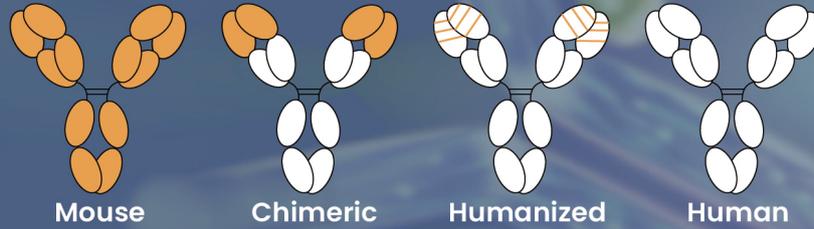
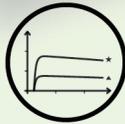


Recombinant antibody technologies have shown significant clinical success. However, murine monoclonal antibodies may induce immunogenic responses, potentially limiting their application in human. Humanized antibodies can overcome these issues and are considered a promising alternative therapeutic agent.

Biointron's antibody humanization services are based on CDR grafting and back mutation with PTM analysis.



# ANTIBODY HUMANIZATION



Guaranteed Affinity Comparable to Parental Antibody



3~4 Weeks Quick Turnaround Time



Suitable for IgG, scFv, Fab, VHH and More

## WORKFLOW

AAAAA  
AAAAA  
AAAAA  
AAAAA

Sequence Design (CDR grafting)



Gene Synthesis & Plasmid Preparation



Transient Expression



Affinity Ranking



Stringent Quality Control



Affinity Purification



[www.biointron.com](http://www.biointron.com)  
[info@biointron.com](mailto:info@biointron.com)

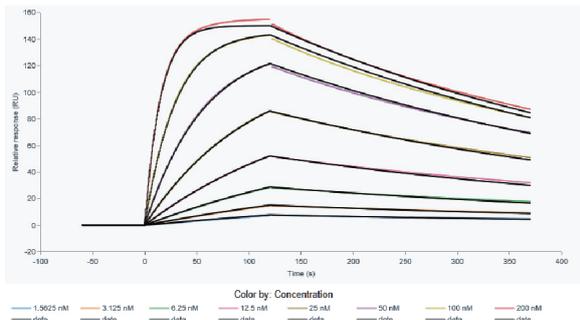
20 Bridge St, Metuchen, NJ 08840  
 No.99-1, Shenmei Road, Zhoupu, Pudong, Shanghai, China

| Service Step                              | Service Description   | Timeline | Deliverables  |
|---|---|----------|---|
| Design of humanized antibody              | <ul style="list-style-type: none"> <li>Bioinformatics analysis</li> <li>3D structure modeling and identification of back mutations</li> <li>Human germlines selection</li> <li>In silico CDR-grafting</li> <li>Sequence optimization</li> </ul> | 2-3 days | <ul style="list-style-type: none"> <li>Designed humanized antibody sequences</li> </ul>                 |
| Humanized antibody recombinant production | <ul style="list-style-type: none"> <li>Codon optimization and gene synthesis</li> <li>Subcloning into expression vector</li> <li>Transient expression</li> <li>Purification</li> <li>QC analysis</li> </ul>                                     | 2 weeks  | <ul style="list-style-type: none"> <li>Purified humanized antibody samples for in house test</li> </ul> |
| Affinity Ranking                          | <ul style="list-style-type: none"> <li>Affinity Determination with soluble antigen via Biacore 8K</li> </ul>  | 1 week   | <ul style="list-style-type: none"> <li>Detailed report</li> </ul>                                       |

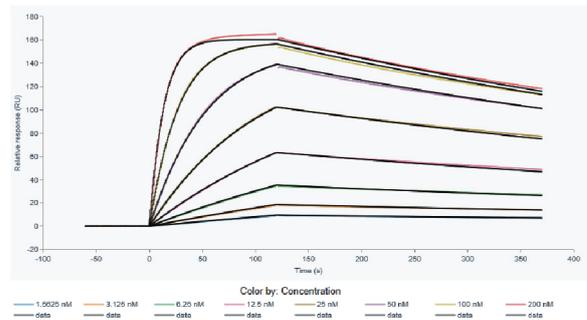
## CASE STUDY

The affinity of the humanized antibody (measured by SPR, Biacore 8K) is comparable with the parental antibody.

IgG

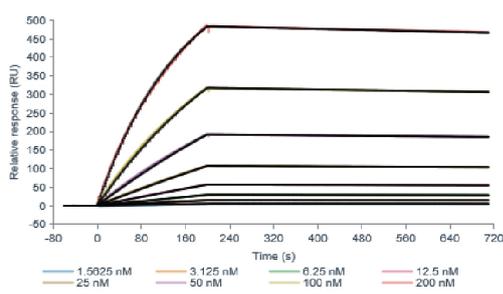


Parental mouse antibody  
KD=6.94x10<sup>-9</sup>

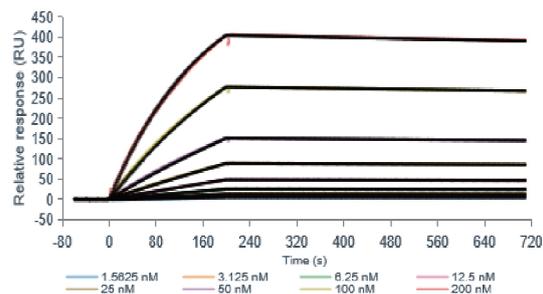


Humanized antibody  
KD=3.33x10<sup>-9</sup>

VHH



Parental VHH antibody  
KD= 2.11x10<sup>-9</sup>



Humanized VHH Antibody  
KD=2.30\*10<sup>-9</sup>