Radiation Biology, Protection and Applications
(PHYS-450)

Quizzz

Week 14

Problem 1:

- When a cell is damaged by radiation:
  - **a** it always causes death to the cell
  - **b** it may repair the damage and operate normally
  - **c** it induces radiation poisoning
  - **d** there is a high probability of cancer
- If radiation causes damage to a cell, and the cell is not effectively repaired:
  - **a** the outcome is always cancer
  - **b** any future offspring of the person will carry the mutation
  - **c** the cell may be removed by the immune system
  - **d** the cell will die
- Prenatal exposure refers to radiation dose received:
  - **a** during childhood
  - **b** by an embryo/fetus during pregnancy
  - **c** by an adult female prior to her becoming pregnant
  - **d** during adulthood

Problem 2:

- The mechanism that causes damage to cells from radiation exposure is **……**
- The most radiosensitive cells in the body are those that divide **……**, and are relatively **specialized / unspecialized**.
- A large dose of radiation in a short period of time is called a/an **……** dose.
- A burn to the skin is an example of a **…… ……** effect.
- Induction of cancer due to radiation exposure is an example of a **……** **……** effect.

Problem 3:

- If a person received a dose of 10 mSv/yr for 50 years, what effects are expected to be seen?

……..

- The risks of heritable genetic effects occurring from radiation are estimated to be **greater / less** than the risk for cancer induction.

- The risk to a developing embryo/fetus from radiation exposure is greater than for an adult because its cells are **specialized / unspecialized** and **rapidly / slowly** dividing.

Problem 4:

Humans are radioactive by nature. Give two examples of a radioisotope that can be found in the human body under « normal circumstances ».

Problem 5:

Why radiation with a linear energy transfer (LET) of 100 keV/μm has the greatest relative biologic effectiveness for cell killing, mutagenesis, or oncogenic transformation?

Problem 6:

Direct / indirect action of radiation dominates for more densely ionizing radiations, such as neutrons. **Direct / indirect** action is dominant for sparsely ionizing radiation, such as X-rays.