

REMOVAL OF SELECTED PROTEINS USING LIGHT ENERGY: PHOTOIMMUNOTHERAPY

SUMMARY

The National Cancer Institute is seeking parties interested in collaborative research to co-develop or license the in vitro and in vivo removal of targets using light energy.

REFERENCE NUMBER

E-209-2014

PRODUCT TYPE

- Therapeutics
- Research Materials
- Diagnostics

KEYWORDS

- IR700
- photoactivation
- aggregation
- fluorophore
- photoimmunotherapy

COLLABORATION OPPORTUNITY

This invention is available for licensing.

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DESCRIPTION OF TECHNOLOGY

Researchers at the NCI [Laboratory of Molecular Theranostics](#) and the [Molecular Imaging Program](#) have developed a new method to modify, isolate and remove a single chemically-labeled molecule or a cluster of proteins associated with the chemically-labeled protein. The chemical label can be an antigen-antibody complex. This discovery is based on the mechanism of photo-immunotherapy (PIT). Unlike PIT, however, which is used for direct therapy, the above-identified technology can be used for controlled drug delivery (e.g., removing unbound drug moieties from circulation) and active detoxification of potentially poisonous material (e.g. bacteria, toxins, virus, venom etc.).

The current state of the art does not readily allow for simple labeling and isolation of proteins or other

biomolecules from complex tissue samples or bodily fluids. The technology consists of using a conjugate of the dye IR700 and a biomolecule with specific binding activity, such as an antibody, to label the cell type or target molecule of interest, followed by irradiation of the sample with light in the near IR spectrum. Upon exposure, the IR700 moiety becomes hydrophobic and aggregates, allowing for mechanical separation of the target molecule or cell type of interest as a complex with the IR700 conjugate. Labeling of cancerous cells *in vivo* with IR700 conjugates, followed by irradiation in the near IR spectrum, causes cell death.

POTENTIAL COMMERCIAL APPLICATIONS

- *In vivo* removal of toxins, pathogens or drugs from a subject
- Cancer immunotherapy

COMPETITIVE ADVANTAGES

Simple and versatile way to separate and remove molecules or cells from a complex mixture.

INVENTOR(S)

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DEVELOPMENT STAGE

- Discovery (Lead Identification)

PUBLICATIONS

Manuscript in preparation. See also:

Mitsunaga M, et al. [PMID 22873679](#)

Mitsunaga M, et al. [PMID 22369484](#)

Mitsunaga M, et al. [PMID 22057348](#)

PATENT STATUS

- **U.S. Filed:** US Provisional Application No. 62/034,990 filed 08 Aug 2014

RELATED TECHNOLOGIES

- E-205-2010

THERAPEUTIC AREA

- Cancer/Neoplasm