BSA design, dosimetry

Bismuth collimator effect on beam shaping assemblies during dose measurements of thermal neutrons and gamma ray.

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Dosimetry in BNCT is more complicated than in conventional radiotherapy (photon and electron therapy). In BNCT, the total absorbed dose is the sum of four dose components: boron, nitrogen; fast neutron and γ-ray doses. The damage of tissue in BNCT is due to three types of ionizing radiation: low linear energy transfer (LET) gamma rays, high-LET protons and heavier high-LET charged particles ^{7}Li, ^{4}He and ^{14}C (Fig 1). A dosimeters for all these doses was developed and verified at the accelerator based neutron source VITA [1]. In order to improve BNCT and protect the patient, it is desirable that the useful dose (boron dose) exceed as much as possible the harmful dose (the sum of the fast neutron, gamma ray and nitrogen doses), where the ratio of useful dose to harmful dose is called the therapeutic factor. In this study, we will present the results of measuring the spatial distribution of boron dose and gamma radiation dose using a small polystyrene scintillator detector [2] in the presence of a bismuth collimator for two neutron beam shaping assembly, one containing moderator of magnesium fluoride and the other moderator made of plexiglass (PMMA) [3].

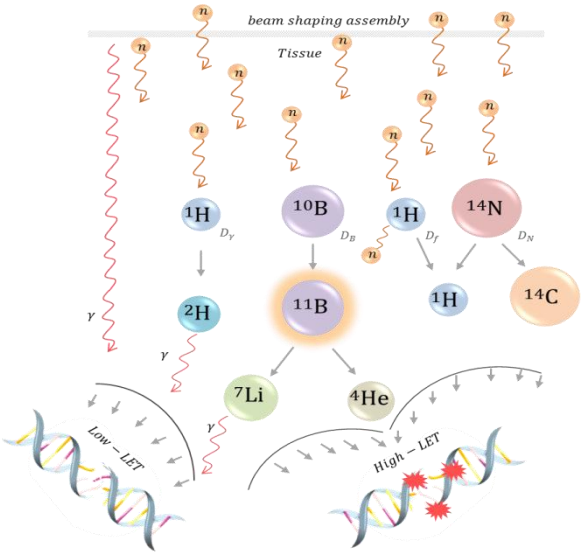

Fig 1

Acknowledgments:
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