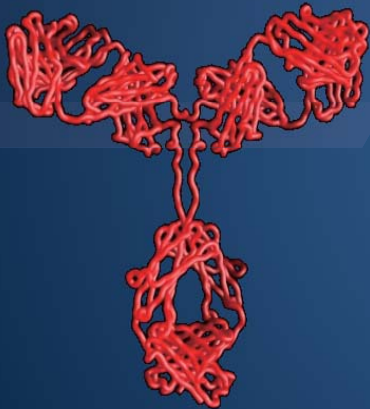


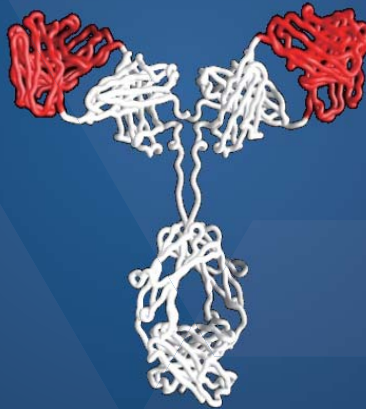
Antibody Humanization

ChemPartner
Dedicated to LifeScience

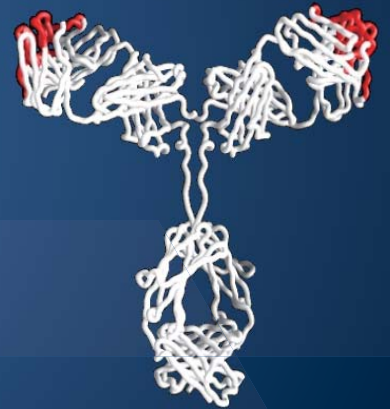
Murine



Chimeric



Humanized



Clone VH an VL from hybridoma

Generate Chimeric Ab to confirm activity

Humanization by CDR grafting and backmutation

- World class humanization design with consideration of activity, immunogenesity and drug productivity.
- Strong structural/modeling support for design.
- High throughput characterization.
- Short turnaround time with guaranteed activity.

Contact

998 Halei Road #5 Zhangjiang Hi-Tech Park Pudong
Shanghai, China 201203
China: +86 21 5132 0000 USA: +1 781 996 5291
Europe: +45 4586 9000 Japan: +81 3 62027441
contact@chempartner.com
www.chempartner.com

Louis Liu
Vice President
Head of Biologics Discovery
+86 21 52320595
louisliu@chempartner.com

Robert Drakas
Executive Director
Business Development &
ShangPharma Investment, US
drakas@shangpharma.com

Cloning 1-2 weeks

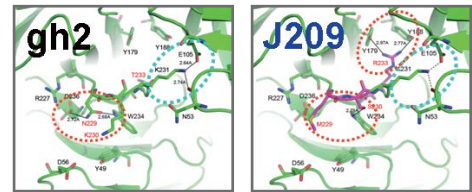
- Culture hybridoma cells and prepare RNA
- RT-PCR using mouse Ig degenerate primer sets
- PCR product sequencing and subcloning into sequencing vectors
- Extensive sequence analysis to determine correct VH/VL

Confirmation 2-3 weeks

- Construct in chimeric (mouse V /human C) format
- Express chimeric mAb in mammalian cells (small scale)
- Purification and QC
- Biacore/bioassay testing to confirm functional identity

Design 1-2 weeks

- Determine the canonical structures of the VH/VL CDRs
- Identify preferred human germline acceptor framework subsets
- Select the best germline framework from subset based on homology
- Select the FW4 region based on homology
- Identify residues critical in loop conformation and interface
- Identify residues within 5Å of CDR binding region by modeling
- Construct multiple humanized Ab with various back-mutation options

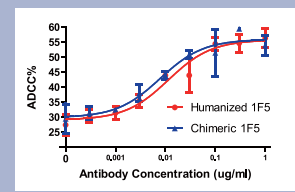
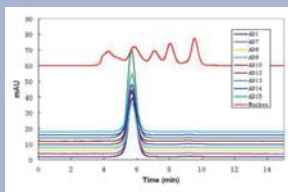
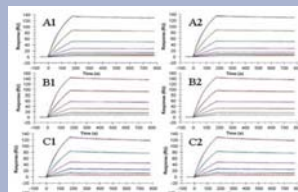
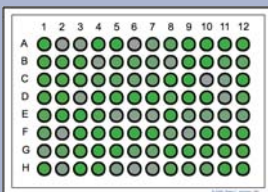


Hypothesis Models

Ab VH	Identity	Ab VH	Similarity	Ab VHx	Identity	Ab VHx	Similarity	Ab VHxx	Identity	Ab VHxx	Similarity	Ab VHxxx	Identity	Ab VHxxx
IGHV1-8*01	62	IGHV1-8*01	81	IGHV1-3*01	56	IGHV1-3*01	73	IGHV1-3*01	52	IGHV1-3*01	67	IGHV7-4-1*0	19	IGHV1-2*03
IGHV1-46*01	61	IGHV1-46*01	81	IGHV1-8*01	54	IGHV1-69*1	72	IGHV1-3*02	52	IGHV1-3*02	66	IGHV7-4-1*02	19	IGHV1-3*01
IGHV1-46*03	61	IGHV1-46*03	81	IGHV1-46*0	54	IGHV1-69*0	72	IGHV1-58*01	50	IGHV1-58*01	66	IGHV1-2*03	19	IGHV1-45*01
IGHV1-3*01	61	IGHV1-69*05	81	IGHV1-46*0	54	IGHV1-69*0	72	IGHV1-58*02	50	IGHV1-58*02	66	IGHV1-8*01	19	IGHV1-45*02
IGHV1-2*01	60	IGHV1-46*02	80	IGHV1-46*0	54	IGHV1-69*0	72	IGHV1-2*04	50	IGHV1-8*01	65	IGHV1-3*01	19	IGHV1-45*01
IGHV1-2*02	60	IGHV1-3*01	80	IGHV1-3*02	54	IGHV1-69*1	72	IGHV1-8*01	50	IGHV1-46*01	65	IGHV1-69*10	19	IGHV5-a*03
IGHV1-2*04	60	IGHV1-69*06	80	IGHV1-58*0	54	IGHV1-69*1	72	IGHV1-46*01	50	IGHV1-46*03	65	IGHV1-69*06	19	IGHV5-a*04
IGHV1-46*02	60	IGHV1-69*01	80	IGHV1-58*0	54	IGHV1-8*01	71	IGHV1-46*03	50	IGHV1-18*01	65	IGHV1-69*05	19	IGHV7-4-1*01
IGHV1-3*02	60	IGHV1-69*12	80	IGHV1-18*0	54	IGHV1-46*0	71	IGHV1-69*02	50	IGHV1-69*02	65	IGHV1-69*01	19	IGHV7-4-1*02
IGHV1-69*05	59	IGHV1-69*13	80	IGHV1-69*1	54	IGHV1-46*0	71	IGHV1-18*01	50	IGHV1-69*08	65	IGHV1-69*12	19	IGHV1-2*02
IGHV1-2*03	58	IGHV1-2*02	79	IGHV1-69*0	54	IGHV1-3*02	71	IGHV1-2*01	49	IGHV1-69*04	65	IGHV1-69*13	19	IGHV1-2*04
IGHV1-18*01	58	IGHV1-2*01	78	IGHV1-69*0	54	IGHV1-58*0	71	IGHV1-2*02	49	IGHV1-69*09	65	IGHV5-51*01	18	IGHV1-8*01
IGHV1-69*08	58	IGHV1-2*04	78	IGHV1-69*0	54	IGHV1-58*0	71	IGHV1-2*02	49	IGHV1-69*10	65	IGHV5-51*03	18	IGHV1-3*02
IGHV1-69*10	58	IGHV1-f*01	78	IGHV1-69*1	54	IGHV1-69*0	71	IGHV1-69*02	49	IGHV1-69*11	65	IGHV5-51*04	18	IGHV1-69*10
IGHV1-69*11	58	IGHV1-3*02	78	IGHV1-69*1	54	IGHV1-69*0	71	IGHV1-69*05	49	IGHV1-69*06	65	IGHV5-a*01	18	IGHV1-69*06
IGHV1-69*06	58	IGHV1-69*02	78	IGHV1-2*04	53	IGHV1-69*0	71	IGHV7-4-1*0	48	IGHV1-69*05	65	IGHV5-a*03	18	IGHV1-69*05
IGHV1-69*01	58	IGHV1-69*08	78	IGHV1-69*0	53	IGHV1-69*0	71	IGHV1-45*02	48	IGHV1-69*01	65	IGHV5-a*04	18	IGHV1-69*01
IGHV1-69*12	58	IGHV1-69*10	78	IGHV7-4-1*	52	IGHV1-69*1	71	IGHV1-2*03	48	IGHV1-69*12	65	IGHV7-81*01	18	IGHV1-69*12
IGHV1-69*13	58	IGHV1-69*11	78	IGHV7-4-1*	52	IGHV1-45*0	70	IGHV1-69*08	48	IGHV1-69*13	65	IGHV1-2*01	18	IGHV1-69*13

Design by sequence analysis and Molecular modeling

Characterization 6-7 weeks



Antibody Characterization by ELISA, Biacore, SEC and bioassay

- Expression and purification of humanized mAbs
- Test in Biacore or functional assay
- Identify the mAb that best retains function with minimal backmutation
- Deliver full report and all material to the client



All ChemPartner animal facilities are AAALAC accredited and OLAW assured.