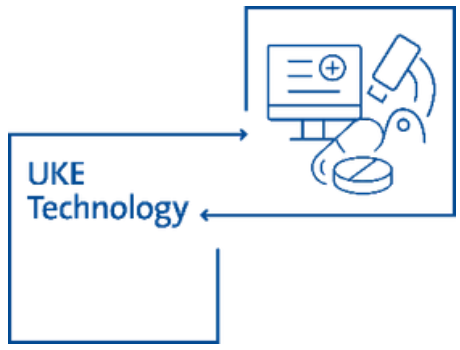

Boosting gene therapy: Recombinant Nanobody-AAVs with increased tissue specificity

Background & Innovation

Adeno-associated Viruses (**AAV**) have become an essential tool in gene therapy and are used as vectors in a number of applications.
AAVs are non-pathogenic, have low immunogenicity and allow long-term expression of the transferred gene. However, they show serious drawbacks**:** **broad tropism**, means the unspecific infection of several tissues and cell types and **low transduction efficiencies**.

This innovation addresses those problems and confers AAVs the required specificity for safe and effective therapeutic application.

Through the integration of heavy chain, single domain antibodies (**VHH**), also named **nanobodies**, we ensure a high tissue **specificity** with increased transduction efficiencies of our AAVs.

Technological advantage

Having their origin in camelids, nanobodies comprise antigen binding fragment of heavy chain only antibodies which are characterized by their comparatively small size.
This confers **remarkable advantages** against conventional antibodies:

- Easy generation of fusion proteins
- Increased stability
- Increased solubility

Technical Description

The implementation of nanobodies to improve the well-known AAV technology takes place by means of **fusion proteins.** This opens the door to two strategies:

- **Bispecific adaptor nanobody proteins**, comprising a target protein specific nanobody, linked to an AAV-specific nanobody.

- **Recombinant AAVs** where the cell marker specific nanobody is integrated in the capsid protein of the viral vector.

Both strategies lead to reliable target specificity of the AAVs.

It has been possible to prove the efficacy of this concept with nanobodies directed against:

- CD38, cell surface protein
- P2X7, ion channel
- ARTC2.2, trans-membrane protein

Our improved AAVs ensure high target specificity, which allows **optimal targeting & transduction efficiencies**.

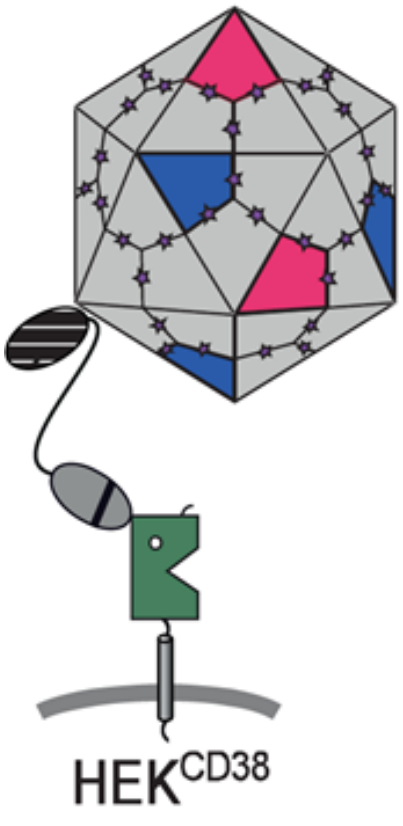

Figure: Schematic representation of an AAV binding to CD38 via a bispecific adaptor

FOCUS SECTORS
- Therapeutics
- Gene/tumor therapy
- AAV Vectors

PROJECT KEY WORDS
- VHH/Nanobody
- High specificity
- Fusion protein

DEVELOPMENT STATUS
- Proof of Concept
- *In vitro* tests successful

PATENT PROCEDURE STATUS
- US/ EP patent pending

POTENTIAL FOR COOPERATION
- R&D Cooperation
- Non-Exclusive Licensing

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