Section 5

Most radiation damage is caused by

A. radiation ionizing the DNA directly.



B. the production of free radicals in the cell.



C. the formation of holes in the cell wall.



D. single-strand breaks.

Which of the following is true regarding the LONG-TERM EFFECTS of radiation exposure?

A. Chronic low-dose exposure causes a distinct “radiation syndrome.”



B. Human effects are seen by statistical increases in already-existing medical conditions.



C. Experiments performed on humans have indicated what medical conditions to expect.



D. Effects appear on a predictable timeline following exposure.

Human evidence of embryological effects indicates

A. the severity of effects correlates well with dose received.



B. sensitivity to damage is highest during the first trimester.



C. nothing - all evidence for embryological effects comes from animal studies.



D. both A and B.

Which of the following cell types are correctly listed from radiosensitive to radioresistant.

A. Muscle cells, nerve cells, epithelial cells



B. Lymphocytes, epithelial cells, nerve cells



C. Epithelial cells, lymphocytes, muscle cells



D. Lymphocytes, nerve cells, epithelial cells

Which of the following effects from prenatal radiation exposure has NOT been observed in humans?

A. Heritable genetic damage



B. Mental retardation



C. Childhood cancer



D. Small head size

Based on your knowledge of cell sensitivity, which of the following organs is likely to be most sensitive to the harmful effects of radiation?

A. Brain



B. Muscle



C. Red bone marrow



D. Intestines

Which of the following is NOT a suspected mechanism by which radiation causes cancer?

A. Damage to chromosomes



B. Mutations in somatic cells



C. Free radicals in cells



D. Excess energy imparted to cell mitochondria

Which of the following is true regarding pregnant workers?

A. The employee is required to declare her pregnancy to her PI and Radiation Control.



B. The employee is not allowed to work with radiation for the duration of her pregnancy.



C. While pregnant, the employee can work with x-ray producing devices, but is restricted by the NRC from working with some forms of radioactive material.



D. The declared pregnant worker may have to make some adjustments to her working conditions or procedures to reduce exposure to the fetus.

A fetus is exposed to a dose of 1000 millirem at 10 weeks after conception. Which of the following maternal behaviors represents a higher excess risk of complications to the child? (Refer to Table 2 in Chapter 5.)

A. Smoking a pack of cigarettes a day



B. Drinking 2-4 alcoholic drinks per day



C. Working in a high-risk occupation



D. All of the above

Joe was exposed to x-rays as part of a medical procedure. He developed a severe burn 12 days after the exposure and lost his hair in the area exposed. In time, the burn healed and his hair grew back. Which of the following doses did his skin most likely receive?

A. 650 rad



B. 300 rad



C. 1000 rad



D. 850 rad

During pregnancy, the risk of morphological defects or gross abnormalities is most likely

A. in the first week after conception.



B. in the second through sixth week after conception.



C. in the third trimester.



D. the risk is equally high throughout the pregnancy.

What source is the greatest producer of natural background radiation?

A. Terrestrial



B. Radon



C. Internal



D. Cosmic

The category that includes radiation exposure from industrial, security, educational, research, military, and power sources makes up about what percent of the TOTAL population radiation exposure?

A. less than 1/10 of a percent



B. 1 percent



C. 10 percent



D. 50 percent

You go to the Emergency Room with severe stomach pains and receive a CT (CAT scan) of your abdomen. Compared to a typical exposure from NATURAL background radiation, about how much exposure did you receive?

A. 30 days



B. 6 months



C. 1 year



D. 2.5 years

In general, radiation damage increases when

A. dose rate increases.



B. area exposed increases.



C. rapidly-dividing cells are impacted.



D. all of the above

Which of the following is NOT a potential effect of radiation exposure?

A. Developing cancer



B. Developing cataracts



C. Emitting a glow from the skin



D. Having a shorter lifespan

The LD50/30 is defined as

A. the dose that will be lethal to 30% of the population within 50 days.



B. the dose that will be lethal to a maximum of 50% and minimum of 30% of the population.



C. the dose that will be lethal to 50% of an exposed mouse population and 30% of an exposed human population.



D. the dose that will be lethal to 50% of the population within 30 days.

Compared to natural background radiation, radiation exposure from man-made medical sources are

A. negligible.



B. much less but still significant.



C. about the same.



D. much greater.

