

Combination of Near Infrared Photoimmunotherapy Targeting Cancer Cells and Host-Immune Activation

Summary

Investigators at the National Cancer Institute (NCI) seek co-development partners and/or licensees for a new therapeutic approach that selectively targets cancer cells and prevents tumor regrowth. The novel method combines antibody-IR700 molecules and Near-Infrared Photo Immunotherapy (NIR-PIT), which has shown great potential in targeting tumors via a host immunogenic response, with already known and available anti-cancer immunomodulators to further enhance the antitumor response. The investigators have shown in mouse models that, when used in combination, NIR-PIT-treatment and standard antitumor agents conferred a potent vaccine-like effect, not only curing mice of local and distant cancers but successfully immunizing them against tumor regrowth.

NIH Reference Number

E-113-2018

Product Type

- Therapeutics

Keywords

- Near-Infrared Photo Immunotherapy, NIR-PIT, photochemical, antibody-IR700, Immunotherapy, Metastasis, Tumor Inhibition, Immunomodulators, Combination Therapy, Kobayashi

Collaboration Opportunity

This invention is available for licensing and co-development.

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Description of Technology

Common methods of cancer therapy largely rely on either direct killing of cancer cells or activation of the host immune response to do so, but not both. A recently developed treatment of tumors uses an antibody/photo-absorber, Ab-IR700, with near infrared

photoimmunotherapy (NIR-PIT), to selectively kill IR700-bound and NIR-light-exposed cancer cells by activating an immunogenic cell death pathway. NIR-PIT has been shown in human clinical trials to effectively target tumor cells via a host immune response with relatively few side effects. However, the depth of NIR-light penetration in vivo limits its usefulness. To address this limitation, the patient's immune response can be further leveraged to reach even distant cancer cells by combining NIR-PIT with already-approved anti-tumor immunomodulator therapies. This strategy has not yet been developed into treatment – but could provide a potentially more superior therapy that targets local deposits as well as metastases.

Investigators at the National Cancer Institute (NCI) have developed a method that combines antibody-IR700/NIR-PIT therapy with already-approved antitumor agents. By combining these classes of therapies, the method targets both local and distant metastatic cancers and importantly, provides a powerful vaccine-like effect which prevents regrowth with minimal harm to normal cells. The method employs an immune system activator and/or an inhibitor of immune-suppressing cells, introduced simultaneously with or sequentially to antibody-IR700 molecules, after which the subject is treated with NIR-PIT. The method has been tested in mouse cancer models with various immunotherapies, where a total cure of local and distant cancers was exhibited in addition to successful immunization against cancer re-emergence. This novel combination of NIR-PIT with anticancer agents has tremendous potential as a highly efficacious therapeutic.

The scientists at NCI seek parties interested in licensing of and/or co-development collaboration on this cancer therapeutic strategy.

Potential Commercial Applications

- Solid cancers. – including those ineffectively treated with anti-PD-1 agents.

Competitive Advantages

- Capability to treat existing local and metastatic disease.
- Potential to prevent new tumor formation.
- Could be a more effective combination therapy compared with those receiving immune-monotherapy, such as anti-PD-1

Inventor(s)

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Development Stage

- Pre-clinical (in vivo)

Publications

Ito K, et al. Near-infrared photochemoimmunotherapy by photoactivatable bifunctional antibody-drug conjugates targeting human epidermal growth factor receptor 2 positive cancer [[Article DOI 10.1021](#)]

Kobayashi H, et al. Near-infrared photoimmunotherapy of cancer [PMID 31335117]

Patent Status

- **U.S. Provisional:** U.S. Provisional Patent Application Number 62/655,612, Filed 10 Apr 2018
- **PCT:** PCT Application Number PCT/US2019/026488, Filed 09 Apr 2019

Therapeutic Area

- Cancer/Neoplasm

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