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# ID 15292

Q1:explain the law of bergnoie and tribondeau concerning radio sensitivity and physical factor affecting radio sensitivity ?

Ans:

# Law of bergnoie and tribondeau:

In 1906,two scientists name bergnoie and tribondeau observed that radio

sensitivty was a function of the metabolic state of tissue being irradiated .this is come to be known as bergnoie and tribondeau and has being verified many times .

Radio sensitivty of living tissue varies with maturation and metabolism

1. Stem cell are radiosensitive .more mature cells are more resistant .
2. Younger tissue are more radiosensitive
3. Tissue with high metabolic activity are highly radiosensitive
4. High proliferation and growth rate high radiosensitivty .

# Physical factor affecting radio sensitivity :

When one irradiates tissue the response of the tissue determine principally by the amount of energy deposite per unite mass the radiation dose in gray (rad).

A number of physical factor affect the degree of radiation response

## Linear energy transfer :

LET is measure of the rate at which energy is transferred from ionizing radiation to soft tissue .

It is another method of expressing radiation quality and determining value of radiation weighting factor used in radiation protection .

LET is expressed in units of kiloelectron volt of energy trasferrd per micrometer of track length in soft tissue .

## Relative biologic effectiveness:

As the LET of radiation increase the ability to produce biologic damage also increase .this quality described by the RBE .

Standard radiation by convection range is 200 to 250 kVp

It used for many years in radiation oncology

In essentialy all early radiobilogic research

Diagnostic x ray have an RBE of 1

## Protraction and fractionation:

If dose of radiation is deleverd over long period of time rather than quickly

Effect of that dose is less

If tme of irradiation is lengthened a higher dose is required to produced the same effect

If the dose is deliverd continusly but at a lower dose rate it is said to be protracted

If dose is deliverd at the same dose rate but in equal fraction all separated by same time the organism will survive ,in this situation dose is said to be fractionated.

Q2: write a short note on the following :

1. Effect of irradiation of macromolecule
2. Radiolysis of water
3. Effect of radiation on cell
4. Fractionation and protraction

Ans:

# Effect of irradiation of macromolecules:

## Macromolecules:

Main chain scission –break of backbone :

Reduce viscosity of solution

Cross-linking –sticky protuberance attached :

Increase viscosity

Point lesions-disrupts bonds:

Cannot measure

## Macromolecule irradiation:

Invivo-in natural envirement

Invitro-out side natural envirement

Radiation of macromolecules invitro molecule tolerate a lot of radiation

Invivo less radiation in tolerated

# b)radoiolysis of water :

human body 80 percent water molecule

most prevalent interaction

ionized H2O dissociate into 2 ions and breaks down to free radicals

# b)effect of radiation on cell :

### cell transformation :

mitotic delay

interference with function

chromosomes breakage

### cell death :

instant

reproduction

interphase death

mitotic or genetic death

repair most commen

# d)fractionation and protraction:

a dose is deliverd over long period of time less effective than that deliverd quickly

if the time of irradiation is lengthened higher dose is required to produce the same effect

lengthening of time accomplished in two ways

## protraction:

reduced dose rate

if dose is deliverd contionously but at a lower dose rate it is said to be praction

example:

a total 12 gy is deleverd in 3 mins is lethal for a rate .however when 12 gy is deliverd at a rate of 1 gy for a total of 12 hours the rate survive

## fractionation:

divide dose into series of small doses

example:

if the gy dose is deliverd at the same dose rate but in 12 equal fractionss of 1 gy each separated by 24 hours the rat will survive

the dose is said to be fractionated

dose fractionation causes less effect due to intracellular repair and recovery between doses

routinely used in oncology

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

Ans:

After exposure to a high radiation dose humans can experience a response within a few days to a few weeks this immediate response is called deterministic effect

Many patients are surprised to discover that having radiation therapy is less difficult than they expected

 the radiation used to damage cancer in your body can also damage healthy cells.

 Just as the benefits of radiation are gradual, you'll usually see a gradual onset of side effects.

Not everyone experiences side effects of radiation. But by being ready for these reactions and responding quickly, you and your doctor can minimize their effect on your life.

 Several weeks after treatment ends, the side effects typically go away.

Each individual person will have a unique response, so it's hard to predict exactly what will and won't happen to you.

 Many of the expected side effects from radiation prove to be misperceptions.

 Still, if you do have fears about side effects, it can take away your peace of mind.

[armpit discomfort](https://www.breastcancer.org/treatment/side_effects/armpit_discomfort)

[chest pain](https://www.breastcancer.org/treatment/side_effects/chest_pain)

[fatigue](https://www.breastcancer.org/treatment/side_effects/fatigue)

[heart problems](https://www.breastcancer.org/treatment/side_effects/heart_probs)

[lowered white blood cell counts](https://www.breastcancer.org/treatment/side_effects/low_white_blood_cell)

[lung problems](https://www.breastcancer.org/treatment/side_effects/lung_probs)