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ADVANTAGES OF VHHS

➤ Structural Advantages

Camelid VHHs stand out structurally due to their lengthy CDR3 loop, enabling them to access otherwise unreachable epitopes on target antigens. Unlike conventional antibodies, VHHs possess a hydrophilic framework, enhancing their compatibility with bi-specific antibodies and alternative formats.

➤ Therapeutic Advantages

VHHs, with their nanoscale dimensions (15 kDa, 2.5nm diameter), penetrate deep into tumors and can breach the blood-brain barrier. They exhibit high affinity, specificity, and modularity, allowing for versatile use as soluble fragments or fused to FC, HSA, or CAR-T receptors in bi/multi-specific formats.

➤ Developability Advantages

VHHs excel in developability, with high melting temperatures (60-80°C, stability at 37°C for weeks), adaptability to non-physiological pHs (3.0-9.0), and resilience to chemical denaturants (2-3 M guanidinium chloride, 6-8 M urea).

➤ Manufacturing Advantages

Nanobodies are cost-effective to produce, leveraging existing manufacturing processes, including standard Protein-A purification. They can be synthesized via microbial or mammalian expression systems, ensuring production flexibility for various therapeutic applications.

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