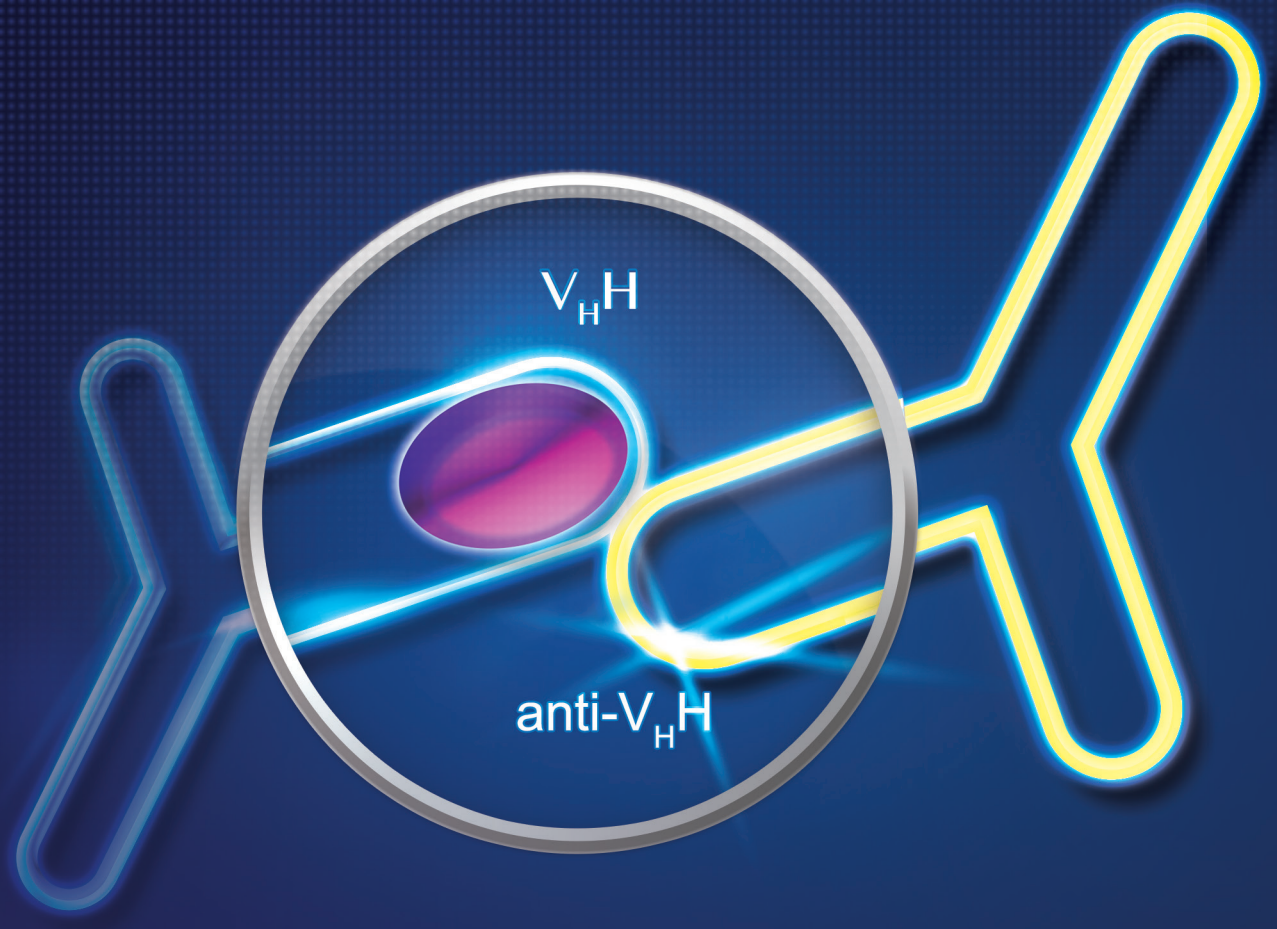


MonoRab™ Anti-Camelid VHH Antibodies

Unique Tools for Detecting Camelid Single Domain Antibodies

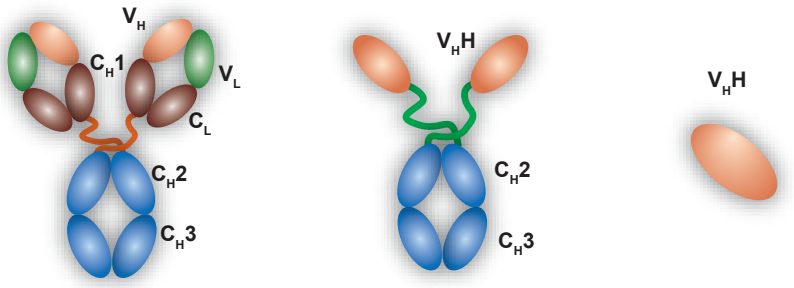
GenScript
Make Research Easy

Humanization, miniaturization and dual function are the trends for antibody drug development. Since camelid single domain antibodies (sdAbs or VHHs) are so small, they do not need to be humanized, but still have a high affinity. They are an ideal option for antibody drug discovery and are also being developed for CAR-T therapies.

GenScript now offers the only recombinant rabbit monoclonal (MonoRab™) Anti-Camelid VHH for identifying target-specific sdAbs. It's not necessary to add a tag to VHH for detection anymore.

What is sdAb or VHH

- Most antibodies are composed of two heavy and two light chains and both chains contribute to the antigen-binding site.
- In addition to these conventional antibodies, llamas, camelids, and sharks also produce antibodies composed only of heavy chains.
- The antigen-binding site of these unusual heavy chain antibodies (hcAbs) is formed only by a single domain, designated as single domain antibodies (sdAbs) or variable domain of heavy chain of hcAbs (VHHs).



Conventional IgG (Camelid Ig G1) | Camelid Ig G2 or Ig G3 | Single domain antibody (sdAb)

Applications of MonoRab™ rabbit anti-camelid VHH antibodies

- VHH antibody screening or titer determination
- Selection of heavy chain antibody-expressing B cells in peripheral blood mononuclear cells (PBMC)
- Expression evaluation and sorting of CAR-T cells harboring a camelid single domain antibody

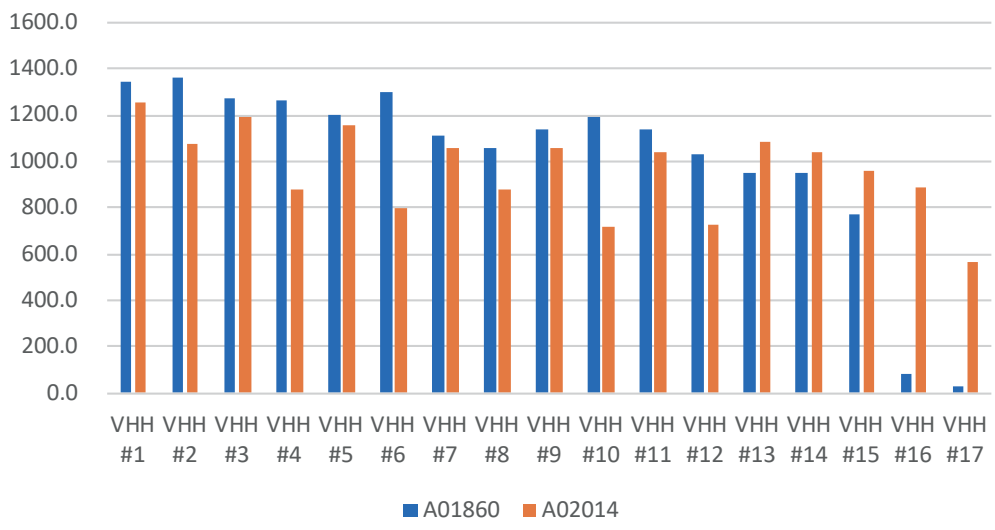
Products selection guide

MonoRab™ Rabbit Anti-Camelid VHH Antibody

Product Type	Species Specificity	Unconjugated	Conjugated						
			HRP	Biotin	iFluor 488	iFluor 555	iFluor 647	PE	FITC
Anti-VHH, mAb	Llama, Camel	**A01860**	A01861	A01995	A01862	A01863	A01994		
Anti-VHH, mAb Cocktail	Llama, Camel, Alpaca	**A02014**	A02016	A02015	A02021	A02020	A02019	A02018	A02017

Binding compatibility comparison

Anti-VHH: ★★★ **Anti-VHH cocktail:** ★★★★



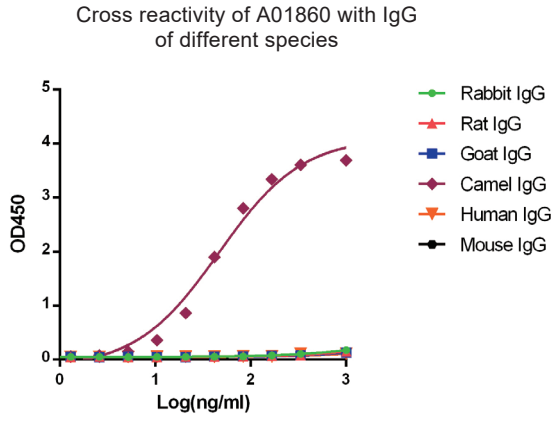
Binding compatibility comparison of MonoRab™ Rabbit Anti-Camelid VHH Antibody, mAb (Cat.No A01860) and MonoRab™ Rabbit Anti-Camelid VHH Cocktail (Cat.No A02014). The performance of cocktail antibody is better. It is ideal to be used for VHH antibody screening.

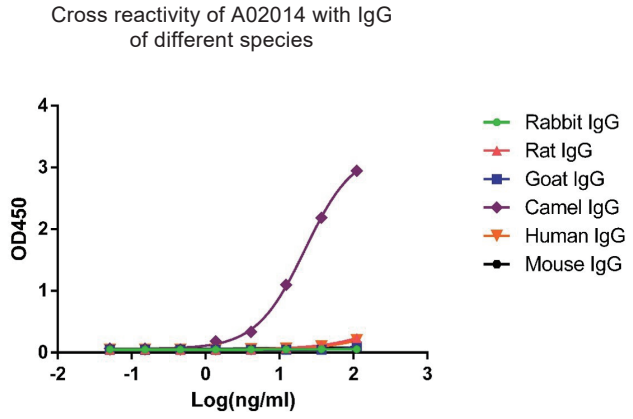
Key Features

- ***MonoRab*™** technology guarantees high affinity: Kd ≈ 10^{-11}M
- No cross reactivity with other species
- Recognizes the variable domain of the camelid antibody
- Specific to camelid IgG2 & IgG3
- Recognizes conformational epitope

Cross reactivity

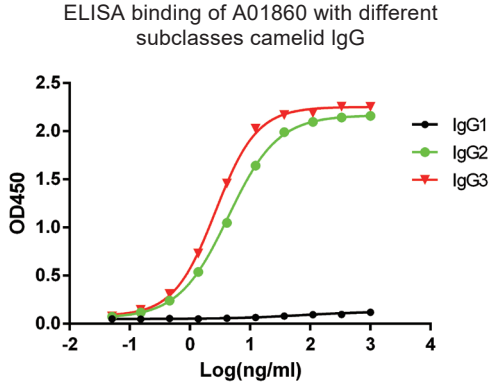
A01860 and A02014 are specific to Camelid IgG and have no cross-reactivity with mouse, rat, rabbit, goat and human immunoglobulins.

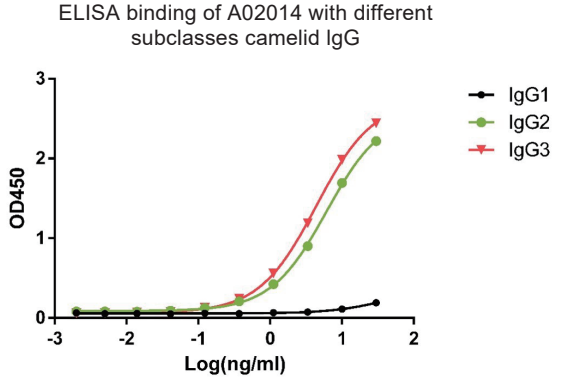




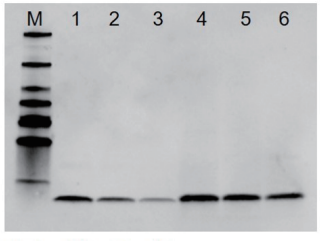
Specificity

A01860 and A02014 are specific to the variable domain of camelid heavy chain antibodies (IgG2&3). It's ideal for isolation of heavy chain antibody expressing PBMC cells or B cells. Hence, a specific VHH gene library can be generated for Nanobody development.



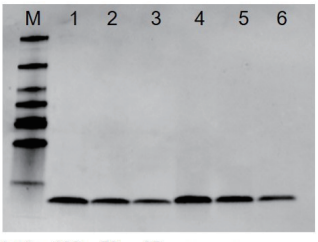


Western Blot of A01860 with VHHs



VHH #1 (ng):	100	50	25	-	-	-
VHH #2 (ng):	-	-	-	100	50	25

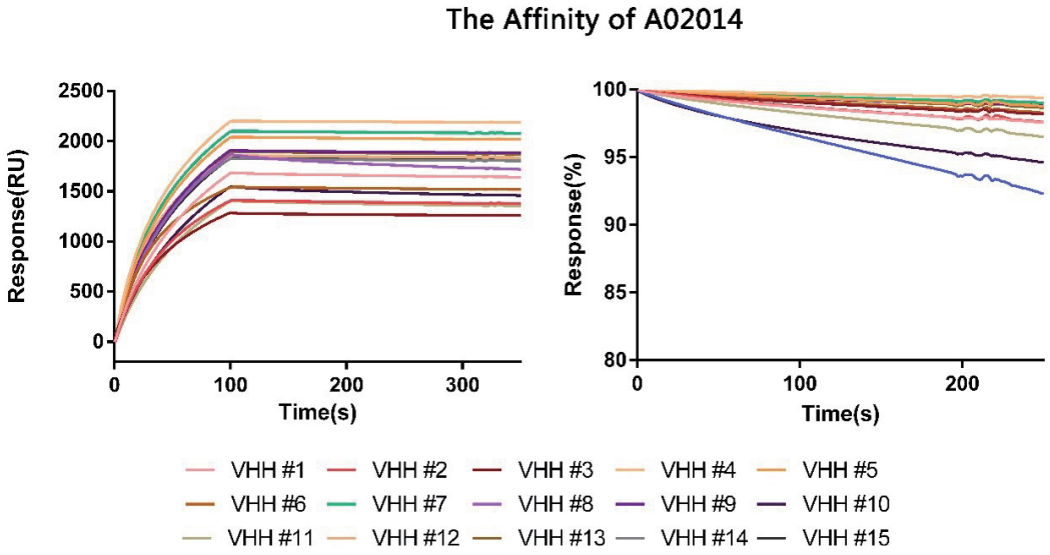
Western Blot of A02014 with VHHs



VHH #1 (ng):	100	50	25	-	-	-
VHH #2 (ng):	-	-	-	100	50	25

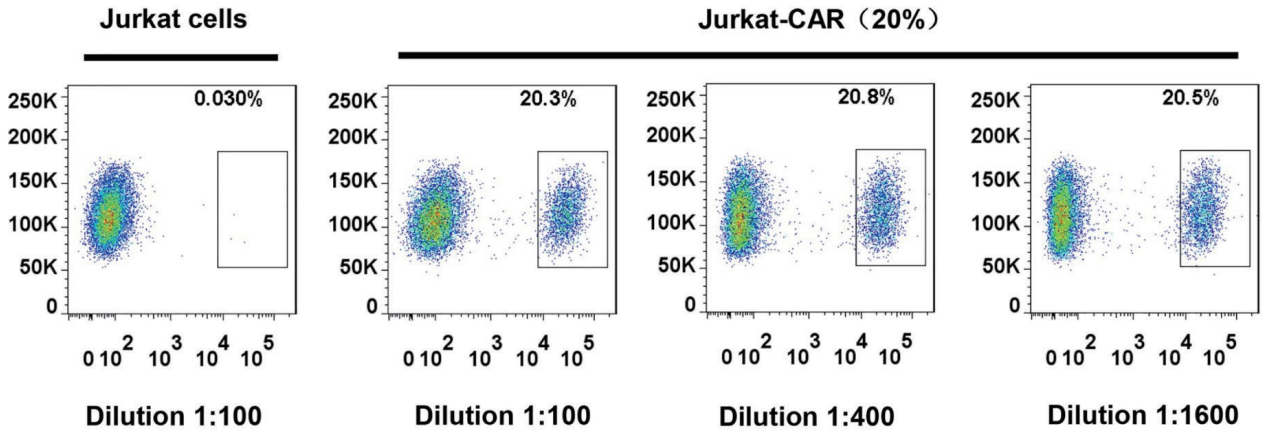
Affinity

The affinity of MonoRab™ Rabbit Anti-Camelid VHH Cocktail (Cat.No A02014) with 15 random VHHs is measured by Biacore. The cocktail antibody shows comprehensive binding activity and high affinity with all of the15 VHHs. Instead of using anti-VHH polyclonal antibodies which have a potential lot-to-lot consistency issue, anti-VHH cocktail antibody is your best choice for VHH direct detection. It's also not necessary to add a tag to VHH for detection any more.



FACS validation

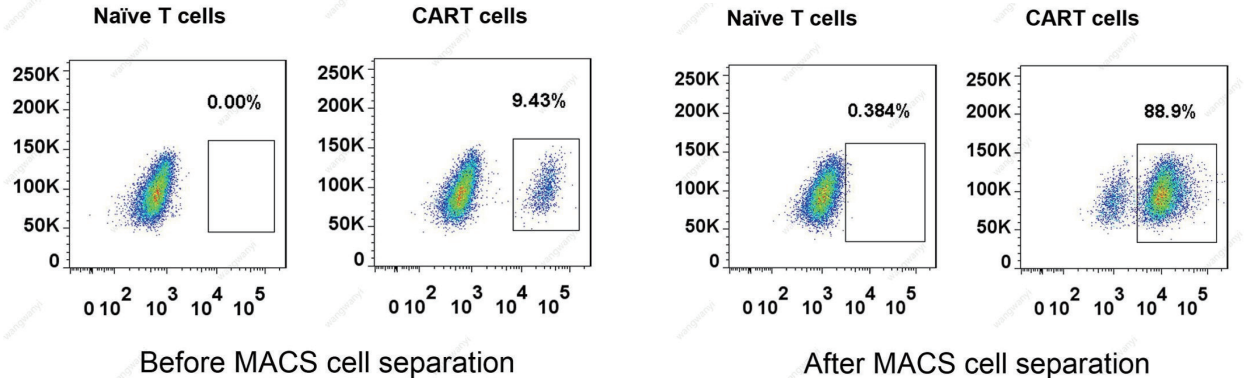
The following data shows FACS binding of a series of dilution of MonoRab™ Rabbit Anti-Camelid VHH Cocktail [PE] (Cat.No A02018) with Jurkat cells and VHH-based Jurkat-CAR cells. With the development of CAR-T therapy, VHH is used more and more frequently in the CAR generation. A02018 shows excellent binding activity on VHH-based Jurkat-CAR cells. It can be used in CAR-T cell verification and determination.



MACS validation

VHH-based CAR-T cells were sorted by MACS with MonoRabTM Rabbit Anti-Camelid VHH Cocktail [Biotin] (Cat.No A02015) and anti-Biotin magnetic nanobeads (Miltenyi) where naïve T cells serves as negative control. Then, the CAR- T cells were stained with MonoRab™ Rabbit Anti-Camelid VHH Cocktail [iFluor 555] (Cat.No A02020) and analyzed by FACS.

As shown in the figure, the ratio of positive CAR-T cells grows from about 10% to 90% after MACS cell separation. A02015 is ideal to be used for CAR-T cell MACS separation.



Citations:

- **David S. Glass1 and Ingmar H. Riedel-Kruse.** A Synthetic Bacterial Cell-Cell Adhesion Toolbox for Programming Multicellular Morphologies and Patterns. *Cell*. **2018-07**
- **Katrin Daniel, Jaroslav Icha, Cindy Horenburg, Doris Müller, Caren Norden, and Jörg Mansfeld.** Conditional control of fluorescent protein degradation by an auxin-dependent nanobody. *PLoS Negl Trop Dis*. **2018-08**
- **Tiwari PM, Vanover D, Lindsay KE, Bawage SS, Kirschman JL, Bhosle S, Lifland AW, Zurla C, Santangelo PJ.** Engineered mRNA-expressed antibodies prevent respiratory syncytial virus infection. *PLoS Negl Trop Dis*. **2018-10**

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