

Free Radical and Radiation Biology

Director

- Douglas R. Spitz (Radiation Oncology/Pathology)

Faculty: <https://frrbp.medicine.uiowa.edu/faculty-and-staff>

Website: <https://frrbp.medicine.uiowa.edu/>

Courses

Free Radical and Radiation Biology Courses

FRRB:3110 Medical Physics I 1-3 s.h.

Introduction to radiation used in clinical setting; fundamental physical units, measurements, principles, atomic structure and types of radiation; X-ray generating equipment, X-ray production, and its interaction with matter. Requirements: admission to free radical and radiation biology program or acceptance to radiation sciences therapy program, and maxillofacial or radiation oncology resident. Same as RSTH:3110.

FRRB:3130 Radiation Safety and Radiobiology 2 s.h.

Instruction on safe operation of radiation producing equipment and handling of radioactive materials; origin and/or derivation of certain formulae and techniques useful in radiation protection programs; regulatory agencies, regulations, and regulatory guides pertinent to student's field; emphasis on applied aspects of radiation protection; characteristics and biological effects of ionizing radiations, properties and uses of radioisotopes, medical applications, and biological basis for protection procedures. Requirements: enrollment in radiation sciences or nuclear medicine technology program. Same as RSP:3130.

FRRB:3215 Medical Physics II 0-3 s.h.

Treatment units used in external radiation therapy; beam calculations, isodose distributions, brachytherapy, quality assurance and quality management, protection and safety. Prerequisites: RSTH:3110. Requirements: admission to free radical and radiation biology program or acceptance to radiation sciences therapy program. Same as RSTH:3215.

FRRB:4000 Special Topics: Advanced Undergraduates arr.

Readings and/or laboratory experience. Offered fall semesters.

FRRB:5000 Radiation Biology 4 s.h.

Comprehensive study of molecular and biological effects of ionizing radiations with emphasis on biomedical therapeutic applications; mammalian radiobiology, contribution of metabolism to radiation effects, and therapeutic applications of radiation in cancer therapy. Offered fall semesters. Prerequisites: CHEM:2210 and BMB:3120. Requirements: college-level physics.

FRRB:5001 Research: Special Topics arr.

FRRB:5005 Rigor and Reproducibility in Redox Biology 1 s.h.

Experiments in redox biology are prone to artifact due to unwanted or unknown oxidations, misunderstanding of how laboratory tools work, assumptions by the investigator that do not hold, and more; faculty and students discuss common experimental approaches used in research in the field—their strengths, weakness, and current best approaches to avoid artifacts—and best approaches to present data to stand the test of time and are easily understood by readers.

FRRB:6000 Seminar: Free Radical and Radiation Biology 1 s.h.

Seminar presentations of cutting edge science in the field of free radical and radiation biology, given by experts in the field as well as trainees.

FRRB:6004 Research: Free Radical and Radiation Biology arr.

Representation of intensive laboratory-based studies in the field of free radical and radiation biology, determined by mutual agreement between faculty members sponsoring the research and consultation with graduate student.

FRRB:6006 Topics in Free Radical Biology and Medicine 1 s.h.

Discussion and presentation of new literature reports in the field of free radical biology and medicine in journal club format.

FRRB:6008 Topics in Radiation and Cancer Biology 1 s.h.

Emerging concepts in the biological effects of radiation and cancer biology; current topics in journal club format.

FRRB:7000 Redox Biology and Medicine 4 s.h.

Chemistry of free radicals, related oxidants, and antioxidants; antioxidant (redox) enzymes—their structure, biochemical function, regulation, and function in redox biology; targets of oxidants—lipids, proteins, DNA; redox biology of health (infants to healthy aging) and disease (cancer, cardiovascular disease, diabetes, neurodegenerative diseases). Offered spring semesters of even years. Prerequisites: BMB:3120 or CHEM:2210.

FRRB:7001 Molecular and Cellular Biology of Cancer 3 s.h.

Fundamental aspects of oncology at cellular and molecular levels; mechanisms of cancer initiation and progression, oncogene action, DNA damage and repair, carcinogenesis by radiation, chemicals, viruses; tumor immunology, anticancer therapies. Offered spring semesters. Requirements: strong basic science background. Same as PATH:7001.