

**Docket #:** S24-042

# **B7H3-Targeting Peptides**

Theranostics represents a paradigm shift in cancer treatment, offering a more personalized and molecular approach to cancer diagnosis and treatment with striking efficacy and low toxicity. The significance of theranostics therefore lies in its ability to personalize and optimize medical treatments by tailoring them to individual patients.

B7H3 is a transmembrane protein, that has recently been identified as a pan-cancer antigen with dense expression across a multitude of cancer types and with restricted expression in normal tissue, rendering B7H3-targeted radiotheranostics a viable treatment option for millions of patients.

Despite the promise of B7H3, no peptide ligands have been identified. Furthermore, because the protein lacks structural and functional characterization there is currently no a priori way to design ligands.

Stanford researchers have discovered B7H3-targeting peptides from peptide phage display that can be used for cancer theranostic applications, such as for diagnostic imaging and peptide-targeted radionuclide therapy. This would allow for both the diagnosis and treatment of various advanced or refractory cancers lacking other viable therapies.

The newly identified peptide is the first peptide identified specific to B7H3, and when chelated to  $^{68}\text{Ga}$  and  $^{177}\text{Lu}$ , the first radionuclide therapy for B7H3. Researchers predict that the B7H3 peptide-targeted radiotherapeutics would have preferential uptake in tumor tissue where the majority of DNA damage would occur, with timely elimination from clearance organs.

## **Stage of Development**

In vitro and in vivo: proof of concept in cell lines

## **Applications**

- Cancer diagnostic
- Radionuclide cancer therapy
- Cancer theranostics

## Advantages

- Cost effective synthesis
- Can be used to diagnose and treat a range of resistant and refractory cancer types
- Favorable pharmacokinetics
- First peptides identified specific to B7H3
  - Can chelate 68Ga and 177Lu for radionuclide therapy

## Publications

- Landry, M., Guenther, T., Pandrala, M., Herrera, M., Zhang, S., Beinat, C. "Discovery and Validation of B7H3-Targeting Peptides for Radionuclide Theranostics." Radionuclide Theranostics for the Management of Cancer Gordon Research Conference (2024). Poster.
- Landry, M., Guenther, T., Pandrala, M., Herrera, M., Zhang, S., Beinat, C. "Discovery and Development of B7H3-Targeting Peptides." Radionuclide Theranostics for the Management of Cancer Gordon Research Seminar (2024). Oral presentation.

## Innovators

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