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Evaluating the Potential of Radiosensitizers to Enhance the Effectiveness of Radiation Therapy

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Radiation Therapy is a central modality in cancer treatment, but its lack of cellular selectivity often results in damage to surrounding healthy tissues. Radiosensitization has emerged as a promising strategy to enhance tumour response while minimizing toxicity.

In this context, several studies explore gold-based radiosensitizers, such as gold nanoparticles (AuNPs) in MCF-7 cells and gold-coated nanodiamonds (NDAus) in A549 cells, showing increased local dose deposition and DNA damage in tumour cells.

This work aims to evaluate the potential of confocal microscopy for three-dimensional quantification of DNA double-strand breaks and their repair, using Fiji software for automated image analysis, in order to compare this 3D approach with conventional 2D methods. Three-dimensional analysis will support the discussion of confocal microscopy, together with Fiji, as a robust tool to study radiosensitization effects. In addition, the use of NDAus in other tumour cell lines will be investigated, broadening the assessment of radiosensitizers.

Field of Research/Work

Beyond Physics

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