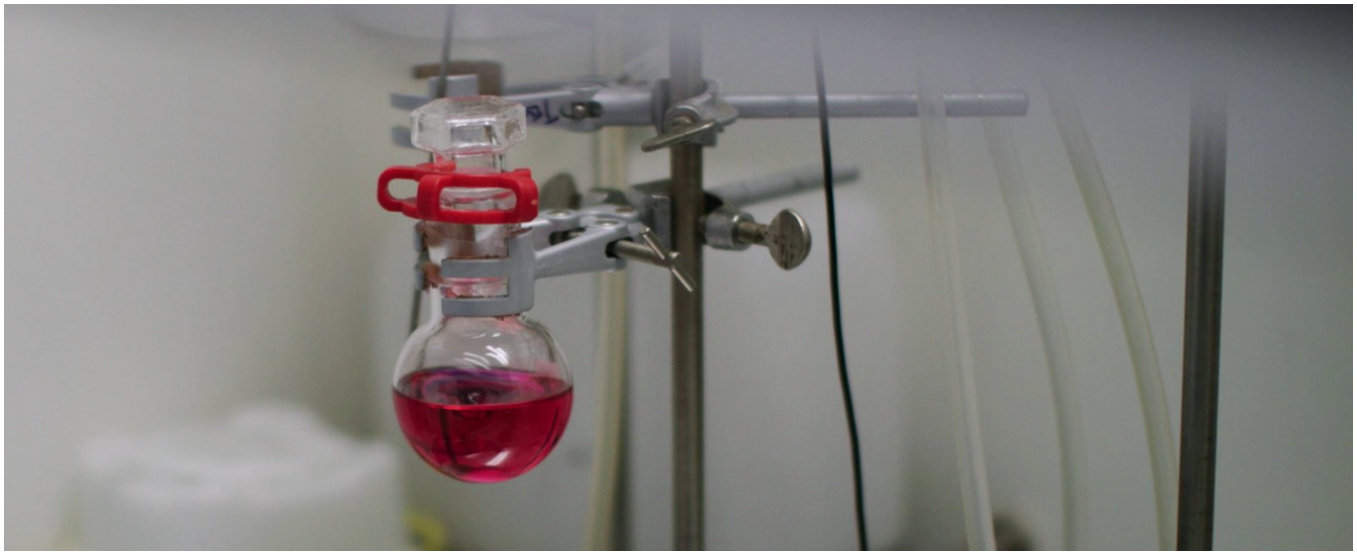
ETH zürich

Licensing Opportunity

A bio-orthogonal chemical reaction for manufacturing protein-drug conjugates



Application

This site-selective chemical reaction links proteins and payloads as stable conjugates in living cells. The method is suitable for manufacturing protein-drug conjugates for cancer treatment, which are new classes of drugs with reduced undesired side-effects.

Features & Benefits

- modifies diverse clinically relevant proteins
- in vivo synthesis
- fewer manufacturing steps than state-of-the-art

Publications

- "Site-specific bioorthogonal protein labelling by tetrazine ligation using endogenous β-amino acid dienophiles", Nature Chemistry (2023) https://doi.org/10.1038/s41557-023-01252-8
- Patent pending, WO2023052526 Methods for preparing pyridazine compounds

transfer

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Reference 2021-094

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Technology Readiness Level

1 2 3 **4** 5 6 7 8 9

Background

A weakness of approved drugs, which are conjugated with antigen-binding proteins, is the inconsistent drug load due to unspecific conjugation reactions. As a result, overdosing or underdosing of patients may occur (high "batch-to-batch" variability). Also, unstable linkage leads to premature cleavage of protein and drug, leading to off-target toxicity and undesired side-effects.

Invention

This method is based on a Diels Alder cycloaddition, which takes place within a living cell. Thereby, the payload is site-selectively attached to a previously marked protein. The result is a well-defined and stable linker between protein and payload.

In contrast to chemical reactions taking place in a test tube, this bio-orthogonal reaction works well in aqueous solution, near-neutral pH, at ambient temperature, and within the crowded interior of a living cell.

The feasibility of tagging proteins with this technology has been successfully demonstrated for diverse protein substrates. Particularly, a small antibody-binding protein was successfully conjugated to a radiolabelling ligand without compromising target binding affinity.

YouTube video:
https://youtu.be/8uyVGTEUnCI