2008 Radiation Oncology Exam Cases

Physics and Dose Calculations

Which one (1) of the following types of radiation interacts primarily by loss of energy through collision with the light atomic nuclei of the absorber? (1 point)

A. X- ray photons

B. Beta particles

C. High energy protons

D. High energy electrons

E. High energy neutrons

Answer: E. The Physics of Radiation Therapy, Faiz M. Khan, Lippincott, Williams & Wilkins, Philadelphia, 2003 p 75

Objective: The terminology, principles, and units used in radiation dosimetry. AND General terminology used in radiation therapy and radiation physics.

General, Basic and Clinical Knowledge

Which one (1) of the following is TRUE with regard to oncogenes: (1 point)

A. They can explain why agents as diverse as radiation, chemicals and viruses can produce tumors that are indistinguishable.

B. Members of the 'myc' family are most common.

C. Presently identified oncogenes are associated with > 50% of human cancers.

D. Oncogenes are found more commonly with solid tumors and less frequently with leukemias and lymphomas.

E. A critical feature of oncogenes is that they act in a recessive fashion.

Answer: A. Objective: Basic cancer related immunology and molecular biology.

Reference: Hall EJ. Radiobiology for the Radiologist. 5th edition, Philadelphia, Lippincott Williams & Wilkins, 2000, chapter 17.

Radiation Biology and Related Topics

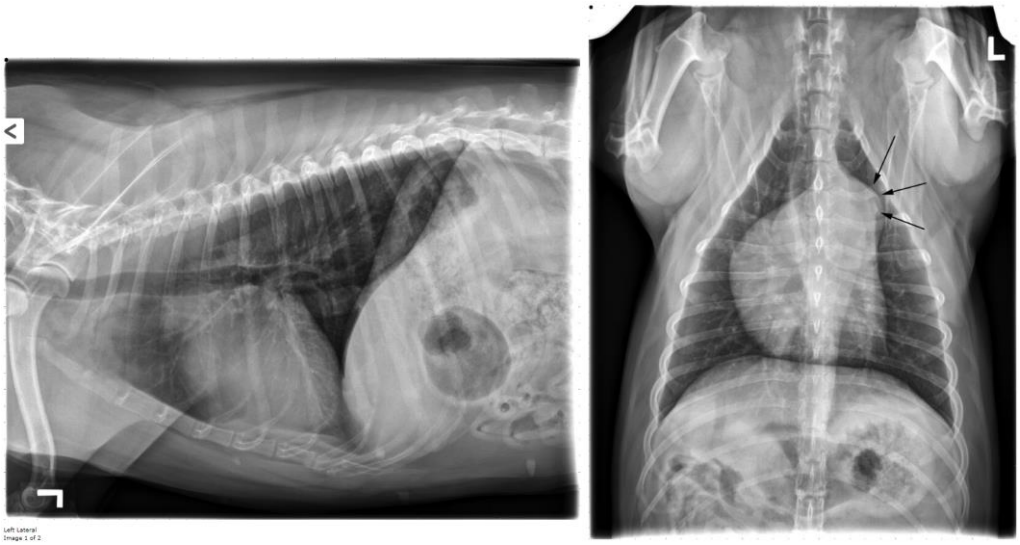
As surviving cells progress through the cell cycle following irradiation, they tend to become less sensitive to a second dose. TRUE or FALSE (1 point)

Answer: False. Objective: The radiation response of cells in various phases of the cell cycle.

Reference: Radiobiology for the Radiologist. Hall, 5th Ed., Chapter 5 Repair of Radiation Damage and the Dose-Rate Effect, page 70-71.

Clinical Aspects of Radiation Oncology (including imaging interpretation)

A 7-year old female spayed bulldog cross comes to your clinic for evaluation of an incompletely excised grade 2 mast cell tumor of the right lateral thigh. The owner reports that her veterinarian noted an arrhythmia 2 years ago and a heart murmur 1 year ago. After ausculting the dog again you note a left basilar ejection heart murmur.



A) The following radiographic changes are present (only one (1) correct answer):

- A. Normal heart and pulmonary vessels
- B. Enlarged left atrium, left ventricle and venous congestion
- C. Enlarged right atrium, right ventricle and main pulmonary artery
- D. Enlarged heart with a globoid shape
- E. Diffuse, miliary pulmonary metastasis

B) The most likely diagnosis is (only one (1) correct answer):

- A. Probable diffuse metastasis
- B. Probable heartworm disease
- C. Probable cardiomyopathy
- D. Probable pulmonic stenosis
- E. Probable mitral endocardiosis

Answer to Part A: C. Answer to Part B: D. Note the normal vessels (artery and vein; size and shape) to the right cranial lung lobe on the lateral projection and the reverse “D” on the VD view. The black arrows on the VD view highlight the enlarged main pulmonary artery. Normal peripheral pulmonary vessels, enlarged right side of the heart and enlarged main pulmonary artery. These radiographic changes are consistent with pulmonic stenosis. Although this is a congenital heart defect, less severe cases may be diagnosed at an older age.

Objective: The radiographic signs of cancer in domestic animals, and other abnormalities likely to be found in diagnostic images of cancer patients. Examples include: radiography of lung metastasis; osseous and spinal neoplasia; sonography of the liver, spleen and lymph nodes; neuroimaging related to cancer. Be able to read and interpret radiographs, nuclear scans, sonograms, CT images, MR images, and port films from cancer patients.

Reference: Thrall, DE: Textbook of Veterinary Diagnostic Radiology, 5th Ed., W.B. Saunders Co., 2007, chapter 33.