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Study of Energy Deposition Using a Multi-Cell Model and Lithium Ions in BORON NEUTRON CAPTURE THERAPY

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This study aims to analyze the energy deposition distribution of lithium-7 (^7Li) ions in a multi-cell model applied to Boron Neutron Capture Therapy (BNCT). Using Monte Carlo simulations with Geant4, we evaluate the influence of charged particle interactions at the cellular scale and their impact on BNCT dosimetry. Results show that ^7Li ions deposit their energy primarily in the cytoplasm and cell membrane, with notable differences compared to alpha particles. The multi-cell model also reveals an increase in average deposited energy and a reduction in energy loss outside the cellular system. Comparison of different Geant4 physical models indicates that G4QGSP_BIC_HP predicts higher energy deposition in cellular compartments. These results improve the accuracy of dosimetric models and contribute to the optimization of BNCT treatment strategies.

Abstract Category

Medical Physics

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