Targeting Cancer Therapeutics and Diagnostics with Camelid Antibodies That Bind FAP

WARF: P230173US01

Inventors: Aaron LeBeau, Joseph Gallant

The Wisconsin Alumni Research Foundation is seeking commercial partners interested in developing imaging molecules that can bind Fibroblast Activation Protein (FAP), a protein overexpressed in all tumor cell lines. UW-Madison researchers have identified a FAP-binding molecule that is small, relatively stable and has a clearance profile that could make it an ideal candidate for cancer theranostics.

Overview

Fibroblast Activation Protein (FAP) is expressed in 90% of all solid tumors, making it an attractive target in cancer. Current small molecules targeting FAP clear from the system too rapidly, and FAP-targeting biologics that can quickly deliver therapeutic payloads without toxic side-effects do not exist. From their library of nanobodies, the LeBeau lab has developed and optimized F7-based camelid constructs that can potentially fill this void.

The Invention

The FAP-binding constructs have higher affinity and tumor penetration than most small molecules, which can improve imaging of tumor growth and may also be used to deliver therapeutics to the tumor site. The identified binding domain (F7) was affinity matured and engineered into a homodimer and bivalent Fc fusion molecule, both of which can be used for PET imaging. The resulting affinity of the molecule is relatively strong, and the residues needing modification for humanizing antibodies are well-defined. Thus, the sequence can be “humanized” directly from the library if needed.

Applications

- Detecting cancer in humans using radio-imaging techniques
- Delivering a rapid therapeutic to a tumor
- Monitoring FAP activity *in vivo* in real-time

Key Benefits

- High affinity for cancer target FAP
- Relatively stable
- Can be cleared from the body within 24-48 hours following administration to a potential patient
- Unlike mice, camelid antibodies are genetically similar enough to human antibodies that relatively little modification is required for therapeutic development.
- Camelid antibodies are structurally simpler and smaller than human antibodies, which allows for better tumor penetration and radiolabeling.

Additional Information

For More Information About the Inventors

- Aaron LeBeau

Tech Fields

- Drug Delivery : Biologics

For current licensing status, please contact Rafael Diaz at rdiaz@warf.org or 608-960-9847