



BAKER COLLEGE

STUDENT LEARNING OUTCOMES

RDT 2110 Radiobiology
3 Semester Hours

Student Learning Outcomes and Enabling Objectives

1. Explore basic cell biology.
 - a. Examine cell structure & constituents.
 - b. Identify radiosensitive components of the cell.
 - c. Explore cell growth.
2. Investigate the types of ionizing radiation and their effects.
 - a. Differentiate between direct and indirect effects of ionizing radiation.
 - b. Discuss the effects of electromagnetic and particulate radiations on cellular interactions.
 - c. Determine biologic damage due to radiation-induced chemical reactions.
3. Examine radiation effects.
 - a. Distinguish between units of radiation quantities and radiologic measures.
 - b. Explain factors affecting relative biological effectiveness (RBE).
 - c. Examine factors influencing radiobiologic/biophysical events at the cellular and subcellular level.
 - d. Discuss radiation effects on the cell cycle.
 - e. Compare somatic and genetic effects of radiation.
4. Explore the relationship between radiosensitivity and response.
 - a. Describe factors influencing radiation response of cells and tissue.
 - b. Discuss the laws of Bergonie and Tribondeau.
 - c. Determine how the laws and principles of radiation biology relate to the clinical practice of radiation therapy.
 - d. Interpret cell survival curves to determine radiosensitivity under numerous conditions.
 - e. Discuss the relationship of radiation quality and dose to systemic responses.
 - f. Describe radiation syndromes and factors influencing response.
 - g. Differentiate between linear, nonlinear, and threshold and nonthreshold dose response curves.
5. Examine the biologic principles of radiation therapy.
 - a. Describe the 5 R's of radiobiology.
 - b. Describe the clinical significance of TD 5/5 and TD 50/and QUANTEC
 - c. Discuss the concept of LD 50/30.
 - d. Compare the relationship of time, dose, fractionation, volume, distance and site to radiation effects.
 - e. Discuss the use of radiation response modifiers.
 - f. Describe the influence of chemotherapy and hyperthermia alone and in combination with radiation therapy.

(SLO's derived from ASRT Radiation Therapy Professional Curriculum—2014)

Big Ideas and Essential Questions

Big Ideas

- Cell Biology
- Types of ionizing radiation
- Radiation effects
- Radiosensitivity and response
- Biologic principles of radiation therapy

Essential Questions

1. What impact does radiation have on the cell cycle?
 2. How do the biological effects of various types of ionizing radiation differ?
 3. Why is it important to know how radiation affects cells?
 4. Why is radiosensitivity and response important in radiation therapy?
 5. What is the relationship between biologic principles and response?
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These SLOs are not approved for experiential credit.

Effective: Spring 2018