Title: Exploring a new microdosimetric quantity for estimating RBE for ion beams

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Ionizing radiations induce damages in DNA when interacting with living beings. These damages may lead to biological effects such as chromosome aberrations and cell death. The radiation potential for inducing DNA damages is related to the capacity of radiation for producing densely ionization pattern in the irradiated tissues. This capacity is often related to the linear energy transfer (LET), however, this quantity is not enough for determining the relative biological effectiveness (RBE) of a given radiation quality. For instance, two heavy charged particles (ions) with the same LET show different RBE. So far, researchers have used the dose-mean lineal energy as a quantity for estimating the RBE of ionizing radiations. In this work, we explore a new microdosimetric quantity called dose mean energy transfer. We also implemented a computational tool for the calculation of such variable using Geant4-DNA toolkit. In addition, a comparison with another classical microdosimetric variable known as dose-mean linear energy was made and RBE variable was determine for each of them. The results show consistent values between dose-mean linear energy and the proposed new microdosimetric variable dose-mean transfer energy. Finally, based on the results obtained for the RBE of each of the variables, the impact of the new variable on the RBE estimation was studied.

Biography

Adriana Forero has completed her physics studies at 22 years, currently she is finishing her Master degrees in Medical Physics at the National University of Colombia. She is currently working in a private medical institute of radiotherapy in Colombia.

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