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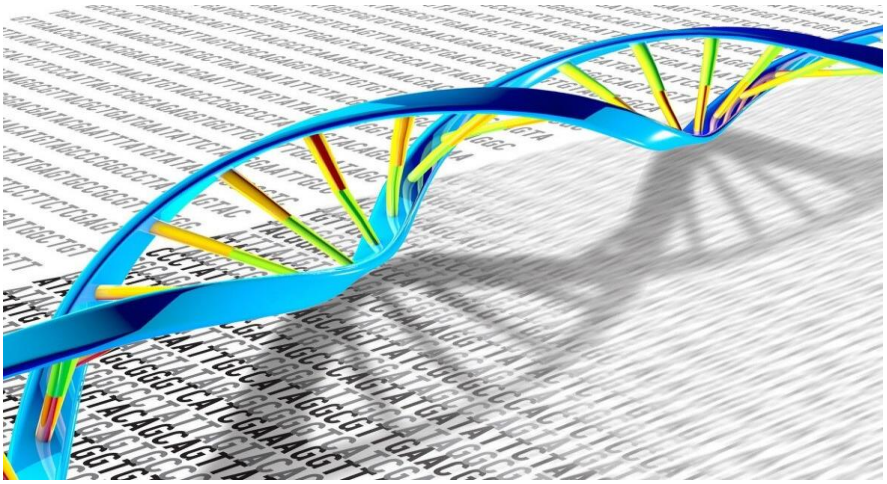

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Assessing DNA Damage in Radiotherapy Applications Using a DNA-Based Detector

Abstract

Both heavy ion and proton radiotherapy modalities are becoming more commonplace for cancer treatment. In addition, magnetic resonance imaging (MRI) is emerging as the image-guided technology of choice for radiotherapy image guidance due to its superior soft-tissue contrast and delineation compared to other imaging modalities. However, current radiation dosimeters do not provide a direct measure of radiobiological damage inflicted from various types of ionizing radiation. Nor do they account for the possible influence of a strong static MRI field on DNA damage during MR-guided radiotherapy. Hence, a more direct approach for assessing radiobiological damage imparted from these and other emerging technologies would be beneficial. To this end, my research is focused on developing a novel approach using a DNA-based detector to directly quantify radiobiological damage. It is known that ionizing radiation can transform supercoiled plasmid DNA into circular and linear conformations by causing single and double strand breaks, respectively. These transformations and their associated degree and type of DNA damage can be measured using gel electrophoresis. I will present our development and testing of a millimeter scale DNA-based detector to directly measure DNA damage.

3:00 p.m. – 4:00 pm Friday, November 6th Virtual

For Zoom Link contact dougs@mail.fresnostate.edu