AbstractID: 7551 Title: Dosimetric and microdosimetric study of 103Pd and 125I seed sources

The use of Iodine-125 or Palladium-103 for brachytherapy applications, as in the treatment of prostates has become a standard treatment in US. The mean energy of Iodine-125 is approximatively 30keV; Palladium emits photons of even lower energy, approximately 20keV, which means a better protection of the surrounding organs at risk. The prescribed dose in Palladium implants has been determined from the experience in Iodine implants with a correction to take into account the differences in dose rate and in RBE. However, there is still an open discussion concerning the RBE of palladium[1, 2].Our team has determined the dose distribution around the new InterSource model of Palladium-103 and Iodine-125[3] seed from the IBt Company. The dosimetric data have been determined by measurements and Monte Carlo (MC) calculations in different phantoms and using different MC codes (EGSnrc and MCNP4B). In the context of the use of low energy brachytherapy sources, we have also compared the two isotopes from a microdosimetric point of view. The photon spectra have first been calculated using the two MC codes. These photon spectra are used as input for the event-by-event MC code TRION. The microdosimetric study is performed in parallel with in-vivo radiobiological experiments designed to determine the RBE of Iodine and Palladium for the regeneration of intestinal crypts in mice[4]. The comparison of the microdosimetric data calculated for each isotope, combined with the radiobiological results, could help to decide on the dose prescription for Iodine and Palladium implants.