Introduction and Background

- More than 50% of cancer patients receive some sort of radiation therapy during the course of their illness.
- While radiation treatment is a mainstay in clinical oncology, there is limited preclinical data in syngeneic models.
- The advent of image-guided small animal irradiators such as the Small Animal Radiation Research Platform (SARRP; Xstrahl Inc., Suwanee, GA) allow for use of targeted focal irradiation (RT) in a broad range of models.
- Here we evaluated the use of RT to broaden efficacy and response duration of immunomodulatory therapies. In the GL261-Luc glioblastoma model, we also examined possible changes in lymphoid and myeloid immune cells by flow cytometry and looked at infiltration of CD4+ T cells by immunohistochemistry.

Materials and Methods

- Cells were implanted either subcutaneous (SC) on the flank (A20 and CT26), in the mammary fat pad (EMT-6, E0771, 4T1-Luc), or intracranially (GL261-Luc) into the appropriate syngeneic mouse host.
- Image-guided irradiation was performed under 1-2% isoflurane anesthesia on the Small Animal Radiation Research Platform (SARRP; Xstrahl Inc., Suwanee, GA). Treatment was delivered at 220 kV and 13.0 mA using an appropriately sized collimator to the total indicated dose (in Gray; Gy) in 2 equally weighted beams. Unless otherwise indicated, focal RT was given on the same day that radiation was given. Antibodies were acquired from Bio X Cell and delivered through intraperitoneal injections.
- In the SC and mammary fat pad models, focal irradiation was delivered only to the tumor and tumor growth changes were tracked by caliper measurements. Mice were euthanized at a tumor volume of approximately 2,000 mm³.
- In the GL261-Luc model, mice were implanted intracranially with 10 µL total volume. Mice were injected with Carprofen at 5 mg/kg and anesthetized using 2% isoflurane for whole brain harvest, fixation in 10% NBF, and cryopreserving the whole organ. Tissue sections were then processed and labeled using direct methods with chromogen substrate on the Bond RXm (Leica Biosystems). Images were obtained on the Aperio VERSA (Leica Biosystems).
- Flow cytometry was performed on the BD流式细胞仪 for analysis with FlowJo software (Tree Star, Inc., Ashland, OR).
- For immunohistochemistry, whole brains were harvested, fixed in 10% NBF and embedded in paraffin for sectioning. Tissue sections were then processed and labeled using direct methods with chromogen substrate on the Bond RXm (Leica Biosystems).

Results and Conclusions

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- The advent of image-guided small animal irradiators such as the Small Animal Radiation Research Platform (SARRP; Xstrahl Inc., Suwanee, GA) allow for use of targeted focal irradiation (RT) in a broad range of models.
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