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Low energy electron collisions of relevance to biological radiation damage

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The interaction of low energy electrons with DNA is known to cause strand breaks and lead to its damage. This process occurs fundamentally through dissociative electron attachment initiated via the formation of a temporary negative ion. Many experimental studies of electron scattering from DNA strands and from its constituents, both in gas and condensed phase, have contributed to the understanding of this process. The electron-rich nature of the DNA building blocks make them difficult targets to study computationally. Most of the work carried out so far concentrates on elastic scattering from nucleobases, deoxyribose, phosphoric acid as well as deoxynucleosides and deoxynucleotides. Calculations for electronically inelastic processes are very scarce. We will present theoretical results both for isolated molecules and small molecular cluster that aim at elucidating how low energy electrons interact with DNA and other molecules present in the cell (for example, water), how this is affected by hydrogen bonding and what role is played by inelastic channels.