

Examination for Diploma, Part 1

Clinical Radiobiology

Time allowed : 3 hours

ALL QUESTIONS ARE TO BE ATTEMPTED.

All questions are of equal value. Clearly labeled diagrams should be drawn wherever relevant.

1. Total dose is one of the major determinants in tumor control but in normal tissues the total dose and individual fraction size are both important. Discuss the RADIOBIOLOGICAL implications of this statement with particular reference to the use of Alpha/Beta ratios in determining the effect of changing the dose per fraction.
2. It is often stated that the technique of the combination of external beam therapy supplemented with brachytherapy is one of the most successful employed in radiotherapy. Compare and contrast the RADIOBIOLOGICAL basis for these two methods.
3. Observations on the relatively slow volume doubling times of untreated human tumors has led some clinicians to the belief that cell proliferation during a course of fractionated radiotherapy is not of great importance in achieving local tumor control. Give an account of what is presently known about the cell kinetics of human tumors, both untreated and treated, with a view to confirming or disclaiming the accuracy of the above opinion.
4. One of the most serious complications of the treatment of cancer is radiation damage to the spinal cord. Describe the radiosensitivity / tolerance of this tissue. What are the main physical and biological factors associated with the risk of chronic progressive radiation myelopathy?
5. In RADIOBIOLOGICAL terms write short notes on three of the following :
 - A) Radiation effects on ova.
 - B) Osteoradionecrosis.
 - C) Radiation effects on lymphocytes.
 - D) Free radicals.
6. This question is of the multiple choice format and is to be answered on the separate QUESTION DOCUMENT provided, according to the instructions of the document itself.

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