Friday 3/1

Biological Effects of Radiation

Protein = affected by direct radiation more
Changes shape of molecule

Enzymes (protein)

DNA

PPT: Direct & Indirect action of ionizing radiation on DNA

Direct action

α
β
γ
X-rays

Indirect action

2-step process

Strand breaks

Single strand break

Double strand break (not as common)

Effects of DNA Mutations

Nucleus = most sensitive region of cell.
4 potential outcomes when a cell is exposed
1. Cell undamaged
2. Cell damaged → repairs + acts normally
3. Cell damaged, cannot repair fully → does not function normally
4. Cell dies

Type of radiation
low LET → indirect effects
high LET → direct effects

If dissolved oxygen is present: free radicals
more chemical action present
Hypoxia ⇒ oxygen-deprived tissue is much harder to kill with radiation
Heat
Type of cell being irradiated
Nucleus more sensitive than cytoplasm
Dividing cells are more sensitive
Differentiated cells are less sensitive

Law of Bergonié and Tribondeau: radiosensitivity of cells is directly proportional to their reproductive activity and inversely proportional to their degree of radiation.