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## Minibeam Therapy with Lithium-7 Ions: Side Effects in Normal Brain

**Abstract:** The purpose of this work was to investigate whether minibeam therapy with heavy ions might offer improvements of the therapeutic ratio for the treatment of human brain cancers. To assess neurotoxicity, we irradiated normal juvenile rats using 120 MeV lithium-7 ions at an absorbed integral dose of 20 Gy. Beams were configured either as a solid parallel circular beam or as an array of planar parallel minibeam having 300-micron width and 1-mm center-to-center spacing within a circular array. We followed animals for 6 months after treatment and utilized behavioral testing and immunohistochemical studies to investigate the resulting cognitive impairment and chronic pathologic changes. We found both solid-beam therapy and minibeam therapy to result in cognitive impairment compared with sham controls, with no apparent reduction in neurotoxicity using heavy ion minibeam instead of solid beams under the conditions of this study.

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