



Calculation of complex DNA damage induced by ions

Eugene Surdutovich, David C. Gallagher, Andrey V. Solov'yov

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This paper is devoted to the analysis of the complex damage of DNA irradiated by ions. The analysis and assessment of complex damage is important because cells in which it occurs are less likely to survive because the DNA repair mechanisms may not be sufficiently effective. We studied the flux of secondary electrons through the surface of nucleosomes and calculated the radial dose and the distribution of clustered damage around the ion's track. The calculated radial dose distribution is compared to simulations. The radial distribution of the complex damage is found to be different from that of the dose. Comparison with experiments may solve the question of what is more lethal for the cell, damage complexity or absorbed energy. We suggest a way to calculate the probability of cell death based on the complexity of the damage. This work is done within the framework of the phenomenon-based multiscale approach to radiation damage by ions.

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