Chapter 41

1. The stage of acute radiation syndrome in which the exposed person temporarily

feels that they are recovering is called the stage:

a. interphase

b. latent

c. manifest

d. prodromal

2. The minimum dose at which temporary sterility begins occur is about:

a. 100 mSv

b. 1 Sv

c. 2 Sv

d. 5 Sv

3. “LD 50/60” means that:

a. 50 Sv will kill 60% of the population

b. 50% of the exposed population will die in 60 hours

c. It takes 60 days of radiation exposure to kill 50% of the population

d. 50% of the exposed population will die in 60 days

4. For a population that has received a lethal dose of radiation, the

average time between exposure and death is called the:

* 1. mean survival time
  2. mean threshold time
  3. mean recovery ratio
  4. latent-manifest ratio

5. In general, the life-span shortening effect of radiation is about lost

per 10 milligray received:

a. 10 hours

b. 10 days

c. 5 days

d. 1 day

6. Physical defects that are caused by radiation exposure to the developing

embryo/fetus after conception, but before birth, are referred to as

effects:

a. congenital

b. mutagenic

c. teratogenic

d. genetic

7. Which of the following would be considered as late effects of radiation exposure:

*I. Malignancies*

*2. GI syndrome*

*3. Life span shortening*

*4. Genetic effects*

a. 1, 2 & 3

b. 2, 3 & 4

c. 1, 3 & 4

d. 3 & 4

8. Hematologic syndrome is expected to occur at dose levels of:

a. 250-1000 mGy

b. 1-10 Gray

c. 10-50 Gray

d. more than 50 Gray

9. Epilation is the:

a. over-production of skin cells

b. loss of hair

c. ulceration of the skin

d. feeling of well-being

10. Most late effects of radiation exposure are considered to follow which

type of response curve?

a. linear, threshold

b. nonlinear, threshold

c. nonlinear, nonthreshold

d. linear, nonthreshold

11. Which of the following is **not** one of the factors that determines the effects of

radiation upon whole organisms?

a. total dose

b. the type of tissue irradiated

c. the amount of tissue irradiated

d. the time that the exposure occurs

12. Which of the following represents the greatest risk to patients suffering

from the hematopoietic syndrome?

a. infection

b. GI bleeding

c. excessive vomiting

d. seizures

13. The minimum amount of radiation required to produce acute radiation syndrome

(ARS) is about:

a. 1 mGy

b. 10 mGy

c. 1 Gray

d. 10 Gray

14. The average radiation dose to survivors of the atom bombs in Japan was:

a. 20 thousand Gy

b. 20 Gray

c. 2 Gray

d. Survivors received no radiation

15. For the hematopoietic syndrome of ARS, the manifest illness stage will most likely

last for:

a. a few days

b. a few minutes

c. a few hours

d. a few weeks

16. Which of the following would **not** be a symptom of gastrointestinal (GI) syndrome?

a. nausea

b. vomiting

c. seizures

d. loss of appetite

17. Acute radiation syndrome includes all of the following forms **except:**

a. gastrointestinal

b. hematopoietic

c. central nervous system

d. respiratory

18. In the early 1900s, radiologists had a higher incidence of than other physicians

who did not use radiation:

a. influenza

b. cataracts

c. multiple sclerosis

d. leukemia

19. Which of the following is a radiosensitizer?

a. cytosine

b. sulfhydryls

c. water

d. vitamin K

e. iodine

20. Average cumulative lifetime occupational exposure for radiographers is estimated at \_\_\_\_\_\_.

a. 1.5 – 2 mGy

b. 15 – 20 mGy

c. 150-200 mGy

d. 1.5 – 2 Gray

21. For patients under 40 years of age, which of the following presents a relative risk

between 2:1 and 10:1 if the related organs are exposed to **diagnostic levels** of

radiation?

a. breast cancer

b. thyroid cancer

c. leukemia

d. cataracts

22. Congenital abnormalities in the form of skeletal and neurological defects would have

been most likely caused by radiation exposure during which period of gestation?

a. conception to 2 weeks

b. 2 weeks to 8 weeks

c. 3 months to 8 months

d. during the 9th month

23. As a very general rule, an early developing fetus receives about what fraction of the

mother’s skin exposure from an abdominal radiograph?

a. 1/10th

b. 1/3rd

c. ½

d. ¾

24. The American College of Radiologists and the American Cancer Society recommend

that **asymptomatic** women in between 45 and 54 years of age should:

a. get their first baseline mammogram during this period

b. have had a baseline study and be having a mammogram each year

c. be having a mammogram every two years

d. not be having mammograms during this period

25. Symptoms that appear immediately after an acute exposure to radiation are

collectively termed:

a. latent syndrome

b. proportional syndrome

c. chronic syndrome

d. acute syndrome

e. prodrome

26. The very first sign of acute radiation syndrome following an acute exposure is

usually:

a. diarrhea

b. incontinence

c. nausea

d. GI bleeding

27. Which of the following refers to birth defects specifically caused by radiation

exposure to the developing embryo/fetus:

a. mutagenic effects

b. teratogenic effects

c. stochastic effects

d. congenital effects

28. Death that follows an acute exposure to radiation of about 12 Gray will generally

occur in:

a. 3-5 hours

b. 1-3 days

c. 4-10 days

d. 4-8 weeks

e. 3-5 months

29. Pregnant Japanese women surviving the atomic bombs are known to have had an

**absolute** risk for birth defects in their newborn children of:

a. 22

b. 10:1

c. 100-200 per million

d. 800 per million

30. Epidemiology is the study of:

a. radiation-induced diseases

b. late radiation effects

c. disease

d. statistics

e. diseases in populations

31. When studying the hematological effects of radiation exposure, which of the following doses

would be of greatest importance?

a. GSD

b. Gonadal dose

c. Skin dose

d. Bone marrow dose

32. Death resulting from acute radiation exposure to the gastrointestinal tract occurs in:

a. 3-5 hours

b. 1-3 days

c. 4-10 days

d. 30-60 days

33. During the embryonic stage of development, most of the tissue differentiation takes

place during:

a. organogenesis

b. osmosis

c. hemostasis

d. oogenesis

34. Accumulated radiation exposure to the eye will most likely result in the formation of:

a. glaucoma

b. scleroma

c. retinitis

d. cataracts

35. Which of the following would be classified as a somatic effect of radiation exposure?

a. nausea

b. leukemia

c. GI hemorrhage

d. all of the above

e. none of the above

36. The minimum amount of radiation at which a particular biological response can be

observed is called the:

a. tolerance dose

b. GSD

c. congenital dose

d. Threshold dose

37. Loss of hair due to an acute exposure to a large amount of radiation is termed:

a. epistaxis

b. epilation

c. erythema

d. bromidrosis

38. The central nervous syndrome, which causes death within a matter of hours, occurs at

radiation doses of approximately:

a. 0.5-1 Gray

b. 1-4.5 Gray

c. 4.5-50 Gray

d. More than 50 Gray

39. The study of a response to radiation for tissue outside of the body (in a test tube

or petri dish), is called a(n) study.

a. intravenous

b. in vento

c. in vitro

d. in vivo

40. In general, when radiation doses are fractionated, somatic radiation damage to

tissues is % reparable:

a. 90%

b. 75%

c. 50%

d. 30%

41. In the expression, “LD 50/60”, the fifty represents the:

a. amount of dose in rems

b. percentage of the population that will die

c. number of days following exposure

d. number of days of exposure

42. During the gastrointestinal syndrome, dehydration is a direct result of radiation

damage to the:

a. white blood cells

b. stem cells

c. nerve cells

d. red blood cells

e. muscle cells

43. Which of the following effects may be observed in the embryo or fetus of a

pregnant woman who has been exposed to radiation?

*1. stunted growth 2. spontaneous abortion 3. intellectual disability*

a. 2 only

b. 3 only

c. 2 & 3 only

d. 1 & 3 only

e. 1, 2 & 3

44. The human LD 50/30 is currently estimated to be about:

a. 1 Gray

b. 3.5 Gray

c. 7 Gray

d. 10 Gray

e. 50 Gray

45. During which stage of fetal growth would our primary concern be for the

possibility of inducing late carcinogenic effects such as adolescent

leukemia?

a. pre-fertilization

b. pre-implantation

c. organogenesis

d. very early fetal growth period (10-12 weeks)

e. mid- to late fetal growth period

46. Epilation begins to occur at dose levels as low as:

a. 1 Gray

b. 2 Gray

c. 3 Gray

d. 50 Gray

47. The earliest systemic effects of radiation exposure in man, which begin to appear

at about 250 mGy, are changes seen in the:

a. blood count

b. skin

c. sperm count

d. eyes

48. An adverse effect upon the production of white blood cells is most likely to occur

when which body system is irradiated?

a. the skeletal system

b. the biliary system

c. the heart

d. the central nervous system

49. The teratogenic effect most likely to be caused by radiation exposure to the

developing embryo/fetus during the third week of gestation is:

a. spontaneous absorption

b. latent carcinogenesis

c. neurological defects

d. skeletal defects

e. mental retardation

50. Most “early” effects of radiation are:

a. deterministic effects that follow a threshold response curve

b. deterministic effects that follow a non-threshold response curve

c. stochastic effects that follow a threshold response curve

d. stochastic effects that follow a non-threshold response curve

51. The most likely teratogenic effect to be caused by radiation exposure during the first

10 days after conception is:

a. spontaneous absorption

b. latent carcinogenesis

c. neurological defects

d. skeletal defects

e. mental retardation

52. A stochastic effect may be considered as a(n) effect:

a. certain response

b. statistical response

c. linear-sigmoid response

d. non-random

53. Erythema begins to occur at dose levels as low as:

a. 1 Gray

b. 2 Gray

c. 3 Gray

d. 5 Gray

54. Mutagenic effects are defined as those biological effects that are:

a. present at birth

b. inherited from progenitors

c. caused by radiation exposure to the developing fetus/embryo

d. caused by radiation exposure to the gametes

e. caused by mutants

55. The period from about 10 days to about 2 months of gestation is known as:

a. organogenesis

b. teratogenesis

c. carcinogenesis

d. mutagenesis

e. the stochastic period

56. Which of the following is FALSE regarding genetic damage from radiation:

a. there are no mutations that are unique to radiation

b. most mutations are recessive

c. mutations appear to follow a linear, non-threshold response curve

d. mutations appear to be multi-hit phenomena

57. A class of genetic disorder in which there are an excessive number of chromosomes

present is called:

a. monosomy

b. oconosomy

c. trisomy

d. mutosomy

58. A 10-day old human embryo is considered to be approximately how much more

sensitive to radiation than an adult:

a. 2 times

b. 5 times

c. 10 times

d. 20 times

e. 50 times

59. At which of the following times during gestation is a significant (200 mGy) dose of

radiation most likely to result in **neurological deformities** for the developing

embryo/fetus:

a. 3 days

b. 3 weeks

c. 7 weeks

d. 5 months

e. 8 months

60. During the 1960s, the ratio of women who had mammograms and developed breast

cancer compared to those who did not have mammograms and still developed

breast cancer was as high as 10:1 according to some studies. This figure is an

expression of:

a. absolute risk

b. excess risk

c. relative risk

d. stochastic risk

61. Central nervous syndrome can be expected to occur at dose levels of:

a. 0.25-1 Gray

b. 1-10 Gray

c. 10-50 Gray

d. more than 50 Gray

62. Which of the following is considered a long-term effect of radiation exposure:

a. cataract formation

b. skin cancer

c. leukemia

d. all of these

e. none of these

63. In the radiation dose-survival curve below, the portion which corresponds to death

from the gastrointestinal tract syndrome is section:

A.

B.

C.

D.

