FIG. 1A

```
MSLISKEELIKLAYSIRPRENEYKTILTNLDEYNKLTTNNNENKYLQLKK 50
MSLISKEELIKLAYSIRPRENEYKTILTNLDEYNKLTTNNNENKYLQLKK 50
MSLISKEELIKLAYSIRPRENEYKTILTNLDEYNKLTTNNNENKYLQLKK 50
MSLISKEELIKLAYSIRPRENEYKTILTNLDEYNKLTTNNNENKYLQLKK 50
MSLISKEELIKLAYSIRPRENEYKTILTNLDEYNKLTTNNNENKYLQLKK 50
**************************************************

LNESIDVFMNKYKTSSRNRALSNLKKDILKEVILIKNSNTSPVEKNLHFV 100
LNESIDVFMNKYKTSSRNRALSNLKKDILKEVILIKNSNTSPVEKNLHFV 100
LNESIDVFMNKYKTSSRNRALSNLKKDILKEVILIKNSNTSPVEKNLHFV 100
LNESIDVFMNKYKNSSRNRALSNLKKDILKEVILIKNSNTSPVEKNLHFV 100
LNESIDVFMNKYKNSSRNRALSNLKKDILKEVILIKNSNTSPVEKNLHFV 100
************.*************************************

WIGGEVSDIALEYIKQWADINAEYNIKLWYDSEAFLVNTLKKAIVESSTT 150
WIGGEVSDIALEYIKQWADINAEYNIKLWYDSEAFLVNTLKKAIVESSTT 150
WIGGEVSDIALEYIKQWADINAEYNIKLWYDSEAFLVNTLKKAIVESSTT 150
WIGGEVSDIALEYIKQWADINAEYNIKLWYDSEAFLVNTLKKAIVESSTT 150
WIGGEVSDIALEYIKQWADINAEYNIKLWYDSEAFLVNTLKKAIVESSTT 150
**************************************************

EALQLLEEEIQNPQFDNMKFYKKRMEFIYDRQKRFINYYKSQINKPTVPT 200
EALQLLEEEIQNPQFDNMKFYKKRMEFIYDRQKRFINYYKSQINKPTVPT 200
EALQLLEEEIQNPQFDNMKFYKKRMEFIYDRQKRFINYYKSQINKPTVPT 200
EALQLLEEEIQNPQFDNMKFYKKRMEFIYDRQKRFINYYKSQINKPTVPT 200
EALQLLEEEIQNPQFDNMKFYKKRMEFIYDRQKRFINYYKSQINKPTVPT 200
**************************************************

IDDIIKSHLVSEYNRDETVLESYRTNSLRKINSNHGIDIRANSLFTEQEL 250
IDDIIKSHLVSEYNRDETVLESYRTNSLRKINSNHGIDIRANSLFTEQEL 250
IDDIIKSHLVSEYNRDETVLESYRTNSLRKINSNHGIDIRANSLFTEQEL 250
IDDIIKSHLVSEYNRDETLLESYRTNSLRKINSNHGIDIRANSLFTEQEL 250
IDDIIKSHLVSEYNRDETLLESYRTNSLRKINSNHGIDIRANSLFTEQEL 250
******************:*******************************

LNIYSQELLNRGNLAAASDIVRLLALKNFGGVYLDVDMLPGIHSDLFKTI 300
LNIYSQELLNRGNLAAASDIVRLLALKNFGGVYLAVAMLPGIHSDLFKTI 300
LNIYSQELLNRGNLAAASDIVRLLALKNFGGVYLDVDMLPGIHSDLFKTI 300
LNIYSQELLNRGNLAAASDIVRLLALKNFGGVYLDVDMLPGIHSDLFKTI 300
LNIYSQELLNRGNLAAASDIVRLLALKNFGGVYLDVDMLPGIHSDLFKTI 300
********************************** * *************

SRPSSIGLDRWEMIKLEAIMKYKKYINNYTSENFDKLDQQLKDNFKLIIE 350
SRPSSIGLDRWEMIKLEAIMKYKKYINNYTSENFDKLDQQLKDNFKLIIE 350
SRPSSIGLDRWEMIKLEAIMKYKKYINNYTSENFDKLDQQLKDNFKLIIE 350
PRPSSIGLDRWEMIKLEAIMKYKKYINNYTSENFDKLDQQLKDNFKLIIE 350
PRPSSIGLDRWEMIKLEAIMKYKKYINNYTSENFDKLDQQLKDNFKLIIE 350
.*********************************************
```

FIG. 1B

```
SKSEKSEIFSKLENLNVSDLEIKIAFALGSVINQALISKQGSYLTNLVIE 400
SKSEKSEIFSKLENLNVSDLEIKIAFALGSVINQALISKQGSYLTNLVIE 400
SKSEKSEIFSKLENLNVSDLEIKIAFALGSVINQALISKQGSYLTNLVIE 400
SKSEKSEIFSKLENLNVSDLEIKIAFALGSVINQALISKQGSYLTNLVIE 400
SKSEKSEIFSKLENLNVSDLEIKIAFALGSVINQALISKQGSYLTNLVIE 400
**************************************************

QVKNRYQFLNQHLNPAIESDNNFTDTTKIFHDSLFNSATAENSMFLTKIA 450
QVKNRYQFLNQHLNPAIESDNNFTDTTKIFHDSLFNSATAENSMFLTKIA 450
QVKNRYQFLNQHLNPAIESDNNFTDTTKIFHDSLFNSATAENSMFLTKIA 450
QVKNRYQFLNQHLNPAIESDNNFTDTTKIFHDSLFNSATAENSMFLTKIA 450
QVKNRYQFLNQHLNPAIESDNNFTDTTKIFHDSLFNSATAENSMFLTKIA 450
**************************************************

PYLQVGFMPEARSTISLSGPGAYASAYYDFINLQENTIEKTLKASDLIEF 500
PYLQVGFMPEARSTISLSGPGAYASAYYDFINLQENTIEKTLKASDLIEF 500
PYLQVGFMPEARSTISLSGPGAYASAYYDFINLQENTIEKTLKASDLIEF 500
PYLQVGFMPEARSTISLSGPGAYASAYYDFINLQENTIEKTLKASDLIEF 500
PYLQVGFMPEARSTISLSGPGAYASAYYDFINLQENTIEKTLKASDLIEF 500
**************************************************

KFPENNLSQLTEQEINSLWSFDQASAKYQFEKYVRDYTGGSLSEDNGVDF 550
KFPENNLSQLTEQEINSLWSFDQASAKYQFEKYVRDYTGGSLSEDNGVDF 550
KFPENNLSQLTEQEINSLWSFDQASAKYQFEKYVRDYTGGSLSEDNGVDF 550
KFPENNLSQLTEQEINSLWSFDQASAKYQFEKYVRDYTGGSLSEDNGVDF 550
KFPENNLSQLTEQEINSLWSFDQASAKYQFEKYVRDYTGGSLSEDNGVDF 550
**************************************************

NKNTALDKNYLLNNKIPSNNVEEAGSKNYVHYIIQLQGDDISYEATCNLF 600
NKNTALDKNYLLNNKIPSNNVEEAGSKNYVHYIIQLQGDDISYEATCNLF 600
NKNTALDKNYLLNNKIPSNNVEEAGSKNYVHYIIQLQGDDISYEATCNLF 600
NKNTALDKNYLLNNKIPSNNVEEAGSKNYVHYIIQLQGDDISYEATCNLF 600
NKNTALDKNYLLNNKIPSNNVEEAGSKNYVHYIIQLQGDDISYEATCNLF 600
**************************************************

SKNPKNSIIIQRNMNESAKSYFLSDDGESILELNKYRIPERLKNKEKVKV 650
SKNPKNSIIIQRNMNESAKSYFLSDDGESILELNKYRIPERLKNKEKVKV 650
SKNPKNSIIIQRNMNESAKSYFLSDDGESILELNKYRIPERLKNKEKVKV 650
SKNPKNSIIIQRNMNESAKSYFLSDDGESILELNKYRIPERLKNKEKVKV 650
SKNPKNSIIIQRNMNESAKSYFLSDDGESILELNKYRIPERLKNKEKVKV 650
**************************************************

TFIGHGKDEFNTSEFARLSVDSLSNEISSFLDTIKLDISPKNVEVNLLGC 700
TFIGHGKDEFNTSEFARLSVDSLSNEISSFLDTIKLDISPKNVEVNLLGA 700
TFIGHGKDEFNTSEFARLSVDSLSNEISSFLDTIKLDISPKNVEVNLLGC 700
TFIGHGKDEFNTSEFARLSVDSLSNEISSFLDTIKLDISPKNVEVNLLGC 700
TFIGHGKDEFNTSEFARLSVDSLSNEISSFLDTIKLDISPKNVEVNLLGC 700
**************************************************.
```

FIG. 1C

```
NMFSYDFNVEETYPGKLLLSIMDKITSTLPDVNKNSITIGANQYEVRINS 750
NMFSYDFNVEETYPGKLLLSIMDKITSTLPDVNKNSITIGANQYEVRINS 750
NMFSYDFNVEETYPGKLLLSIMDKITSTLPDVNKNSITIGANQYEVRINS 750
NMFSYDFNVEETYPGKLLLSIMDKITSTLPDVNKDSITIGANQYEVRINS 750
NMFSYDFNVEETYPGKLLLSIMDKITSTLPDVNKDSITIGANQYEVRINS 750
**********************************:***************

EGRKELLAHSGKWINKEEAIMSDLSSKEYIFFDSIDNKLKAKSKNIPGLA 800
EGRKELLAHSGKWINKEEAIMSDLSSKEYIFFDSIDNKLKAKSKNIPGLA 800
EGRKELLAHSGKWINKEEAIMSDLSSKEYIFFDSIDNKLKAKSKNIPGLA 800
EGRKELLAHSGKWINKEEAIMSDLSSKEYIFFDSIDNKLKAKSKNIPGLA 800
EGRKELLAHSGKWINKEEAIMSDLSSKEYIFFDSIDNKLKAKSKNIPGLA 800
**************************************************

SISEDIKTLLLDASVSPDTKFILNNLKLNIESSIGDYIYYEKLEPVKNII 850
SISEDIKTLLLDASVSPDTKFILNNLKLNIESSIGDYIYYEKLEPVKNII 850
SISEDIKTLLLDASVSPDTKFILNNLKLNIESSIGDYIYYEKLEPVKNII 850
SISEDIKTLLLDASVSPDTKFILNNLKLNIESSIGDYIYYEKLEPVKNII 850
SISEDIKTLLLDASVSPDTKFILNNLKLNIESSIGDYIYYEKLEPVKNII 850
**************************************************

HNSIDDLIDEFNLLENVSDELYELKKLNNLDEKYLISFEDISKNNSTYSV 900
HNSIDDLIDEFNLLENVSDELYELKKLNNLDEKYLISFEDISKNNSTYSV 900
HNSIDDLIDEFNLLENVSDELYELKKLNNLDEKYLISFEDISKNNSTYSV 900
HNSIDDLIDEFNLLENVSDELYELKKLNNLDEKYLISFEDISKNNSTYSV 900
HNSIDDLIDEFNLLENVSDELYELKKLNNLDEKYLISFEDISKNNSTYSV 900
**************************************************

RFINKSNGESVYVETEKEIFSKYSEHITKEISTIKNSIITDVNGNLLDNI 950
RFINKSNGESVYVETEKEIFSKYSEHITKEISTIKNSIITDVNGNLLDNI 950
RFINKSNGESVYVETEKEIFSKYSEHITKEISTIKNSIITDVNGNLLDNI 950
RFINKSNGESVYVETEKEIFSKYSEHITKEISTIKNSIITDVNGNLLDNI 950
RFINKSNGESVYVETEKEIFSKYSEHITKEISTIKNSIITDVNGNLLDNI 950
**************************************************

QLDHTSQVNTLNAAFFIQSLIDYSSNKDVLNDLSTSVKVQLYAQLFSTGL 1000
QLDHTSQVNTLNAAFFIQSLIDYSSNKDVLNDLSTSVKVQLYAQLFSTGL 1000
QLDHTSQVNTLNAAFFIQSLIDYSSNKDVLNDLSTSVKVQLYAQLFSTGL 1000
QLDHTSQVNTLNAAFFIQSLIDYSSNKDVLNDLSTSVKVQLYAQLFSTGL 1000
QLDHTSQVNTLNAAFFIQSLIDYSSNKDVLNDLSTSVKVQLYAQLFSTGL 1000
**************************************************

NTIYDSIQLVNLISNAVNDTINVLPTITEGIPIVSTILDGINLGAAIKEL 1050
NTIYDSIQLVNLISNAVNDTINVLPTITEGIPIVSTILDGINLGAAIKEL 1050
NTIYDSIQLVNLISNAVNDTINVLPTITEGIPIVSTILDGINLGAAIKEL 1050
NTIYDSIQLVNLISNAVNDTINVLPTITEGIPIVSTILDGINLGAAIKEL 1050
NTIYDSIQLVNLISNAVNDTINVLPTITEGIPIVSTILDGINLGAAIKEL 1050
**************************************************
```

FIG. 1D

```
LDEHDPLLKKELEAKVGVLAINMSLSIAATVASIVGIGAEVTIFLLPIAG 1100
LDEHDPLLKKELEAKVGVLAINMSLSIAATVASIVGIGAEVTIFLLPIAG 1100
LDEHDPLLKKELEAKVGVLAINMSLSIAATVASIVGIGAEVTIFLLPIAG 1100
LDEHDPLLKKELEAKVGVLAINMSLSIAATVASIVGIGAEVTIFLLPIAG 1100
LDEHDPLLKKELEAKVGVLAINMSLSIAATVASIVGIGAEVTIFLLPIAG 1100
************************************************

ISAGIPSLVNNELILHDKATSVVNYFNHLSESKKYGPLKTEDDKILVPID 1150
ISAGIPSLVNNELILHDKATSVVNYFNHLSESKKYGPLKTEDDKILVPID 1150
ISAGIPSLVNNELILHDKATSVVNYFNHLSESKKYGPLKTEDDKILVPID 1150
ISAGIPSLVNNELILHDKATSVVNYFNHLSESKEYGPLKTEDDKILVPID 1150
ISAGIPSLVNNELILHDKATSVVNYFNHLSESKEYGPLKTEDDKILVPID 1150
*********************************:**************

DLVISEIDFNNNSIKLGTCNILAMEGGSGHTVTGNIDHFFSSPSISSHIP 1200
DLVISEIDFNNNSIKLGTCNILAMEGGSGHTVTGNIDHFFSSPSISSHIP 1200
DLVISEIDFNNNSIKLGTCNILAMEGGSGHTVTGNIDHFFSSPSISSHIP 1200
DLVISEIDFNNNSIKLGTCNILAMEGGSGHTVTGNIDHFFSSPYISSHIP 1200
DLVISEIDFNNNSIKLGTCNILAMEGGSGHTVTGNIDHFFSSPYISSHIP 1200
****************************************** ******

SLSIYSAIGIETENLDFSKKIMMLPNAPSRVFWWETGAVPGLRSLENDGT 1250
SLSIYSAIGIETENLDFSKKIMMLPNAPSRVFWWETGAVPGLRSLENDGT 1250
SLSIYSAIGIETENLDFSKKIMMLPNAPSRVFWWETGAVPGLRSLENDGT 1250
SLSVYSAIGIKTENLDFSKKIMMLPNAPSRVFWWETGAVPGLRSLENNGT 1250
SLSVYSAIGIKTENLDFSKKIMMLPNAPSRVFWWETGAVPGLRSLENNGT 1250
***:******:*************************************:**

RLLDSIRDLYPGKFYWRFYAFFDYAITTLKPVYEDTNIKIKLDKDTRNFI 1300
RLLDSIRDLYPGKFYWRFYAFFDYAITTLKPVYEDTNIKIKLDKDTRNFI 1300
RLLDSIRDLYPGKFYWRFYAFFDYAITTLKPVYEDTNIKIKLDKDTRNFI 1300
KLLDSIRDLYPGKFYWRFYAFFDYAITTLKPVYEDTNTKIKLDKDTRNFI 1300
KLLDSIRDLYPGKFYWRFYAFFDYAITTLKPVYEDTNTKIKLDKDTRNFI 1300
:********************************** ************

MPTITTNEIRNKLSYSFDGAGGTYSLLLSSYPISTNINLSKDDLWIFNID 1350
MPTITTNEIRNKLSYSFDGAGGTYSLLLSSYPISTNINLSKDDLWIFNID 1350
MPTITTNEIRNKLSYSFDGAGGTYSLLLSSYPISTNINLSKDDLWIFNID 1350
MPTITTDEIRNKLSYSFDGAGGTYSLLLSSYPISMNINLSKDDLWIFNID 1350
MPTITTDEIRNKLSYSFDGAGGTYSLLLSSYPISMNINLSKDDLWIFNID 1350
******:***************************** ***************

NEVREISIENGTIKKGKLIKDVLSKIDINKNKLIIGNQTIDFSGDIDNKD 1400
NEVREISIENGTIKKGKLIKDVLSKIDINKNKLIIGNQTIDFSGDIDNKD 1400
NEVREISIENGTIKKGKLIKDVLSKIDINKNKLIIGNQTIDFSGDIDNKD 1400
NEVREISIENGTIKKGNLIEDVLSKIDINKNKLIIGNQTIDFSGDIDNKD 1400
NEVREISIENGTIKKGNLIEDVLSKIDINKNKLIIGNQTIDFSGDIDNKD 1400
****************:**:******************************
```

FIG. 1E

```
RYIFLTCELDDKISLIIEINLVAKSYSLLLSGDKNYLISNLSNIIEKINT 1450
RYIFLTCELDDKISLIIEINLVAKSYSLLLSGDKNYLISNLSNIIEKINT 1450
RYIFLTCELDDKISLIIEINLVAKSYSLLLSGDKNYLISNLSNTIEKINT 1450
RYIFLTCELDDKISLIIEINLVAKSYSLLLSGDKNYLISNLSNTIEKINT 1450
RYIFLTCELDDKISLIIEINLVAKSYSLLLSGDKNYLISNLSNTIEKINT 1450
**************************************** ******

LGLDSKNIAYNYTDESNNKYFGAISKTSQKSIIHYKKDSKNILEFYNDST 1500
LGLDSKNIAYNYTDESNNKYFGAISKTSQKSIIHYKKDSKNILEFYNDST 1500
LGLDSKNIAYNYTDESNNKYFGAISKTSQKSIIHYKKDSKNILEFYNDST 1500
LGLDSKNIAYNYTDESNNKYFGAISKTSQKSIIHYKKDSKNILEFYNGST 1500
LGLDSKNIAYNYTDESNNKYFGAISKTSQKSIIHYKKDSKNILEFYNGST 1500
*********************************************.**

LEFNSKDFIAEDINVFMKDDINTITGKYYVDNNTDKSIDFSISLVSKNQV 1550
LEFNSKDFIAEDINVFMKDDINTITGKYYVDNNTDKSIDFSISLVSKNQV 1550
LEFNSKDFIAEDINVFMKDDINTITGKYYVDNNTDKSIDFSISLVSKNQV 1550
LEFNSKDFIAEDINVFMKDDINTITGKYYVDNNTDKSIDFSISLVSKNQV 1550
LEFNSKDFIAEDINVFMKDDINTITGKYYVDNNTDKSIDFSISLVSKNQV 1550
**************************************************

KVNGLYLNESVYSSYLDFVKNSDGHHNTSNFMNLFLDNISFWKLFGFENI 1600
KVNGLYLNESVYSSYLDFVKNSDGHHNTSNFMNLFLDNISFWKLFGFENI 1600
KVNGLYLNESVYSSYLDFVKNSDGHHNTSNFMNLFLDNISFWKLFGFENI 1600
KVNGLYLNESVYSSYLDFVKNSDGHHNTSNFMNLFLNNISFWKLFGFENI 1600
KVNGLYLNESVYSSYLDFVKNSDGHHNTSNFMNLFLNNISFWKLFGFENI 1600
************************************:*************

NFVIDKYFTLVGKTNLGYVEFICDNNKNIDIYFGEWKTSSSKSTIFSGNG 1650
NFVIDKYFTLVGKTNLGYVEFICDNNKNIDIYFGEWKTSSSKSTIFSGNG 1650
NFVIDKYFTLVGKTNLGYVEFICDNNKNIDIYFGEWKTSSSKSTIFSGNG 1650
NFVIDKYFTLVGKTNLGYVEFICDNNKNIDIYFGEWKTSSSKSTIFSGNG 1650
NFVIDKYFTLVGKTNLGYVEFICDNNKNIDIYFGEWKTSSSKSTIFSGNG 1650
**************************************************

RNVVVEPIYNPDTGEDISTSLDFSYEPLYGIDRYINKVLIAPDLYTSLIN 1700
RNVVVEPIYNPDTGEDISTSLDFSYEPLYGIDRYINKVLIAPDLYTSLIN 1700
RNVVVEPIYNPDTGEDISTSLDFSYEPLYGIDRYINKVLIAPDLYTSLIN 1700
RNVVVEPIYNPDTGEDISTSLDFSYEPLYGIDRYINKVLIAPDLYTSLIN 1700
RNVVVEPIYNPDTGEDISTSLDFSYEPLYGIDRYINKVLIAPDLYTSLIN 1700
**************************************************

INTNYYSNEYYPEIIVLNPNTFHKKVNINLDSSSFEYKWSTEGSDFILVR 1750
INTNYYSNEYYPEIIVLNPNTFHKKVNINLDSSSFEYKWSTEGSDFILVR 1750
INTNYYSNEYYPEIIVLNPNTFHKKVNINLDSSSFEYKWSTEGSDFILVR 1750
INTNYYSNEYYPEIIVLNPNTFHKKVNINLDSSSFEYKWSTEGSDFILVR 1750
INTNYYSNEYYPEIIVLNPNTFHKKVNINLDSSSFEYKWSTEGSDFILVR 1750
**************************************************
```

FIG. 1F

```
YLEESNKKILQKIRIKGILSNTQSFNKMSIDFKDIKKLSLGYIMSNFKSF 1800
YLEESNKKILQKIRIKGILSNTQSFNKMSIDFKDIKKLSLGYIMSNFKSF 1800
YLEESNKKILQKIRIKGILSNTQSFNKMSIDFKDIKKLSLGYIMSNFKSF 1800
YLEESNKKILQKIRIKGILSNTQSFNKMSIDFKDIKKLSLGYIMSNFKSF 1800
YLEESNKKILQKIRIKGILSNTQSFNKMSIDFKDIKKLSLGYIMSNFKSF 1800
**************************************************

NSENELDRDHLGFKIIDNKTYYYDEDSKLVKGLININNSLFYFDPIEFNL 1850
NSENELDRDHLGFKIIDNKTYYYDEDSKLVKGLININNSLFYFDPIEFNL 1850
NSENELDRDHLGFKIIDNKTYYYDEDSKLVKGLININNSLFYFDPIEFNL 1850
NSENELDRDHLGFKIIDNKTYYYDEDSKLVKGLININNSLFYFDPIESNL 1850
NSENELDRDHLGFKIIDNKTYYYDEDSKLVKGLININNSLFYFDPIESNL 1850
********************************************** **


VTGWQTINGKKYYFDINTGAALISYKIINGKHFYFNNDGVMQLGVFKGPD 1900
VTGWQTINGKKYYFDINTGAALISYKIINGKHFYFNNDGVMQLGVFKGPD 1900
VTGWQTINGKKYYFDINTGAALTSYKIINGKHFYFNNDGVMQLGVFKGPD 1900
VTGWQTINGKKYYFDINTGAASTSYKIINGKHFYFNNNGVMQLGVFKGPD 1900
VTGWQTINGKKYYFDINTGAASTSYKIINGKHFYFNNNGVMQLGVFKGPD 1900
********************  **************:************

GFEYFAPANTQNNNIEGQAIVYQSKFLTLNGKKYYFDNDSKAVTGWRIIN 1950
GFEYFAPANTQNNNIEGQAIVYQSKFLTLNGKKYYFDNDSKAVTGWRIIN 1950
GFEYFAPANTQNNNIEGQAIVYQSKFLTLNGKKYYFDNNSKAVTGWRIIN 1950
GFEYFAPANTQNNNIEGQAIVYQSKFLTLNGKKYYFDNDSKAVTGWRIIN 1950
GFEYFAPANTQNNNIEGQAIVYQSKFLTLNGKKYYFDNDSKAVTGWRIIN 1950
*************************************:************

NEKYYFNPNNAIAAVGLQVIDNNKYYFNPDTAIISKGWQTVNGSRYYFDT 2000
NEKYYFNPNNAIAAVGLQVIDNNKYYFNPDTAIISKGWQTVNGSRYYFDT 2000
NEKYYFNPNNAIAAVGLQVIDNNKYYFNPDTAIISKGWQTVNGSRYYFDT 2000
NEKYYFNPNNAIAAVGLQVIDNNKYYFNPDTAIISKGWQTVNGSRYYFDT 2000
NEKYYFNPNNAIAAVGLQVIDNNKYYFNPDTAIISKGWQTVNGSRYYFDT 2000
**************************************************

DTAIAFNGYKTIDGKHFYFDSDCVVKIGVFSTSNGFEYFAPANTYNNNIE 2050
DTAIAFNGYKTIDGKHFYFDSDCVVKIGVFSTSNGFEYFAPANTYNNNIE 2050
DTAIAFNGYKTIDGKHFYFDSDCVVKIGVFSTSNGFEYFAPANTYNNNIE 2050
DTAIAFNGYKTIDGKHFYFDSDCVVKIGVFSGSNGFEYFAPANTYNNNIE 2050
DTAIAFNGYKTIDGKHFYFDSDCVVKIGVFSGSNGFEYFAPANTYNNNIE 2050
******************************* ******************

GQAIVYQSKFLTLNGKKYYFDNNSKAVTGWQTIDSKKYYFNTNTAEAATG 2100
GQAIVYQSKFLTLNGKKYYFDNNSKAVTGWQTIDSKKYYFNTNTAEAATG 2100
GQAIVYQSKFLTLNGKKYYFDNNSKAVTGLQTIDSKKYYFNTNTAEAATG 2100
GQAIVYQSKFLTLNGKKYYFDNNSKAVTGWQTIDSKKYYFNTNTAEAATG 2100
GQAIVYQSKFLTLNGKKYYFDNNSKAVTGWQTIDSKKYYFNTNTAEAATG 2100
**************************** ******************
```

FIG. 1G

```
WQTIDGKKYYFNTNTAEAATGWQTIDGKKYYFNTNTAIASTGYTIINGKH 2150
WQTIDGKKYYFNTNTAEAATGWQTIDGKKYYFNTNTAIASTGYTIINGKH 2150
WQTIDGKKYYFNTNTAEAATGWQTIDGKKYYFNTNTAIASTGYTIINGKH 2150
WQTIDGKKYYFNTNTAEAATGWQTIDGKKYYFNTNTSIASTGYTIINGKY 2150
WQTIDGKKYYFNTNTAEAATGWQTIDGKKYYFNTNTSIASTGYTIINGKY 2150
************************************:************:

FYFNTDGIMQIGVFKGPNGFEYFAPANTDANNIEGQAILYQNEFLTLNGK 2200
FYFNTDGIMQIGVFKGPNGFEYFAPANTDANNIEGQAILYQNEFLTLNGK 2200
FYFNTDGIMQIGVFKGPNGFEYFAPANTDANNIEGQAILYQNEFLTLNGK 2200
FYFNTDGIMQIGVFKVPNGFEYFAPANTHNNNIEGQAILYQNKFLTLNGK 2200
FYFNTDGIMQIGVFKVPNGFEYFAPANTHNNNIEGQAILYQNKFLTLNGK 2200
*************** ************. ************:*******

KYYFGSDSKAVTGWRIINNKKYYFNPNNAIAAIHLCTINNDKYYFSYDGI 2250
KYYFGSDSKAVTGWRIINNKKYYFNPNNAIAAIHLCTINNDKYYFSYDGI 2250
KYYFGSDSKAVTGWRIINNKKYYFNPNNAIAAIHLCTINNDKYYFSYDGI 2250
KYYFGSDSKAITGWQTIDGKKYYFNPNNAIAATHLCTINNDKYYFSYDGI 2250
KYYFGSDSKAITGWQTIDGKKYYFNPNNAIAATHLCTINNDKYYFSYDGI 2250
**********:***: *:.************* ****************

LQNGYITIERNNFYFDANNESKMVTGVFKGPNGFEYFAPANTHNNNIEGQ 2300
LQNGYITIERNNFYFDANNESKMVTGVFKGPNGFEYFAPANTHNNNIEGQ 2300
LQNGYITIERNNFYFDANNESKMVTGVFKGPNGFEYFAPANTHNNNIEGQ 2300
LQNGYITIERNNFYFDANNESKMVTGVFKGPNGFEYFAPANTHNNNIEGQ 2300
LQNGYITIERNNFYFDANNESKMVTGVFKGPNGFEYFAPANTHNNNIEGQ 2300
**************************************************

AIVYQNKFLTLNGKKYYFDNDSKAVTGWQTIDGKKYYFNLNTAEAATGWQ 2350
AIVYQNKFLTLNGKKYYFDNDSKAVTGWQTIDGKKYYFNLNTAEAATGWQ 2350
AIVYQNKFLTLNGKKYYFDNDSKAVTGWQTIDGKKYYFNLNTAEAATGWQ 2350
AIVYQNKFLTLNGKKYYFDNDSKAVTGWQTIDSKKYYFNLNTAVAVTGWQ 2350
AIVYQNKFLTLNGKKYYFDNDSKAVTGWQTIDSKKYYFNLNTAVAVTGWQ 2350
**********************************.********** *.****

TIDGKKYYFNLNTAEAATGWQTIDGKKYYFNTNTFIASTGYTSINGKHFY 2400
TIDGKKYYFNLNTAEAATGWQTIDGKKYYFNTNTFIASTGYTSINGKHFY 2400
TIDGKKYYFNLNTAEAATGWQTIDGKKYYFNTNTFIASTGYTSINGKHFY 2400
TIDGEKYYFNLNTAEAATGWQTIDGKRYYFNTNTYIASTGYTIINGKHFY 2400
TIDGEKYYFNLNTAEAATGWQTIDGKRYYFNTNTYIASTGYTIINGKHFY 2400
****:**********************:*******:******* *******

FNTDGIMQIGVFKGPNGFEYFAPANTHNNNIEGQAILYQNKFLTLNGKKY 2450
FNTDGIMQIGVFKGPNGFEYFAPANTHNNNIEGQAILYQNKFLTLNGKKY 2450
FNTDGIMQIGVFKGPNGFEYFAPANTDANNIEGQAILYQNKFLTLNGKKY 2450
FNTDGIMQIGVFKGPDGFEYFAPANTHNNNIEGQAILYQNKFLTLNGKKY 2450
FNTDGIMQIGVFKGPDGFEYFAPANTHNNNIEGQAILYQNKFLTLNGKKY 2450
***************:**********. **********************
```

FIG. 1H

```
YFGSDSKAVTGLRTIDGKKYYFNTNTAVAVTGWQTINGKKYYFNTNTSIA 2500
YFGSDSKAVTGLRTIDGKKYYFNTNTAVAVTGWQTINGKKYYFNTNTSIA 2500
YFGSDSKAVTGLRTIDGKKYYFNTNTAVAVTGWQTINGKKYYFNTNTSIA 2500
YFGSDSKAVTGLRTIDGKKYYFNTNTAVAVTGWQTINGKKYYFNTNTYIA 2500
YFGSDSKAVTGLRTIDGKKYYFNTNTAVAVTGWQTINGKKYYFNTNTYIA 2500
********************************************** **

STGYTIISGKHFYFNTDGIMQIGVFKGPDGFEYFAPANTDANNIEGQAIR 2550
STGYTIISGKHFYFNTDGIMQIGVFKGPDGFEYFAPANTDANNIEGQAIR 2550
STGYTIISGKHFYFNTDGIMQIGVFKGPDGFEYFAPANTDANNIEGQAIR 2550
STGYTIISGKHFYFNTDGIMQIGVFKGPDGFEYFAPANTDANNIEGQAIR 2550
STGYTIISGKHFYFNTDGIMQIGVFKGPDGFEYFAPANTDANNIEGQAIR 2550
************************************************

YQNRFLYLHDNIYYFGNNSKAATGWVTIDGNRYYFEPNTAMGANGYKTID 2600
YQNRFLYLHDNIYYFGNNSKAATGWVTIDGNRYYFEPNTAMGANGYKTID 2600
YQNRFLYLHDNIYYFGNNSKAATGWVTIDGNRYYFEPNTAMGANGYKTID 2600
YQNRFLYLHDNIYYFGNDSKAATGWATIDGNRYYFEPNTAMGANGYKTID 2600
YQNRFLYLHDNIYYFGNDSKAATGWATIDGNRYYFEPNTAMGANGYKTID 2600
*****************:*******.************************

NKNFYFRNGLPQIGVFKGSNGFEYFAPANTDANNIEGQAIRYQNRFLHLL 2650
NKNFYFRNGLPQIGVFKGSNGFEYFAPANTDANNIEGQAIRYQNRFLHLL 2650
NKNFYFRNGLPQIGVFKGSNGFEYFAPANTDANNIEGQAIRYQNRFLHLL 2650
NKNFYFRNGLPQIGVFKGPNGFEYFAPANTDANNIDGQAIRYQNRFLHLL 2650
NKNFYFRNGLPQIGVFKGPNGFEYFAPANTDANNIDGQAIRYQNRFLHLL 2650
******************.***************:**************

GKIYYFGNNSKAVTGWQTINGKVYYFMPDTAMAAAGGLFEIDGVIYFFGV 2700
GKIYYFGNNSKAVTGWQTINGKVYYFMPDTAMAAAGGLFEIDGVIYFFGV 2700
GKIYYFGNNSKAVTGWQTINGKVYYFMPDTAMAAAGGLFEIDGVIYFFGV 2700
GKIYYFGNNSKAVTGWQTINSKVYYFMPDTAMAAAGGLFEIDGVIYFFGV 2700
GKIYYFGNNSKAVTGWQTINSKVYYFMPDTAMAAAGGLFEIDGVIYFFGV 2700
********************.****************************

DGVKAPGIYG 2710 (SEQ ID NO: 1, 630)
DGVKAPGIYG 2710 (SEQ ID NO: 4)
DGVKAPGIYG 2710 (SEQ ID NO: 19, VPI10463)
DGVKAPGIYG 2710 (SEQ ID NO: 15, R20291)
DGVKAPGIYG 2710 (SEQ ID NO: 17, CD196)
**********
```

Fig. 2A

```
MSLVNRKQLEKMANVRFRTQEDEYVAILDALEEYHNMSENTVVEKYLKLKDINSLTDIYI 60
MSLVNRKQLEKMANVRFRTQEDEYVAILDALEEYHNMSENTVVEKYLKLKDINSLTDIYI 60
MSLVNRKQLEKMANVRFRTQEDEYVAILDALEEYHNMSENTVVEKYLKLKDINSLTDIYI 60
MSLVNRKQLEKMANVRFRVQEDEYVAILDALEEYHNMSENTVVEKYLKLKDINSLTDIYI 60
MSLVNRKQLEKMANVRFRVQEDEYVAILDALEEYHNMSENTVVEKYLKLKDINSLTDIYI 60
******************.****************************************

DTYKKSGRNKALKKFKEYLVTEVLELKNNNLTPVEKNLHFVWIGGQINDTAINYINQWKD 120
DTYKKSGRNKALKKFKEYLVTEVLELKNNNLTPVEKNLHFVWIGGQINDTAINYINQWKD 120
DTYKKSGRNKALKKFKEYLVTEVLELKNNNLTPVEKNLHFVWIGGQINDTAINYINQWKD 120
DTYKKSGRNKALKKFKEYLVTEVLELKNNNLTPVEKNLHFVWIGGQINDTAINYINQWKD 120
DTYKKSGRNKALKKFKEYLVTEVLELKNNNLTPVEKNLHFVWIGGQINDTAINYINQWKD 120
************************************************************

VNSDYNVNVFYDSNAFLINTLKKTVVESAINDTLESFRENLNDPRFDYNKFFRKRMEIIY 180
VNSDYNVNVFYDSNAFLINTLKKTVVESAINDTLESFRENLNDPRFDYNKFFRKRMEIIY 180
VNSDYNVNVFYDSNAFLINTLKKTVVESAINDTLESFRENLNDPRFDYNKFFRKRMEIIY 180
VNSDYNVNVFYDSNAFLINTLKKTIVESATNDTLESFRENLNDPRFDYNKFYRKRMEIIY 180
VNSDYNVNVFYDSNAFLINTLKKTIVESATNDTLESFRENLNDPRFDYNKFYRKRMEIIY 180
*************************:**** **********************:********

DKQKNFINYYKAQREENPELIIDDIVKTYLSNEYSKEIDELNTYIEESLNKITQNSGNDV 240
DKQKNFINYYKAQREENPELIIDDIVKTYLSNEYSKEIDELNTYIEESLNKITQNSGNDV 240
DKQKNFINYYKAQREENPELIIDDIVKTYLSNEYSKEIDELNTYIEESLNKITQNSGNDV 240
DKQKNFINYYKTQREENPDLIIDDIVKIYLSNEYSKDIDELNSYIEESLNKVTENSGNDV 240
DKQKNFINYYKTQREENPDLIIDDIVKIYLSNEYSKDIDELNSYIEESLNKVTENSGNDV 240
***********:******:******** ********:*****:********:*:******

RNFEEFKNGESFNLYEQELVERWNLAAASDILRISALKEIGGMYLDVDMLPGIQPDLFES 300
RNFEEFKNGESFNLYEQELVERWNLAAASDILRISALKEIGGMYLDVDMLPGIQPDLFES 300
RNFEEFKNGESFNLYEQELVERWNLAAASDILRISALKEIGGMYLAVAMLPGIQPDLFES 300
RNFEEFKGGESFKLYEQELVERWNLAAASDILRISALKEVGGVYLDVDMLPGIQPDLFES 300
RNFEEFKGGESFKLYEQELVERWNLAAASDILRISALKEVGGVYLDVDMLPGIQPDLFES 300
*******.****:*****************************:**:** * ************

IEKPSSVTVDFWEMTKLEAIMKYKEYIPEYTSEHFDMLDEEVQSSFESVLASKSDKSEIF 360
IEKPSSVTVDFWEMTKLEAIMKYKEYIPEYTSEHFDMLDEEVQSSFESVLASKSDKSEIF 360
IEKPSSVTVDFWEMTKLEAIMKYKEYIPEYTSEHFDMLDEEVQSSFESVLASKSDKSEIF 360
IEKPSSVTVDFWEMVKLEAIMKYKEYIPGYTSEHFDMLDEEVQSSFESVLASKSDKSEIF 360
IEKPSSVTVDFWEMVKLEAIMKYKEYIPGYTSEHFDMLDEEVQSSFESVLASKSDKSEIF 360
**************.************* ******************************

SSLGDMEASPLEVKIAFNSKGIINQGLISVKDSYCSNLIVKQIENRYKILNNSLNPAISE 420
SSLGDMEASPLEVKIAFNSKGIINQGLISVKDSYCSNLIVKQIENRYKILNNSLNPAISE 420
SSLGDMEASPLEVKIAFNSKGIINQGLISVKDSYCSNLIVKQIENRYKILNNSLNPAISE 420
SSLGDMEASPLEVKIAFNSKGIINQGLISVKDSYCSNLIVKQIENRYKILNNSLNPAISE 420
SSLGDMEASPLEVKIAFNSKGIINQGLISVKDSYCSNLIVKQIENRYKILNNSLNPAISE 420
************************************************************

DNDFNTTTNTFIDSIMAEANADNGRFMMELGKYLRVGFFPDVKTTINLSGPEAYAAAYQD 480
DNDFNTTTNTFIDSIMAEANADNGRFMMELGKYLRVGFFPDVKTTINLSGPEAYAAAYQD 480
DNDFNTTTNTFIDSIMAEANADNGRFMMELGKYLRVGFFPDVKTTINLSGPEAYAAAYQD 480
```

FIG. 2B

```
DNDFNTTTNAFIDSIMAEANADNGRFMMELGKYLRVGFFPDVKTTINLSGPEAYAAAYQD 480
DNDFNTTTNAFIDSIMAEANADNGRFMMELGKYLRVGFFPDVKTTINLSGPEAYAAAYQD 480
*********:**************************************************

LLMFKEGSMNIHLIEADLRNFEISKTNISQSTEQEMASLWSFDDARAKAQFEEYKRNYFE 540
LLMFKEGSMNIHLIEADLRNFEISKTNISQSTEQEMASLWSFDDARAKAQFEEYKRNYFE 540
LLMFKEGSMNIHLIEADLRNFEISKTNISQSTEQEMASLWSFDDARAKAQFEEYKRNYFE 540
LLMFKEGSMNIHLIEADLRNFEISKTNISQSTEQEMASLWSFDDARAKAQFEEYKKNYFE 540
LLMFKEGSMNIHLIEADLRNFEISKTNISQSTEQEMASLWSFDDARAKAQFEEYKKNYFE 540
************************************************************:****

GSLGEDDNLDFSQNIVVDKEYLLEKISSLARSSERGYIHYIVQLQGDKISYEAACNLFAK 600
GSLGEDDNLDFSQNIVVDKEYLLEKISSLARSSERGYIHYIVQLQGDKISYEAACNLFAK 600
GSLGEDDNLDFSQNIVVDKEYLLEKISSLARSSERGYIHYIVQLQGDKISYEAACNLFAK 600
GSLGEDDNLDFSQNTVVDKEYLLEKISSLARSSERGYIHYIVQLQGDKISYEAACNLFAK 600
GSLGEDDNLDFSQNTVVDKEYLLEKISSLARSSERGYIHYIVQLQGDKISYEAACNLFAK 600
************** ********************************************

TPYDSVLFQKNIEDSEIAYYYNPGDGEIQEIDKYKIPSIISDRPKIKLTFIGHGKDEFNT 660
TPYDSVLFQKNIEDSEIAYYYNPGDGEIQEIDKYKIPSIISDRPKIKLTFIGHGKDEFNT 660
TPYDSVLFQKNIEDSEIAYYYNPGDGEIQEIDKYKIPSIISDRPKIKLTFIGHGKDEFNT 660
TPYDSVLFQKNIEDSEIAYYYNPGDGEIQEIDKYKIPSIISDRPKIKLTFIGHGKDEFNT 660
TPYDSVLFQKNIEDSEIAYYYNPGDGEIQEIDKYKIPSIISDRPKIKLTFIGHGKDEFNT 660
************************************************************

DIFAGFDVDSLSTEIEAAIDLAKEDISPKSIEINLLGCNMFSYSINVEETYPGKLLLKVK 720
DIFAGFDVDSLSTEIEAAIDLAKEDISPKSIEINLLGCNMFSYSINVEETYPGKLLLKVK 720
DIFAGFDVDSLSTEIEAAIDLAKEDISPKSIEINLLGANMFSYSINVEETYPGKLLLKVK 720
DIFAGLDVDSLSTEIETAIDLAKEDISPKSIEINLLGCNMFSYSVNVEETYPGKLLLRVK 720
DIFAGLDVDSLSTEIETAIDLAKEDISPKSIEINLLGCNMFSYSVNVEETYPGKLLLRVK 720
*****:**********:********************.******:************:**

DKISELMPSISQDSIIVSANQYEVRINSEGRRELLDHSGEWINKEESIIKDISSKEYISF 780
DKISELMPSISQDSIIVSANQYEVRINSEGRRELLDHSGEWINKEESIIKDISSKEYISF 780
DKISELMPSISQDSIIVSANQYEVRINSEGRRELLDHSGEWINKEESIIKDISSKEYISF 780
DKVSELMPSISQDSIIVSANQYEVRINSEGRRELLDHSGEWINKEESIIKDISSKEYISF 780
DKVSELMPSISQDSIIVSANQYEVRINSEGRRELLDHSGEWINKEESIIKDISSKEYISF 780
**:********************************************************

NPKENKITVKSKNLPELSTLLQEIRNNSNSSDIELEEKVMLTECEINVISNIDTQIVEER 840
NPKENKITVKSKNLPELSTLLQEIRNNSNSSDIELEEKVMLTECEINVISNIDTQIVEER 840
NPKENKITVKSKNLPELSTLLQEIRNNSNSSDIELEEKVMLTECEINVISNIDTQIVEER 840
NPKENKIIVKSKNLPELSTLLQEIRNNSNSSDIELEEKVMLAECEINVISNIDTQVVEGR 840
NPKENKIIVKSKNLPELSTLLQEIRNNSNSSDIELEEKVMLAECEINVISNIDTQVVEGR 840
******* ********************************:*************:** *

IEEAKNLTSDSINYIKDEFKLIESISDALCDLKQQNELEDSHFISFEDISETDEGFSIRF 900
IEEAKNLTSDSINYIKDEFKLIESISDALCDLKQQNELEDSHFISFEDISETDEGFSIRF 900
IEEAKNLTSDSINYIKDEFKLIESISDALCDLKQQNELEDSHFISFEDISETDEGFSIRF 900
IEEAKSLTSDSINYIKNEFKLIESISDALYDLKQQNELEESHFISFEDILETDEGFSIRF 900
IEEAKSLTSDSINYIKNEFKLIESISDALYDLKQQNELEESHFISFEDILETDEGFSIRF 900
*****.**********:************ *********:********* **********
```

FIG. 2C

```
INKETGESIFVETEKTIFSEYANHITEEISKIKGTIFDTVNGKLVKKVNLDTTHEVNTLN 960
INKETGESIFVETEKTIFSEYANHITEEISKIKGTIFDTVNGKLVKKVNLDTTHEVNTLN 960
INKETGESIFVETEKTIFSEYANHITEEISKIKGTIFDTVNGKLVKKVNLDTTHEVNTLN 960
IDKETGESIFVETEKAIFSEYANHITEEISKIKGTIFDTVNGKLVKKVNLDATHEVNTLN 960
IDKETGESIFVETEKAIFSEYANHITEEISKIKGTIFDTVNGKLVKKVNLDATHEVNTLN 960
*:**************:************************************:********

AAFFIQSLIEYNSSKESLSNLSVAMKVQVYAQLFSTGLNTITDAAKVVELVSTALDETID 1020
AAFFIQSLIEYNSSKESLSNLSVAMKVQVYAQLFSTGLNTITDAAKVVELVSTALDETID 1020
AAFFIQSLIEYNSSKESLSNLSVAMKVQVYAQLFSTGLNTITDAAKVVELVSTALDETID 1020
AAFFIQSLIEYNSSKESLSNLSVAMKVQVYAQLFSTGLNTITDAAKVVELVSTALDETID 1020
AAFFIQSLIEYNSSKESLSNLSVAMKVQVYAQLFSTGLNTITDAAKVVELVSTALDETID 1020
************************************************************

LLPTLSEGLPIIATIIDGVSLGAAIKELSETSDPLLRQEIEAKIGIMAVNLTTATTAIIT 1080
LLPTLSEGLPIIATIIDGVSLGAAIKELSETSDPLLRQEIEAKIGIMAVNLTTATTAIIT 1080
LLPTLSEGLPIIATIIDGVSLGAAIKELSETSDPLLRQEIEAKIGIMAVNLTTATTAIIT 1080
LLPTLSEGLPVIATIIDGVSLGAAIKELSETSDPLLRQEIEAKIGIMAVNLTAATTAIIT 1080
LLPTLSEGLPVIATIIDGVSLGAAIKELSETSDPLLRQEIEAKIGIMAVNLTAATTAIIT 1080
**********:*************************************:*******

SSLGIASGFSILLVPLAGISAGIPSLVNNELVLRDKATKVVDYFKHVSLVETEGVFTLLD 1140
SSLGIASGFSILLVPLAGISAGIPSLVNNELVLRDKATKVVDYFKHVSLVETEGVFTLLD 1140
SSLGIASGFSILLVPLAGISAGIPSLVNNELVLRDKATKVVDYFKHVSLVETEGVFTLLD 1140
SSLGIASGFSILLVPLAGISAGIPSLVNNELILRDKATKVVDYFSHISLAESEGAFTSLD 1140
SSLGIASGFSILLVPLAGISAGIPSLVNNELILRDKATKVVDYFSHISLAESEGAFTSLD 1140
*********************************:************.*:**.*:**.** **

DKIMMPQDDLVISEIDFNNNSIVLGKCEIWRMEGGSGHTVTDDIDHFFSAPSITYREPHL 1200
DKIMMPQDDLVISEIDFNNNSIVLGKCEIWRMEGGSGHTVTDDIDHFFSAPSITYREPHL 1200
DKIMMPQDDLVISEIDFNNNSIVLGKCEIWRMEGGSGHTVTDDIDHFFSAPSITYREPHL 1200
DKIMMPQDDLVISEIDFNNNSITLGKCEIWRMEGGSGHTVTDDIDHFFSAPSITYREPHL 1200
DKIMMPQDDLVISEIDFNNNSITLGKCEIWRMEGGSGHTVTDDIDHFFSAPSITYREPHL 1200
**********************.************************************

SIYDVLEVQKEELDLSKDLMVLPNAPNRVFAWETGWTPGLRSLENDGTKLLDRIRDNYEG 1260
SIYDVLEVQKEELDLSKDLMVLPNAPNRVFAWETGWTPGLRSLENDGTKLLDRIRDNYEG 1260
SIYDVLEVQKEELDLSKDLMVLPNAPNRVFAWETGWTPGLRSLENDGTKLLDRIRDNYEG 1260
SIYDVLEVQKEELDLSKDLMVLPNAPNRVFAWETGWTPGLRSLENDGTKLLDRIRDNYEG 1260
SIYDVLEVQKEELDLSKDLMVLPNAPNRVFAWETGWTPGLRSLENDGTKLLDRIRDNYEG 1260
************************************************************

EFYWRYFAFIADALITTLKPRYEDTNIRINLDSNTRSFIVPIITTEYIREKLSYSFYGSG 1320
EFYWRYFAFIADALITTLKPRYEDTNIRINLDSNTRSFIVPIITTEYIREKLSYSFYGSG 1320
EFYWRYFAFIADALITTLKPRYEDTNIRINLDSNTRSFIVPIITTEYIREKLSYSFYGSG 1320
EFYWRYFAFIADALITTLKPRYEDTNIRINLDSNTRSFIVPVITTEYIREKLSYSFYGSG 1320
EFYWRYFAFIADALITTLKPRYEDTNIRINLDSNTRSFIVPVITTEYIREKLSYSFYGSG 1320
****************************************:*******************

GTYALSLSQYNMGINIELSESDVWIIDVDNVVRDVTIESDKIKKGDLIEGILSTLSIEEN 1380
GTYALSLSQYNMGINIELSESDVWIIDVDNVVRDVTIESDKIKKGDLIEGILSTLSIEEN 1380
GTYALSLSQYNMGINIELSESDVWIIDVDNVVRDVTIESDKIKKGDLIEGILSTLSIEEN 1380
```

FIG. 2D

```
GTYALSLSQYNMNINIELNENDTWVIDVDNVVRDVTIESDKIKKGDLIENILSKLSIEDN 1380
GTYALSLSQYNMNINIELNENDTWVIDVDNVVRDVTIESDKIKKGDLIENILSKLSIEDN 1380
************.*****.*.*.*:************************.***.****:*

KIILNSHEINFSGEVNGSNGFVSLTFSILEGINAIIEVDLLSKSYKLLISGELKILMLNS 1440
KIILNSHEINFSGEVNGSNGFVSLTFSILEGINAIIEVDLLSKSYKLLISGELKILMLNS 1440
KIILNSHEINFSGEVNGSNGFVSLTFSILEGINAIIEVDLLSKSYKLLISGELKILMLNS 1440
KIILDNHEINFSGTLNGGNGFVSLTFSILEGINAVIEVDLLSKSYKVLISGELKTLMANS 1440
KIILDNHEINFSGTLNGGNGFVSLTFSILEGINAVIEVDLLSKSYKVLISGELKTLMANS 1440
****:.******* :**.****************:***********:******* ** **

NHIQQKIDYIGFNSELQKNIPYSFVDSEGKENGFINGSTKEGLFVSELPDVVLISKVYMD 1500
NHIQQKIDYIGFNSELQKNIPYSFVDSEGKENGFINGSTKEGLFVSELPDVVLISKVYMD 1500
NHIQQKIDYIGFNSELQKNIPYSFVDSEGKENGFINGSTKEGLFVSELPDVVLISKVYMD 1500
NSVQQKIDYIGLNSELQKNIPYSFMDDKGKENGFINCSTKEGLFVSELSDVVLISKVYMD 1500
NSVQQKIDYIGLNSELQKNIPYSFMDDKGKENGFINCSTKEGLFVSELSDVVLISKVYMD 1500
* :********:************:*.:******** ***********.***********

DSKPSFGYYSNNLKDVKVITKDNVNILTGYYLKDDIKISLSLTLQDEKTIKLNSVHLDES 1560
DSKPSFGYYSNNLKDVKVITKDNVNILTGYYLKDDIKISLSLTLQDEKTIKLNSVHLDES 1560
DSKPSFGYYSNNLKDVKVITKDNVNILTGYYLKDDIKISLSLTLQDEKTIKLNSVHLDES 1560
NSKPLFGYCSNDLKDVKVITKDDVIILTGYYLKDDIKISLSFTIQDENTIKLNGVYLDEN 1560
NSKPLFGYCSNDLKDVKVITKDDVIILTGYYLKDDIKISLSFTIQDENTIKLNGVYLDEN 1560
:*** *** **:**********:* ****************:*:***:*****.*:***.

GVAEILKFMNRKGNTNTSDSLMSFLESMNIKSIFVNFLQSNIKFILDANFIISGTTSIGQ 1620
GVAEILKFMNRKGNTNTSDSLMSFLESMNIKSIFVNFLQSNIKFILDANFIISGTTSIGQ 1620
GVAEILKFMNRKGNTNTSDSLMSFLESMNIKSIFVNFLQSNIKFILDANFIISGTTSIGQ 1620
GVAEILKFMNKKGSTNTSDSLMSFLESMNIKSIFINSLQSNTKLILDTNFIISGTTSIGQ 1620
GVAEILKFMNKKGSTNTSDSLMSFLESMNIKSIFINSLQSNTKLILDTNFIISGTTSIGQ 1620
**********:**.*******************:* **** *:***:************

FEFICDENDNIQPYFIKFNTLETNYTLYVGNRQNMIVEPNYDLDDSGDISSTVINFSQKY 1680
FEFICDENDNIQPYFIKFNTLETNYTLYVGNRQNMIVEPNYDLDDSGDISSTVINFSQKY 1680
FEFICDENDNIQPYFIKFNTLETNYTLYVGNRQNMIVEPNYDLDDSGDISSTVINFSQKY 1680
FEFICDKDNNIQPYFIKFNTLETKYTLYVGNRQNMIVEPNYDLDDSGDISSTVINFSQKY 1680
FEFICDKDNNIQPYFIKFNTLETKYTLYVGNRQNMIVEPNYDLDDSGDISSTVINFSQKY 1680
******:::***************:************************************

LYGIDSCVNKVVISPNIYTDEINITPVYETNNTYPEVIVLDANYINEKINVNINDLSIRY 1740
LYGIDSCVNKVVISPNIYTDEINITPVYETNNTYPEVIVLDANYINEKINVNINDLSIRY 1740
LYGIDSCVNKVVISPNIYTDEINITPVYETNNTYPEVIVLDANYINEKINVNINDLSIRY 1740
LYGIDSCVNKVIISPNIYTDEINITPIYEANNTYPEVIVLDTNYISEKINININDLSIRY 1740
LYGIDSCVNKVIISPNIYTDEINITPIYEANNTYPEVIVLDTNYISEKINININDLSIRY 1740
**********:**************:**:***********:***.****:*********

VWSNDGNDFILMSTSEENKVSQVKIRFVNVFKDKTLANKLSFNFSDKQDVPVSEIILSFT 1800
VWSNDGNDFILMSTSEENKVSQVKIRFVNVFKDKTLANKLSFNFSDKQDVPVSEIILSFT 1800
VWSNDGNDFILMSTSEENKVSQVKIRFVNVFKDKTLANKLSFNFSDKQDVPVSEIILSFT 1800
VWSNDGSDFILMSTDEENKVSQVKIRFTNVFKGNTISDKISFNFSDKQDVSINKVISTFT 1800
VWSNDGSDFILMSTDEENKVSQVKIRFTNVFKGNTISDKISFNFSDKQDVSINKVISTFT 1800
******.*******.************.****.:*:::*:**********.:.::* :**
```

FIG. 2E

```
PSYYEDGLIGYDLGLVSLYNEKFYINNFGMMVSGLIYINDSLYYFKPPVNNLITGFVTVG 1860
PSYYEDGLIGYDLGLVSLYNEKFYINNFGMMVSGLIYINDSLYYFKPPVNNLITGFVTVG 1860
PSYYEDGLIGYDLGLVSLYNEKFYINNFGMMVSGLIYINDSLYYFKPPVNNLITGFVTVG 1860
PSYYVEGLLNYDLGLISLYNEKFYINNFGMMVSGLVYINDSLYYFKPPIKNLITGFTTIG 1860
PSYYVEGLLNYDLGLISLYNEKFYINNFGMMVSGLVYINDSLYYFKPPIKNLITGFTTIG 1860
**** :**:.*****:*******************:************::******.*:*

DDKYYFNPINGGAASIGETIIDDKNYYFNQSGVLQTGVFSTEDGFKYFAPANTLDENLEG 1920
DDKYYFNPINGGAASIGETIIDDKNYYFNQSGVLQTGVFSTEDGFKYFAPANTLDENLEG 1920
DDKYYFNPINGGAASIGETIIDDKNYYFNQSGVLQTGVFSTEDGFKYFAPANTLDENLEG 1920
DDKYYFNPDNGGAASVGETIIDGKNYYFSQNGVLQTGVFSTEDGFKYFAPADTLDENLEG 1920
DDKYYFNPDNGGAASVGETIIDGKNYYFSQNGVLQTGVFSTEDGFKYFAPADTLDENLEG 1920
******** ******:******.*****.*.*********************:********

EAIDFTGKLIIDENIYYFDDNYRGAVEWKELDGEMHYFSPETGKAFKGLNQIGDYKYYFN 1980
EAIDFTGKLIIDENIYYFDDNYRGAVEWKELDGEMHYFSPETGKAFKGLNQIGDYKYYFN 1980
EAIDFTGKLIIDENIYYFDDNYRGAVEWKELDGEMHYFSPETGKAFKGLNQIGDYKYYFN 1980
EAIDFTGKLTIDENVYYFGDNYRAAIEWQTLDDEVYYFSTDTGRAFKGLNQIGDDKFYFN 1980
EAIDFTGKLTIDENVYYFGDNYRAAIEWQTLDDEVYYFSTDTGRAFKGLNQIGDDKFYFN 1980
********* ****:***.****.*:**: **.*::***.:**:********** *:***

SDGVMQKGFVSINDNKHYFDDSGVMKVGYTEIDGKHFYFAENGEMQIGVFNTEDGFKYFA 2040
SDGVMQKGFVSINDNKHYFDDSGVMKVGYTEIDGKHFYFAENGEMQIGVFNTEDGFKYFA 2040
SDGVMQKGFVSINDNKHYFDDSGVMKVGYTEIDGKHFYFAENGEMQIGVFNTEDGFKYFA 2040
SDGIMQKGFVNINDKTFYFDDSGVMKSGYTEIDGKYFYFAENGEMQIGVFNTADGFKYFA 2040
SDGIMQKGFVNINDKTFYFDDSGVMKSGYTEIDGKYFYFAENGEMQIGVFNTADGFKYFA 2040
***:******.***:..********* ********:*************** *******

HHNEDLGNEEGEEISYSGILNFNNKIYYFDDSFTAVVGWKDLEDGSKYYFDEDTAEAYIG 2100
HHNEDLGNEEGEEISYSGILNFNNKIYYFDDSFTAVVGWKDLEDGSKYYFDEDTAEAYIG 2100
HHNEDLGNEEGEEISYSGILNFNNKIYYFDDSFTAVVGWKDLEDGSKYYFDEDTAEAYIG 2100
HHDEDLGNEEGEALSYSGILNFNNKIYYFDDSFTAVVGWKDLEDGSKYYFDEDTAEAYIG 2100
HHDEDLGNEEGEALSYSGILNFNNKIYYFDDSFTAVVGWKDLEDGSKYYFDEDTAEAYIG 2100
**:********* :*********************************************

LSLINDGQYYFNDDGIMQVGFVTINDKVFYFSDSGIIESGVQNIDDNYFYIDDNGIVQIG 2160
LSLINDGQYYFNDDGIMQVGFVTINDKVFYFSDSGIIESGVQNIDDNYFYIDDNGIVQIG 2160
LSLINDGQYYFNDDGIMQVGFVTINDKVFYFSDSGIIESGVQNIDDNYFYIDDNGIVQIG 2160
ISIINDGKYYFNDSGIMQIGFVTINNEVFYFSDSGIVESGMQNIDDNYFYIDENGLVQIG 2160
ISIINDGKYYFNDSGIMQIGFVTINNEVFYFSDSGIVESGMQNIDDNYFYIDENGLVQIG 2160
:*:****:*****.****:******::*********:***:***********:**:****

VFDTSDGYKYFAPANTVNDNIYGQAVEYSGLVRVGEDVYYFGETYTIETGWIYDMENESD 2220
VFDTSDGYKYFAPANTVNDNIYGQAVEYSGLVRVGEDVYYFGETYTIETGWIYDMENESD 2220
VFDTSDGYKYFAPANTVNDNIYGQAVEYSGLVRVGEDVYYFGETYTIETGWIYDMENESD 2220
VFDTSDGYKYFAPANTVNDNIYGQAVEYSGLVRVGEDVYYFGETYTIETGWIYDMENESD 2220
VFDTSDGYKYFAPANTVNDNIYGQAVEYSGLVRVGEDVYYFGETYTIETGWIYDMENESD 2220
************************************************************
```

Fig 2F

```
KYYFNPETKKACKGINLIDDIKYYFDEKGIMRTGLISFENNNYYFNENGEMQFGYINIED 2280
KYYFNPETKKACKGINLIDDIKYYFDEKGIMRTGLISFENNNYYFNENGEMQFGYINIED 2280
KYYFNPETKKACKGINLIDDIKYYFDEKGIMRTGLISFENNNYYFNENGEMQFGYINIED 2280
KYYFDPETKKAYKGINVIDDIKYYFDENGIMRTGLITFEDNHYYFNEDGIMQYGYLNIED 2280
KYYFDPETKKAYKGINVIDDIKYYFDENGIMRTGLITFEDNHYYFNEDGIMQYGYLNIED 2280
****:****** ****:**********:********:**:*:*****:* **:**:****

KMFYFGEDGVMQIGVFNTPDGFKYFAHQNTLDENFEGESINYTGWLDLDEKRYYFTDEYI 2340
KMFYFGEDGVMQIGVFNTPDGFKYFAHQNTLDENFEGESINYTGWLDLDEKRYYFTDEYI 2340
KMFYFGEDGVMQIGVFNTPDGFKYFAHQNTLDENFEGESINYTGWLDLDEKRYYFTDEYI 2340
KTFYFSEDGIMQIGVFNTPDGFKYFAHQNTLDENFEGESINYTGWLDLDEKRYYFTDEYI 2340
KTFYFSEDGIMQIGVFNTPDGFKYFAHQNTLDENFEGESINYTGWLDLDEKRYYFTDEYI 2340
* ***.***:**************************************************

AATGSVIIDGEEYYFDPDTAQLVISE 2366 (SEQ ID NO: 2, 630)
AATGSVIIDGEEYYFDPDTAQLVISE 2366 (SEQ ID NO: 25, VPI10463)
AATGSVIIDGEEYYFDPDTAQLVISE 2366 (SEQ ID NO: 6)
AATGSVIIDGEEYYFDPDTAQLVISE 2366 (SEQ ID NO: 21, R20291)
AATGSVIIDGEEYYFDPDTAQLVISE 2366 (SEQ ID NO: 23, CD196)
*************************
```

FIG. 3

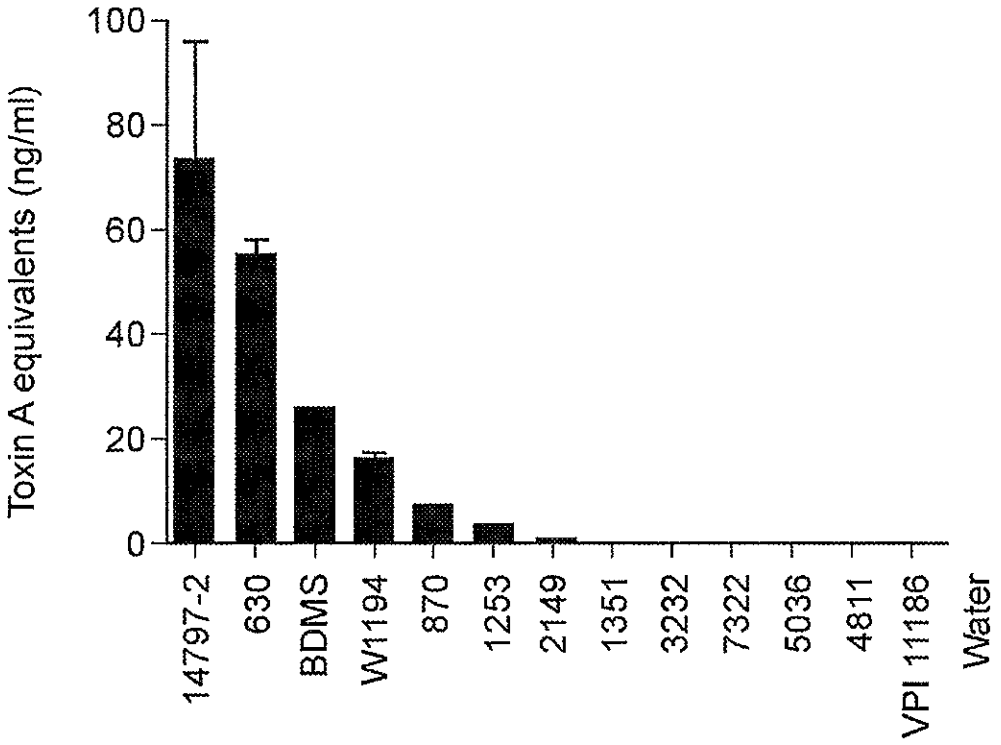

Toxin A equivalents (ng/ml)
100
80
60
40
20
0
14797-2
630
BDMS
W1194
870
1253
2149
1351
3232
7322
5036
4811
VPI 11186
Water

FIG. 4A

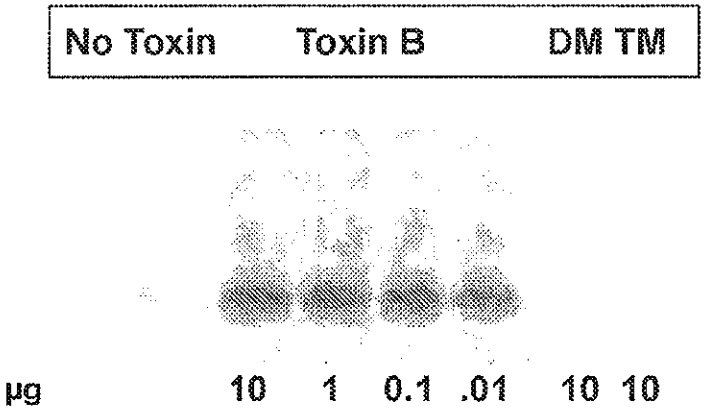

No Toxin
Toxin B
DM TM
µg
10
1
0.1
.01
10
10

FIG. 4B

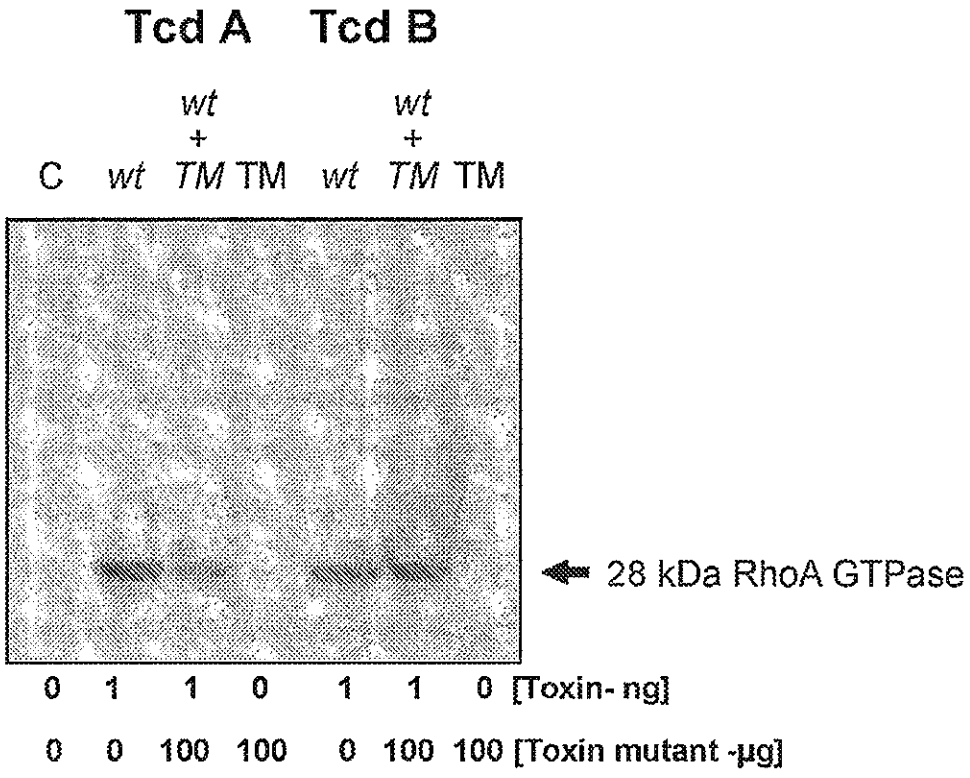

Tcd A
Tcd B
wt + TM
wt + TM
C
wt
TM
wt
TM
28 kDa RhoA GTPase
0 1 1 0 1 1 0 [Toxin- ng]
0 0 100 100 0 100 100 [Toxin mutant -µg]

FIG. 5

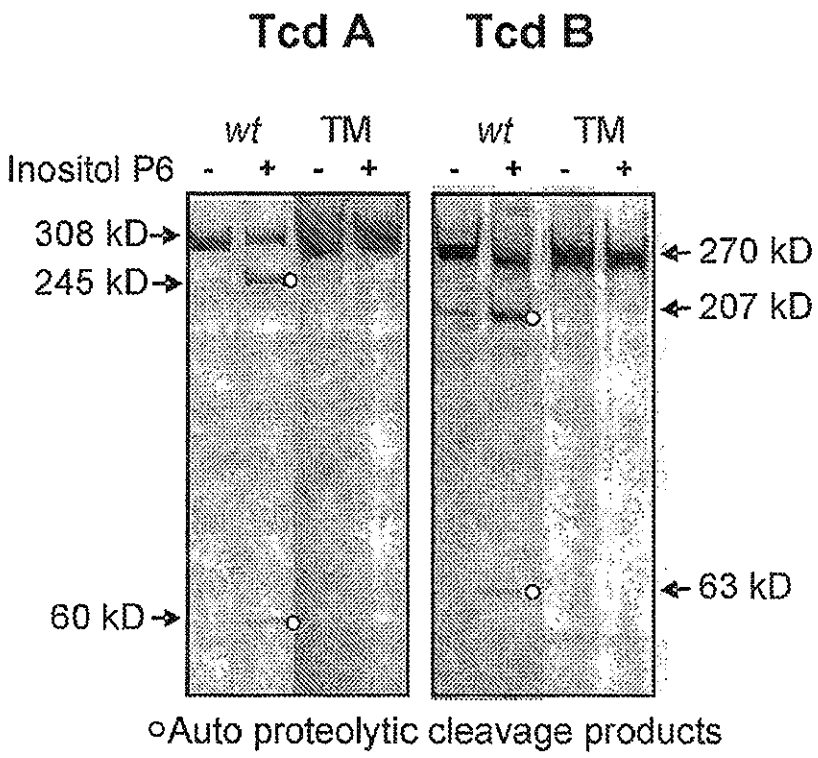

Tcd A
Tcd B
wt
TM
wt
TM
Inositol P6 - + - + - + - +
308 kD
245 kD
60 kD
270 kD
207 kD
63 kD
Auto proteolytic cleavage products

FIG. 6

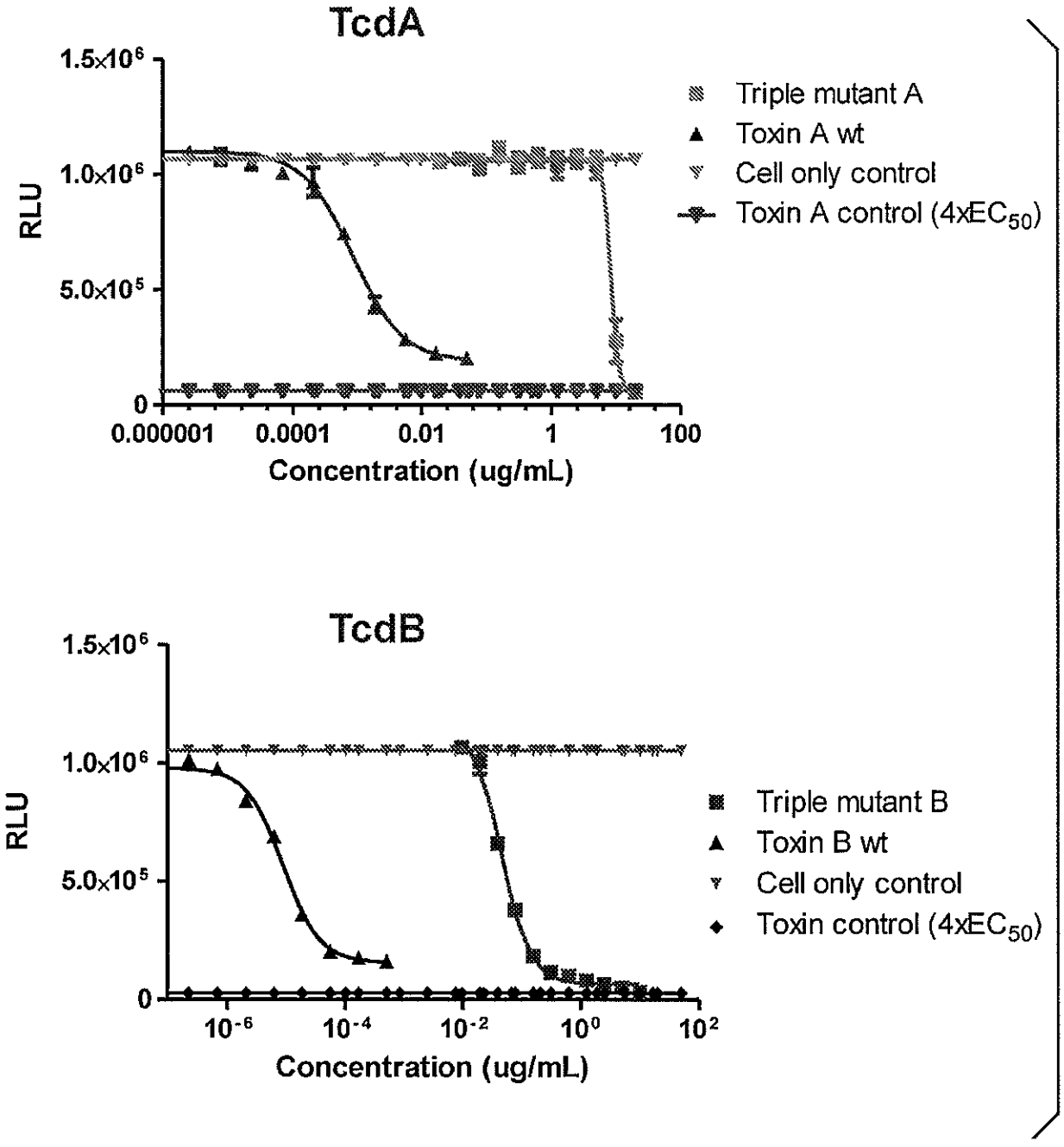
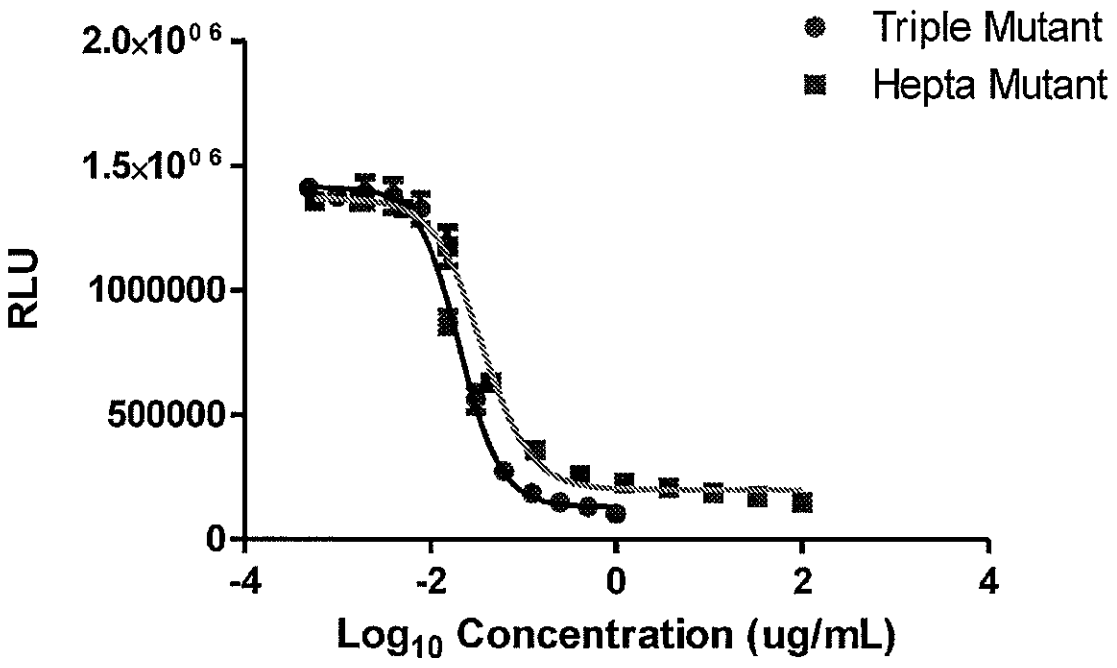

TcdA
1.5x10^6
1.0x10^6
5.0x10^5
0
RLU
0.000001
0.0001
0.01
1
100
Concentration (ug/mL)
Triple mutant A
Toxin A wt
Cell only control
Toxin A control (4xEC50)
TcdB
1.5x10^6
1.0x10^6
5.0x10^5
0
RLU
10^-6
10^-4
10^-2
10^0
10^2
Concentration (ug/mL)
Triple mutant B
Toxin B wt
Cell only control
Toxin control (4xEC50)

FIG. 7



	Triple Mutant	Hepta Mutant
EC_{50}	0.02078	0.03590

FIG. 8

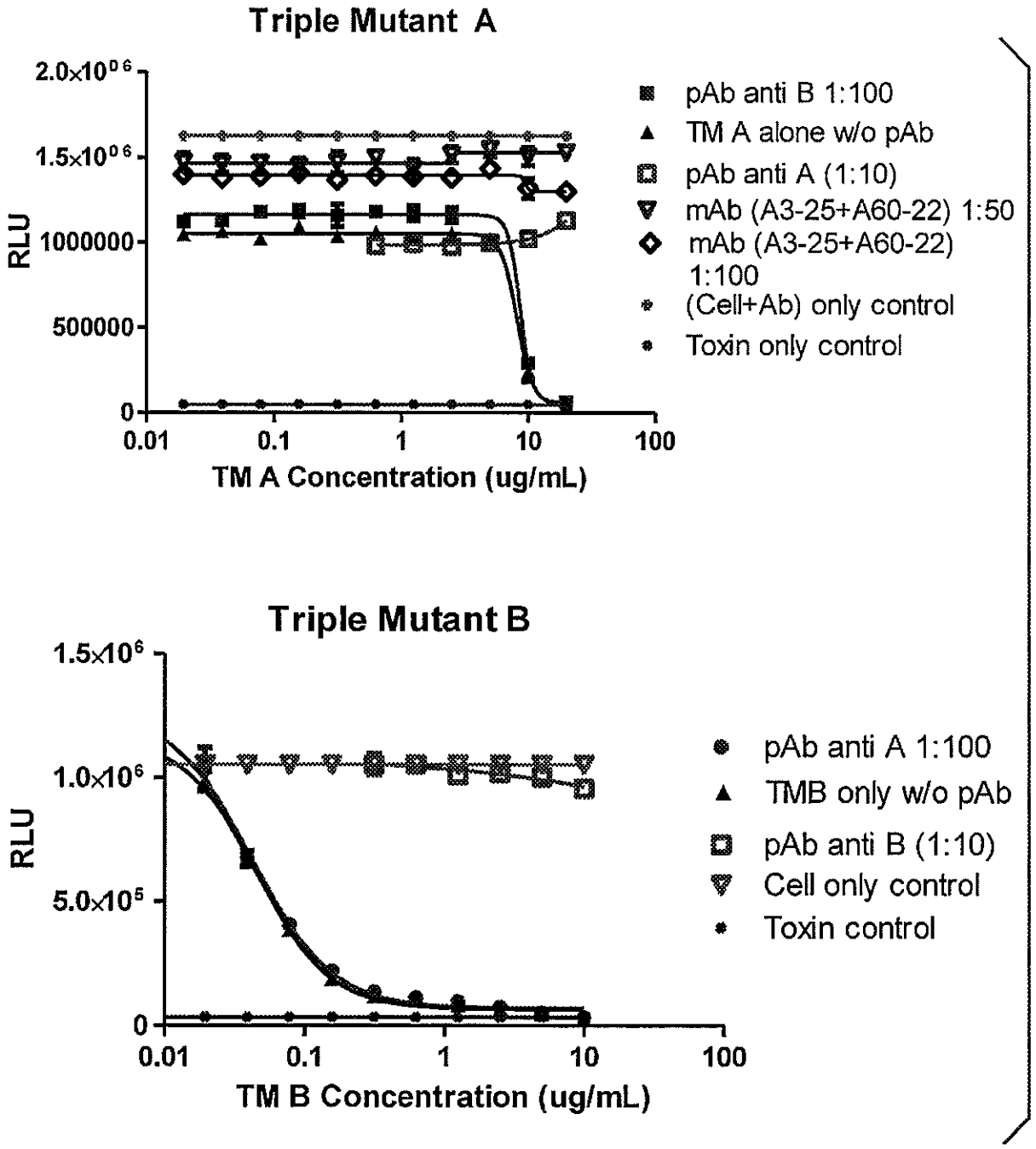

Triple Mutant A
2.0x10^06
1.5x10^06
1000000
500000
0
RLU
0.01
0.1
1
10
100
TM A Concentration (ug/mL)
pAb anti B 1:100
TM A alone w/o pAb
pAb anti A (1:10)
mAb (A3-25+A60-22) 1:50
mAb (A3-25+A60-22) 1:100
(Cell+Ab) only control
Toxin only control
Triple Mutant B
1.5x10^6
1.0x10^6
5.0x10^5
0
RLU
0.01
0.1
1
10
100
TM B Concentration (ug/mL)
pAb anti A 1:100
TMB only w/o pAb
pAb anti B (1:10)
Cell only control
Toxin control

FIG. 9

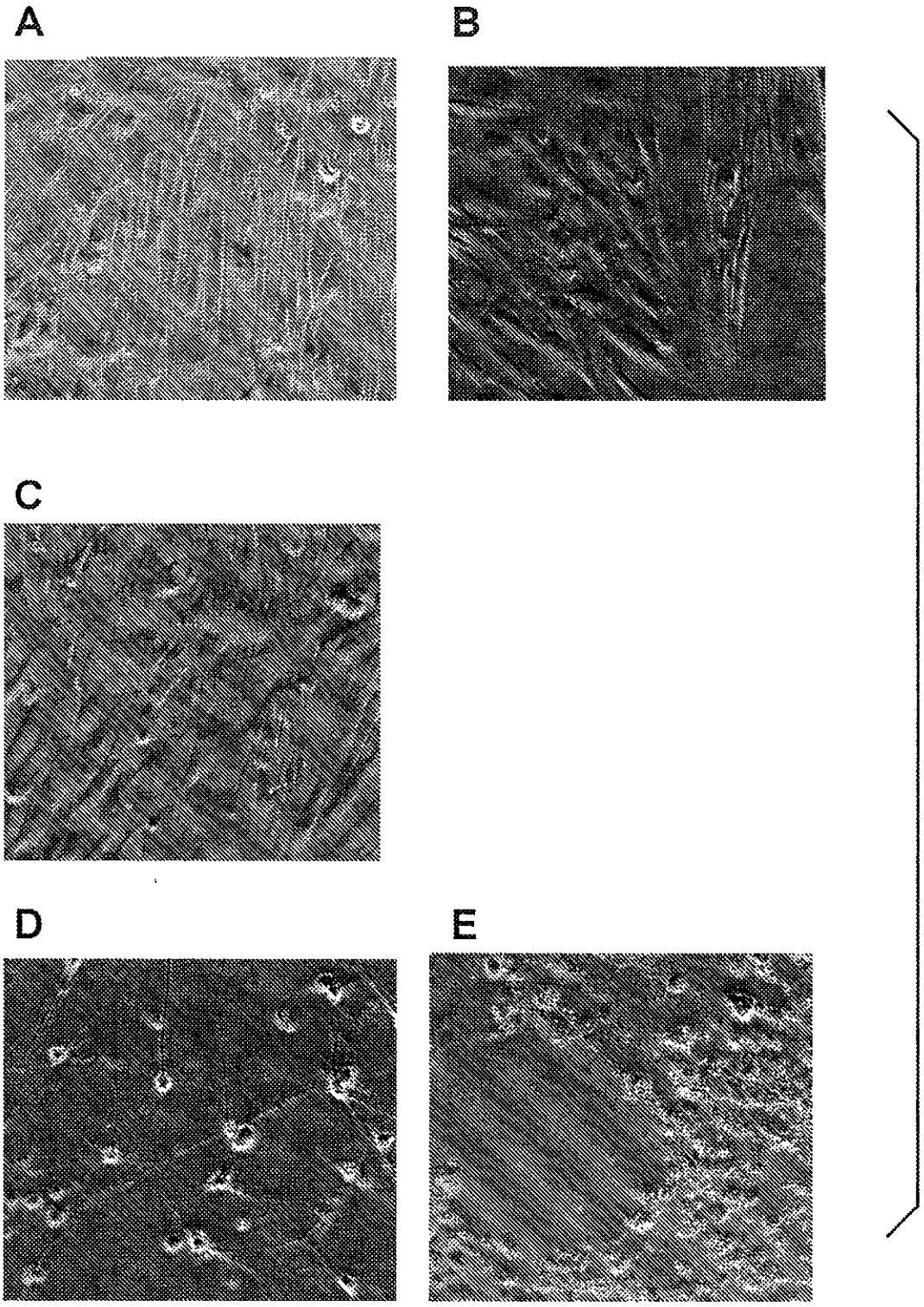


FIG. 10

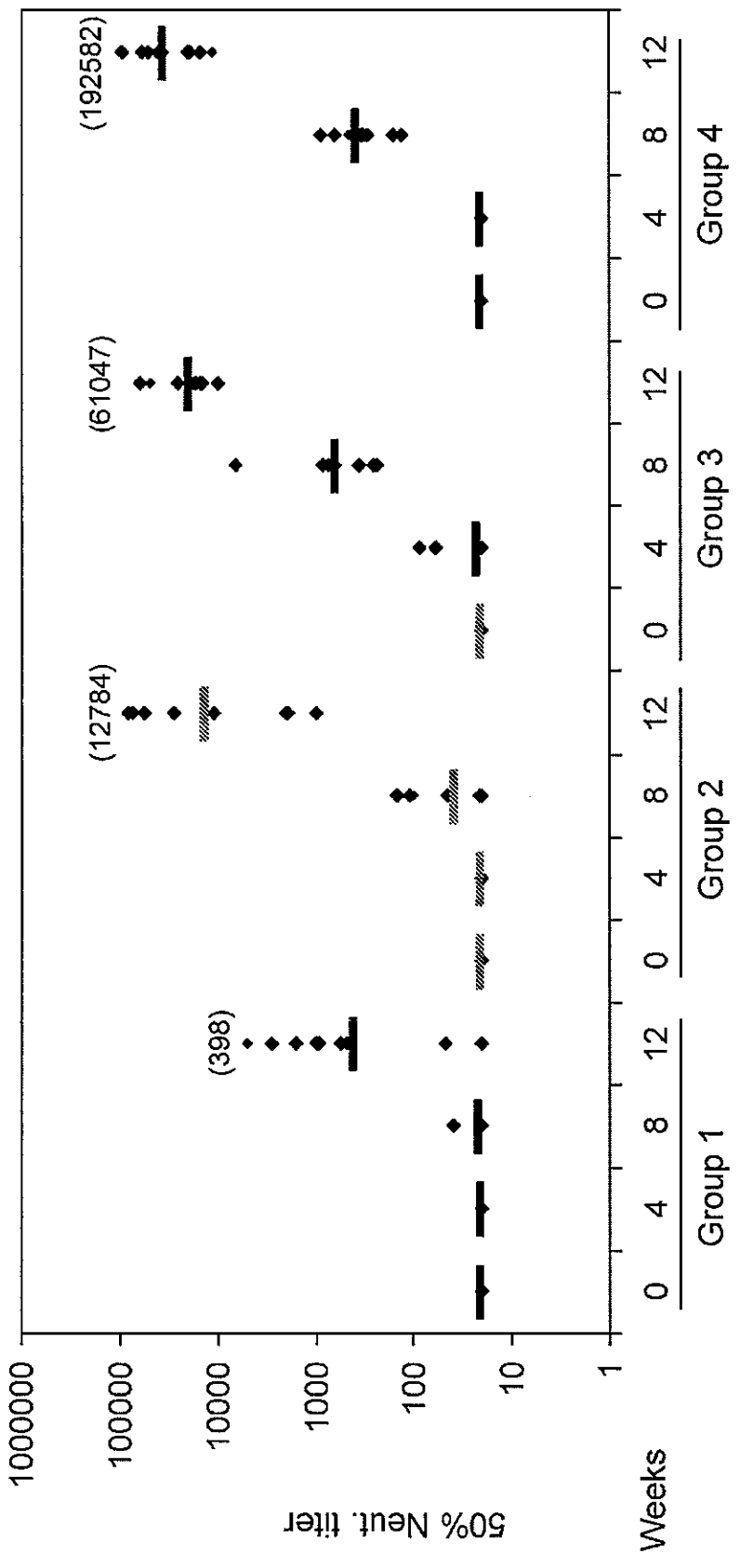

1000000
100000
10000
1000
100
10
1
50% Neut. titer
(192582)
(61047)
(12784)
(398)
0
4
8
12
0
4
8
12
0
4
8
12
0
4
8
12
Weeks
Group 1
Group 2
Group 3
Group 4

FIG. 11A

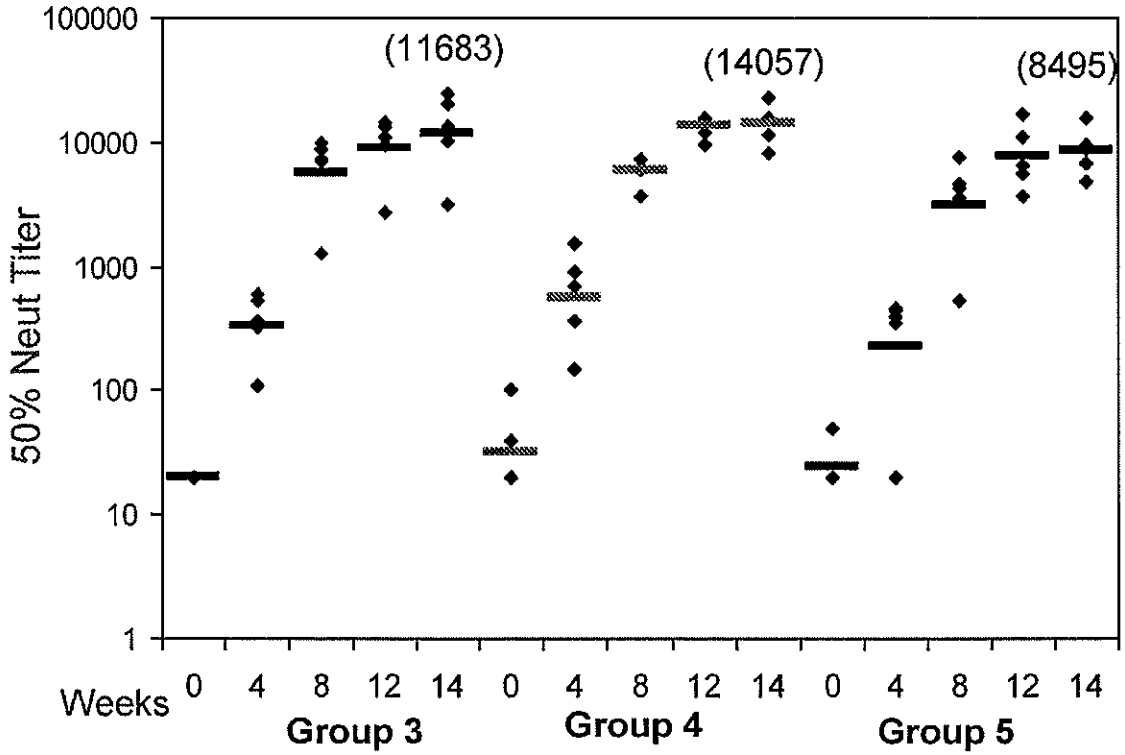


FIG. 11B

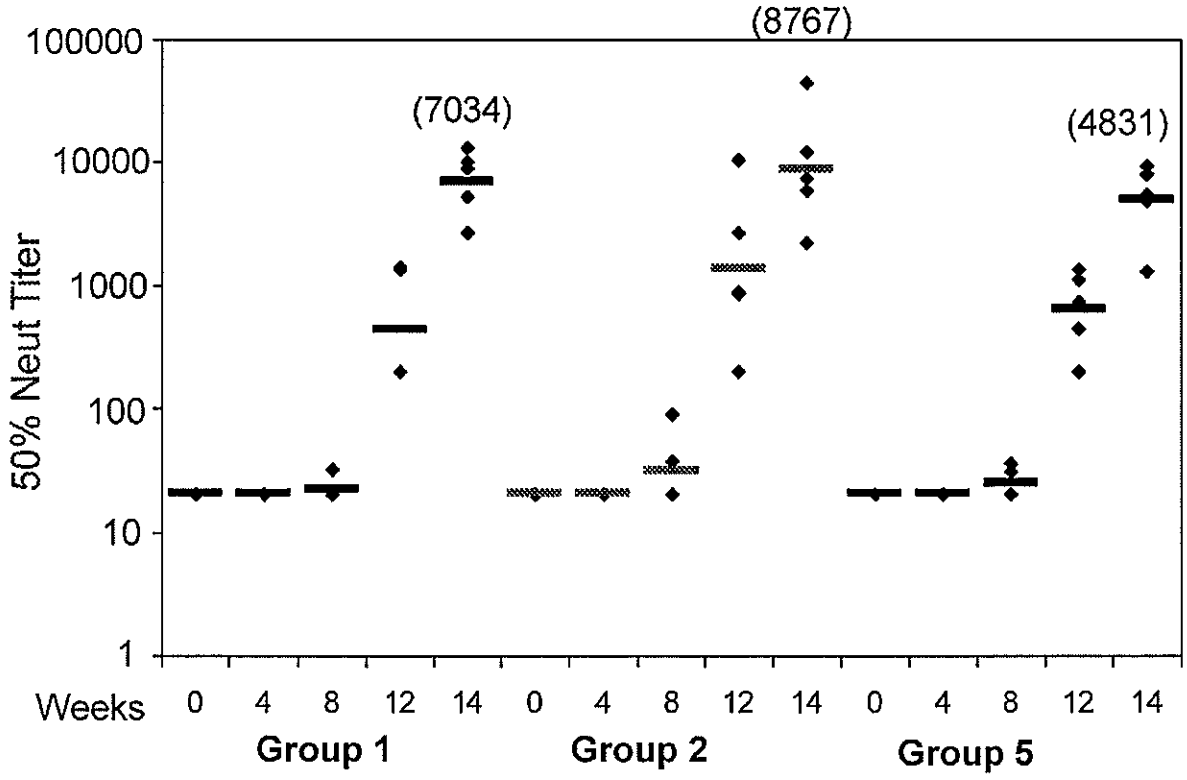


FIG. 12

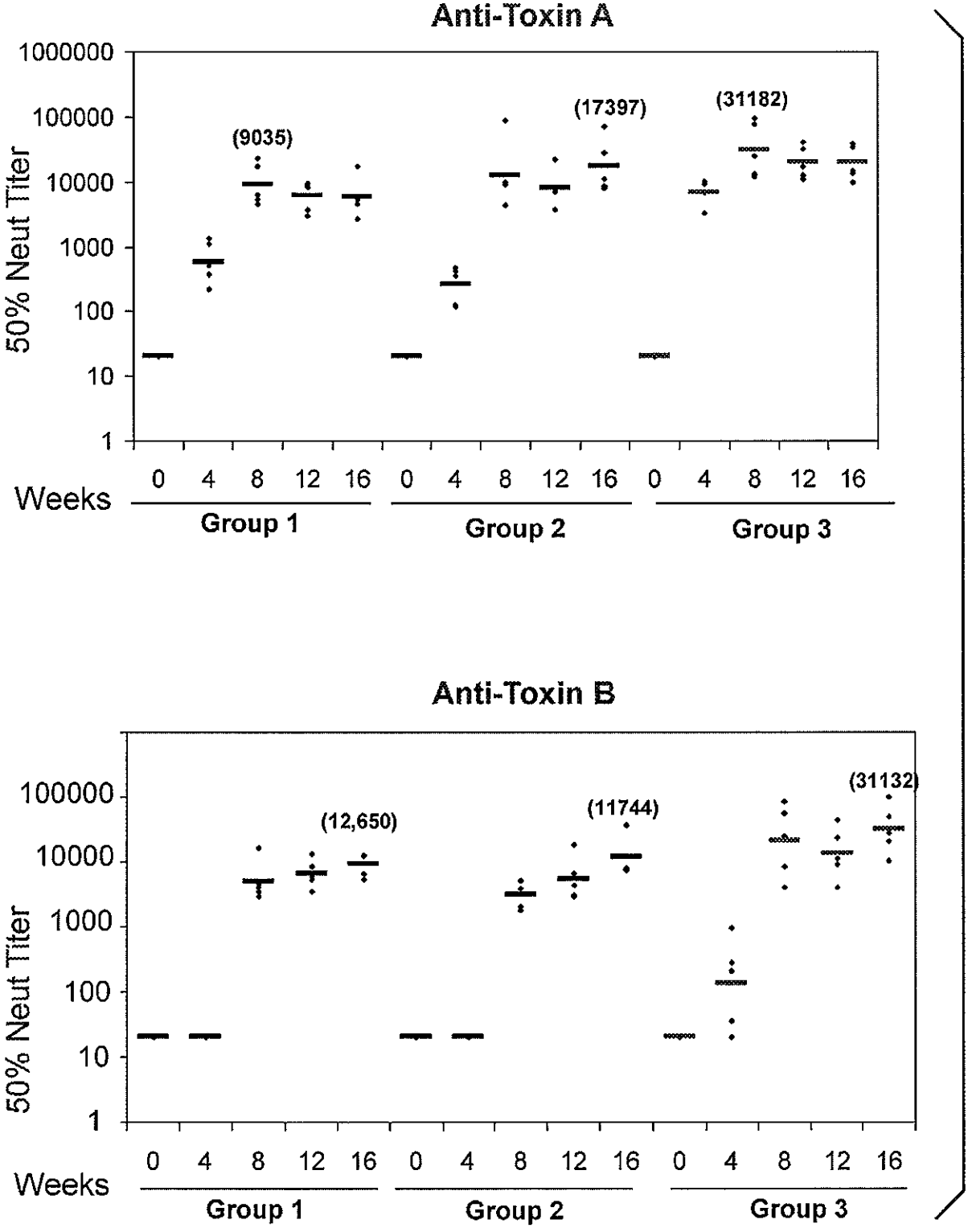

Anti-Toxin A
1000000
100000
10000
1000
100
10
1
50% Neut Titer
(9035)
(17397)
(31182)
0 4 8 12 16 0 4 8 12 16 0 4 8 12 16
Weeks
Group 1
Group 2
Group 3
Anti-Toxin B
100000
10000
1000
100
10
1
50% Neut Titer
(12,650)
(11744)
(31132)
0 4 8 12 16 0 4 8 12 16 0 4 8 12 16
Weeks
Group 1
Group 2
Group 3

FIG. 13A

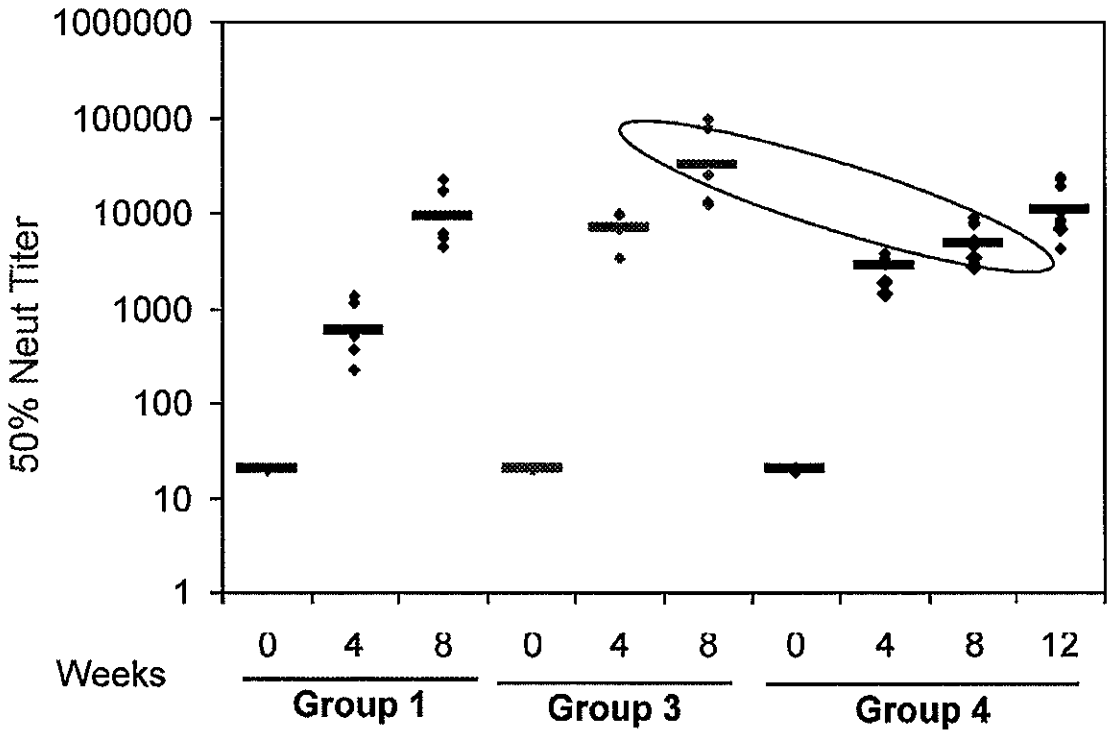


FIG. 13B

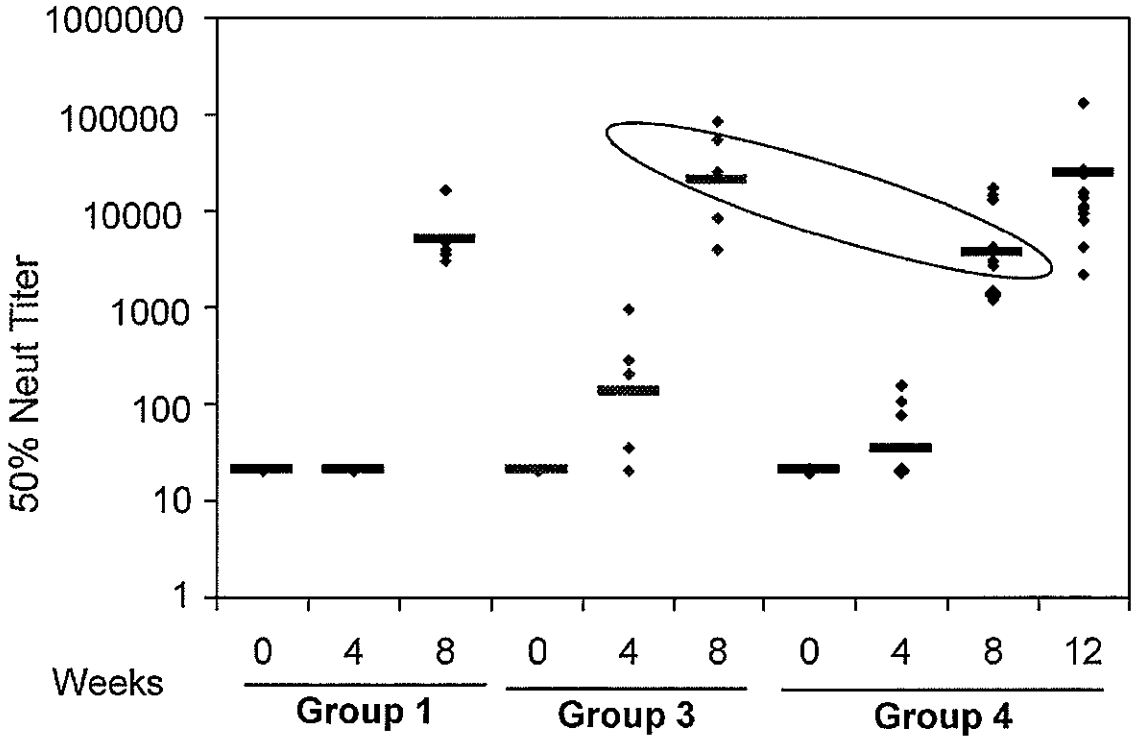


FIG. 14

Bleed/ Vax
W0
Bleed/ Vax
W4
Bleed/ Vax
W8
Bleed/ Vax
W12
Clindamycin
W16
Bleed/ challenge
W17
Terminal Bleed
W18
Group 1
Group 2
Group 3
←non-immunized
Percent survival
Days Post-Infection
0
20
40
60
80
100
0
2
4
6
8
10
12

FIG. 15

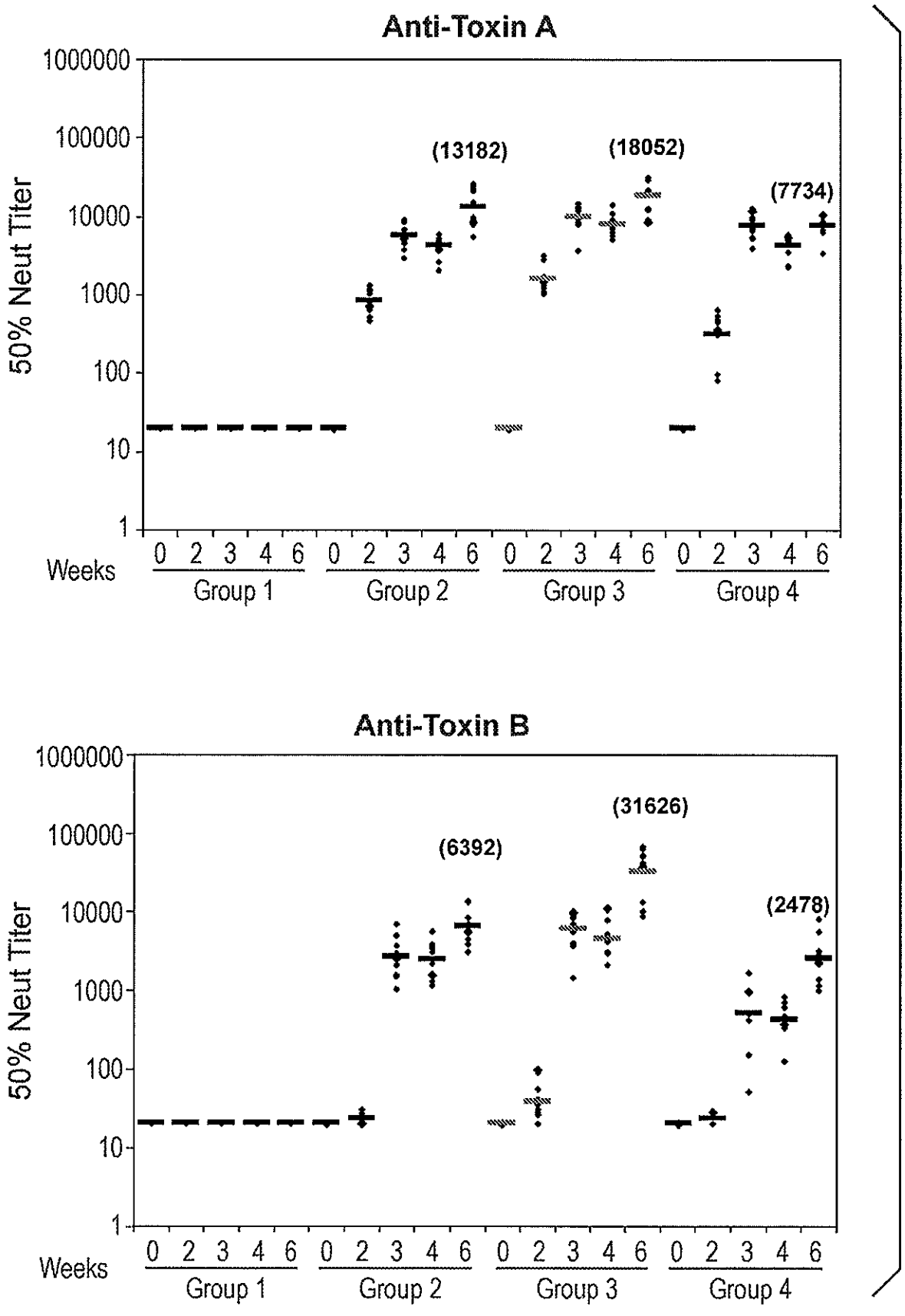

Anti-Toxin A
50% Neut Titer
1000000
100000
10000
1000
100
10
1
(13182)
(18052)
(7734)
Weeks
0 2 3 4 6 0 2 3 4 6 0 2 3 4 6 0 2 3 4 6
Group 1
Group 2
Group 3
Group 4
Anti-Toxin B
50% Neut Titer
1000000
100000
10000
1000
100
10
1
(6392)
(31626)
(2478)
Weeks
0 2 3 4 6 0 2 3 4 6 0 2 3 4 6 0 2 3 4 6
Group 1
Group 2
Group 3
Group 4

FIG. 16A

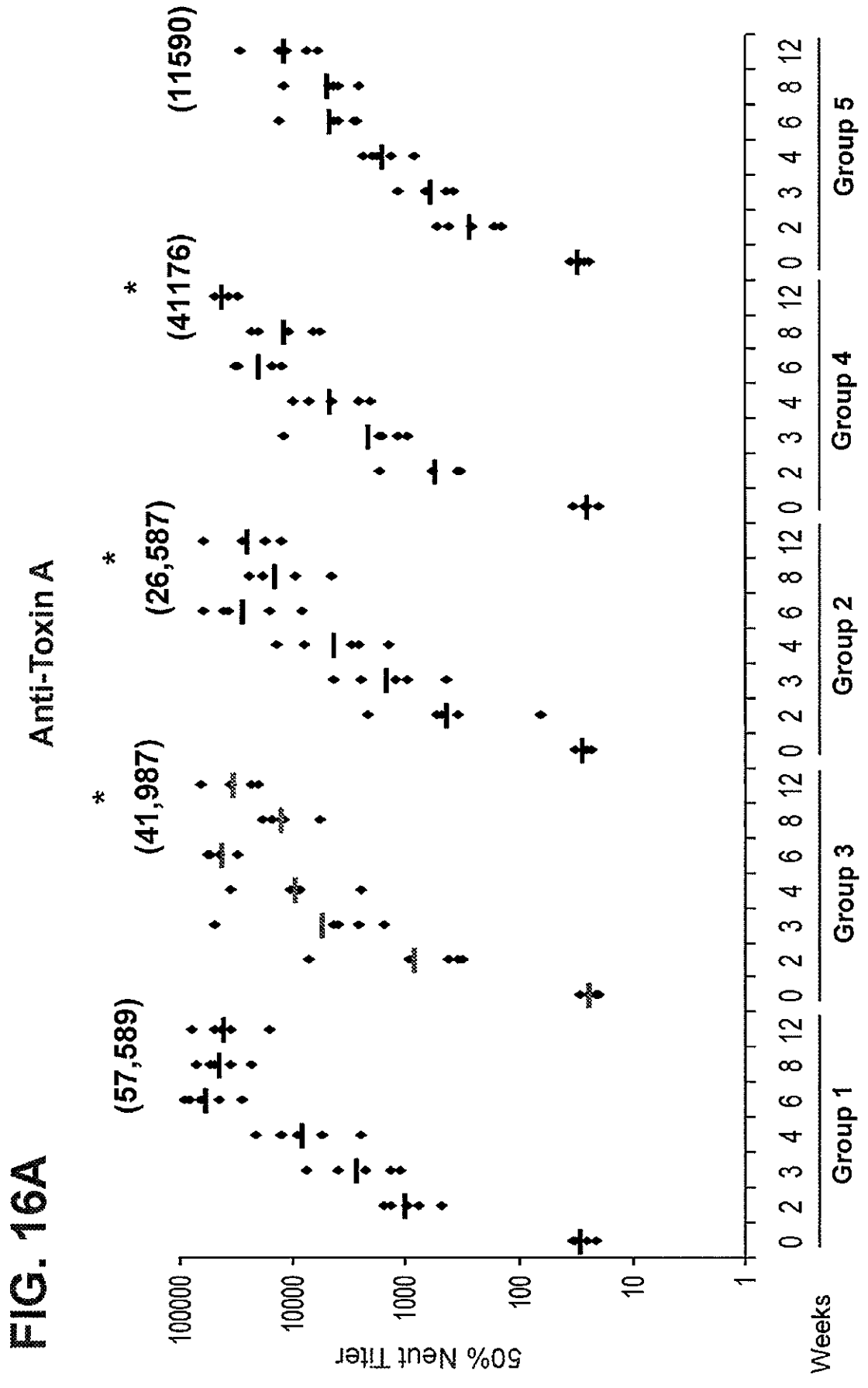

Anti-Toxin A
(57,589)
(41,987)
(26,587)
(41176)
(11590)
*
*
*
50% Neut Titer
100000
10000
1000
100
10
1
Weeks
0 2 3 4 6 8 12 0 2 3 4 6 8 12 0 2 3 4 6 8 12 0 2 3 4 6 8 12 0 2 3 4 6 8 12
Group 1
Group 3
Group 2
Group 4
Group 5

FIG. 16B

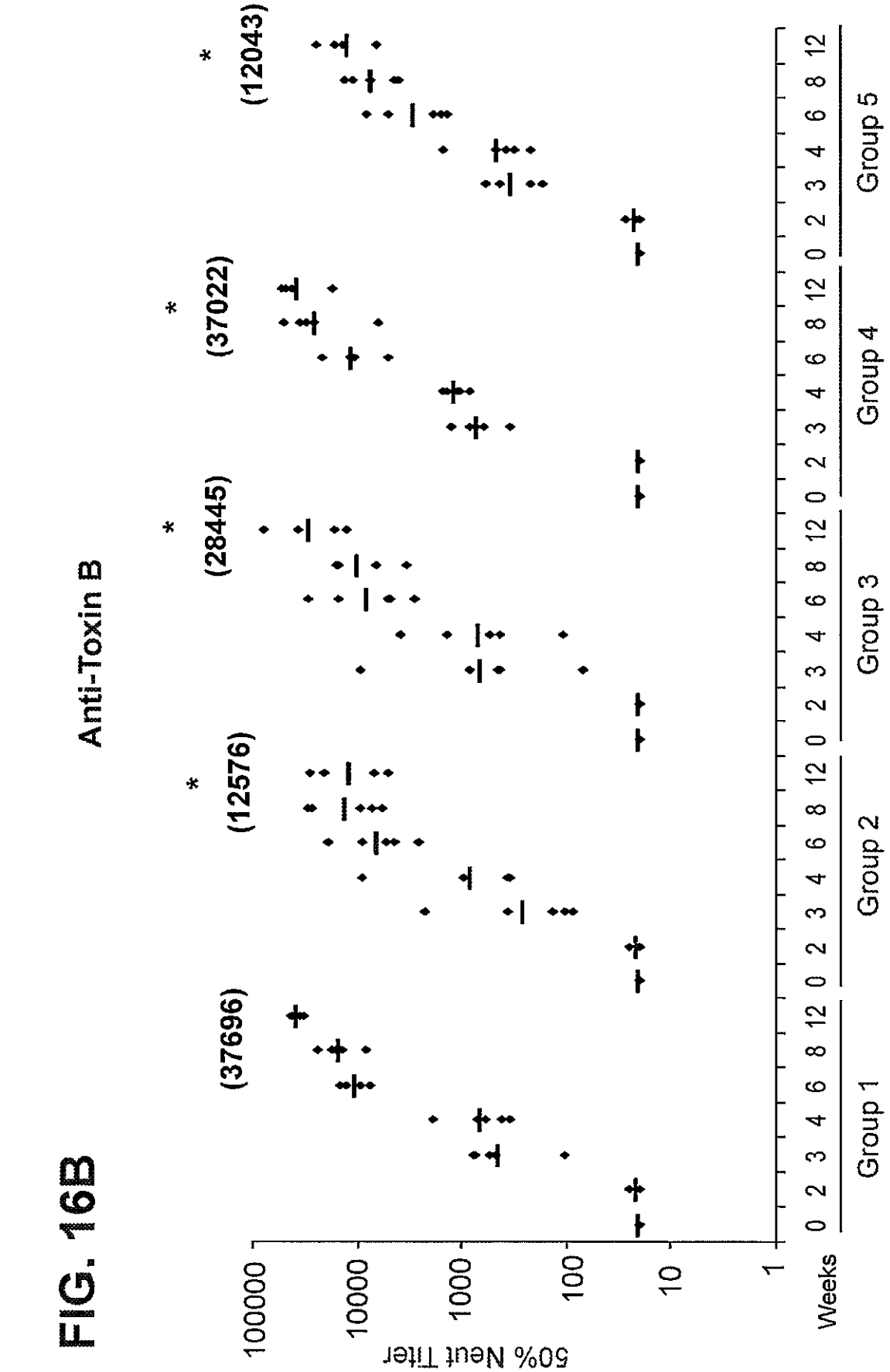

Anti-Toxin B
50% Neut Titer
100000
10000
1000
100
10
1
Weeks
0 2 3 4 6 8 12 0 2 3 4 6 8 12 0 2 3 4 6 8 12 0 2 3 4 6 8 12 0 2 3 4 6 8 12
Group 1
Group 2
Group 3
Group 4
Group 5
(37696)
(12576)
(28445)
(37022)
(12043)
*
*
*
*
*

FIG. 17

Variable Light Chain (muK)

MKLPVRLLVLMFWIPGSSSDVVMTHTPLSLPVSLGDQASMSC*RS*
*SQSLIHSNGNTYLH*WYLQKPGQSPKLLIS*KVSNRFS*GVPDRFSG
SGSGTDFTLKISRVEAEDLGVYFC*SQTTYFPYT*FGGGTREIK**RAD**
AAPTVSIFPPSS (SEQ ID NO: 36)

Variable Heavy Chain (mIgE)

MYLGLNCVFIVFLLKGVQSEVNLEESGGGLVQPGGSMKLSCVAS
*GFTFTNYWMN*WVRQSPEKGLEWIA*EIRLKSHNYATHFAESVKG*
RFTISRDDSKSAVSLQMTNLTPEDTGIFYCTW*DYYGNPAFVY*WG
QGTLVTVSA**ASIRNPQLYPLKPCKGTASMTLGCLVKDYFPGPVT**
VTWYSDSLNMSTVN (SEQ ID NO: 37)

FIG. 18

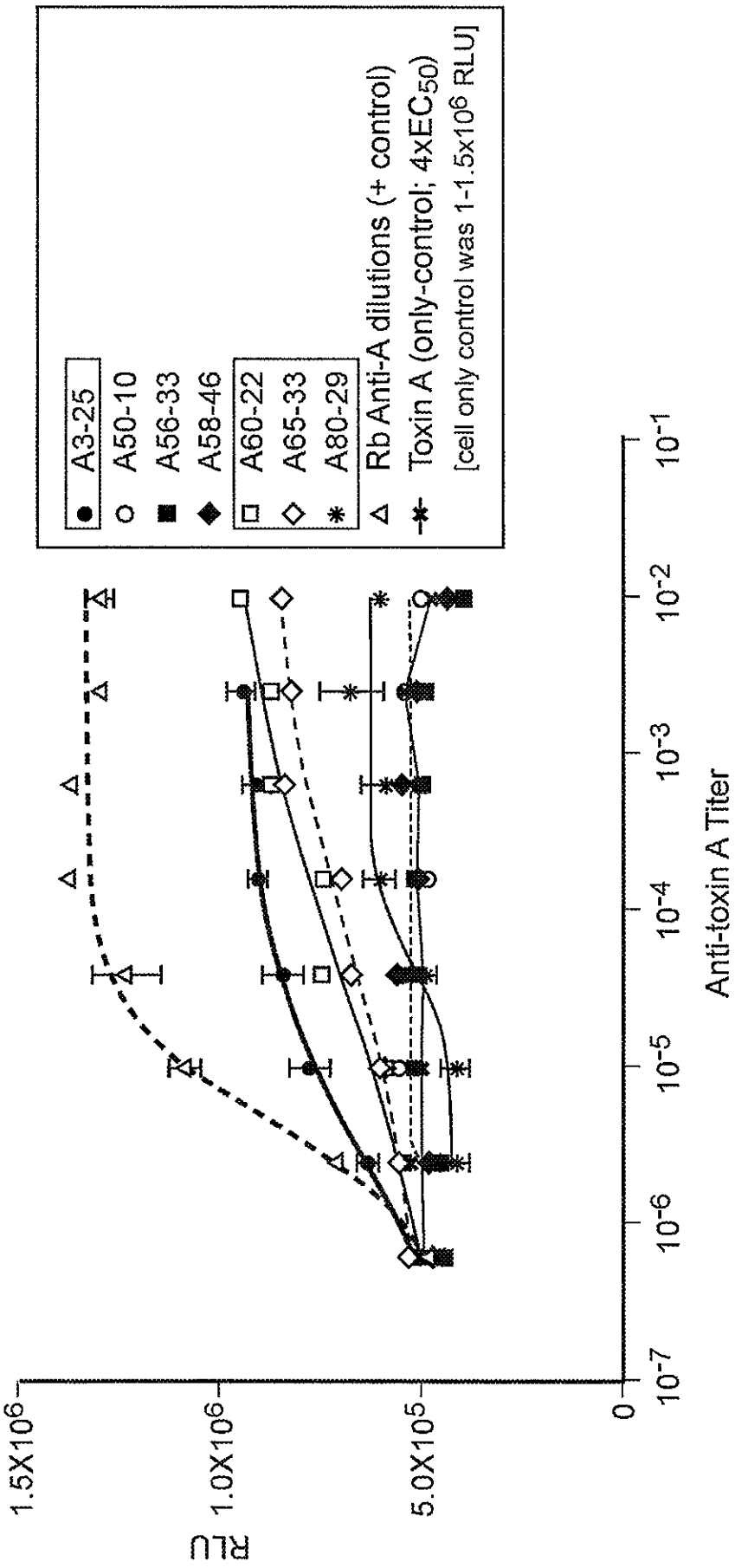

A3-25
A50-10
A56-33
A58-46
A60-22
A65-33
A80-29
Rb Anti-A dilutions (+ control)
Toxin A (only-control; 4xEC50)
[cell only control was 1-1.5x10^6 RLU]
RLU
1.5X10^6
1.0X10^6
5.0X10^5
0
10^-7
10^-6
10^-5
10^-4
10^-3
10^-2
10^-1
Anti-toxin A Titer

FIG. 19

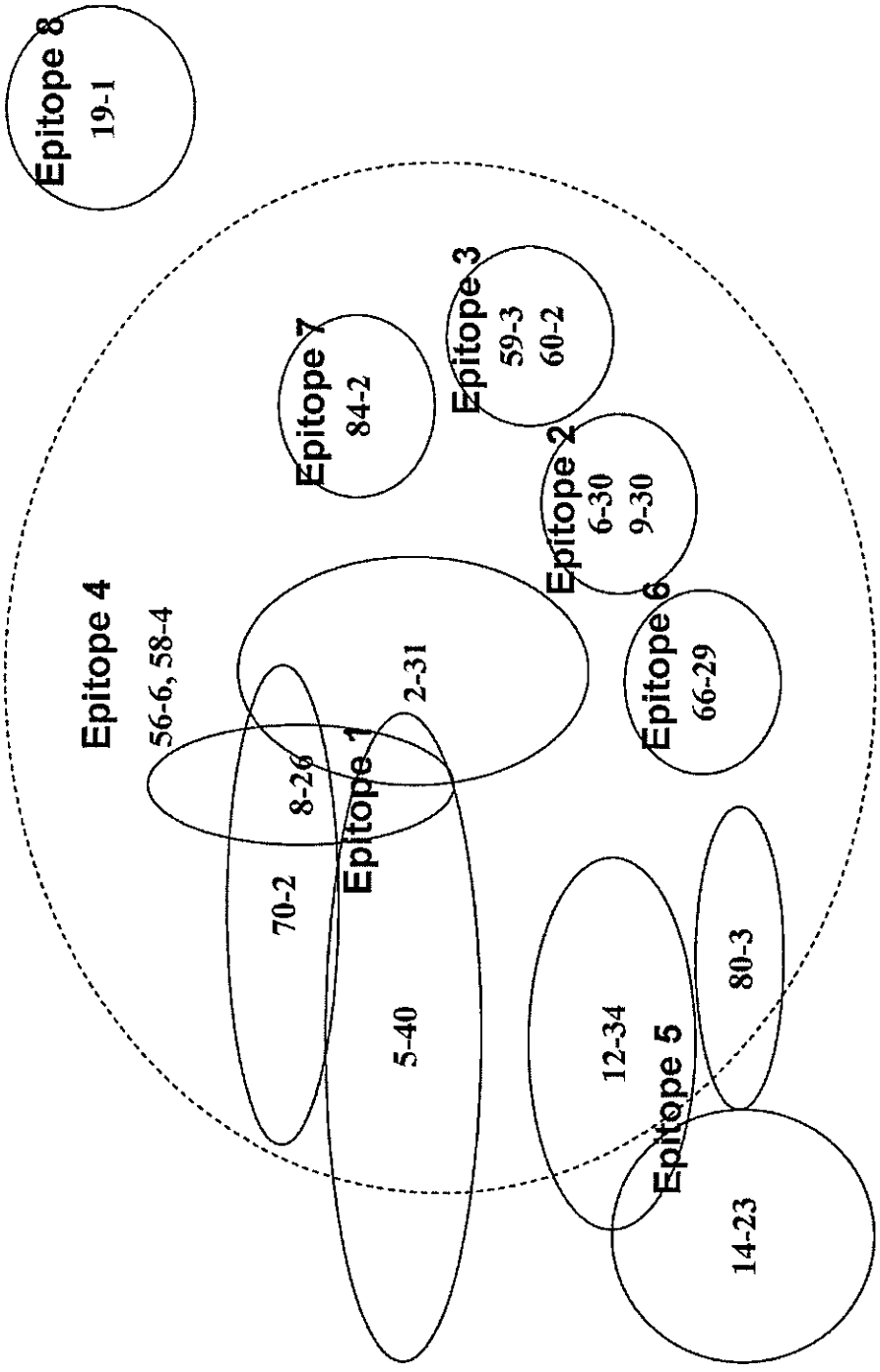

Epitope 8
19-1
Epitope 7
84-2
Epitope 3
59-3
60-2
Epitope 2
6-30
9-30
Epitope 6
66-29
Epitope 4
56-6, 58-4
2-31
8-26
Epitope 1
70-2
5-40
12-34
80-3
Epitope 5
14-23

FIG. 20A

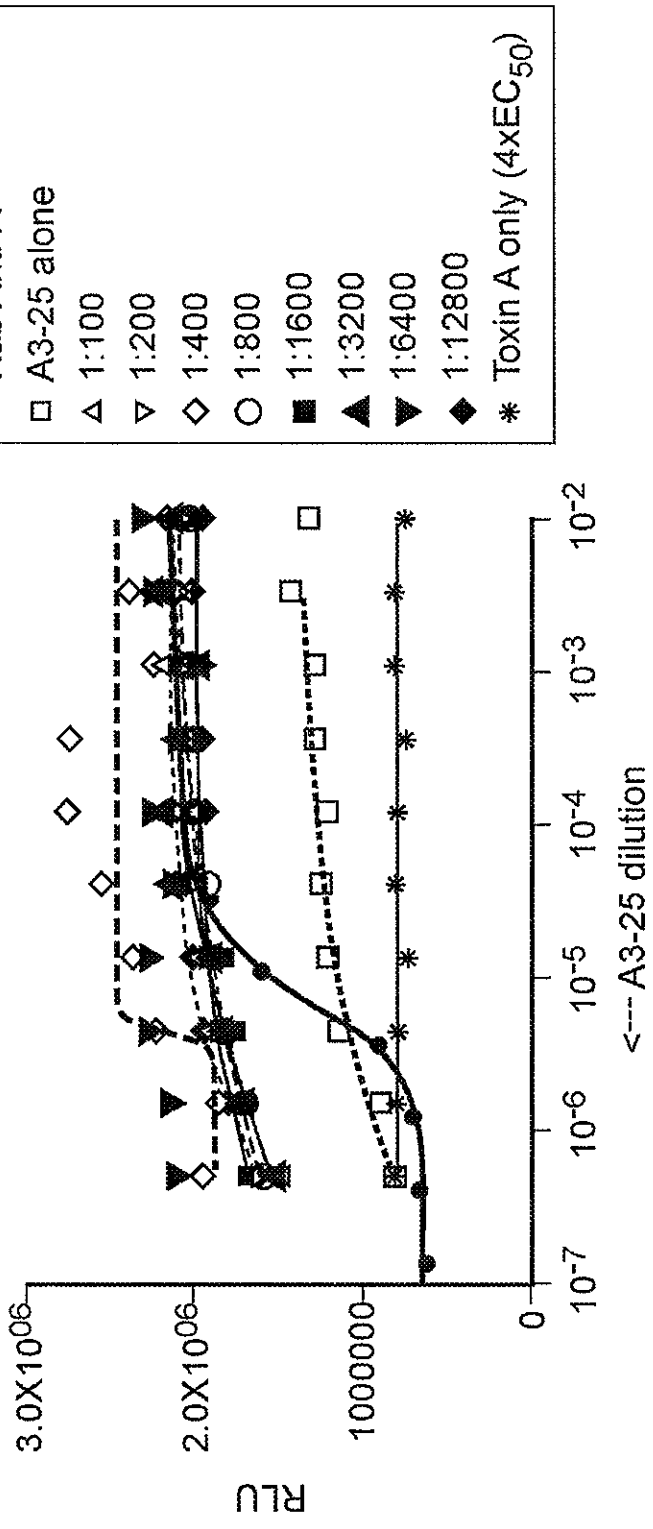

Rab Anti-A
A3-25 alone
1:100
1:200
1:400
1:800
1:1600
1:3200
1:6400
1:12800
Toxin A only (4xEC50)
RLU
3.0X10^06
2.0X10^06
1000000
0
10^-7
10^-6
10^-5
10^-4
10^-3
10^-2
<--- A3-25 dilution

FIG. 20B

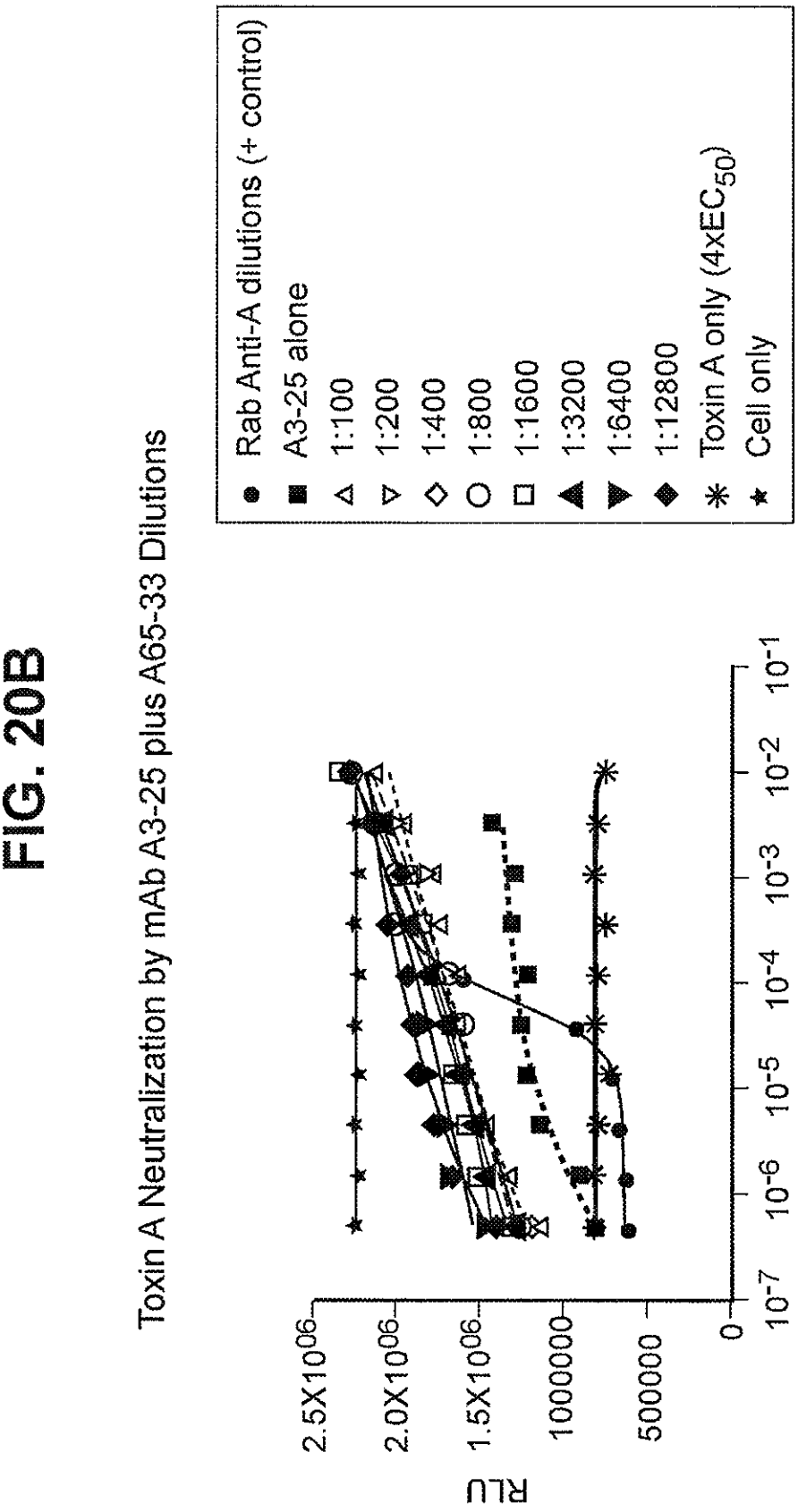

Toxin A Neutralization by mAb A3-25 plus A65-33 Dilutions
Rab Anti-A dilutions (+ control)
A3-25 alone
1:100
1:200
1:400
1:800
1:1600
1:3200
1:6400
1:12800
Toxin A only (4xEC50)
Cell only
RLU
2.5X10^06
2.0X10^06
1.5X10^06
1000000
500000
0
10^-7
10^-6
10^-5
10^-4
10^-3
10^-2
10^-1
<--- A3-25 dilution

FIG. 20C

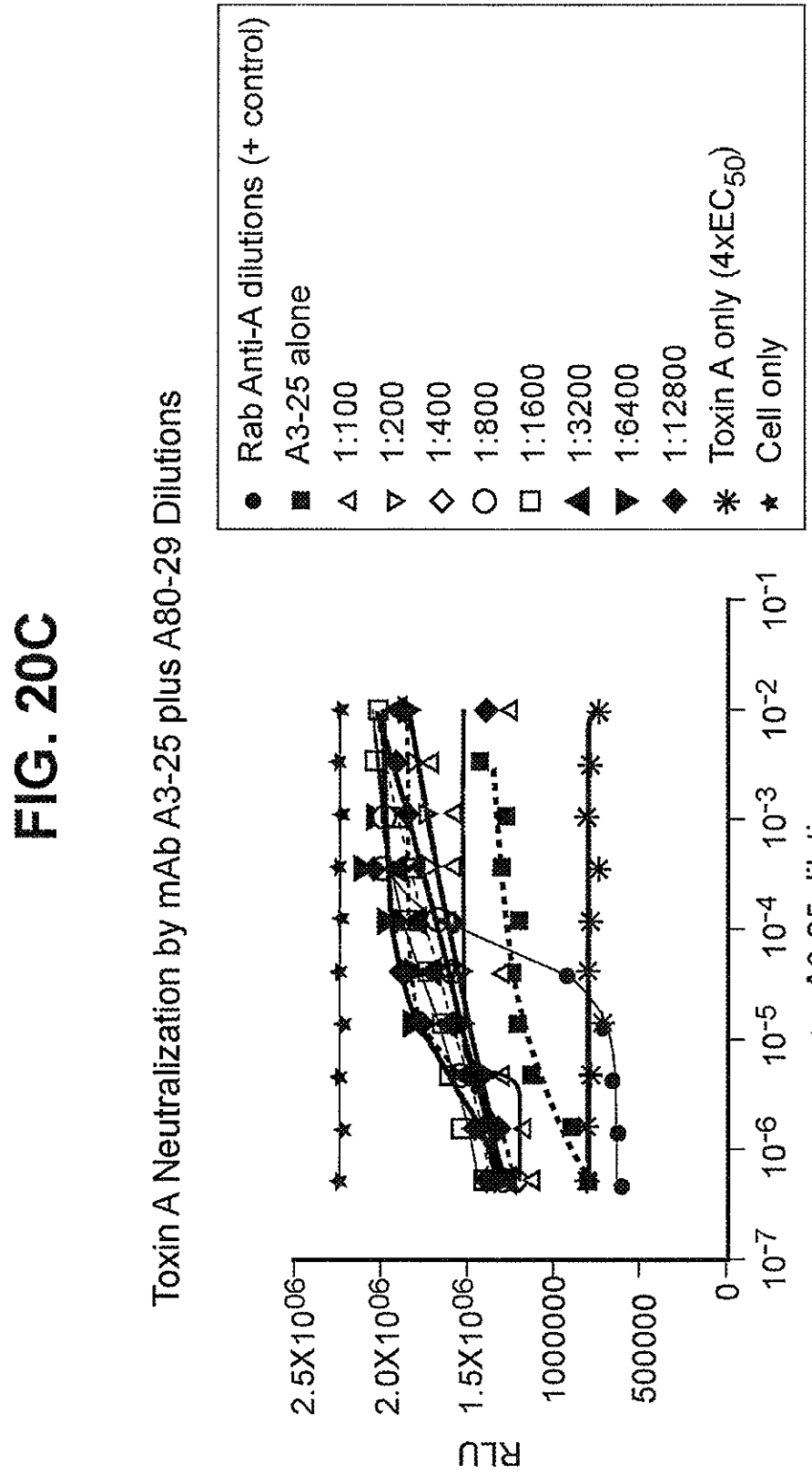

Toxin A Neutralization by mAb A3-25 plus A80-29 Dilutions
Rab Anti-A dilutions (+ control)
A3-25 alone
1:100
1:200
1:400
1:800
1:1600
1:3200
1:6400
1:12800
Toxin A only (4xEC50)
Cell only
RLU
2.5X10^06
2.0X10^06
1.5X10^06
1000000
500000
0
10^-7
10^-6
10^-5
10^-4
10^-3
10^-2
10^-1
<--- A3-25 dilution

FIG. 21A

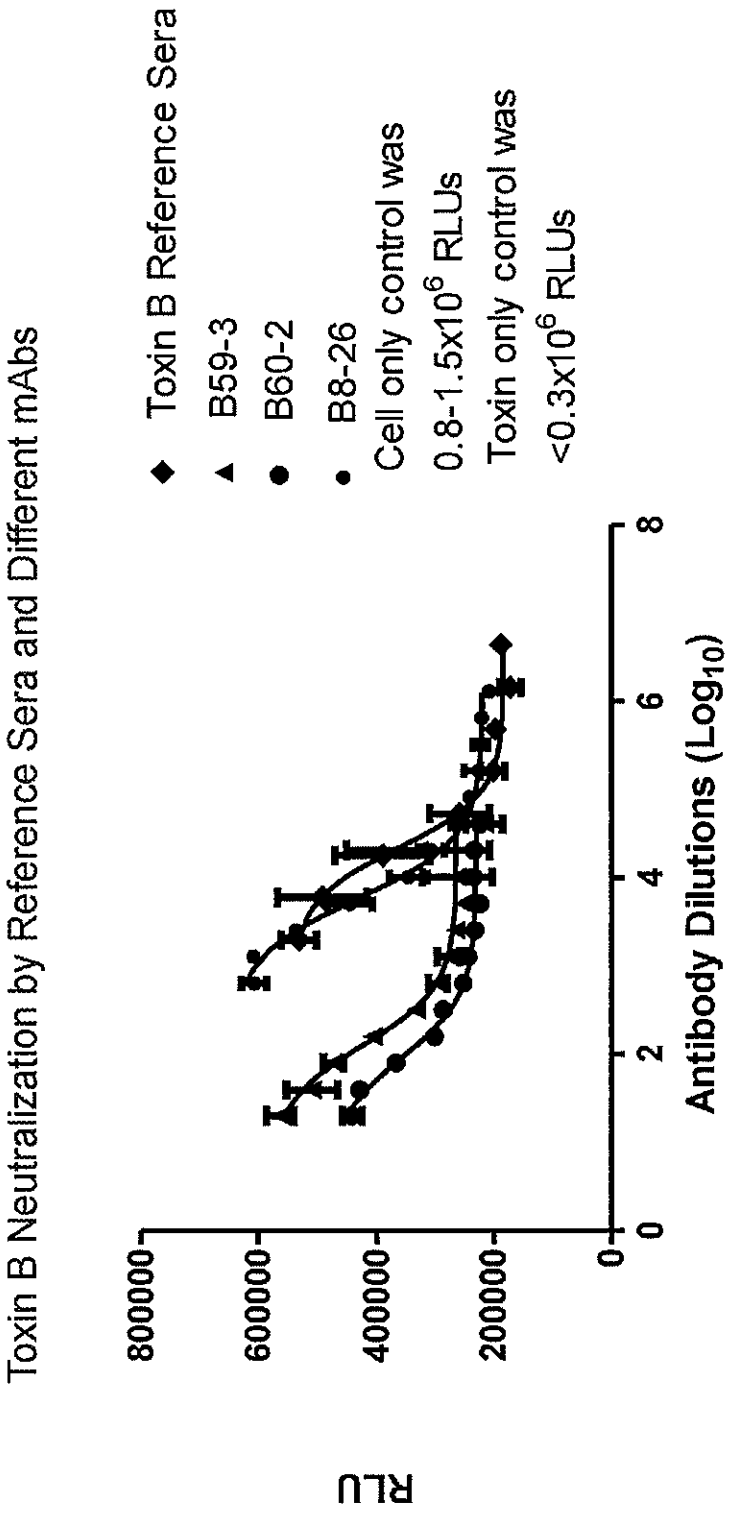

Toxin B Neutralization by Reference Sera and Different mAbs
Toxin B Reference Sera
B59-3
B60-2
B8-26
Cell only control was
0.8-1.5x10^6 RLUs
Toxin only control was
<0.3x10^6 RLUs
RLU
800000
600000
400000
200000
0
0
2
4
6
8
Antibody Dilutions (Log10)

FIG. 21B

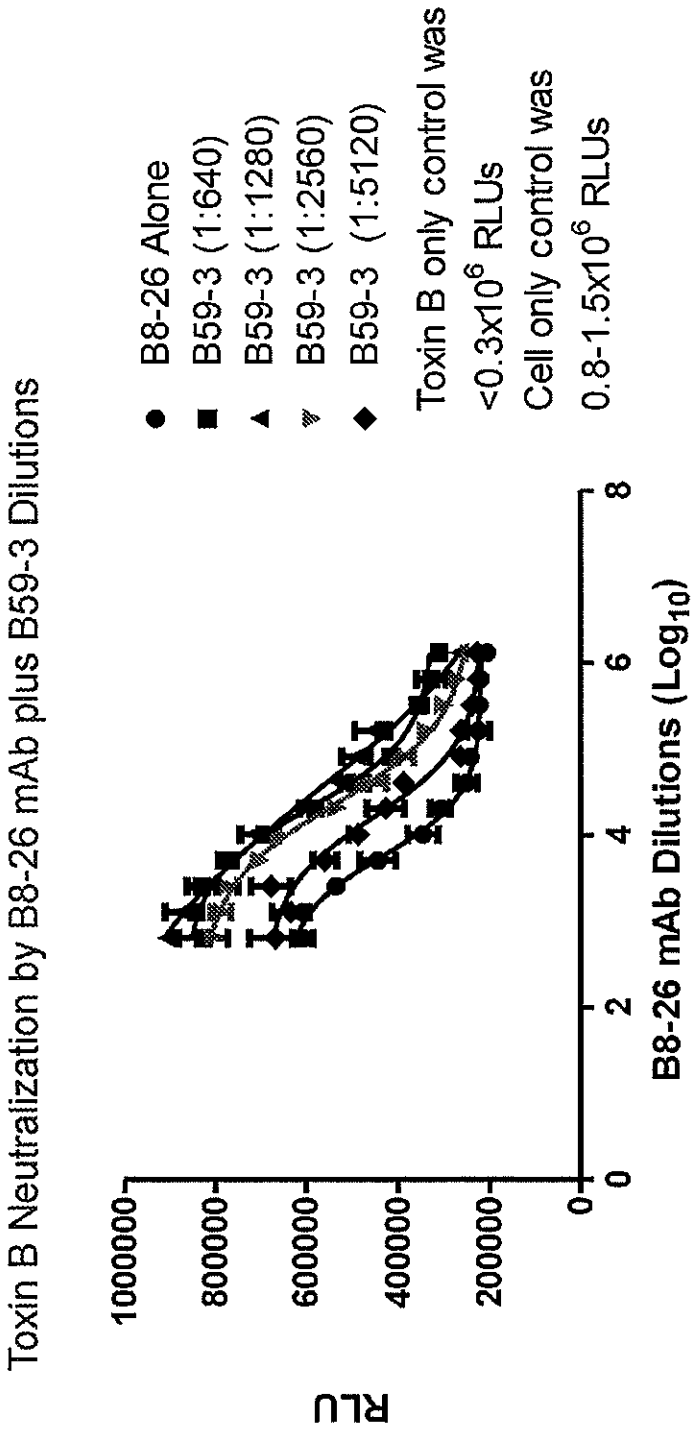

Toxin B Neutralization by B8-26 mAb plus B59-3 Dilutions
B8-26 Alone
B59-3 (1:640)
B59-3 (1:1280)
B59-3 (1:2560)
B59-3 (1:5120)
Toxin B only control was
<0.3x10^6 RLUs
Cell only control was
0.8-1.5x10^6 RLUs
RLU
1000000
800000
600000
400000
200000
0
0
2
4
6
8
B8-26 mAb Dilutions (Log10)

FIG. 22

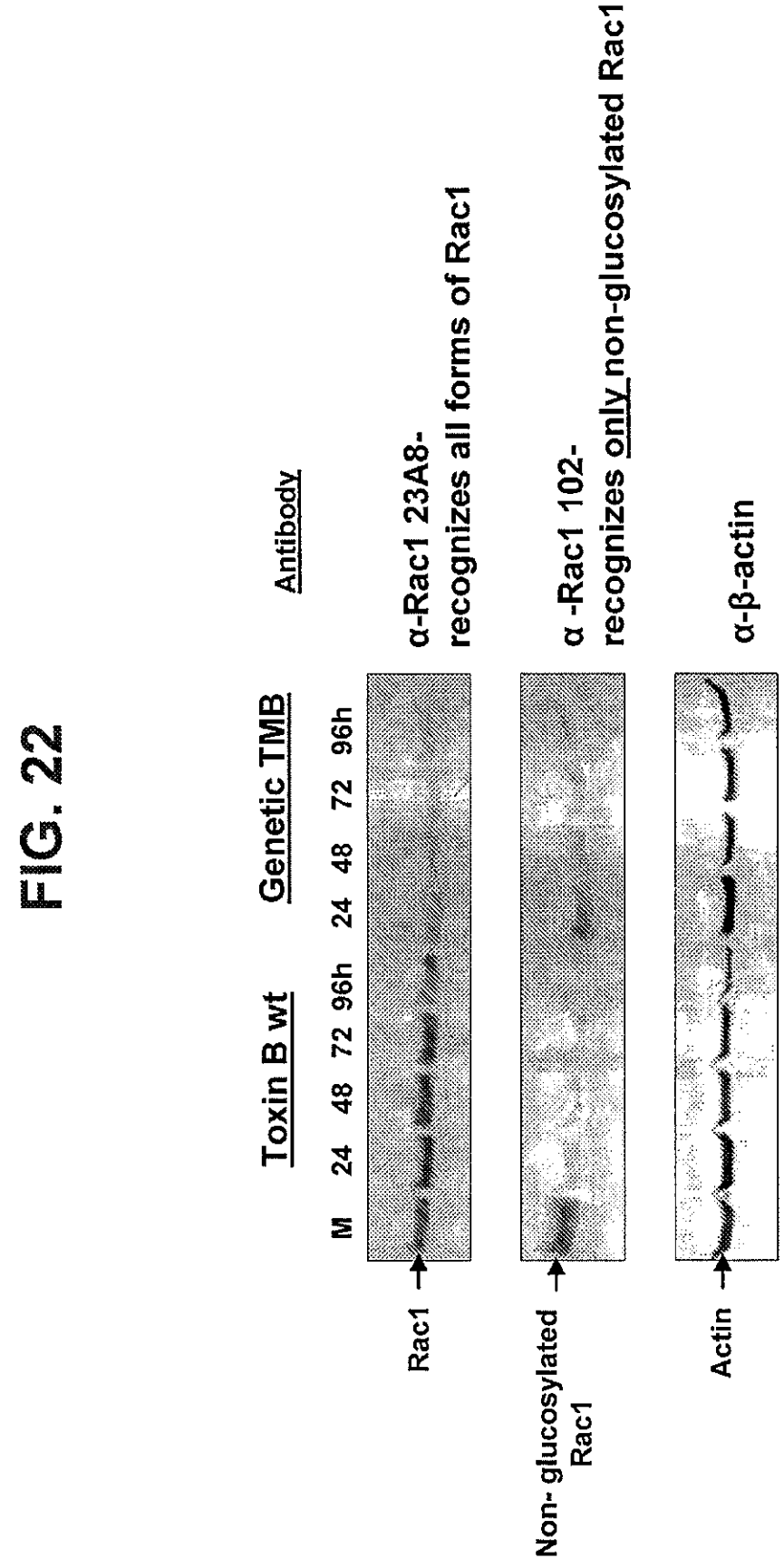
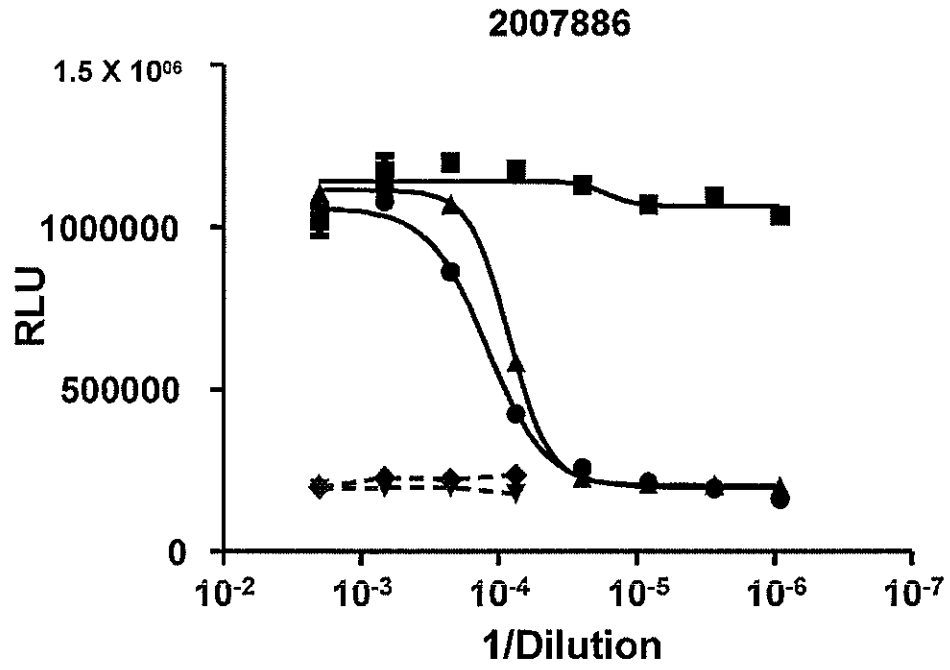

Toxin B wt
Genetic TMB
Antibody
M 24 48 72 96h 24 48 72 96h
α-Rac1 23A8- recognizes all forms of Rac1
α -Rac1 102- recognizes only non-glucosylated Rac1
α-β-actin
Rac1
Non- glucosylated Rac1
Actin

FIG. 23A



IC50	0.0001196

FIG. 23B

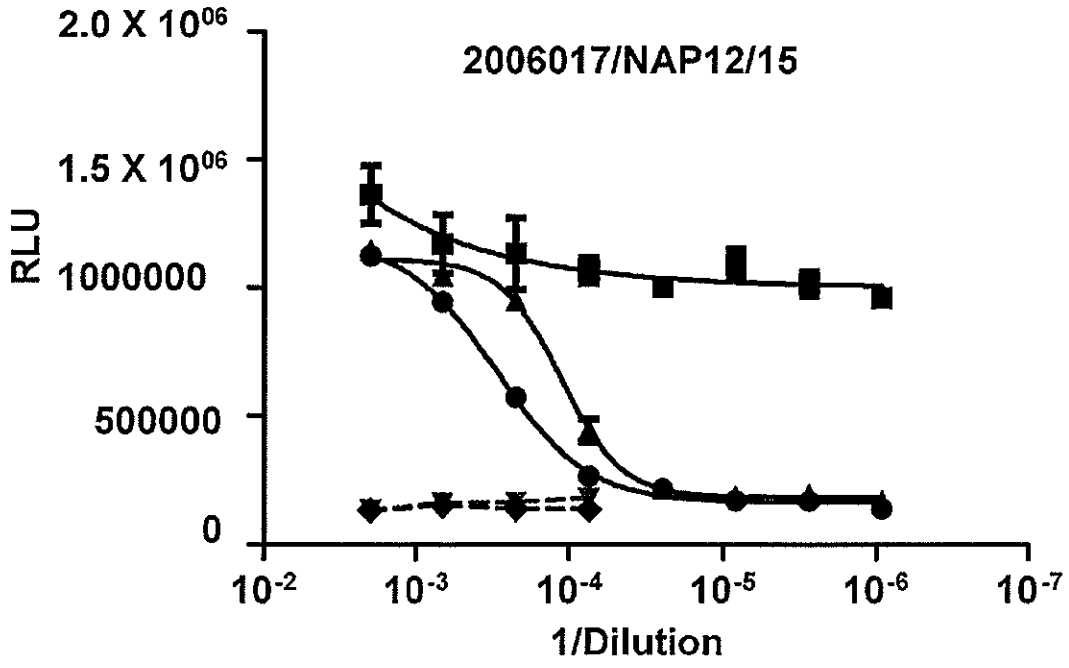


FIG. 23C

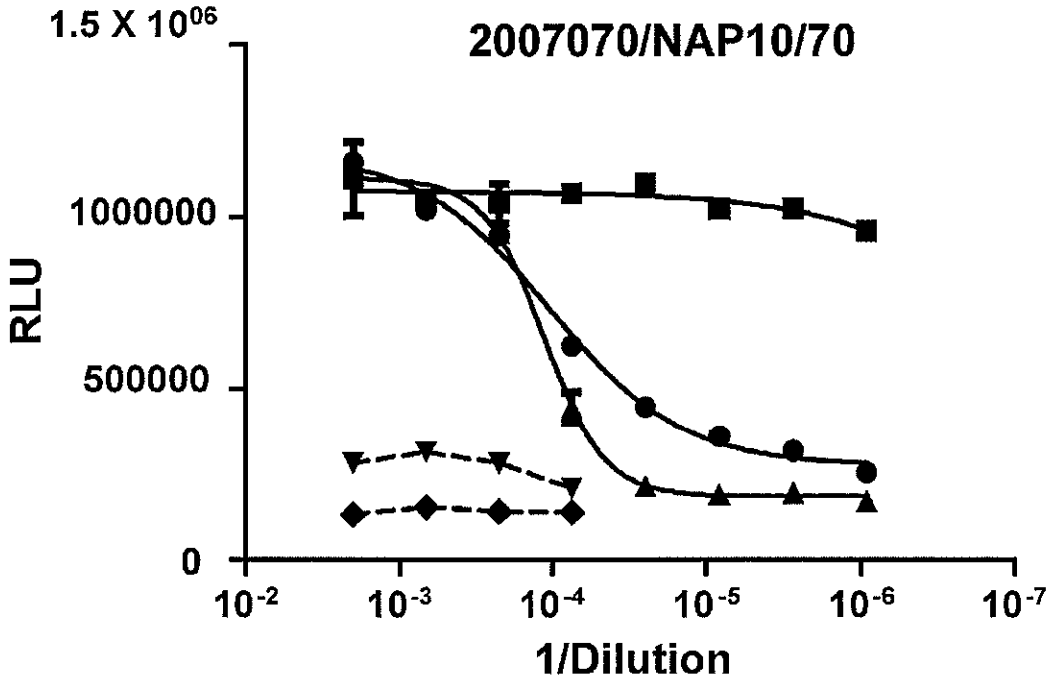


FIG. 23D

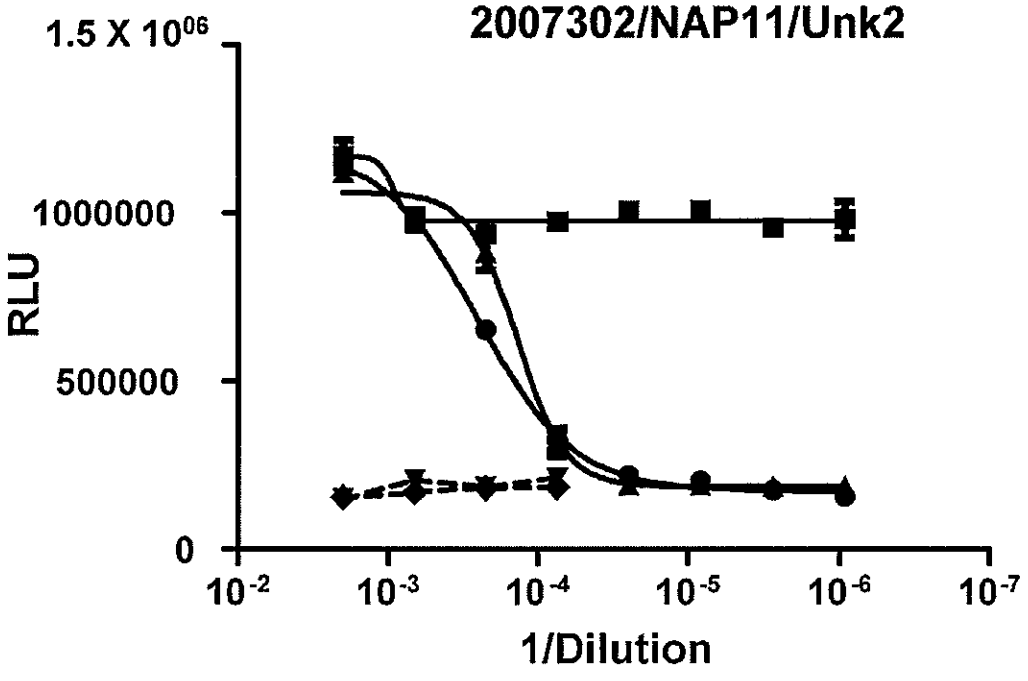


FIG. 23E

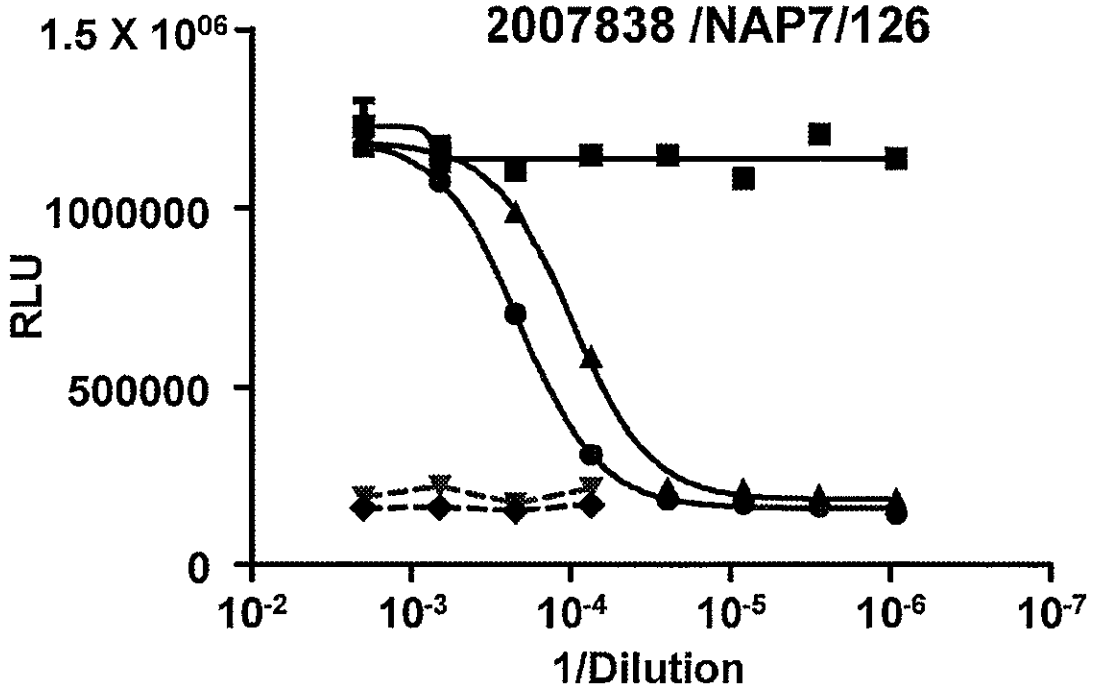


FIG. 23F

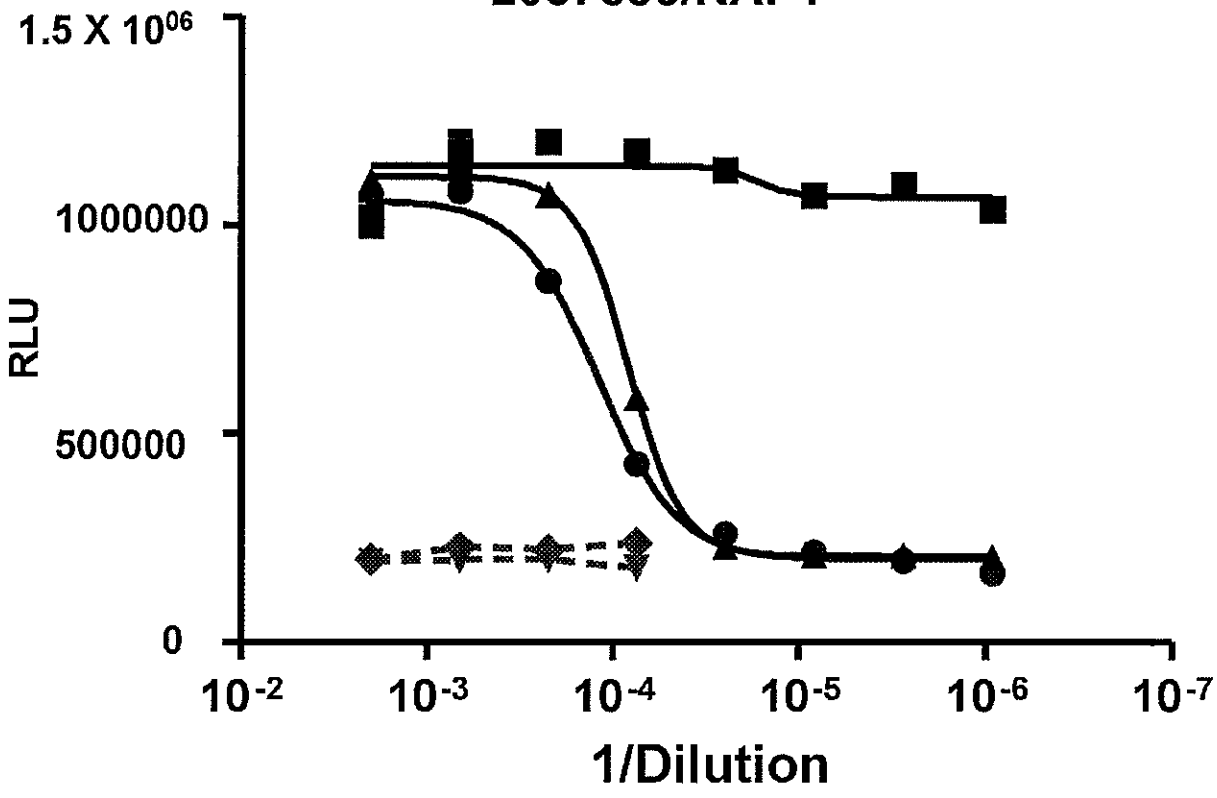


FIG. 23G

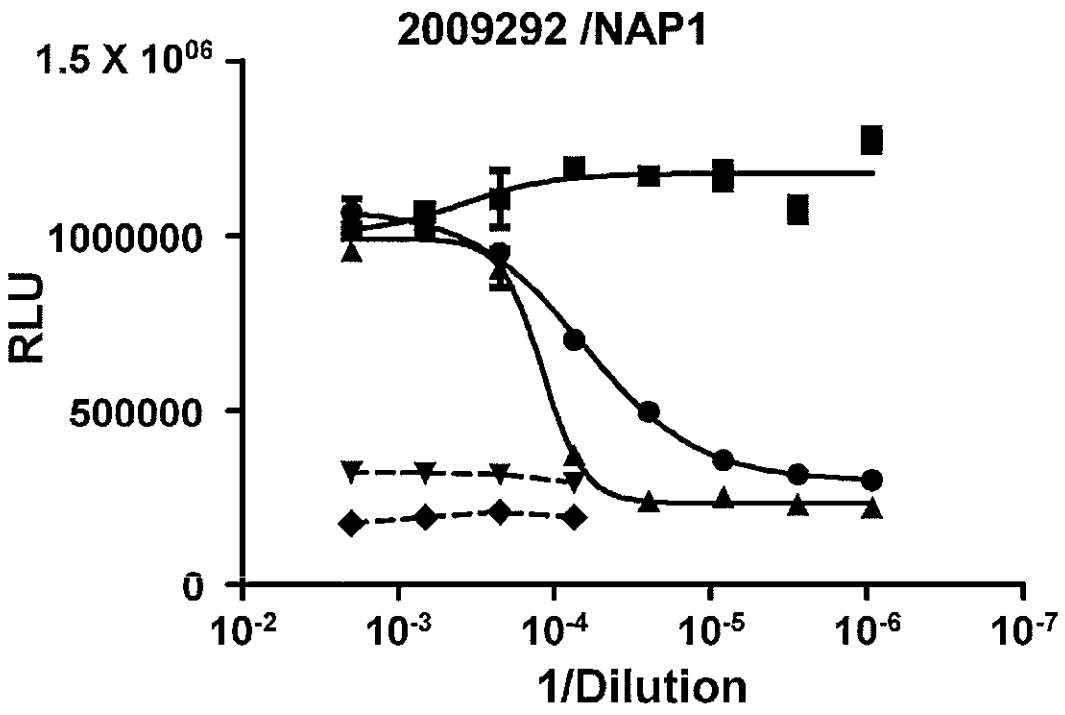


FIG. 23H

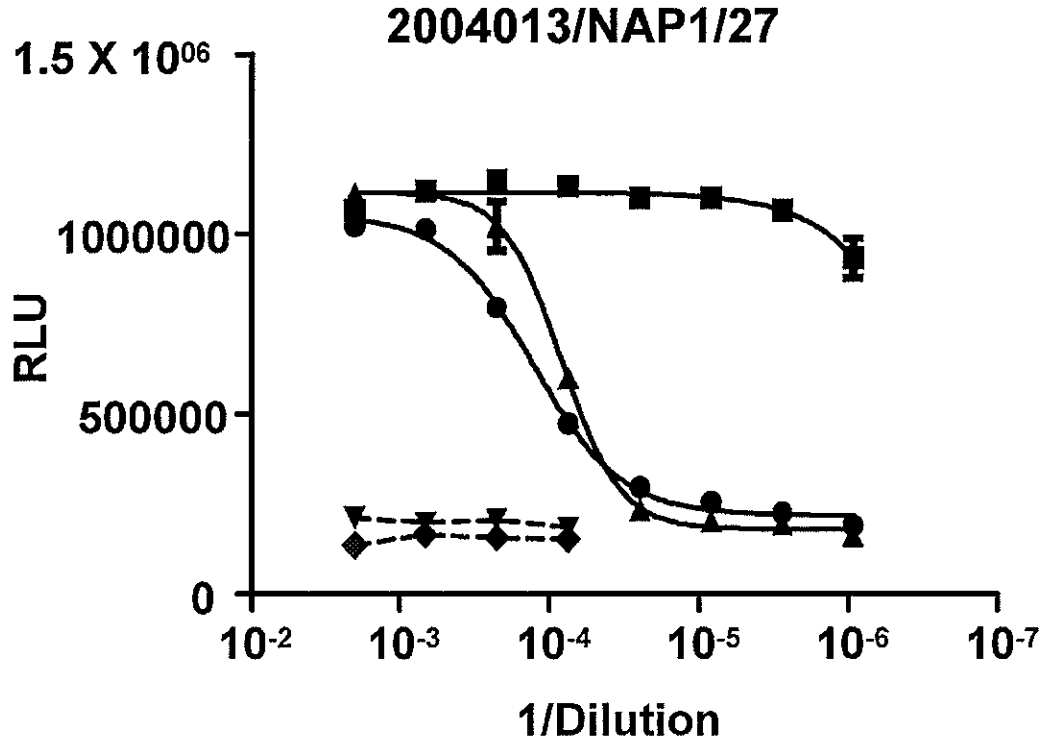


FIG. 23 I

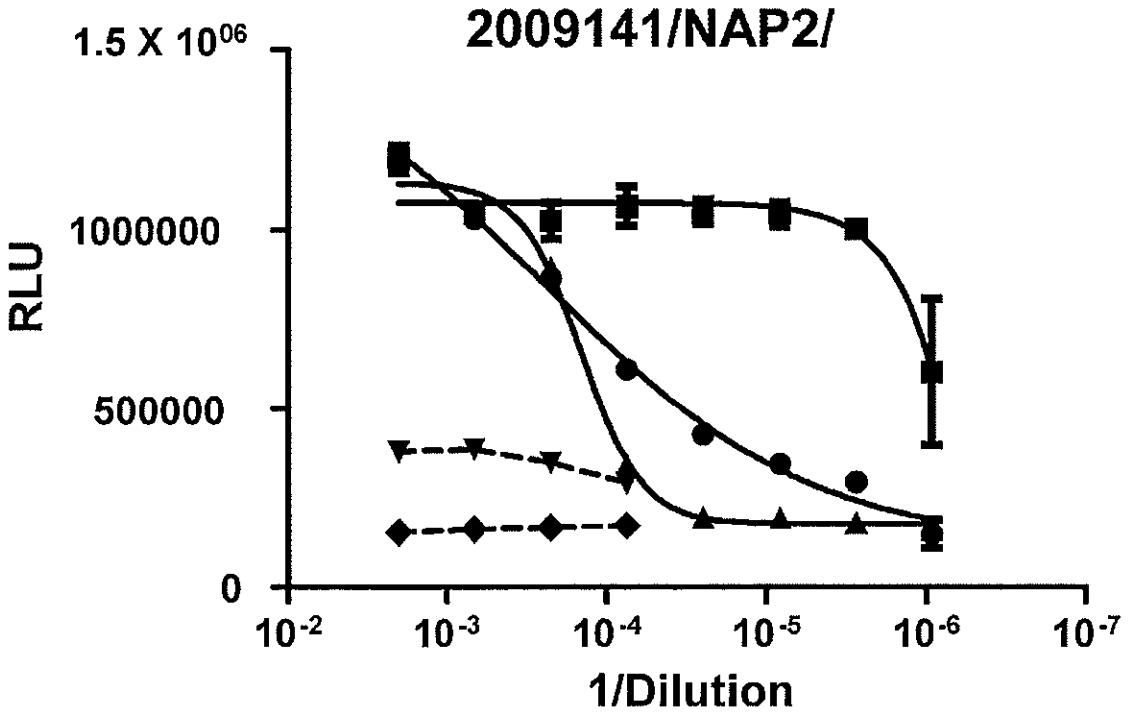


FIG. 23J

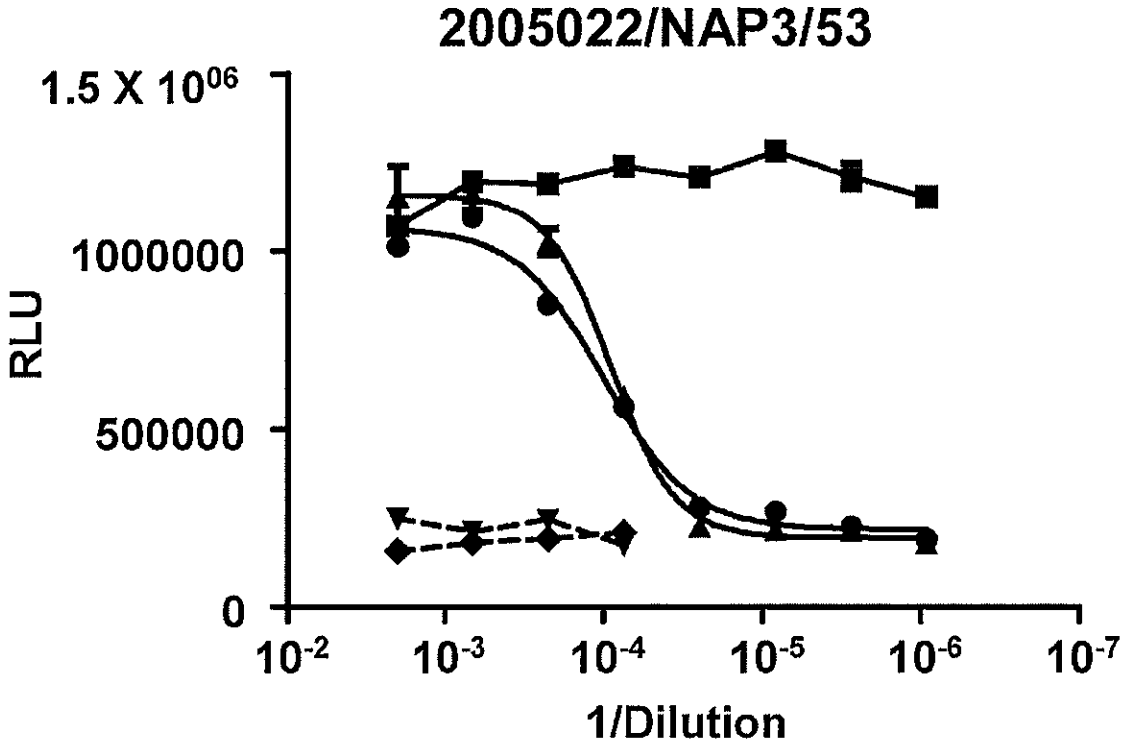


FIG. 23K

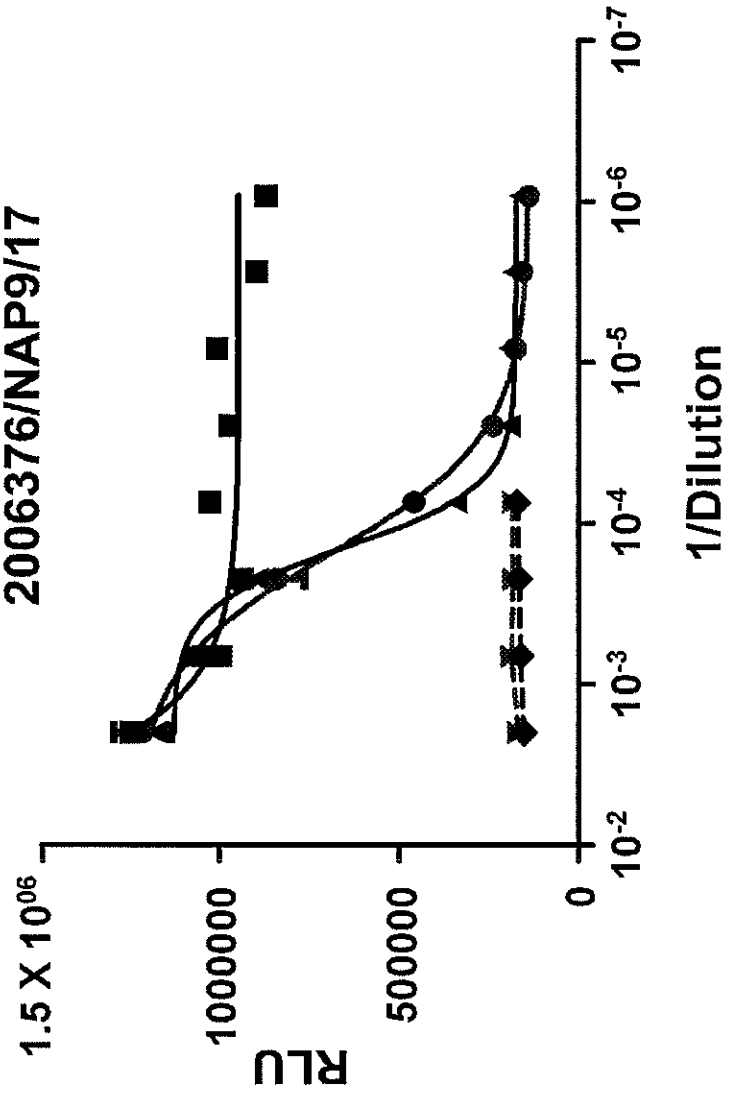

2006376/NAP9/17
RLU
1.5 X 10^06
1000000
500000
0
10^-2
10^-3
10^-4
10^-5
10^-6
10^-7
1/Dilution

FIG. 24A

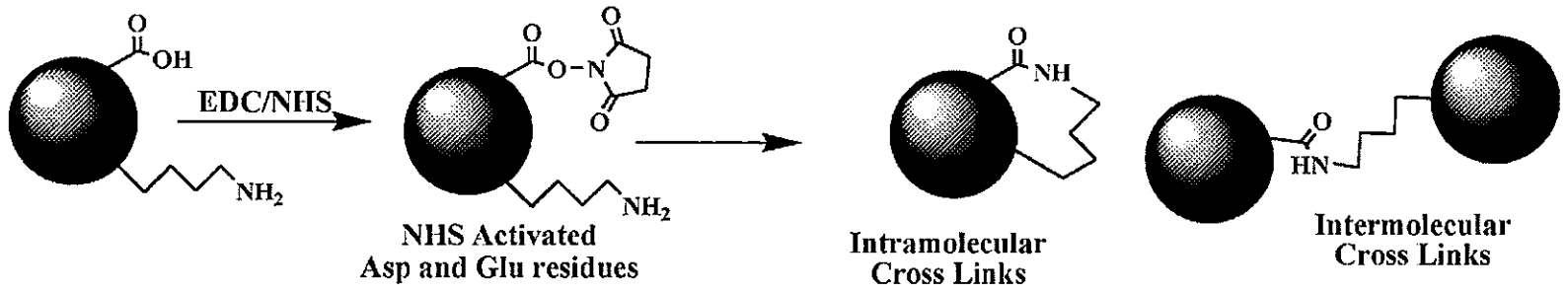


FIG. 24B

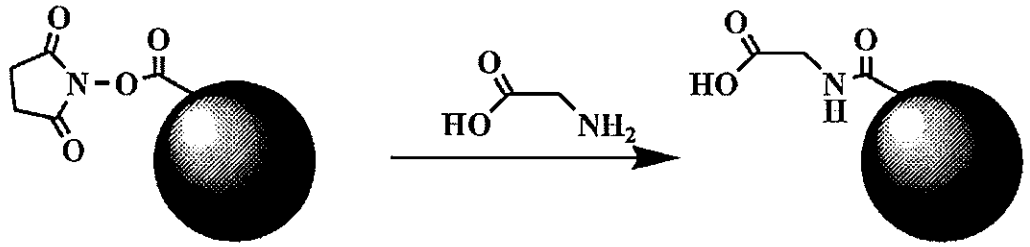
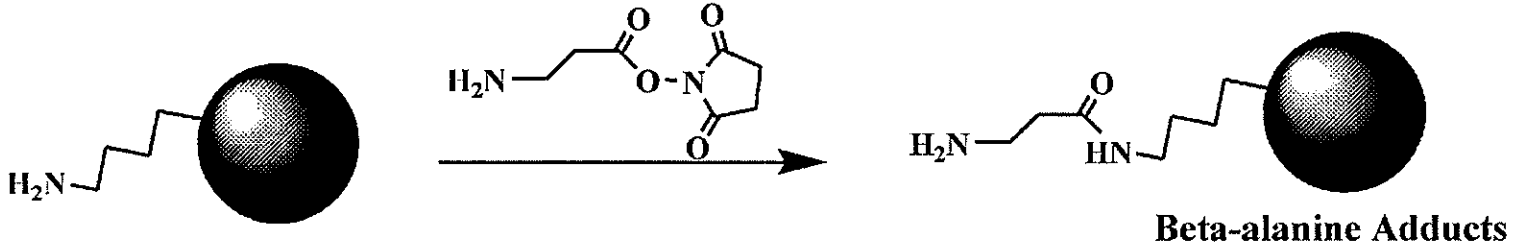


FIG. 24C



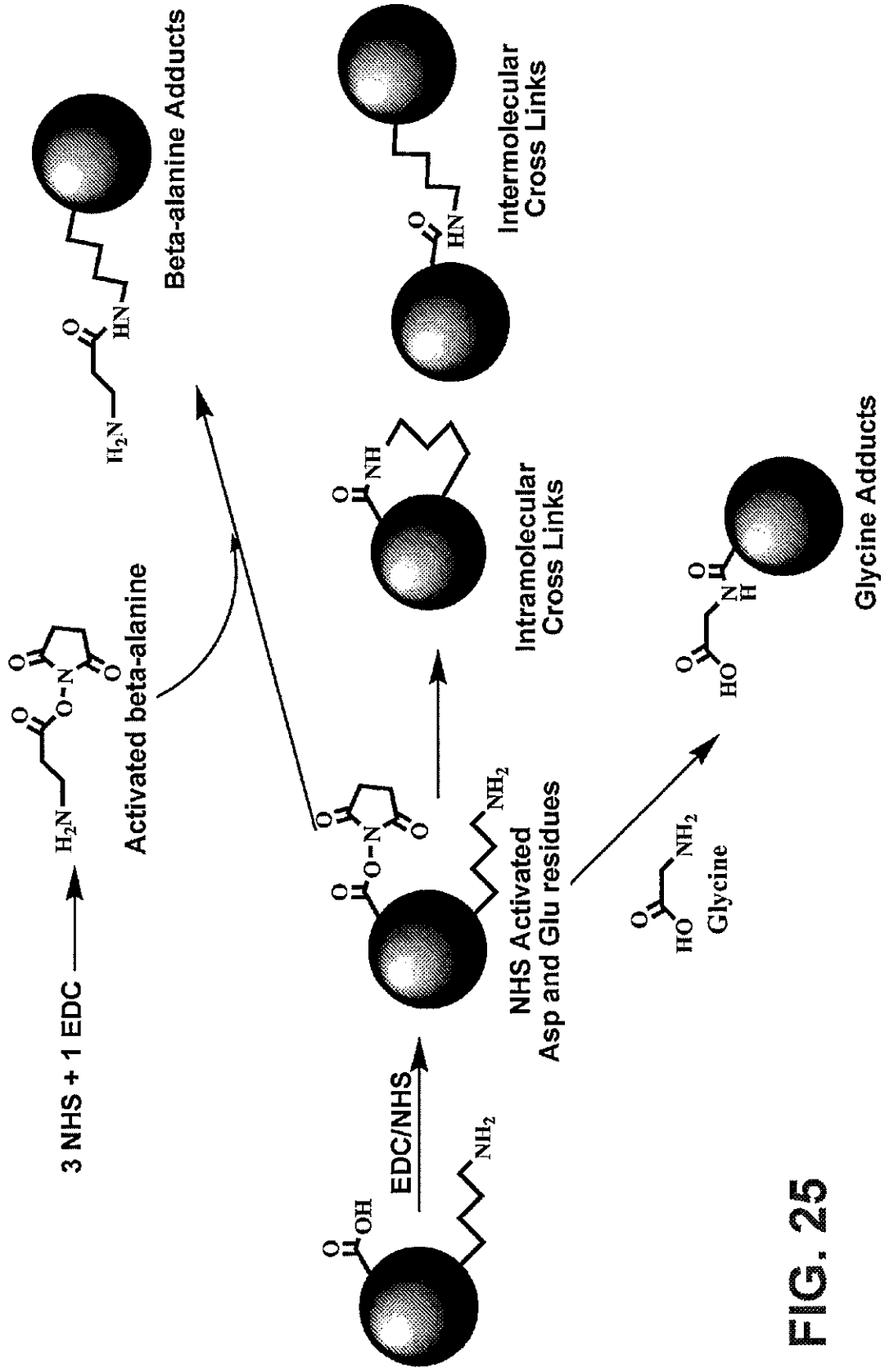

3 NHS + 1 EDC
Activated beta-alanine
Beta-alanine Adducts
EDC/NHS
NHS Activated
Asp and Glu residues
Intramolecular
Cross Links
Intermolecular
Cross Links
Glycine
Glycine Adducts

FIG. 25