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Q1: Explain the law of bergonie and tribondeau concerning radio sensitivity and physical factors affecting radio sensitivity?

Ans: The law of Bergonie & Tribondeau:

- This law of the bergonie and tribondeau that has been verified many times.
- Radiosensitivity of the living tissues varies with the maturation and metabolism.
- Stem cells are that the radiosensitive. They can be more mature cells that are more the radioresistant.
- In this law of the younger tissue and organ are with the radiosensitive.
- In the law of diagnostic imaging of radiation.
- The law tissue with the high of a metabolic activity are radiosensitive.
- In a high proliferation with the rate for cells and a high growth with the rate for tissue result in increased of radiosensitivity.

Physical Factor Effecting and Radiosensitivity:

1: Linear Energy Transfer:

- Linear energy transfer is the energy transferred per unit length of the track.
- It is related to the linear attenuation coefficient.
- It is the high linear energy transfer radiations (alpha particles, protons, electrons)
- It is the low linear energy transfer radiations (Gamma rays, X-rays).

2: Relative Biologic Effectiveness:

- In relative biological effectiveness with the ratio biological effectiveness of one type of the ionizing of radiation.
- This ability to produce biological damage is also increased.

3: Protraction and Fractionation:

- This effect of that dose is less.
- If the time of irradiation is lengthened, a higher dose is required to produce the same effect.
- Dose protraction and fractionation cause less effect allowing time for intracellular repair and tissue recovery.

Q2: Write a short note on the following?

Ans: (A) Effect of Irradiation of Macromolecule:

- When macromolecules are irradiated with the solution in vitro.

- Three (3) major effect when macromolecules are the irradiated in vitro.
- In vitro with less radiation is a tolerated.

1: Main – Chain Scission:

- The breakage in the thread or the backbone of the long – chain macromolecule.
- The long single molecule is a reduced into the smaller molecule.

2: Cross – Linking:

- Some macromolecule are have the small spur like with the molecules extending off the main chain.
- Crosslinking is increase in the viscosity of a macromolecule solution.

3: Point – Lesions:

- The disruption of a single chemical bonds that are result in a point lesions.
- These point lesions are the cellular radiation damage that result in the late radiation effect at the body level.

(B)

Radiolysis of Water:

- The ion pair can be rejoin into the stable water of a molecule.

- If they are don't rejoin, the negative ion can be join with the another water molecule.
- The human body has up to 80% of water molecules.
- It is the most prevalent interaction.
- The ionization of water result in production of a hydrogen and hydroxyl free radicals.

(C) Effect of Radiation on Cell:

1: Cell Transformation:

- They are mitotic delay
- It is the interference with function
- Chromosome breakage.

2: Cell Death:

- Instant
- Reproductive
- Interphase Death
- Mitotic or Genetic Death

3: Repair – Most Common:

(D) Fractionation and Protraction:

- This effect of that dose is less.
- If the time of irradiation is a lengthened, a higher dose is a required in a produce with the same effect.
- Dose protraction and fractionation cause less effect allowing time for intracellular repair and tissue recovery.

Example Protraction:

- The exposure while flying
- They are some occupational exposure
- Exposure to a radionuclide with a long Half-life.

Example Fractionation:

- The multiple diagnostic x-ray produce over the period of a hours or days
- Radiation therapy during pregnancy to body areas other than the abdomen e.g breast over a period of weeks.

Q3: Write a summary of the early effects of radiation on the human body?

Ans: In the after exposure to a high radiation dose, human can be the experience of a response within a few days to a few weeks. This immediate response is called a deterministic effect. Such early effect are deterministic because the severity of response is dose threshold, and the dose-response relationship is nonlinear.

1: Acute Radiation Syndrome:

- (A): Hematologic Syndrome
- (B): Gastrointestinal Syndrome
- (C): Central nervous system syndrome

2: Local Tissue Damage:

- (A): Skin

(B): Gonads

(C): Extremities

3: Hematologic depression:

4: Cytogenetic damage: