Novel Photoimmuno-Theranostics for Detection and Elimination of Skin Cancer Cells

Novel photoimmuno-theranostics for detection and elimination of skin cancer cells and simple methods to generate the homogeneous reagents.

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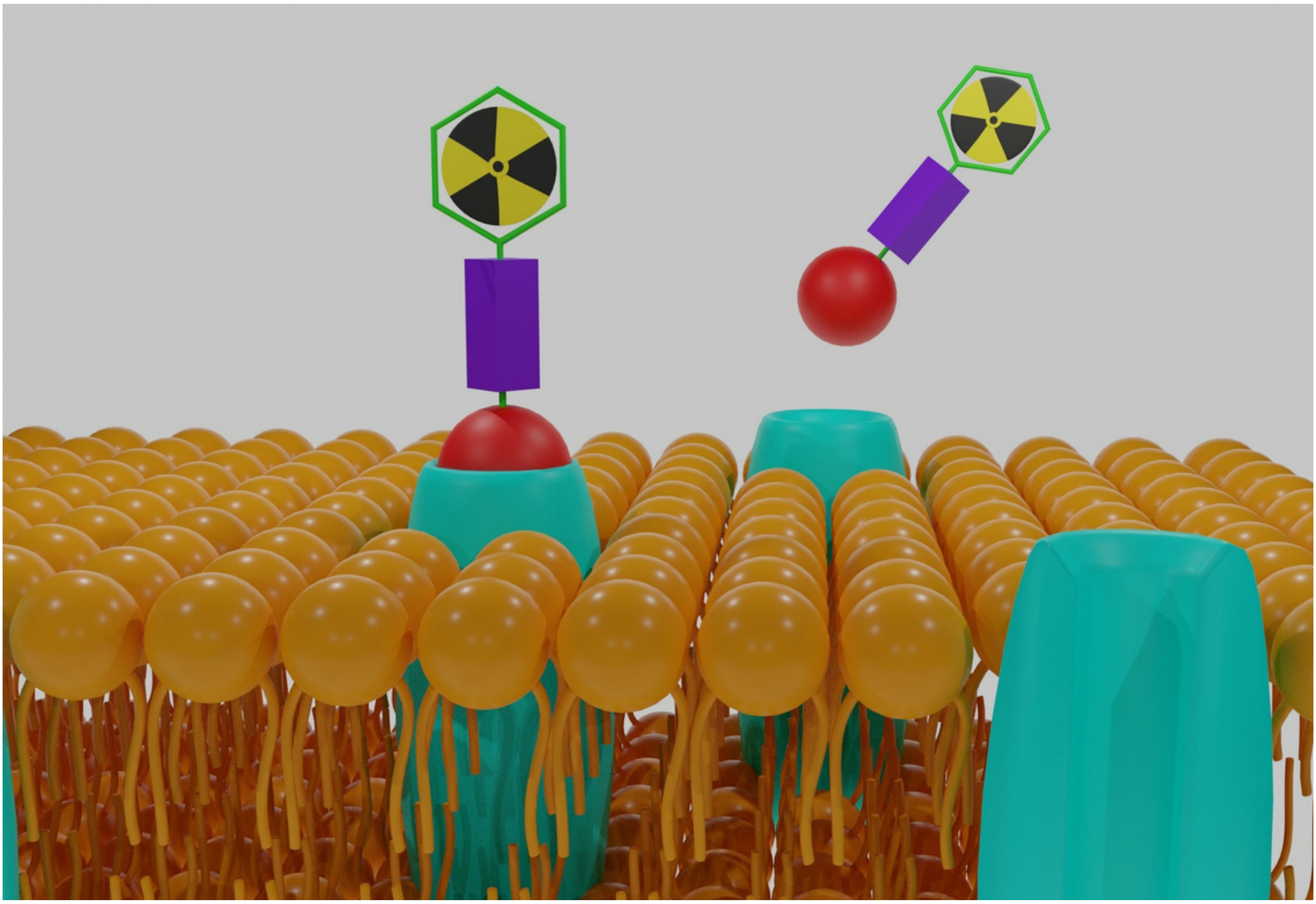

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Background

Currently, skin cancers are the most commonly diagnosed forms of human cancer worldwide, and more than 3.5 million new cases are diagnosed per year in USA. During recent years, significant progress has been achieved to improve skin cancer prognosis and management. Still, the incidence and mortality rate of melanoma and non-melanoma skin cancer has been increased over the past decades.

One therapeutic option against non-melanoma skin cancer is photodynamic therapy (PDT). PDT holds great promise for improving non-melanoma skin cancer treatment; several photosensitizers have been approved for use in humans such as porfimer sodium (Photofrin), meta-tetrahydroxyphenylchlorin (Foscan) and 5-aminolevulinic acid (Metvix).

Thus far, tumor targeting in PDT management relies on passive accumulation of photosensitizers in tumor tissues, which can limit the success of PDT. Moreover, these forms of photosensitization can also damage healthy tissue and result in prolonged skin photosensitivity.

The considerable growth in understanding molecular mechanisms of cancer development has paved the way for developing targeted therapies addressing key disease biomarkers. Therefore, combining targeted therapies with PDT resulted in so-called photoimmunotherapy (PIT).

Technology Overview

Theranostics are mostly used in cancer therapies and are widely believed to have a considerable impact on healthcare before, during and after disease by improving cancer prognosis and management simultaneously. Current theranostics approaches still rely on unspecific passive tumor targeting strategies, which have a scattergun effect and tend to damage both neoplastic and non-neoplastic cells. This is in contrast to the theranostics of the technology provided herein, which generates highly homogeneous, standardized and pharmaceutically acceptable photoimmunoconjugates in a controlled way. Thus, the photoimmuno-theranostic reagents produced by the methods according to the present disclosure possess a homogenized pharmacokinetic and bio-distribution property not known in the prior art.

The technology provided herein relates to an immuno-theranostics approach which was developed for targeting epidermal growth factor receptor (EGFR) expressing skin cancer cells by conjugating IRDye®700DX N-hydroxysuccinimide ester (IR700) photosensitizer to a single-chain variable fragment antibody against EGFR (scFv-425) using SNAP-tag technology.

Benefits

The technology also relates to novel methods which generate homogeneous and specific photoimmuno-theranostics reagents in a simple, controlled and efficient way. This method combines molecular optical imaging, photodynamic therapy and immunotherapy using SNAP-tag technology.

Applications

The technology provided herein generally relates to novel specific photoimmuno-theranostics for the use in detection and elimination of skin cancer cells.

Opportunity

Opportunity for collaboration, licensing and clinical trials.

Patents

- PCT/EP2015/063422

IP Status

- Patented

Seeking

- Commercial partner
- Development partner
- Licensing