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AWARDS

Molecular Imaging Travel Award

SUBSPECIALTY CONTENT

Molecular Imaging

CODE: SSC11-06

SESSION:

ISP: Molecular Imaging (Applications I)

Cytotoxic T-cells as Cellular Probes to Differentiate Glioma from Radiation Injury by MRI

DATE: Monday, December 01 2008
START TIME: **11:20 AM**
END TIME: **11:30 AM**
LOCATION: E353A

DISCLOSURES

S.A. - Nothing to disclose.
A.I. - Nothing to disclose.
B.J. - Nothing to disclose.
K.J. - Nothing to disclose.
S.K. - Nothing to disclose.
R.K. - Nothing to disclose.
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PURPOSE

Recurrent glioma and radiation injury cannot be differentiated based on routine post contrast CT or MRI, PET and other parametric analysis of MRI data. Reports indicate effective therapy of recurrent glioma by cytotoxic T-cells following vaccination of primed dendritic cells (DC). The purposes of this study were to determine (1) whether T-cells collected from cord blood can be sensitized against glioma cells (U-251); (2) whether these sensitized T-cells (CTLs) can be used as probes to identify implanted glioma (U-251) in a rodent model by cellular magnetic resonance imaging (CMRI); (3) whether these CTLs can be used to differentiate glioma from radiation

necrosis.

METHOD AND MATERIALS

Cord blood CD2+/CD3+ and CD14+ cells were collected. CD14+ cells were converted to DCs and primed with glioma cell lysate. Irradiated primed DCs were used to sensitize collected T-cells. Specificity of CTLs in killing tumor cells was also determined and compared with control T-cells. To use CTLs as probes for MRI, cells were labeled with ferumoxide-protamine sulfate. Labeled, unlabeled CTLs and control T-cells were injected in glioma bearing rats and animals underwent MRI on days 3 and 7 following injection of cells. Multiecho T2-weighted and T2*-weighted images were acquired using a 7-Tesla MRI systems. Labeled CTLs were also injected in radiation injury rat model to determine whether these CTLs would accumulate non-specifically to the site of radiation injury.

RESULTS

We were able to make effective CTLs using U251 cell lysate primed DCs. These CTLs were able to kill U251 cells in in-vitro experiments. MR images showed increased low signal intensity areas in tumor that received labeled CTLs compared to that of unlabeled cells or control (non-sensitized) T-cells. Analysis of R2 and R2* values showed significant differences among the groups of animals. Histochemistry proved the accumulation of iron positive cells. No definite low signal intensity area was seen in rats with radiation injury which was also confirmed by inability to find iron positive cells on histochemistry.

CONCLUSION

Our results indicate that T-cells can be sensitized effectively by in vitro methods and these sensitized T-cells can be used as cellular probes to identify glioma and to differentiate glioma from radiation necrosis.

CLINICAL RELEVANCE/APPLICATION

This can easily be translated to clinics, where patient’s cells can be used to make primed DCs and CTLs in a GMP laboratory.

QUESTIONS ABOUT THIS EVENT EMAIL:

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