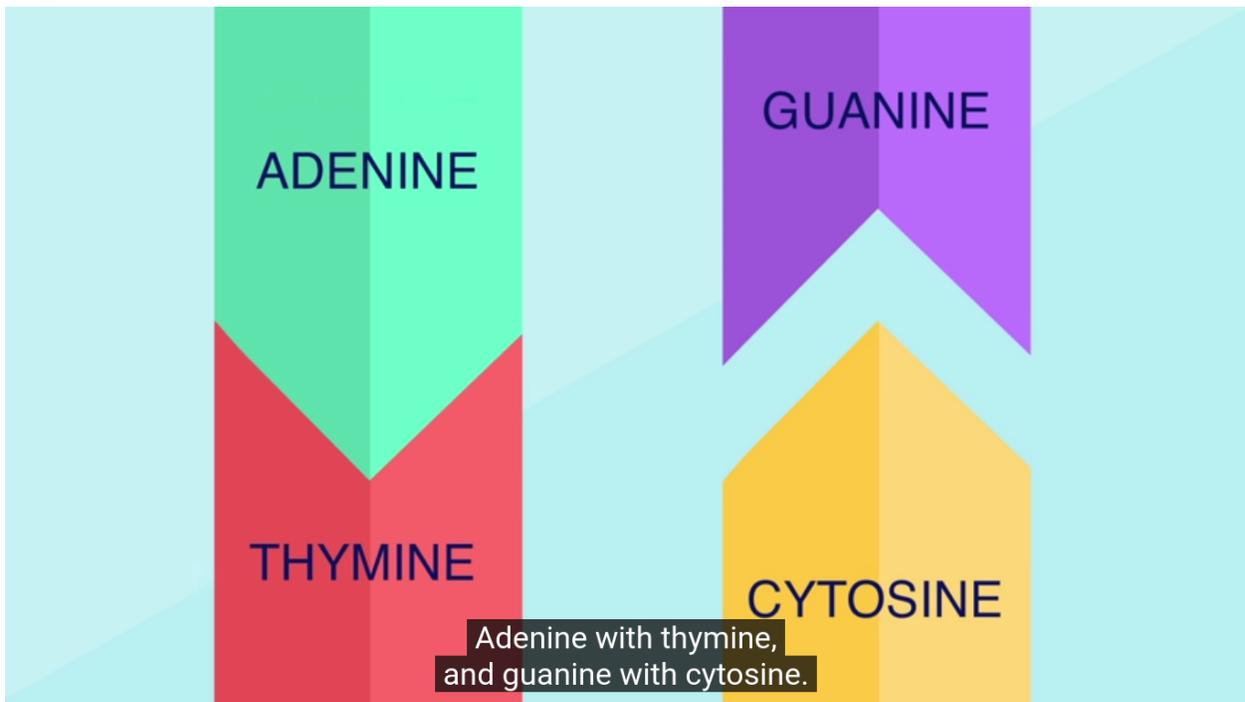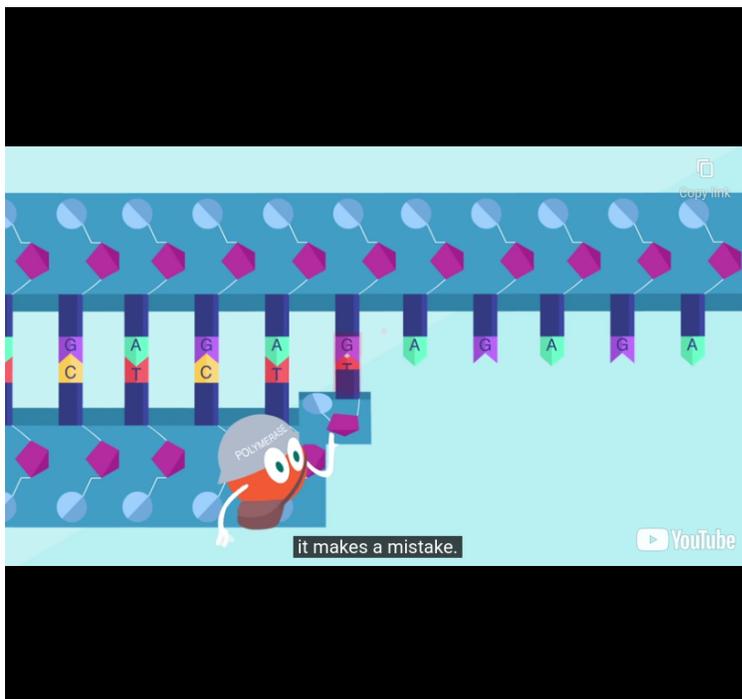Repair pathways rely on specialized enzymes

XYZ reverse order, zip the split

NITROGENOUS BASE

PHOSPHATE

SUGAR

G

A

Each nucleotide contains a base,

A G A G A G A G A G A
T C T

POLYMERASE

the enzyme DNA polymerase
is supposed to bring in the right partner

each base on the template strand
1/100,000 pairings has error

MULTIPLE CHOICE QUESTION   100 out of 100

How often does DNA polymerase make a mistake in base pairing?

- [ ] Once every 100 base pairs
- [ ] Once every 50,000 base pairs
- [x] Once every 100,00 base pairs

Rewatch   Continue

2nd set of enzymes double-checks and fixes errors
Only 1 in billion error

Hydrogen peroxide   3+ mutation CAUSES
Smoking
Polymerase error

UV light causes neighbors to fuse
Distorts helix shape

Gamma and X-rays sever backbone   radiation
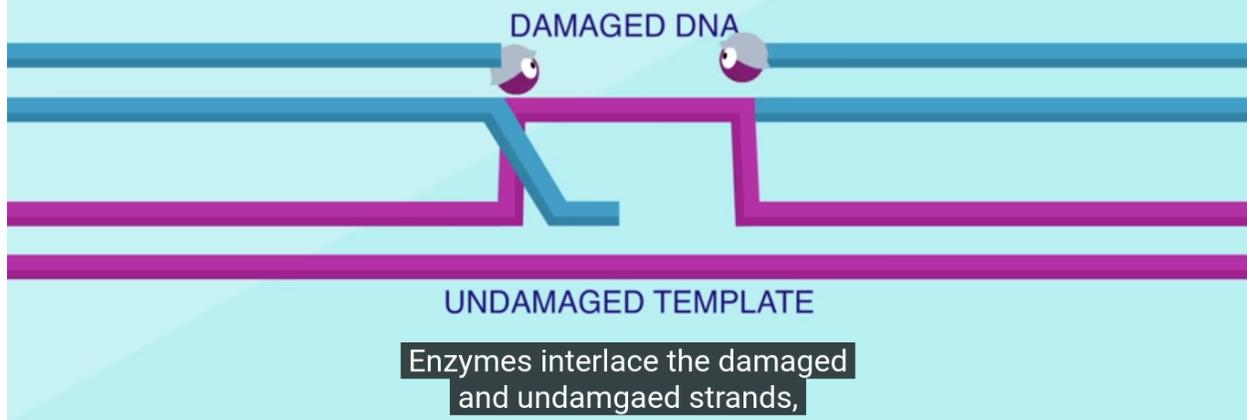DOUBLE STRAND BREAK > cell death

Base excision repair   cut and paste
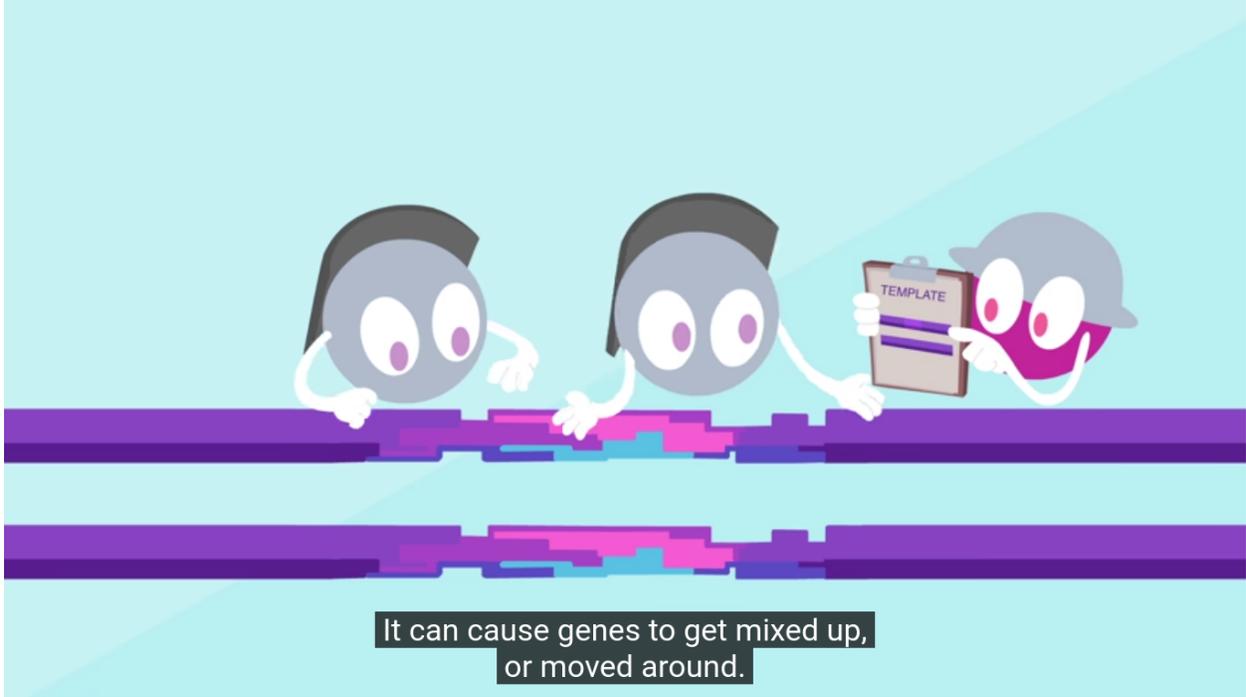**Nucleotide** excision repair
Replaces strand of 24 nucleotides   2 EXCISION REPAIR

HOMOLOGOUS RECOMBINATION

DAMAGED DNA

UNDAMAGED TEMPLATE

get them to exchange sequences of nucleotides,

HOMOLOGOUS RECOMBINATION

DAMAGED DNA

UNDAMAGED TEMPLATE

Enzymes interlace the damaged and undamgaed strands,

It can cause genes to get mixed up, or moved around.
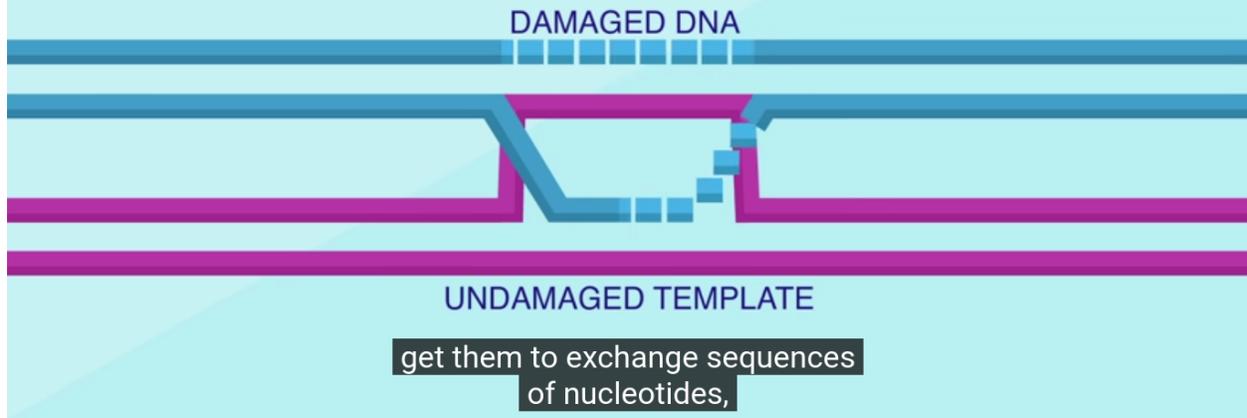
Non-homologous end joining

Moth color better matches
Camouflage

BENEFICIAL
mutations