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Quantification of hydroxyl radicals and solvated electrons produced by irradiated gold nanoparticles suggests a crucial role of interfacial water

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Highlights :

- G-values for HO[•] and solvated electrons produced when gold nanoparticles are submitted to ionizing radiation are determined
- Massive quantities (4.5 fold) of both species are quantified
- Unexpectedly, gamma rays induce more radicals than X-rays
- We propose that interfacial water around nanoparticles plays a key role in radical production

Abstract

The potential benefit of gold nanoparticles (GNP) to radiotherapy has been demonstrated in a range of cell lines and radiation sources as well as in rodent models, sometimes with contradictory results. Few experimental studies have explored the involved deleterious species, hydroxyl radical being so far the most cited, whereas theoretical studies have usually focused on secondary electrons emitted from GNP, making comparison between these two

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