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Hyperthermal heavy ion damage to DNA bases[1] SARVENAZ SARABIPOUR, ZONGWU DENG, MICHAEL HUELS, Ion Reaction Laboratory, Dep. of Nuclear Medicine & Radiobiology, Univ. of Sherbrooke, QC, Canada — Ionization and fragmentation of DNA is a key step in biological radiation damage. When heavy ions cross the cell, secondary ballistic ions, electrons and radicals are generated along the ion tracks. Here we report measurements of ionic fragments induced by 1-100eV Ar^+ irradiation of Adenine, Guanine and Cytosine films on Pt. Experiments are conducted with a UHV ion-beam apparatus consisting of a low energy ion source, a beam line with high resolution magnetic mass spectrometer (MS), a biomolecular film preparation system, and a reaction chamber with high-resolution quadrupole MS to monitor desorbing ion yields. Among the major fragments, NH_4^+ was identified in the desorption mass spectra of all bases examined, indicating efficient de-amination; in cells this results in pre-mutagenic lesions. Several important factors, e.g. intra/inter-molecular proton/hydrogen tunneling, tautomeric equilibrium and the molecular geometry of the bases in the films likely contribute to ion induced de-amination, and will be discussed here.

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