NORTHERN HEALTH RESEARCH CONFERENCE

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Radiation Induced Functional Changes In Lens Epithelial Cells and Implications for Cataract Formation

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ABSTRACT:
The goal of this research is to examine the mechanisms behind the biological response to ionizing radiation exposure in the lens of the eye. It has been said that the lens is one of the most radiosensitive tissues. Lens epithelial cells (LEC) are the actively dividing cells within the lens. LEC are believed to be the main target of radiation since it is known that ionizing radiation targets actively dividing cells.

Lately, there has been a controversy on how radiation affects the lens. Recent epidemiological studies claim that there is no threshold dose for damage to the lens and that any increase in radiation dose is associated with an increase in biological complications. Secondly, it has been brought to light that there is no dose rate effect when it comes to the lens of the eye, which means that the lens of the eye is sensitive to any rate of radiation it encounters. The research we are conducting will help clarify these assumptions by examining the effects of different radiation doses and dose rates on cell survival, adhesion and migration. Cell survival is being quantified using the clonogenic assay post irradiation. Cell migration is being measured using the Boyden Chamber assay post irradiation. Lastly, cell adhesion is being measured using fluorometric detection kits containing precoated multiwell plates with various extracellular matrix proteins.

With the medical field constantly developing new ways to utilize radiation, combined with our daily exposure to radiation, we need to better comprehend the mechanistic effects of radiation on our cells. The data collected from this proposal will help gain a better understanding of the mechanism of radiation exposure to the lens. Since the lens is known to be very radiosensitive, it can serve as a benchmark on how radiation can affect other cells in the human body.