J Laser Opt Photonics 2019, Volume 06 DOI: 10.4172/2469-410X-C2-050

6<sup>th</sup> World Congress on

Physics

May 13-14, 2019 | Paris, France

## Exploring a new microdosimetric quantity for estimating RBE for ion beamsy

Adriana Marcela Forero Torres<sup>1</sup> and Mario A Bernal<sup>2</sup>

<sup>1</sup>National University of Colombia, Colombia <sup>2</sup>Campinas State University, Brazil

I onizing 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 dosemean 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.