

Single Domain Antibody

Discovery and Engineering

Single Domain Antibody

Single domain antibody, also known as domain antibody, such as $V_{H,H}$, V_{NAR} or sdAb, is a kind of antibody fragments consisting of a single monomeric variable antibody domain and lacking the light chain and CH1 domain of the heavy chain in conventional Fab region. The first single domain antibody was engineered from the $V_{H,H}$ domain of heavy-chain antibody identified in camelids (e.g. dromedaries, camels, llamas, and alpacas). And the V_{NAR} domain of cartilaginous fishes (e.g. shark) heavy-chain antibody (known as IgNAR, immunoglobulin new antigen receptor) is another qualified source for sdAb development.



Advantages of sdAb

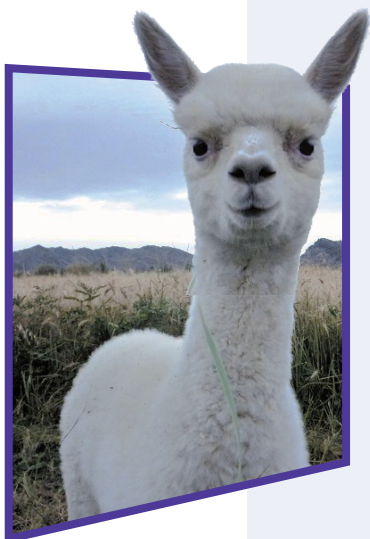
- Smallest antibody fragment (12-15 kDa)
- Recognize novel/hidden epitopes
- High stability within extreme conditions and intracellular environment
- Outstanding penetrability
- Short plasma half-life and better clearance
- Improved bioavailability
- Expressible in both eukaryotic and prokaryotic systems
- Excellent chaperone for the crystallization of challenging targets
- Great potential in downstream engineering

In terms of these advantages compared with the conventional antibody, sdAb presents great applications in many aspects including biological diagnosis, medical imaging, and immunodetection. Equipped with advanced platforms and extensive experience, Creative Biolabs is a well-recognized leader in the field of sdAb discovery and engineering.

sdAb Discovery Services

Immune Phage Display Library Construction and Screening

We have unparalleled capabilities for the construction of $V_{H,H}$ or V_{NAR} based sdAb libraries through immunized camel, llama, alpaca or shark.



- **Premade sdAb Library Screening**
We have developed a series of premade sdAb libraries that enables rapid discovery of large numbers of high-potency sdAbs against the interest targets.
- **Intrabody Discovery**
The intrabody discovery platform enables the screening and validation of novel sdAbs that can bind to intracellular targets specifically within various cellular compartments.
- **Anti-albumins sdAb Discovery**
Human serum albumin is one of the popular biomarkers in drug discovery, we are able to generate novel anti-albumin sdAbs to extend the serum half-life of therapeutic agents.
- **Anti-membrane Protein sdAb Discovery**
We have developed a robust and highly effective strategy for single domain antibody discovery to the challenging membrane protein targets.
- **Anti-idiotypic sdAb Discovery**
We offer anti-idiotypic sdAb production services with high affinity and specificity. Camelidae is immunized with target antibodies in the forms of whole IgG, scFv, Fab or F(ab')₂ that preserve the antibody activity to develop anti-idiotypic antibodies.
- **Anti-BBB sdAb Discovery**
Anti-BBB sdAb can be used as vectors to target drugs or therapeutic peptides into the brain.
- **Custom sdAb Production**
Our high efficient sdAb production platforms can tailor the production of interest sdAbs with various formats and modifications.

| sdAb Engineering Services

- **De Novo sdAb Sequencing**
Using our proprietary Database Assisted Shotgun Sequencing (DASS) technology, sdAb can be sequenced by subunit with 100% coverage and dozens of successful cases proving 100% accuracy.
- **sdAb Affinity Maturation**
In combination with first-class phage display antibody library construction and screening technologies, our proprietary DNA mutagenesis technique enables 10-100 fold increase in affinity for parental sdAbs.
- **sdAb Humanization**
sdAb humanization is used to avoid the possible immunogenicity in the clinic. The strategies in Creative Biolabs include CDR grafting, back-mutation, and site-specific mutation.
- **Bispecific sdAb Engineering**
Bispecific antibodies (bsAbs), which are capable of simultaneous binding to two different targets. We have successfully produced a series of bispecific single domain antibodies for our global clients.



➤ sdAb Conjugation

We have developed a range of custom sdAb bioconjugation services, including quantum dots conjugation, fluorophores conjugation, PEGylation conjugation, biotins conjugation and so on.

➤ sdAb Stability Improvement

As stability is one of the most important requirements in the application of therapeutic and diagnostic, we can improve the sdAb stability with both the physical stability (thermodynamic stability) and the chemical stability.

➤ Antibody Camelization

We provide *in silico* design services of camlized antibodies. We select the single domain antibody framework with the best homology backbone, perform CDR grafting *in silico*, and then run computer-based antibody modeling to do back mutations.

Key Attributes for Custom Services



Advanced Platforms

Based on our advanced phage display technology, our scientists are specialized in phage display library construction and screening.



Various Species

We can immunize camel, llama, alpaca or even shark as repertoire source to develop single domain antibodies against interested targets (antigens).



Custom Engineering

We have established standard protocols for different sdAb development services to meet our clients' special requirements.

As a forward-looking research institute as well as a leading custom service provider in the field of sdAb discovery and engineering, **Creative Biolabs** has won good reputation among our worldwide customers. We can offer high-quality customized services by adjusting protocols to meet even the most specific requirements. Please feel free to contact us for more details.



Contact Us

 Web: www.creative-biolabs.com/sdab



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