Figure 1

Figure 2

```
Position  1         10        20        30        40        50        60        70        80        90
Name      |...|....|....|....|....|....|abcdef...|....|....|....|....|....|....|....|....|....|....|
012/DPK9  DIQMTQSPSSLSASVGDRVTITCRASQSISS-------YLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTISSLQPEDFATYYCQQSYSTP 2-1-1
02/DPK9   DIQMTQSPSSLSASVGDRVTITCRASQSISS-------YLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTISSLQPEDFATYYCQQSYSTP 2-1-1
018/DPK1  DIQMTQSPSSLSASVGDRVTITCQASQDISN-------YLNWYQQKPGKAPKLLIYDASNLETGVPSRFSGSGSGTDFTFTISSLQPEDIATYYCQQYDNLP 2-1-1
08/DPK1   DIQMTQSPSSLSASVGDRVTITCQASQDISN-------YLNWYQQKPGKVPKLLIYDASNLETGVPSRFSGSGSGTDFTFTISSLQPEDIATYYCQQYDNLP 2-1-1
A20/DPK4  DIQMTQSPSSLSASVGDRVTITCRASQGISN-------YLAWYQQKPGKVPKLLIYAASTLQSGVPSRFSGSGSGTDFTLTISSLQPEDVATYYCQKYNSAP 2-1-1
A30       DIQMTQSPSSLSASVGDRVTITCRASQGIRN-------DLGWYQQKPGKAPKRLIYAASSLQSGVPSRFSGSGSGTEFTLTISSLQPEDFATYYCLQHNSYP 2-1-1
L14/DKP2  NIQMTQSPSAMSASVGDRVTITCRARQGISN-------YLAWFQQKPGKVPKHLIYAASSLQSGVPSRFSGSGSGTEFTLTISSLQPEDFATYYCLQHNSYP 2-1-1
L1        DIQMTQSPSSLSASVGDRVTITCRASQGISN-------YLAWFQQKPGKAPKSLIYAASSLQSGVPSRFSGSGSGTDFTLTISSLQPEDFATYYCQQYNSYP 2-1-1
L15/DPK7  DIQMTQSPSSLSASVGDRVTITCRARQGISS-------WLAWYQQKPEKAPKSLIYAASSLQSGVPSRFSGSGSGTDFTLTISSLQPEDFATYYCQQYNSYP 2-1-1
L4        AIQLTQSPSSLSASVGDRVTITCRASQGISS-------ALAWYQQKPGKAPKLLIYDASSLESGVPSRFSGSGSGTDFTLTISSLQPEDFATYYCQQFNSYP 2-1-1
L18       AIQLTQSPSSLSASVGDRVTITCRASQGISS-------ALAWYQQKPGKAPKLLIYDASSLESGVPSRFSGSGSGTDFTLTISSLQPEDFATYYCQQFNSYP 2-1-1
L5/DPK5   DIQMTQSPSSVSASVGDRVTITCRASQGISS-------WLAWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTISSLQPEDFATYYCQQANSFP 2-1-1
L19/DPK6  DIQMTQSPSSVSASVGDRVTITCRASQGISS-------WLAWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTISSLQPEDFATYYCQQANSFP 2-1-1
L8/DPK8   DIQLTQSPSFLSASVGDRVTITCRASQGISS-------YLAWYQQKPGKAPKLLIYAASTLQSGVPSRFSGSGSGTEFTLTISSLQPEDFATYYCQQLNSYP 2-1-1
L23       AIRMTQSPFSLSASVGDRVTITCWASQGISS-------YLAWYQQKPAKAPKLFIYYASSLQSGVPSRFSGSGSGTDYTLTISSLQPEDFATYYCQQYYSTP 2-1-1
L9        AIRMTQSPSSFSASTGDRVTITCRASQGISS-------YLAWYQQKPGKAPELLIYAASTLQSGVPSRFSGSGSGTDFTLTISCLQSEDFATYYCQQYYSFP 2-1-1
L24/DPK10 VIWMTQSPSLLSASTGDRVTISCRMSQGISS-------YLAWYQQKPGKAPELLIYAASTLQSGVPSRFSGSGSGTDFTLTISCLQSEDFATYYCQQYYSFP 2-1-1
L11/DPK3  AIQMTQSPSSLSASVGDRVTITCRASQGIRN-------DLGWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTISSLQPEDFATYYCLQDYNYP x-1-1
L12       DIQMTQSPSTLSASVGDRVTITCRASQSISS-------WLAWYQQKPGKAPKLLIYDASSLESGVPSRFSGSGSGTEFTLTISSLQPDDFATYYCQQYNSYS 2-1-x
O11/DPK13 DIVMTQTPLSLPVTPGEPASISCRSSQSLLDSDDGNTYLDWYLQKPGQSPQLLIYTLSYRASGVPDRFSGSGSGTDFTLKISRVEAEDVGVYYCMQRIEFP 3-1-1
O1/DPK13  DIVMTQTPLSLPVTPGEPASISCRSSQSLLDSDDGNTYLDWYLQKPGQSPQLLIYTLSYRASGVPDRFSGSGSGTDFTLKISRVEAEDVGVYYCMQRIEFP 3-1-1
A17/DPK18 DVVMTQSPLSLPVTLGQPASISCRSSQSLVYS-DGNTYLNWFQQRPGQSPRRLIYKVSNWDSGVPDRFSGSGSGTDFTLKISRVEAEDVGVYYCMQGTHWP 4-1-1
A1/DPK19  DVVMTQSPLSLPVTLGQPASISCRSSQSLVYS-DGNTYLNWFQQRPGQSPRRLIYKVSNWDSGVPDRFSGSGSGTDFTLKISRVEAEDVGVYYCMQGTHWP 4-1-1
A18/DPK28 DIVMTQTFLSLSVTRQQPASISCKSSQSLLHS-DGVTYLYWYLQRPQQSPQLLTYEVSSRFSGVPDRFSGSGSGTDFTLKISRVEAEDVGVYYCMQGTHLP 4-1-1
A2/DPK12  DIVMTQTPLSLSVTPGQPASISCKSSQSLLHS-DGKTYLYWYLQKPGQPPQLLIYEVSNRFSGVPDRFSGSGSGTDFTLKISRVEAEDVGVYYCMQSIQLP 4-1-1
A19/DPK15 DIVMTQSPLSLPVTPGEPASISCRSSQSLLHS-NGYNYLDWYLQKPGQSPQLLIYLGSNRASGVPDRFSGSGSGTDFTLKISRVEAEDVGVYYCMQALQTP 4-1-1
A3/DPK15  DIVMTQSPLSLPVTPGEPASISCRSSQSLLHS-NGYNYLDWYLQKPGQSPQLLIYLGSNRASGVPDRFSGSGSGTDFTLKISRVEAEDVGVYYCMQALQTP 4-1-1
A23/DPK16 DIVMTQTPLSSPVTLGQPASISCRSSQSLVHS-DGNTYLSWLQQRPGQPPRLLIYKISNRFSGVPDRFSGSGAGTDFTLKISRVEAEDVGVYYCMQATQFP 4-1-1
A27/DPK22 EIVLTQSPGTLSLSPGERATLSCRASQSVSSS----YLAWYQQKPGQAPRLLIYGASSRATGIPDRFSGSGSGTDFTLTISRLEPEDFAVYYCQQYGSSP 6-1-1
A11/DPK20 EIVLTQSPATLSLSPGERATLSCGASQSVSSS----YLAWYQQKPGLAPRLLIYDASSRATGIPDRFSGSGSGTDFTLTISRLEPEDFAVYYCQQYGSSP 6-1-1
L2/DPK21  EIVMTQSPATLSVSPGERATLSCRASQSVSS-----NLAWYQQKPGQAPRLLIYGASTRATGIPARFSGSGSGTEFTLTISSLQSEDFAVYYCQQYNNWP 2-1-1
L16       EIVMTQSPATLSVSPGERATLSCRASQSVSS-----NLAWYQQKPGQAPRLLIYGASTRATGIPARFSGSGSGTEFTLTISSLQSEDFAVYYCQQYNNWP 2-1-1
L6        EIVLTQSPATLSLSPGERATLSCRASQSVSS-----YLAWYQQKPGQAPRLLIYDASNRATGIPARFSGSGPGTDFTLTISSLEPEDFAVYYCQQRSNWH 2-1-x
L20       EIVLTQSPATLSLSPGERATLSCRASQGVSS-----YLSWYQQKPGQAPRLLIYGASTRATGIPARFSGSGSGTDFTLTISSLQPEDFAVYYCQQDYNLP 6-1-1
L25/DPK23 EIVMTQSPATLSLSPGERATLSCRASQSVSSS----YLSWYQQKPGQAPRLLIYGASTRATGIPARFSGSGSGTDFTLTISSLQPEDFAVYYCQQDYNLP 6-1-1
B3/DPK24  DIVMTQSPDSLAVSLGERATINCKSSQSVLYSSNNKNYLAWYQQKPGQPPKLLIYWASTRESGVPDRFSGSGSGTDFTLTISSLQAEDVAVYYCQQYYSTP 3-1-1
B2        ETTLTQSPAFMSATPGDKVNISCKASQDIDD-------DMNWYQQKPGEAAIFIIQEATTLVPGIPPRFSGSGYGTDFTLTINNIESEDAAYYFCLQHDNFP 2-1-1
A26/DPK26 EIVLTQSPDFQSVTPKEKVTITCRASQSIGS-------SLHWYQQKPDQSPKLLIKYASQSFSGVPSRFSGSGSGTDFTLTINSLEAEDAATYYCHQSSSLP 2-1-1
A10/DPK26 EIVLTQSPDFQSVTPKEKVTITCRASQSIGS-------SLHWYQQKPDQSPKLLIKYASQSFSGVPSRFSGSGSGTDFTLTINSLEAEDAATYYCHQSSSLP 2-1-1
A14/DPK25 DVVMTQSPAFLSVTPGEKVTITCQASEGIGN-------YLYWYQQKPDQAPKLLIKYASQSISGVPSRFSGSGSGTDFTFTISSLEAEDAATYYCQQGNKHP 2-1-1
```

Figure 3

```
          1         2         3         4         5
          0         0         0         0         0
DIQMTQSPASLSASVGETVTITCRASGNIHNYLAWYQQKQGKSPQLLVYYTTTLAD D1.3 Vκ
L23                     SqgIssY                   Yas
A14/DPK25               SegIgNY                   Yas
L1                      SqgIsNY                   aas
O12/DPK9                SqsIssY                   aas
O18/DPK1                SqdIsNY                   das
A30                     SqgIrNd                   aas
L14/DPK2                rqgIsNY                   aas
L4                      SqgIssa                   ass
L8/DPK8                 SqgIssY                   aas
L9                      SqgIssY                   aas
L18                     SqgIssa                   ass
L15/DPK7                SqgIssw                   aas
L5/DPK5                 SqgIssw                   ass
L11/DPK3                SqgIrNd                   aas
B2                      SqdIddd                   eaT
L24/DPK10               SqgIssy                   aas
L12                     SqsIssw                   aas
L6                      SqsvssY                   das
A26/DPK26               SqsIgss                   Yas
L16                     Sqsvssn                   asT
L2/DPK21                Sqsvssn                   gas

   6         7         8         9         10        10
   0         0         0         0          0         8
GVPSRFSGSGSGTQYSLKINSLQPEDFGSYYCQHFWSTPRTFGGGTKLEIKR  D1.3 Vκ
L23                               yySTP
A14                               gnkhP
L1                                ynSyP
O12                               sySTP
O18                               ydnlP
A30                               hnSyP
L14                               hnSyP
L4                                FnSyP
L8                                lnSyP
L9                                yySyP
L18                               FnSyP
L15                               ynSyP
L5                                anSfP
L11                               dynyP
B2                                hdnfP
L24/DPK10                         yySfP
L12                               ynSys
L6                                rsnwP
A26                               ssSlP
L16                               ynnwP
L2                                ynnwP

J1                                     wTFGqGTKvEIKR
J2                                     yTFGqGTKLEIKR
J3                                     fTFGpGTKvdIKR
J4                                     lTFGGGTKvEIKR
J5                                     iTFGqGTRLEIKR
```

Figure 4

```
          1         2         3         4         5         6
          0         0         0         0         0         0
QVQLQESGPGLVAPSQSLSITCTVSGFSLTGYGVNWVRQPPGKGLEWLGMIWGDGNTDYNSALKS
D1.3 VH

Tou-VH4.21                  gSfsGYyws               eIihsGsTnYNpsLKS
DP-63                       gSfsGYyws               eInhsGsTnYNpsLKS
V58                         gSvsGYyws               yIyysGsTnnNpsLKS
VIV-4                       gSissYyws               rIytsGsTnYNpsLKS
DP-71                       gSissYyws               yIyysGsTnYNpsLKS
V71-4                       gSvssYyws               yIyysGsTnYNpsLKS
VH4.16                      gSissYyws               yIyysGsTnYNpsLKS
DP-45                       FtfssYamh               aIgtgGgTyYadsvKg
DP-48                       FtfssYdmh               aIgtaGdTyYpgsvKg
DP-42                       Ftvssnyms               vIysgGsTyYadsvKg
8-1B                        Ftvssnyms               vIysgGsTyYadsvKg

    7         8 8   8       9         10        11
    0         0 2abc3       0          0         0
RLSISKDNSKSQVFLKMNSLHTDDTARYYCARERDYRLDYWGQGTTLTVSS D1.3 VH

JH1                                   aeyfqhWGQGTLVTVSS
JH2                                   ywyfDlWGRGTLVTVSS
JH3                                     afDvWGQGTMVTVSS
JH4                                     yfDYWGQGTLVTVSS
JH5                                    nwfDsWGQGTLVTVSS
JH6                                 yyydYgmDvWGQGTTVTVSS
```

Figure 5

```
         1         2         3         4         5
         0         0         0         0         0
DIQMTQSPASLSASVGETVTITCRASGNIHNYLAWYQQKQGKSPQLLVYYTTTLAD mouse D1.3 VK
AIRMTQSPFSLSASVGDRVTITCRASGNIHNYLAWYQQKPAKAPKLFIYYTTTLAD humanized D1.3 VK

   6         7         8         9        10       10
   0         0         0         0         0        8
GVPSRFSGSGSGTQYSLKINSLQPEDFGSYYCQHFWSTPRTFGGGTKLEIKR mouse D1.3 VK
GVPSRFSGSGSGTDYTLTISSLQPEDFATYYCQHFWSTPRTFGGGTKVEIKR humanized D1.3 VK
```

```
         1         2         3         4         5         6
         0         0         0         0         0         0
QVQLQESGPGLVAPSQSLSITCTVSGFSLTGYGVNWVRQPPGKGLEWLGMIWGDGNTDYNSALKS mouse D1.3 VH
QVQLQESGPGLVKPSETLSLTCTVSGGSVSGYGVNWIRQPPGKGLEWIGMIWGDGNTDYNSSLKS humanized D1.3 VH

    7         8 8   8       9        10        11
    0         0 2abc3       0         0         0
RLSISKDNSKSQVFLKMNSLHTDDTARYYCARERDYRLDYWGQGTTLTVSS mouse D1.3 VH
RVTISVDTSKNQFSLKLSSVTAADTAVYYCARERDYRLDYWGQGTLVTVSS humanized D1.3 VH
```

Figure 6

>phoB_binding_box
>-10_phoA_promoter
>rbs
C-KAPPA
C-KAPPA
C-KAPPA
C-KAPPA

>rbs
>phage_lambda_terminator

Figure 7

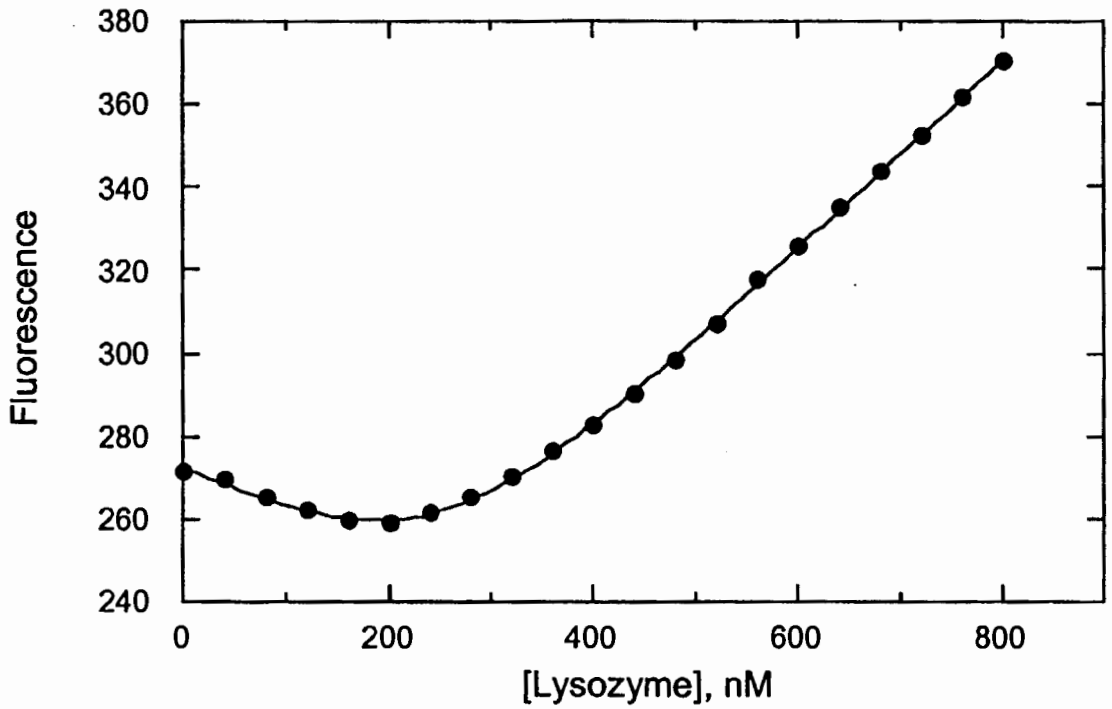

380
360
340
320
300
280
260
240
Fluorescence
0
200
400
600
800
[Lysozyme], nM

Figure 8

```
         1         2      2         3         4         5
         0         0     7abcd     0         0         0
DIELTQSPASLAVSLGQRATISCRASESVEY  YVTSLMQWYQQKPGQPPKLLIFAASNVES 9.3 Vκ

B3/DPK24               ksSqSVlYssnnknyla               wAStrES
A17 DPK18              RsSqSlvYs dgntyln                kvSNrdS
A1/DPK19               RsSqSlvYs dgntyln                kvSNwdS
A2/DPK12               ksSqSllhs dgktyly                evSNrfS
A19/DPK15              RsSqSllhs ngynyld                lgSNraS
A23/DPK16              RsSqSlvhs dgntyls                kiSNrfS
O11/DPK13              RsSqSlldsddgntyld                tlSyraS
A18/DPK28              ksSqSllhs dgvtyly                evSsrfS


   6         7         8         9        10       10
   0         0         0         0        0        8
GVPARFSGSGSGTNFSLNIHPVDEDDVAMYFCQQSRKVPYTFGGGTKLEIKR 9.3 Vκ

B3/DPK24                         QQyystP
A17/DPK18                        mQgthwP
A1/DPK19                         mQgthwP
A2/DPK12                         mQSiqlP
A19/DPK15                        mQalqtP
A23/DPK16                        mQatqfP
O11/DPK13                        mQriefP
A18/DPK28                        mQgthlP
J1                                     wTFGqGTKvEIKR
J2                                     YTFGqGTKLEIKR
J3                                     fTFGpGTKvdIKR
J4                                     lTFGGGTKvEIKR
J5                                     iTFGqGTrLEIKR
```

Figure 9

```
         1         2         3         4         5         6
         0         0        _0_        0         0       _0_
EVKLQQSGPGLVTPSQSLSITCTVSGFSLSDYGVHWVRQSPGQGLEWLGVIWAGGGTNYNSALMS  9.3 VH

DP-45                      FtfSsYamH              aIgtGGGTyYadsvKg
Tou-VH4.21                 gSfSgYyws              eIihsGsTNYNpsLKS
DP-63                      gSfSgYyws              eInhsGsTNYNpsLKS
VIV-4                      gSiSsYyws              rIytsGsTNYNpsLKS
DP-71                      gSiSsYyws              yIyysGsTNYNpsLKS
V71-4                      gSvSsYyws              yIyysGsTNYNpsLKS
VH4.16                     gSiSsYyws              yIyysGsTNYNpsLKS
DP-48                      FtfSsYdmH              aIgtaGdTyYpgsvKg
DP-42                      FtvSsnyms              VIysGGsTyYadsvKg
8-1B                       FtvSsnyms              VIysGGsTyYadsvKg
V58                        gSvSgYyws              yIyysGsTNnNpsLKS


    7         8 8   8       9        10            11
    0         0 2abc3       0         0abcd         0
RKSISKDNSKSQVFLKMNSLQADDTAVYYCARDKGYSYYYSMDYWGQGTSVTVSS  9.3 VH

JH1                                      aeyfqhWGQGTlVTVSS
JH2                                      ywyfDlWGrGTlVTVSS
JH3                                        afDvWGQGTmVTVSS
JH4                                        yfDYWGQGTlVTVSS
JH5                                       nwfDsWGQGTlVTVSS
JH6                                    YSYdYgMDvWGQGTtVTVSS
```

Figure 10

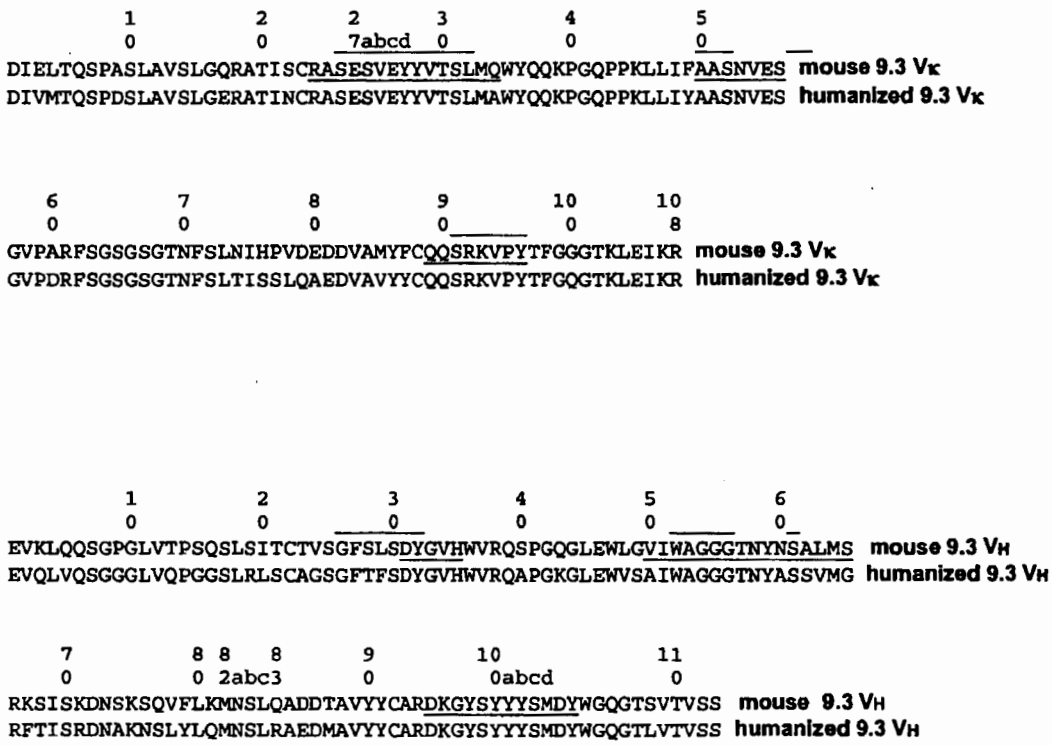

1 2 2 3 4 5
0 0 7abcd 0 0 0
DIELTQSPASLAVSLGQRATISCRASESVEYYVTSLMQWYQQKPGQPPKLLIFAASNVES mouse 9.3 Vκ
DIVMTQSPDSLAVSLGERATINCRASESVEYYVTSLMAWYQQKPGQPPKLLIYAASNVES humanized 9.3 Vκ
6 7 8 9 10 10
0 0 0 0 0 8
GVPARFSGSGSGTNFSLNIHPVDEDDVAMYPCQQSRKVPYTFGGGTKLEIKR mouse 9.3 Vκ
GVPDRFSGSGSGTNFSLTISSLQAEDVAVYYCQQSRKVPYTFGQGTKLEIKR humanized 9.3 Vκ
1 2 3 4 5 6
0 0 0 0 0 0
EVKLQQSGPGLVTPSQSLSITCTVSGFSLSDYGVHWVRQSPGQGLEWLGVIWAGGGTNYNSALMS mouse 9.3 VH
EVQLVQSGGGLVQPGGSLRLSCAGSGFTFSDYGVHWVRQAPGKGLEWVSAIWAGGGTNYASSVMG humanized 9.3 VH
7 8 8 8 9 10 11
0 0 2abc3 0 0abcd 0
RKSISKDNSKSQVFLKMNSLQADDTAVYYCARDKGYSYYYSMDYWGQGTSVTVSS mouse 9.3 VH
RFTISRDNAKNSLYLQMNSLRAEDMAVYYCARDKGYSYYYSMDYWGQGTLVTVSS humanized 9.3 VH

Figure 11

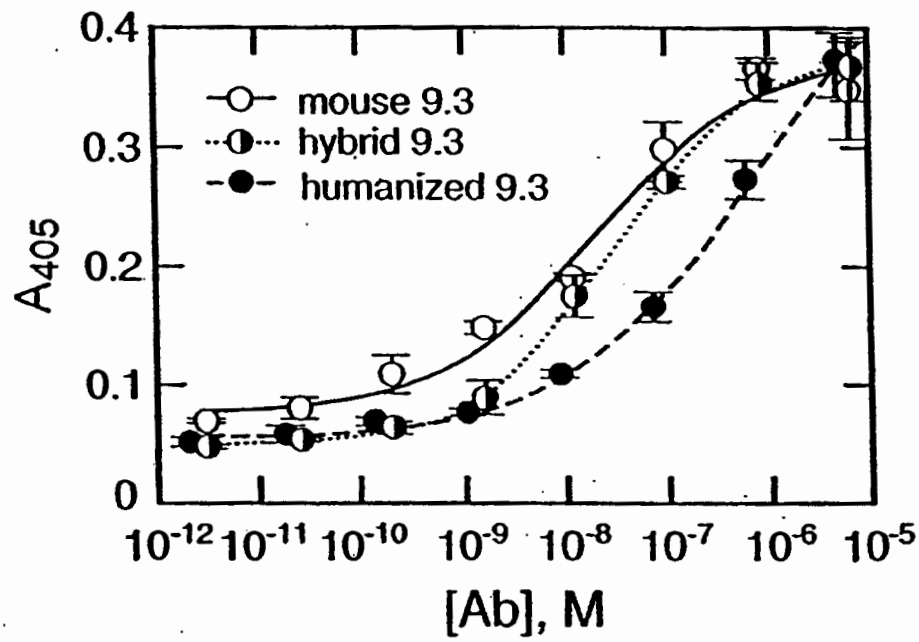

0.4
0.3
0.2
0.1
0
A405
mouse 9.3
hybrid 9.3
humanized 9.3
10-12 10-11 10-10 10-9 10-8 10-7 10-6 10-5
[Ab], M

Figure 12

```
         1         2      2      3         4         5
         0         0      7abcd  0         0         0
DIVLTQSPVSLAVSVGQRATISCKASQSVDFDGESYMNWYQQKPGQPPKLLIYVVSNLES mouse BCF2 Vκ
DIVMTQTPLSLSVTPGQPASISCKASQSVDFDGESYMNWYLQKPGQPPQLLIYVVSNLES humanized BCF2 Vκ

   6         7         8         9        10       10
   0         0         0         0         0        8
GIPARFSGSGSGTDFTLNIHPVEEEDAATYYCQQSNEDPLTFGAGTNLELKR mouse BCF2 Vκ
GVPDRFSGSGSGTDFTLKISRVEAEDVGVYYCQQSNEDPLTFGGGYKVEIKR humanized BCF2 Vκ

         1         2         3         4         5 5       6
         0         0         0         0         0 2a      0
EVQLQQSGPELVKPGASMKISCKVSGYSFTDHTMNWVKQSHGKNLELIGLINPFNGDATYKQKFTG mouse BCF2 VH
EVQLVQSGAEVKKPGATVKISCKVSGYTFTDHTMNWVQQAPGKGLEWMGLINPFNGDATYKQKFQG humanized BCF2 VH

   7         8 8   8       9        10        11
   0         0 2abc3       0         0         0
KATLTVDRSSSTAFMELLSLTSEDSAVYYCARYGNYAMDYWGQGTSVTVSS mouse BCF2 VH
RVTITADTSTDTAYMELSSLRSEDTAVYYCARYGNYAMDYWGQGTTVTVSS humanized BCF2 VH
```

Figure 13

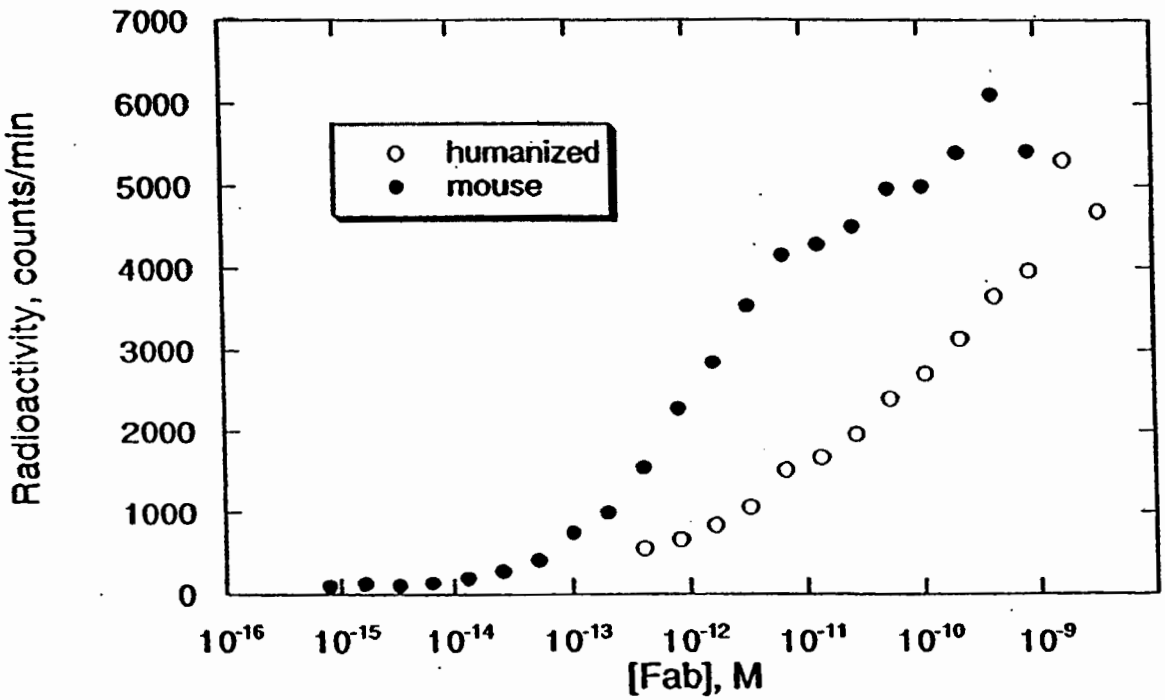
```
         1         2       2        3         4         5
         0         0      7abcde   0         0         0
**VLTQTPLSLPVSLGDQASISCRSSQSLEHNNGNTYLNWYLQKPGQSPQLLIYRVSNRFS mouse NGAD65 Vκ
DVVMTQSPLSLPVTLGQPASISCRSSQSLEHNNGNTYLNWFQQRPGQSPRRLIYRVSNRFS humanized NGAD65 Vκ

   6         7         8         9        10       10
   0         0         0         0        0        8
GGLDRFSGSGSGTDFTLKISRVEAEDLGVYFCLQVTHVPFTFGSGTKLEIKR mouse NGAD65 Vκ
GVPDRFSGSGSGTDFTLKISRVEAEDVGVYYClQVTHVPFTFGPGTKVDIKR humanized NGAD65 Vκ


         1         2         3         4         5 5    5    6
         0         0         0         0         0 2a   6    0
QVQLQQPGAELVKPGASVKMSCKASGYRFSSYNMHWVKQTPGQGLEWIGAIYPRSGDTSYN mouse NGAD65 VH
EVQLLQSAAEVKRPGESLRISCKTSGYSFTSYNMHWVRQMPGKELEWMGAIYPRSGDTSYN humanized NGAD65 VH

         7         8 8    8       9    9    10          11
         0         0 2abc3        0    4    0ab         0
QKFKGKATLTADKSSSTAYMQLGSLTSEDSAVYYCVRSYDYDAPFAFWGQGTLVTVSA mouse NGAD65 VH
PSFQGHVTISADSSSSTAYLQWSSLKASDAAMYYCVRSYDYDAPFAFWGQGTLVTVSS humanized NGAD65 VH
```

Figure 14


7000
6000
5000
4000
3000
2000
1000
0
Radioactivity, counts/min
humanized
mouse
10-16
10-15
10-14
10-13
10-12
10-11
10-10
10-9
[Fab], M