

## Part 10: Radionuclide Therapy

- Which one of the following statements is FALSE?
  - In a  $\beta / \gamma$  emitter like I-131, the ratio of tissue damage is  $\sim 90\% \beta / 10\% \gamma$
  - Target-to-non target ratio is more critical therapeutically than diagnostically
  - The ideal  $t_{\text{eff}}$  of a therapeutic radiopharmaceutical is  $1.5 \times$  procedure length
  - Particulate emission is preferable to photon emission for therapy
- Which 1 of the following radioisotopes has no current **therapeutic** applications in Nuclear Medicine?
  - Y-90
  - I-131
  - P-32
  - Sr-85
  - Sm-153
- Which 1 of the following radioisotopes is an alpha particle emitter?
  - Y-90
  - I-131
  - P-32
  - Ra-223
  - Sm-153
- Of the four types of thyroid cancer,
  - Follicular and anaplastic are treatable, the others are not
  - Papillary and medullary are treatable, the others are not
  - Papillary and anaplastic are treatable, the others are not
  - Follicular and papillary are treatable, the others are not
- For a hyperthyroid patient with a 50% uptake, treatment with 10 mCi of I-131 NaI solution results in a thyroid dose of approximately
  - 10 Rads
  - 100 Rads
  - 1,000 Rads
  - 10,000 Rads
- For a hyperthyroid patient undergoing treatment with 10 mCi of I-131 NaI solution for hyperthyroidism, the patient is advised that it will take \_\_\_\_ weeks to begin to observe beneficial effects and \_\_\_\_ weeks to reach the maximum beneficial effect.
  - 2, 6
  - 1, 12
  - 4-6, 12
  - 12, 24

7. The long-term side effect of a successful treatment of hyperthyroidism with I-131 NaI solution is

- a. thyroid carcinoma
- b. hypothyroidism
- c. aplastic anemia
- d. Hashimoto's thyroiditis

8. The release criterion for a patient hospitalized for treatment of a thyroid cancer patient with I-131 NaI solution is a reading of

- a. 5 mR/hr at body surface
- b. 7 mr/hr at body surface
- c. 5 mR/hr at 1 m from patient's chest
- d. 7 mr/hr at 1 m from patient's chest
- e. None of the above

9. Which ONE of the following statements is FALSE?

- a. Use of Sr-89 chloride for treating pain from bony metastases is palliative and not curative
- b. Use of Sr-89 chloride for treating pain from bony metastases has an overall response rate of ~ 80%
- c. Sr-89 chloride for treating pain from bony metastases may cause pain to flare up before a positive response is obtained.
- d. Use of 4 mCi of Sr-89 chloride for treating pain from bony metastases confers a bone marrow radiation dose of ~ 25 R

10. Which ONE of the following statements regarding successful treatment of *polycythemia vera* with P-32 is FALSE?

- a. Increases median survival time 8-fold
- b. Often requires two 4-mCi doses for effective treatment
- c. The radiopharmaceutical used is P-32 chromic phosphate colloid
- d. Bone marrow dose exceeds 200 R for a 4 mCi injected dose
- e. 11% of successfully treated patients eventually develop leukemia

11. Which of the following therapies involves use of an unsealed source in the body?

- a. Brachytherapy
- b. Teletherapy
- c. Radiopharmaceutical Therapy
- d. Neutron irradiation

12. Which of the following therapeutic radioisotopes places the dose administrator at greatest risk?

- a. I-131
- b. P-32
- c. Sr-89
- d. Y-90

13. Which one of the following protocols is used for Zevalin in the radioimmunotherapy of non-Hodgkins Lymphoma?

- a. dosimetric dose on day 1, therapeutic dose on day 3
- b. dosimetric dose on day 1, therapeutic dose on day 8
- c. dosimetric dose on day 1, therapeutic dose on day 21
- d. no dosimetric dose on day 1, therapeutic dose on day 8

14. Typical prescribed doses for treating Graves Disease and Plummer's Disease are, respectively,

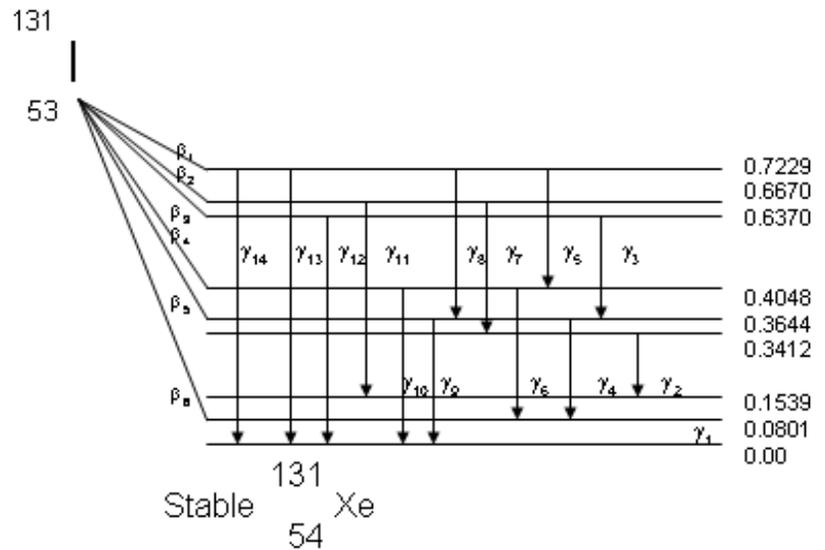
- a. 8 mCi and 25 mCi
- b. 25 mCi and 8 mCi
- c. 15 mCi and 50 mCi
- d. 8 mCi and 100 mCi
- e. 25 mCi and 25 mCi

15. If the first dose of I-131 administered for treating hyperthyroidism or thyroid carcinoma fails to adequately treat the patient, the second dose should be equal to

- a. 50% of the first dose
- b. 100% of the first dose
- c. 150% of the first dose
- d. 200% of the first dose
- e. same as the first dose

16. In the decay scheme of I-131 printed below, the gamma ray used for imaging is

- a. gamma 3
- b. gamma 4
- c. gamma 9
- d. gamma 13
- e. gamma 14



17. Since the decay scheme displayed above indicates that there are 14 gamma rays and 6 beta particles emitted by I-131, then the ratio of tissue damage caused by beta particles compared to gamma rays is

- a. 6/14
- b. 6/20
- c. 14/20
- d. none of the above

18. Which ONE of the following statements is TRUE?

- a. Women are more likely to develop hyperthyroidism and are more difficult to treat than men
- b. Women are more likely to develop hyperthyroidism and are less difficult to treat than men
- c. Women are less likely to develop hyperthyroidism and are more difficult to treat than men
- d. Women are less likely to develop hyperthyroidism and are less difficult to treat than men

19. Which one of the following statements describes the FDA approved indication for palliation of bone pain with Sr-89 chloride?

- a. Patient presents with bone pain and requests Sr-89 therapy
- b. Patient with bone pain caused by bony metastases from breast or prostate cancer but no other primary malignancy
- c. Patient with bone pain caused by bony metastases from osteosarcoma but no other primary malignancy
- d. Patient with bone pain caused by bony metastases from any primary malignancy

20. Which ONE of the following statements is FALSE?

- a. The biological distribution of Sr-89 is essentially identical to that of Tc-99m MDP
- b. Sr is a Ca analog
- c. Therapy with Sr-89 is both palliative and curative
- d. One reason that Sr-89 therapy is effective while minimizing bone and bone marrow dose is that it is retained in metastases longer than in normal bone tissue

21. Typical injected dose of Sr-89 chloride is

- a. 0.4 mCi
- b. 4 mCi
- c. 40 mCi
- d. 400 mCi

22. Typical injected dose of P-32 Na phosphate for treating Polycythemia Vera is

- a. 0.4 mCi
- b. 4 mCi
- c. 40 mCi
- d. 400 mCi

23. P-32 CrPO<sub>4</sub> colloid is suitable for treating malignant effusions in women with ovarian carcinoma. The route of injection is

- a. intravenous
- b. intracavitary
- c. intraarterial
- d. intradermal
- e. subcutaneous

24. Which one of the following is not required for a high dose therapy for thyroid cancer?

- a. After patient is released, the room must be surveyed by Radiation Safety before being occupied by the next patient
- b. Everyone involved in the patient's care must wear a film badge
- c. Everyone involved in the patient's care must provide a urine specimen to check for I-131 excretion
- d. Patient must be in a private room

25. Which ONE of the following statements regarding both Sr-89 and I-131 is TRUE?

- a. Both decay by  $\beta^+$  emission
- b. Both decay by  $\beta^-$  emission
- c. Both emit  $\gamma$  photons along with the  $\beta$  particles
- d. The radiation risk to the person administering the dose would be approximately the same for both isotopes
- e. Both require hospitalization until patient reading is  $<5$  mR/hr at 1 m from patient's chest