Antibody Humanization

Drive Value with
Novel Immuno-Oncology Products Based on
Proprietary Discovery Platform

Y-BIOLOGICS

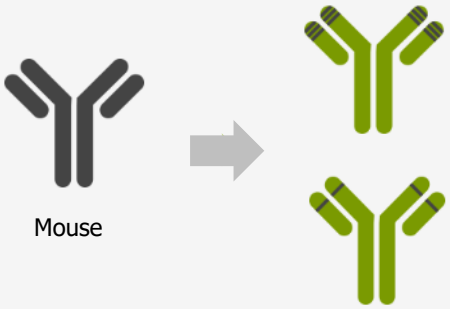
Antibody Humanization

Humanized Antibodies

Antibody humanization involves replacing the non-human frameworks and CDRs with human sequences, a critical step in developing therapeutic antibodies. This process ensures that the antibody is safe for use in humans by reducing immunogenicity, while carefully preserving the ability of the antibody to recognize and bind its specific target antigen. Maintaining this binding ability is essential for the antibody's therapeutic efficacy.

Frame-Region Shuffling

The CDRs are directly involved in antigen binding, while the framework regions contribute to the structural integrity of the antibody. Through our proprietary Frame-Region Shuffling technique, we incorporate the mouse CDR regions into the Ymax®-ABL fully-human antibody library. This approach allows for an optimized combination of mouse CDRs and human framework regions, resulting in a humanized antibody library with improved binding affinity and stability. This method ensures the preservation of antigen recognition while enhancing the antibody's overall therapeutic potential.



CDR-grafting

In this method, mouse CDR regions are preserved while human sequences replace the framework regions (FR1-FR4), creating VH and VL libraries for antibody screening.

Guided selection

This approach conserves only the CDR3 of the heavy chain's variable region from the mouse antibody, while human sequences replace the remaining variable regions. A VH and VL pool library is then constructed for antibody screening.

Our Unique Advantages

- Proprietary human antibody library backbone
- Biopanning for antibodies with enhanced affinity
- Extensive experience and technical expertise from industry-leading experts

Antibody Optimization Process

4 WEEKS	1 WEEKS	4 WEEKS	1 WEEKS	2 WEEKS	4 WEEKS
Humanized Ab library design and construct	Biopanning	Monophage assay	Clone isolation	IgG conversion	Antibody production

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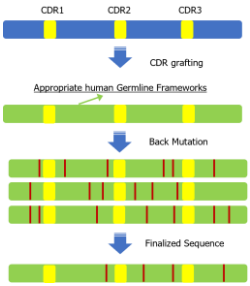
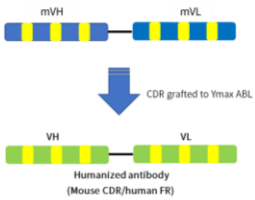
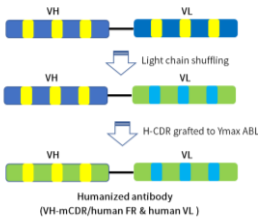
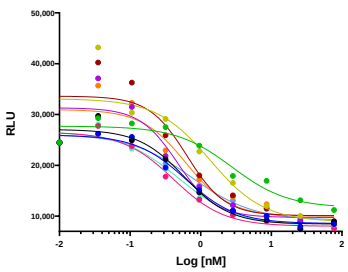
Options for Antibody Humanization

	Option	Preparation process		Lead time
1	Computation Method (*In silico*)	1. Sequence Design CDR, Framework region in Human, Germline 3D structural modeling & back mutation 2. IgG conversion 3. Antibody production 4. Analysis ELISA/FACS, Biacore™/Octet®, Neutralization		3 - 4 months
2	Library construction I (VH-VL CDR grafting)	1. VH-VL CDR grafting Mouse CDR/human FR 2. IgG conversion 3. Antibody production 4. Analysis ELISA/FACS, Biacore™/Octet®, Neutralization		6 - 7 months
3	Library construction II (VH CDR grafting & LC shuffling)	1. VH CDR grafting & LC shuffling VH-Mouse CDR/human FR & human VL 2. IgG conversion 3. Antibody production 4. Analysis ELISA/FACS, Biacore™/Octet®, Neutralization		6 - 7 months

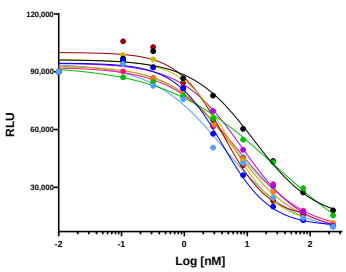
※Explore your options with a complimentary consultation.

Humanized Library construction and Screening

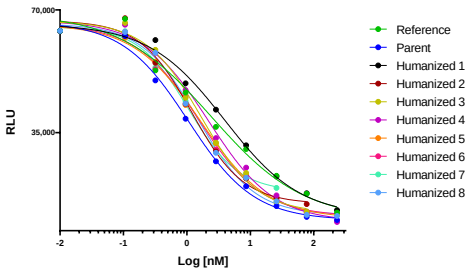
Soluble



Membrane (CHO)



Membrane (HEK)



	Mouse	VH-VL CDR grafting							
	Reference	Parent	Huma 1	Huma 2	Huma 3	Huma 4	Huma 5	Huma 6	Huma 7	Huma 8
		4.53 mg/L	7.71 mg/L	1.91 mg/L	3.5 mg/L	5 mg/L	7 mg/L	10 mg/L	1 mg/L	4.5 mg/L
Soluble IC50	2.767	0.6177	0.5856	0.6416	1.364	0.4673	0.6182	0.4118	0.4954	0.7412
Membrane(CHO) IC50	28.02	4.021	12.72	4.147	5.452	8.341	6.089	6.926	5.3	4.284
Membrane(HEK) IC50	2.43	1.053	3.945	1.188	1.688	2.201	1.653	1.565	1.064	1.501