Affinity Maturation

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

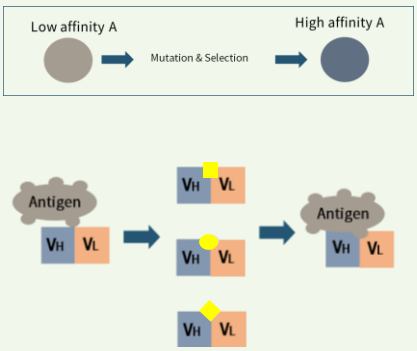
Y-BIOLOGICS

Affinity Maturation

We provide specialized antibody optimization services, carefully selecting clones with enhanced attributes or affinity from screened human antibodies. Our approach ensures that you receive tailored solutions to meet your specific research and therapeutic needs.

Technical Description

Technology	Technology Description
Light chain shuffling	Fixing the heavy chain and integrating our proprietary 10^7 light chain pool generates a shuffled library. Bio-panning is then used to select optimized antibody candidates.
Core packing	By analyzing core packing elements such as the hydrophobic core, exposed residues, charge clusters, and salt bridges, conserved residues are identified and substitut ed, creating a library to optimize antibody structures for enhanced stability and functionality.
CDR hotspot mutagenesis	Somatic mutation sites within the CDR residues are predicted, and a randomized library is constructed targeting these regions. Optimized antibodies are then selected for enhanced performance.
CDR random mutagenesis	Random mutations are introduced into the CDR regions of the heavy chain, generating a diverse library from which optimized antibodies are selected for improved functionality.

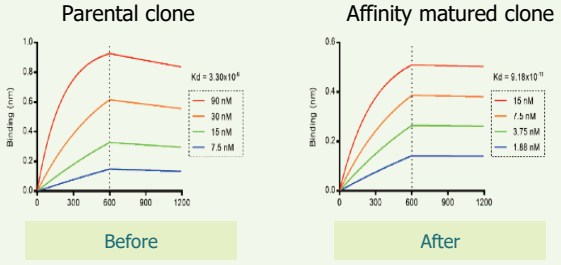


Our Unique Advantages

- World-class Light Chain Pool with over10^7 variations
- Leveraging cutting-edge automation to deliver phage antibody candidates in just 3 months
- Years of accumulated technical knowledge, extensive experience, and a highly skilled team ensure top-tier service and results

Application Example

Affinity change of antibody selected after optimization



Clone name	KD (M)	K_{on} (1/Ms)	K_{off} (1/s)	Fold increase
Parental	$3.3x10^{-9}$	$5.2x10^{4}$	$1.7x10^{-4}$	
Affinity matured	$9.2x10^{-11}$	$2.3x10^{5}$	$2.1x10^{-5}$	36

Source: company data

Antibody Optimization Process

Step	Process
Antigen prep	• Provided by customer
Library construction (1month)	• Designing optimal approach • Construction of ~10^6 optimization library • Determine VH, VL diversity
Biopanning (1month)	• Establishing and executing panning strategy • Pool (poly) phage titration & ELISA
Monophage Analysis (2months)	• Single (mono) phage ELISA • Sequence analysis and clone isolation • Screening for specific and non-specific binding
IgG production (1month)	• IgG conversion of clone with specific binding • IgG transient expression and production • IgG affinity assay
Antibody Analysis (1month)	• Specificity: ELISA, FACS • Affinity: Biacore™ 8K, Octet® R8 • Characteristics: neutralization, internalization, epitope

Options for Affinity Maturation

Option		Preparation process	Lead time
1	Light Chain Shuffling Core Packing	1. Library preparation • Light Chain Shuffling : After fixing the heavy chain and adding 10^6 to 10^7 of light chains, a new LC shuffling library is created for biopanning and positive phage selection • Core Packing : By analyzing core packing elements such as the hydrophobic core, exposed residues, charge clusters, and salt bridges, conserved residues are identified and substituted, creating a library to optimize antibody structures for enhanced stability and functionality. 2. Biopanning 3. Monophage analysis 4. Full IgG conversion & production - HEK293F (40mL) 5. Affinity measurement - SPR / BLI	6 - 7 months
2	Light Chain Shuffling CDR hot spot	1. Library preparation • Light Chain Shuffling : After fixing the heavy chain and adding 10^6 to 10^7 of light chains, a new LC shuffling library is created for biopanning and positive phage selection • CDR hotspot library : In the case of the DNA of the variable region of the antibody, an LC shuffling library is created for the mutational CDR hotspot where mutations can frequently occur during *in vivo* affinity maturation for the purpose of biopanning and positive phage selection 2. Biopanning 3. Monophage analysis 4. Full IgG conversion & production - HEK293F (40mL) 5. Affinity measurement - SPR / BLI	6 - 7 months
3	Light Chain Shuffling Core Packing CDR hot spot	1. Library preparation • Light Chain Shuffling : After fixing the heavy chain and adding 10^6 to 10^7 of light chains, a new LC shuffling library is created for biopanning and positive phage selection • Core Packing : By analyzing core packing elements such as the hydrophobic core, exposed residues, charge clusters, and salt bridges, conserved residues are identified and substituted, creating a library to optimize antibody structures for enhanced stability and functionality. • CDR hotspot library : In the case of the DNA of the variable region of the antibody, an LC shuffling library is created for the mutational CDR hotspot where mutations can frequently occur during *in vivo* affinity maturation for the purpose of biopanning and positive phage selection 2. Biopanning 3. Monophage analysis 4. Full IgG conversion & production - HEK293F (40mL) 5. Affinity measurement - SPR / BLI	6 - 7 months
4	HC CDR random mutagenesis LC CDR random mutagenesis	1. Library preparation • CDR random mutagenesis : VH-CDR2, CDR3, CDR2/3 VL-CDR1, CDR3, CDR1/3 2. Biopanning 3. Monophage analysis 4. Full IgG conversion & production - HEK293F (40mL) 5. Affinity measurement - SPR / BLI	6 - 7 months

Note : Explore your options with a complimentary consultation.