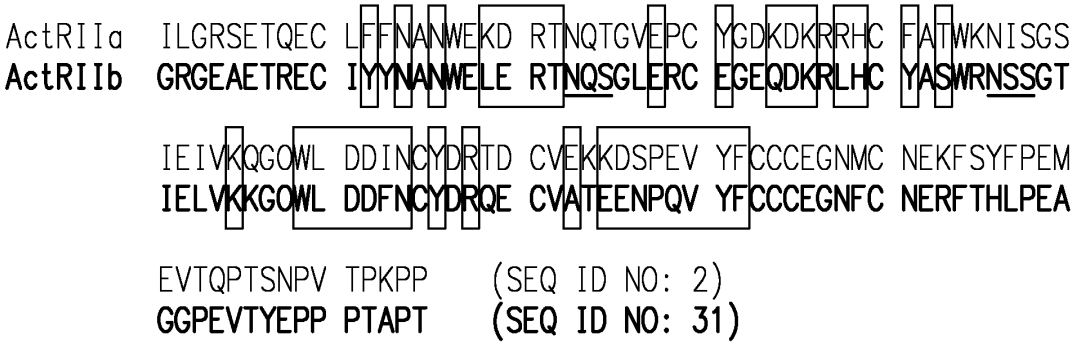

ActRIIa ILGRSETQEC LFFNANWEKD RTNQTGVEPC YGDKDKRRHC FATWKNISGS
ActRIIb GRGEAETREC IYYNANWELE RTNQSGLERC EGEQDKRLHC YASWRNSSGT
IEIVKQGCWL DDINCYDRTD CVEKKDSPEV YFCCCEGNMC NEKFSYFPEM
IELVKKGCWL DDFNCYDRQE CVATEENPQV YFCCCEGNFC NERFTHLPEA
EVTQPTSNPV TPKPP (SEQ ID NO: 2)
GGPEVTYEPP PTAPT (SEQ ID NO: 31)

FIG.1

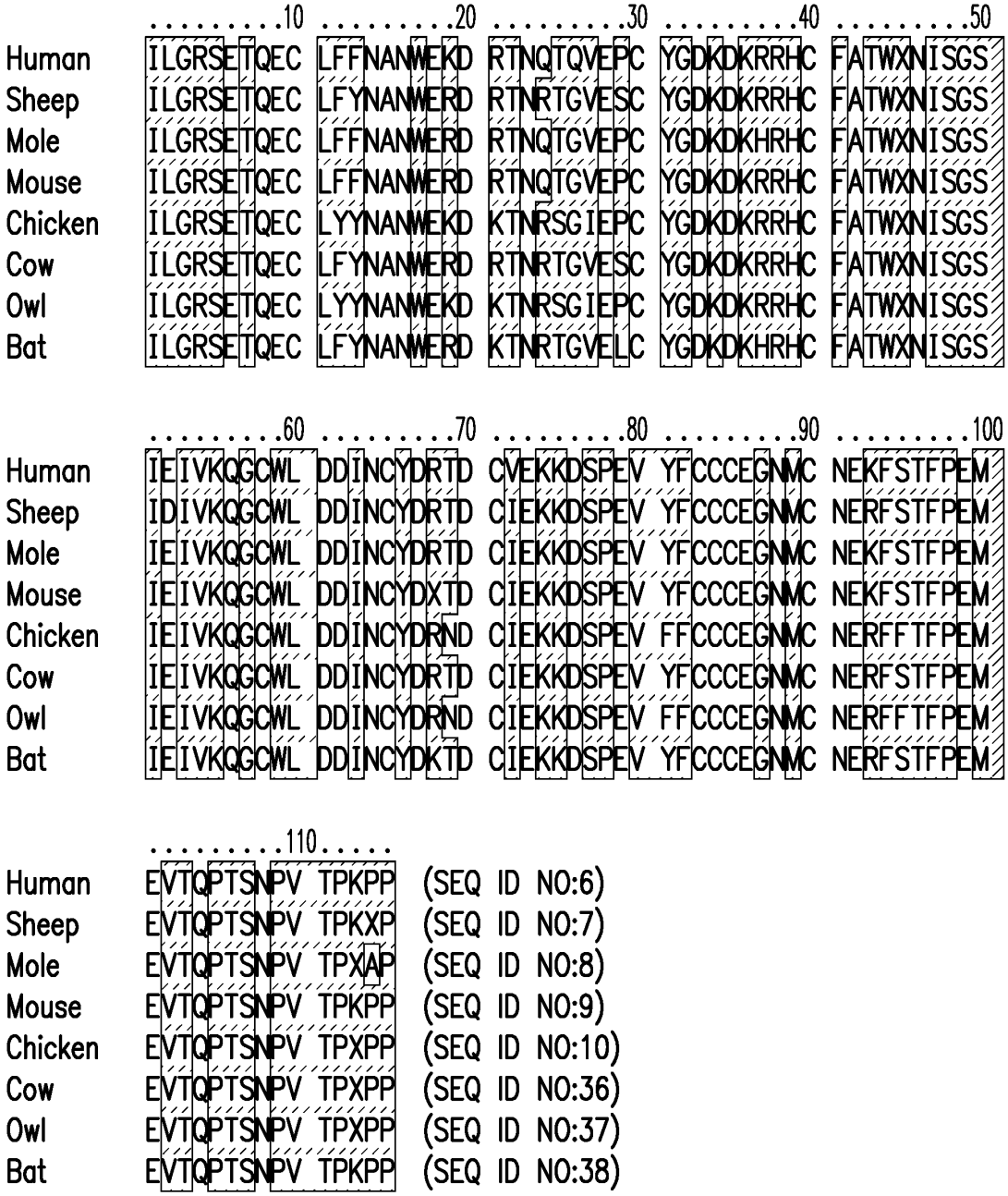

.....10 .....20 .....30 .....40 50
Human ILGRSETQEC LFFNANWEKD RTNQTQVEPC YGDKDKRRHC FATWXNISGS
Sheep ILGRSETQEC LFYNANWERD RTNRTGVESC YGDKDKRRHC FATWXNISGS
Mole ILGRSETQEC LFFNANWERD RTNQTGVEPC YGDKDKHRHC FATWXNISGS
Mouse ILGRSETQEC LFFNANWERD RTNQTGVEPC YGDKDKRRHC FATWXNISGS
Chicken ILGRSETQEC LYYNANWEKD KTNRSGIEPC YGDKDKRRHC FATWXNISGS
Cow ILGRSETQEC LFYNANWERD RTNRTGVESC YGDKDKRRHC FATWXNISGS
Owl ILGRSETQEC LYYNANWEKD KTNRSGIEPC YGDKDKRRHC FATWXNISGS
Bat ILGRSETQEC LFYNANWERD KTNRTGVELC YGDKDKHRHC FATWXNISGS
.....60 .....70 .....80 .....90 100
Human IEIVKQGCWL DDINCYDRTD CVEKKDSPEV YFCCCEGNMC NEKFSTFPEM
Sheep IDIVKQGCWL DDINCYDRTD CIEKKDSPEV YFCCCEGNMC NERFSTFPEM
Mole IEIVKQGCWL DDINCYDRTD CIEKKDSPEV YFCCCEGNMC NEKFSTFPEM
Mouse IEIVKQGCWL DDINCYDXTD CIEKKDSPEV YFCCCEGNMC NEKFSTFPEM
Chicken IEIVKQGCWL DDINCYDRND CIEKKDSPEV FFCCCEGNMC NERFFTFPEM
Cow IEIVKQGCWL DDINCYDRTD CIEKKDSPEV YFCCCEGNMC NERFSTFPEM
Owl IEIVKQGCWL DDINCYDRND CIEKKDSPEV FFCCCEGNMC NERFFTFPEM
Bat IEIVKQGCWL DDINCYDKTD CIEKKDSPEV YFCCCEGNMC NERFSTFPEM
.....110.....
Human EVTQPTSNPV TPKPP (SEQ ID NO:6)
Sheep EVTQPTSNPV TPKXP (SEQ ID NO:7)
Mole EVTQPTSNPV TPXAP (SEQ ID NO:8)
Mouse EVTQPTSNPV TPKPP (SEQ ID NO:9)
Chicken EVTQPTSNPV TPXPP (SEQ ID NO:10)
Cow EVTQPTSNPV TPXPP (SEQ ID NO:36)
Owl EVTQPTSNPV TPXPP (SEQ ID NO:37)
Bat EVTQPTSNPV TPKPP (SEQ ID NO:38)

FIG.2

```
IgG1 -------THTCPPCPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKF 53
IgG4 ---ESKYGPPCPSCPAPEFLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSQEDPEVQF 57
IgG2 -------VECPPCPAPPVAG PSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVQF 51
IgG3 EPKSCDTPPPCPRCPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVQF 60
                ** **** . * ********************************:*****:*

IgG1 NWYVDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKT 113
IgG4 NWYVDGVEVHNAKTKPREEQFNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPSSIEKT 117
IgG2 NWYVDGVEVHNAKTKPREEQFNSTFRVVSVLTVLHQDWLNGKEYKCKVSNKGLPAPIEKT 111
IgG3 KWYVDGVEVHNAKTKPREEQYNSTFRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKT 120
     :**********************:***:**********:**********.**:.****

IgG1 ISKAKGQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTP 173
IgG4 ISKAKGQPREPQVYTLPPSQEEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTP 177
IgG2 ISKTKGQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTP 171
IgG3 ISKTKGQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESSGQPENNYKTTP 180
     ***:**********************:**********************.********:***

IgG1 PVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK 225 (SEQ ID NO:32)
IgG4 PVLDSDGSFFLYSRLTVDKSRWQEGNVFSCSVMHEALHNHYTQKSLSLSLGK 229 (SEQ ID NO:35)
IgG2 PMLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK 223 (SEQ ID NO:33)
IgG3 PMLDSDGSFFLYSKLTVDKSRWQQGNIFSCSVMHEALHNRFTQKSLSLSPGK 232 (SEQ ID NO:34)
     *:**********:**********:**:**********::********* **
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FIG.3

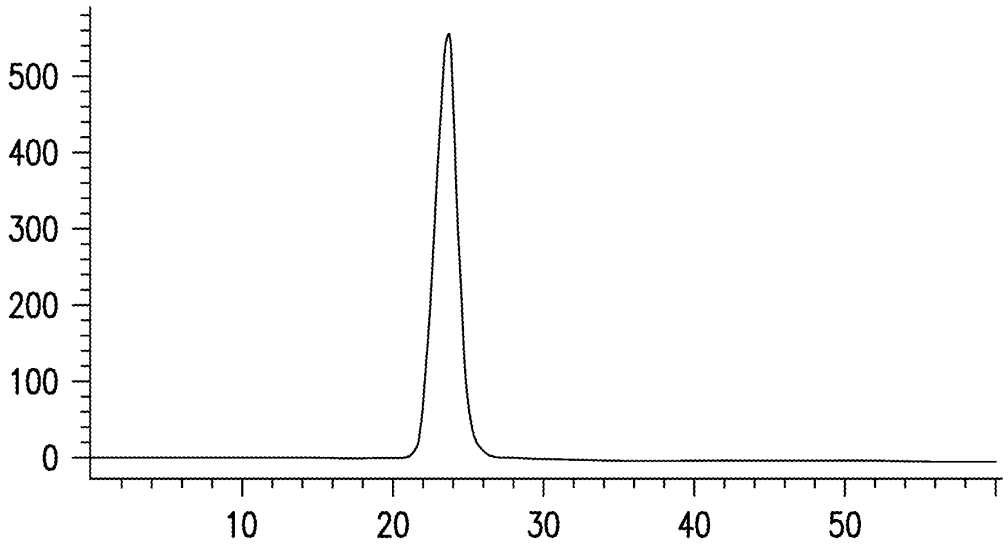


FIG.4A

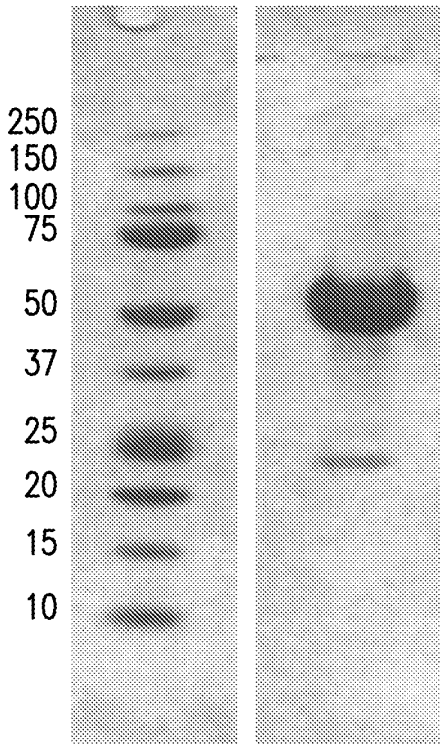


FIG.4B

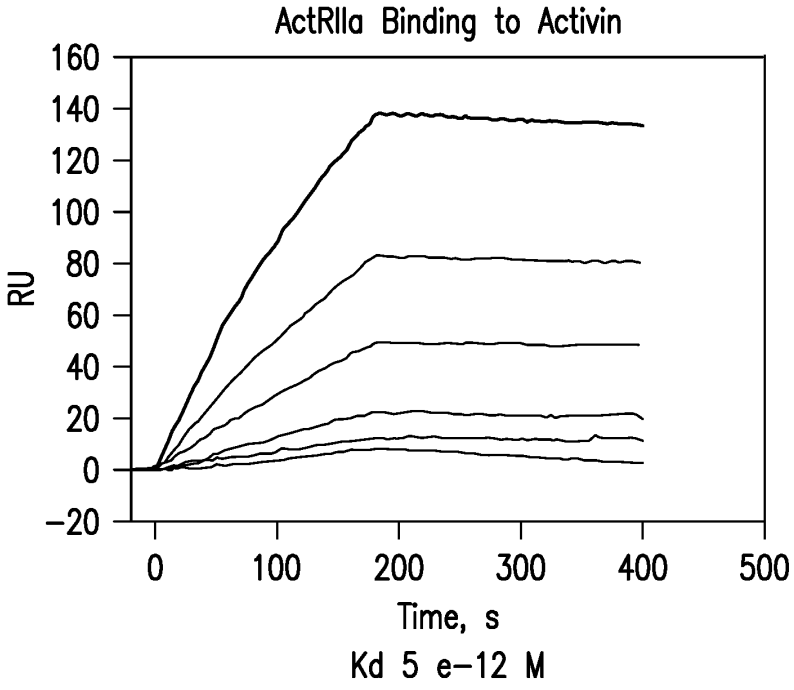

ActRIIa Binding to Activin
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FIG.5A

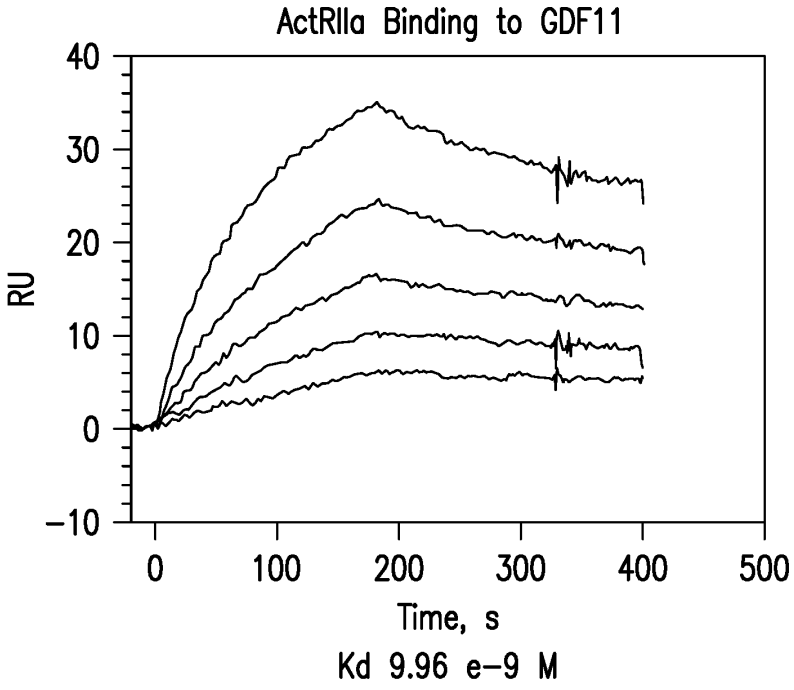

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100
200
300
400
500
Time, s
Kd 9.96 e−9 M

FIG.5B