Engineering the Sodium/ Iodide Symporter for Enhanced Targeted Internal Radiotherapy

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ADDRESSED NEED

This technology addresses a critical limitation in current cancer therapies by enabling targeted delivery of radioactive treatments to tumors while protecting healthy thyroid tissue. This technology directly addresses these challenges by enabling targeted delivery of radioactive treatments to tumors while protecting healthy thyroid tissue.

KEY BENEFITS

- **Improved Targeting:** Higher specificity towards tumor cells compared to traditional therapies.
- **Reduced Toxicity:** Limits the exposure of healthy tissues to radiation.
- **Enhanced Efficacy:** Increases the potential for successful treatment outcomes in non-thyroidal cancers.
- **Versatile Applications:** Adaptable for use in various cancer types, expanding treatment options.
- **Innovative Mechanism:** Introduces a new paradigm in cancer therapy through targeted gene delivery.

TECHNOLOGY FEATURES

- **Selective Transport:** Engineered NIS variants that preferentially transport oxyanions over iodide.
- **Electrogenic Mechanism:** Utilizes a dual Na^+ transport mechanism to enhance substrate selectivity.
- **Scalable Design:** Potential for widespread application in various cancer types through gene therapy approaches.
- **Minimal Side Effects:** Protects healthy tissues by utilizing non-radioactive iodide to saturate endogenous NIS.

SUMMARY

The Sodium/Iodide Symporter (NIS) is a critical protein that facilitates the active transport of iodide into thyroid cells, essential for synthesizing thyroid hormones. Recent advancements in engineering NIS variants aim to selectively transport oxyanions, offering innovative therapeutic strategies for cancer treatment in the thyroid and elsewhere while minimizing side effects.

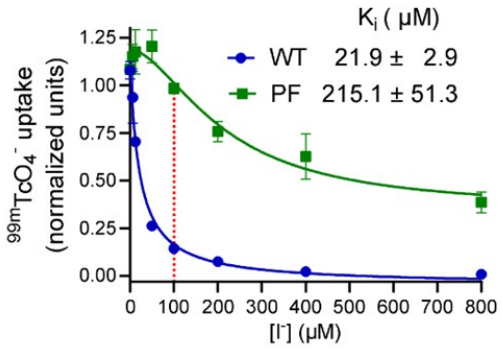

Figure 1: Plot of natural (WT) and engineered NIS (PF) variants demonstrating selective transport of oxyanions with increasing iodine dose.

OTHER DETAILS

Intellectual Property Status: A provisional patent has been filed.

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