

**Radiation Biology Course**  
**Tuesdays 4-5:30 pm, 2 Donner**

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**Textbooks: Radiobiology for the Radiologist (Hall and Giaccia, 6th ed.), &  
 Basic Clin. Radiobiology (G. Steel, 3rd ed.)**

| Date | Lecture title   | Instructor(s) |
|------|---|---------------|
| 2/24 | Types of radiation, radiation chemistry, target theory; Nature of DNA strand breaks and chrom. Aberrations              | Koch          |
| 3/3  | <i>In vitro</i> and <i>in vivo</i> cell survival curves; D <sub>q</sub> , D <sub>0</sub> , LPL and LQ models            | Tuttle        |
| 3/10 | Cell cycle and radiosensitivity; DNA repair at the cellular level, RBE, LET, dose-rate effects                          | Kao           |
| 3/17 | Modes of Cell death: necrosis, apoptosis, senescence, differentiation, autophagy  | Busch         |
| 3/24 | Molecular Techniques in RB: PFGE, COMET, H2AX, Flow Cytom, Gene Expression Analysis                                     | Koumenis      |
| 3/31 | Tumor hypoxia: causes, types, methods of measurement; Oxygen effect; Reoxygenation                                      | Evans         |
| 4/7  | Molecular aspects of hypoxic response-HIFs. Exploiting tumor hypoxia (hypoxic sensitizers and cytotoxins, gene therapy) | Koumenis      |
| 4/14 | Influence of oncogenes/tumor suppressor genes (e.g., EGFR, Ras, p53, BRCA1) on the cellular response to IR              | Dorsey        |
| 4/21 | Tumor Radiobiology: TCD <sub>50</sub> , tumor growth delays, spheroids  | Rengan        |
| 4/28 | Mid-term exam   |               |
| 5/5  | Normal tissue injury: early vs. late effects; Total body irradiation  | Cengel        |
| 5/12 | Radiation-induced carcinogenesis; Hereditary effects of IR;   | Kennedy       |
| 5/19 | Effects of IR on fetus and embryo; Radioprotectors  | Kennedy       |
| 5/26 | Time, dose and fractionation schemes in RT-hyper/hypofractionation  | Glatstein     |
| 6/2  | PDT-Principles and clinical practice  | Hahn          |
| 6/9  | Dose-response curves in the clinic; Brachytherapy and the dose-rate effect; BNCT  | Lin           |
| 6/16 | Particle Beams in RT-theory and practice  | McDonough     |
| 6/23 | Combination of RT/chemo; Radiosensitizers and radiation modifiers; Anti-angiogenic agents                               | Maity         |
| 6/30 | Final Exam  |               |