Enhancement of type 1 interferon induction with drug and radiation treatments to increase anti-tumor immunity
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Introduction
- Evidence shows the efficacy of radiation therapy relies on interferon (IFN) signaling.
- Radiotherapy (RT), in a type 1 IFN-dependent manner, promotes innate immune responses that support an adaptive immune response and anti-tumor immunity.

**Fig. 1 Role of Interferon-Beta (IFNb)**

- Direct administration of interferon to patients has adverse outcomes.
- Thus, it is important to find and target pathways (other than the already established cGAS-STING pathway) to improve RT efficacy.
- SR1001 (RORα agonist) and GSK4112 (Rev-erbα agonist) were identified in a drug screen for IFNb augmentation.
- Both are involved in the immune system and the circadian rhythm.
- **We hypothesized that RORα and Rev-erbα work together with radiation to augment type 1 IFN production.**

Methods

**Cultured 293A cells**

**Administered Treatments**

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<thead>
<tr>
<th>No Radiation</th>
<th>No drug</th>
<th>SR1001</th>
<th>GSK4112</th>
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**Fig. 2 Relative mRNA expression for IFNb1 and CCL5 (downstream of IFNb1) in radiated and untreated cells.**

Results

**IFNB expression in cells treated with radiation + drug**

- The results show that RORα and Rev-erbα work together with radiation to augment type 1 IFN production.
- Since both RORα and Rev-erbα are circadian controlled, they may exist a link between the circadian rhythm and the immune response to radiation.
- Future directions will focus on determining if the time of drug and radiation delivery relative to the 24-hour circadian cycle plays a role in increasing RT induced anti-tumor immunity.

**Fig. 3 Relative mRNA expression for IFNb1 and CCL5 in cells treated with radiation and drugs.**

Conclusion

Acknowledgements

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References


