Topic: Radiation Biology

1. When the human body is exposed to ionizing radiation, a commonly altered molecule is: ?

- A. Water, H2O
- B. Deoxyribonucleic Acid, DNA
- C. Ribonucleic Acid, RNA
- D. Carbon Dioxide, CO2

Answer:

A. Water is the most common molecule found in the human body and is commonly altered by ionizing radiation.

Topic: Delivery

2. Given an initial mean seed activity of 220 uCi (microcurries), in three half lives of Palladium 103; Pd-103 the mean seed activity will measure approximately: ?

A. 217 uCi B. 157 uCi C. 87 uCi D. 55 uCi

Answer:

D. A half life is the time it would take for a radioactive material to decline to half of its activity. In three half lives a source will decay to: $(1 / 2^3)$; one eighth of the original activity. 220uCi x $(1 / 2^3)$ = 55uCi.

Topic: Treatment

3. A treatment is planned for 100cm SSD but is delivered at 106cm SSD. What mistake in dose delivered takes place?

A. Over treatment by: ~ 6%
B. Under treatment by: ~ 6%
C. Under treatment by: ~ 9%
D. Under treatment by: ~ 11%

Answer:

D. This is an inverse square problem. The class solution is: Dose delivered = 100% - (Planned SSD / Delivered SSD)²%; 100% - (100 SSD / 106 SSD)² = 100% - 89% = ~ 11% under treatment.