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Masked nanobodies for targeted cancer therapy

A masked nanobody technology that is activated only in the tumor microenvironment to safely deliver anti-cancer therapeutics.

IP Status: Utility Patent Pending; Application No. 18/141,728

Applications

- Antibody drug conjugates
- Bi-specific antibodies
- Cell therapies (e.g. CAR T cell, NK cell, etc.)

Key Benefits & Differentiators

- **Highly selective:** The technology avoids off-target effects and associated toxicities by activating the nanobody exclusively in the tumor microenvironment
- **Unique masking approach:** The masked nanobodies incorporate a unique masking group that can be applied to any nanobody formulation, opening a wide range of new applications for cancer therapy

Technology Overview

Target non-specificity is a common problem in immunotherapy that minimizes the efficacy of cancer treatment. Many current cancer immunotherapeutics target tumor-associated antigens, but since these antigens can also be expressed on healthy cells, the treatments can cause "on-target, off-tumor" toxicity. This can be particularly problematic for highly potent therapies, limiting their dosage and effectiveness. While strategies like antibody masking have emerged to address this, the same solutions have not been developed for nanobody-based therapies, which offer unique advantages due to their smaller size and high binding affinity.

Researchers at the University of Minnesota have developed a novel approach to design masked nanobodies that are only unmasked by tumor-producing proteases. The technology involves linking a unique masking group to the nanobody via a flexible linker with a proteolytic site that is cleaved by matrix metalloproteinases overexpressed in solid tumors. This steric masking prevents the nanobody from binding to its target until it reaches the tumor microenvironment. Once unmasked, the nanobody is free to bind to tumor cells, allowing for targeted drug delivery or immune cell activation while avoiding healthy tissues. This is the first masking strategy developed specifically for nanobodies, offering a promising new avenue for cancer immunotherapy.

Phase of Development

TRL: 3
In vitro proof-of-concept has been demonstrated

Desired Partnerships

This technology is now available for:

Technology ID
2022-246

Category
All Technologies
Life Sciences/Biologics
Life Sciences/Human Health
Life Sciences/Pharmaceuticals
Life Sciences/Therapeutics

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Researchers

- **Carston Wagner, PhD** Professor, Department of Medicinal Chemistry