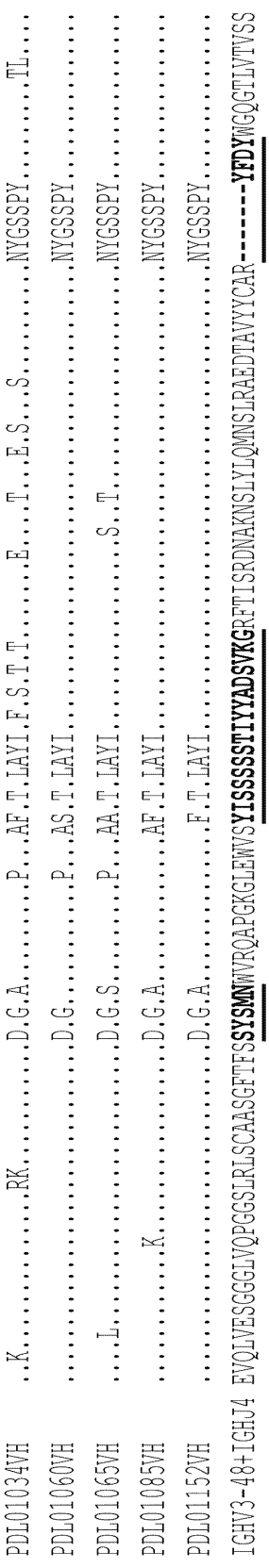
FIG. 1


PDL01034VH ..K.....RK.....D.G.A.....P...AF.T.LAYI.F.S.T.T.....E....T..E.S...S.....NYGSSPY.....TL....
PDL01060VH .....D.G.....P...AS.T.LAYI.....NYGSSPY.....
PDL01065VH ....L.....D.G.S.....P...AA.T.LAYI.....S..T.....NYGSSPY.....
PDL01085VH .....K.....D.G.A.....AF.T.LAYI.....NYGSSPY.....
PDL01152VH .....D.G.A.....F.T.LAYI.....NYGSSPY.....
IGHV3-48+IGHJ4 EVQLVESGGGLVQPGGSLRLSCAASGFTFSSYSMNWVRQAPGKGLEWVSYISSSSSTIYYADSVKGRFTISRDNAKNSLYLQMNSLRAEDTAVYYCAR------YFDYWGQGTLVTVSS
PDL01034VL .....T.L.GK.....K...D.NKFIS...H....G.R...HYT....P.I.....R.YSFS..N.E...I.....L.-.DNL....G.....
PDL01060VL .....D.NKF.S...H.....HYT....P.....R.Y.....L.-.DNL.....
PDL01065VL .....D.NKF.S...H.....HYT....P.....R.Y.....L.-.DNL.....
PDL01085VL .....D.NKF.S.....HYT....P.....L.-.DNL.....
PDL01152VL .....D.NKF.S.....HYT.....L.-.DNL.....
IGKV1-39+IGKJ2 DIQMTQSPSSLSASVGDRVTITCRASQSISSYLNWYQQKPGKAPKLLIYAASSLQSGVPSRFSGSGSGTDFTLTISSLQPEDFATYYCQQSYSTPYTFGQGTKLEIK

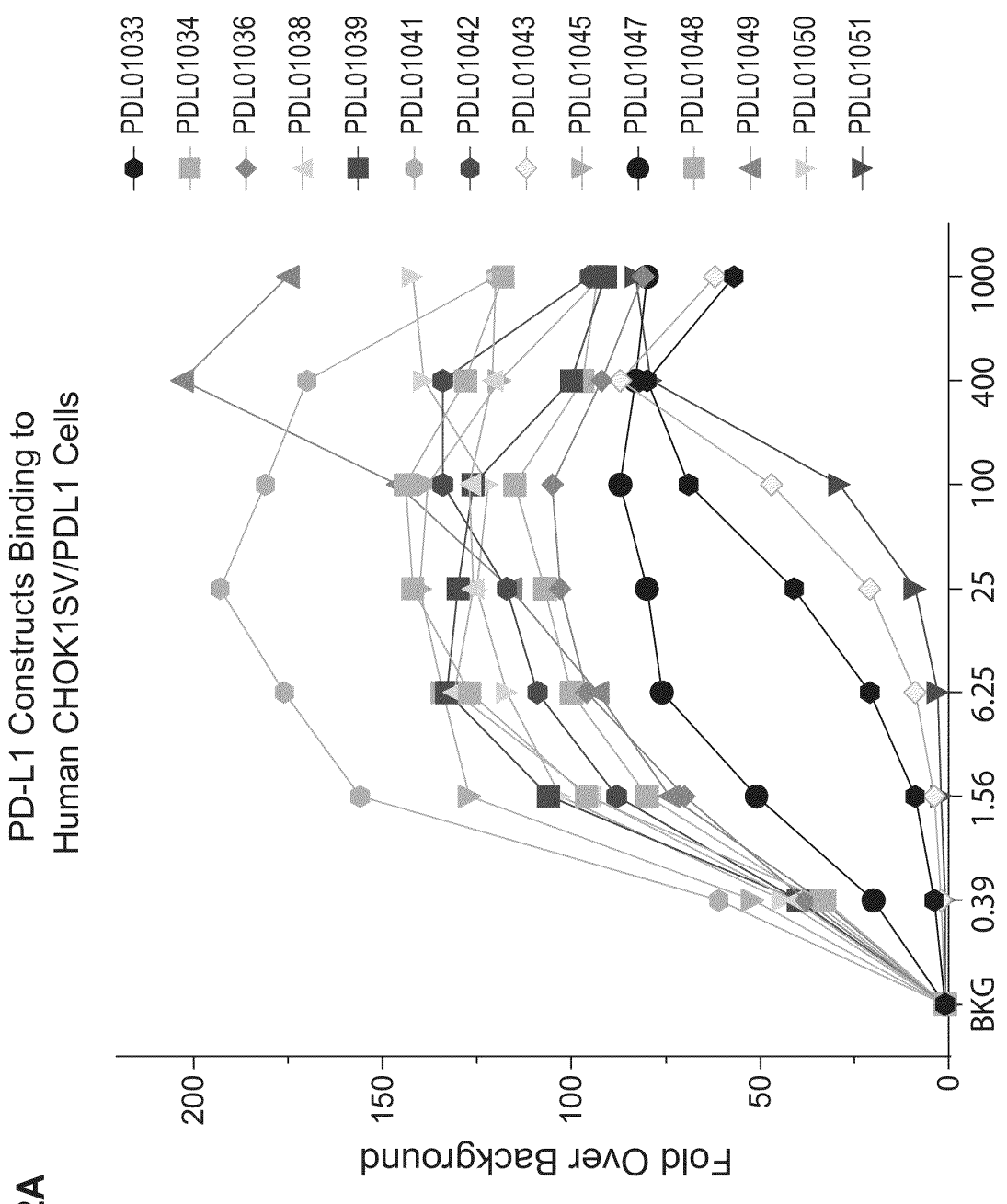

PD-L1 Constructs Binding to
Human CHOK1SV/PDL1 Cells
PDL01033
PDL01034
PDL01036
PDL01038
PDL01039
PDL01041
PDL01042
PDL01043
PDL01045
PDL01047
PDL01048
PDL01049
PDL01050
PDL01051
Fold Over Background
0
50
100
150
200
BKG
0.39
1.56
6.25
25
100
400
1000

FIG. 2A

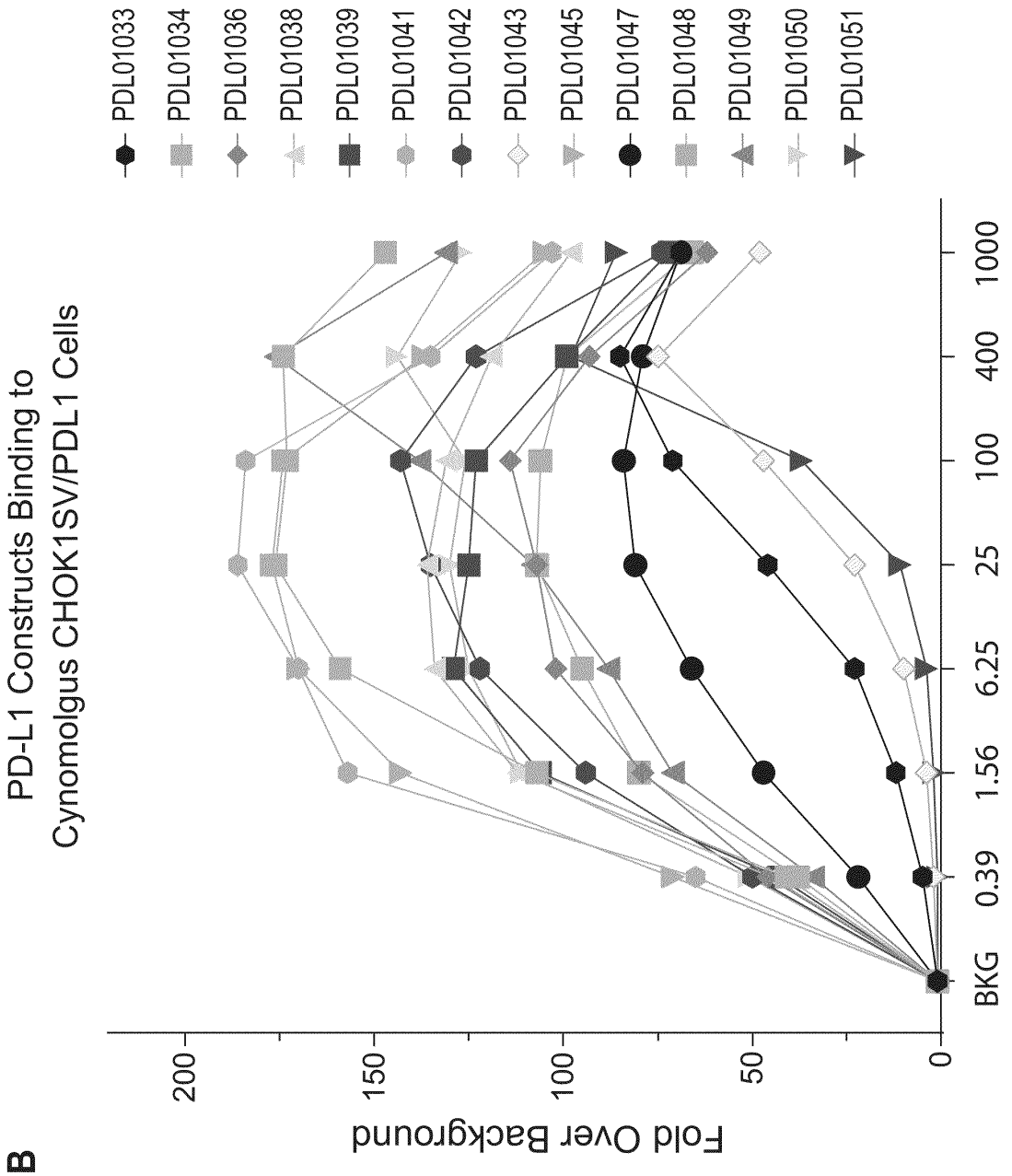

PD-L1 Constructs Binding to
Cynomolgus CHOK1SV/PDL1 Cells
PDL01033
PDL01034
PDL01036
PDL01038
PDL01039
PDL01041
PDL01042
PDL01043
PDL01045
PDL01047
PDL01048
PDL01049
PDL01050
PDL01051
Fold Over Background
0
50
100
150
200
BKG
0.39
1.56
6.25
25
100
400
1000

FIG. 2B

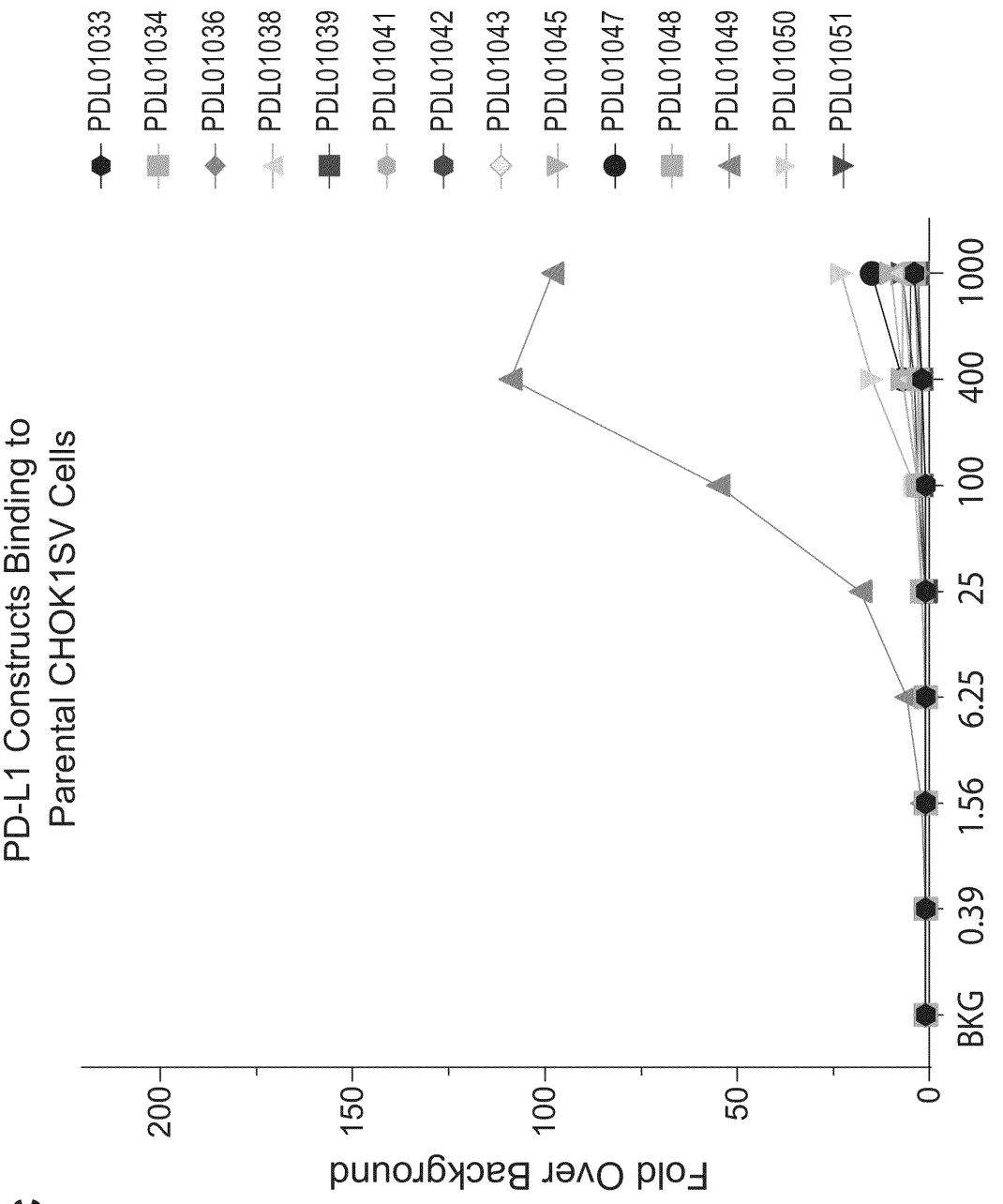

PD-L1 Constructs Binding to
Parental CHOK1SV Cells
Fold Over Background
0
50
100
150
200
BKG
0.39
1.56
6.25
25
100
400
1000
PDL01033
PDL01034
PDL01036
PDL01038
PDL01039
PDL01041
PDL01042
PDL01043
PDL01045
PDL01047
PDL01048
PDL01049
PDL01050
PDL01051

FIG. 2C

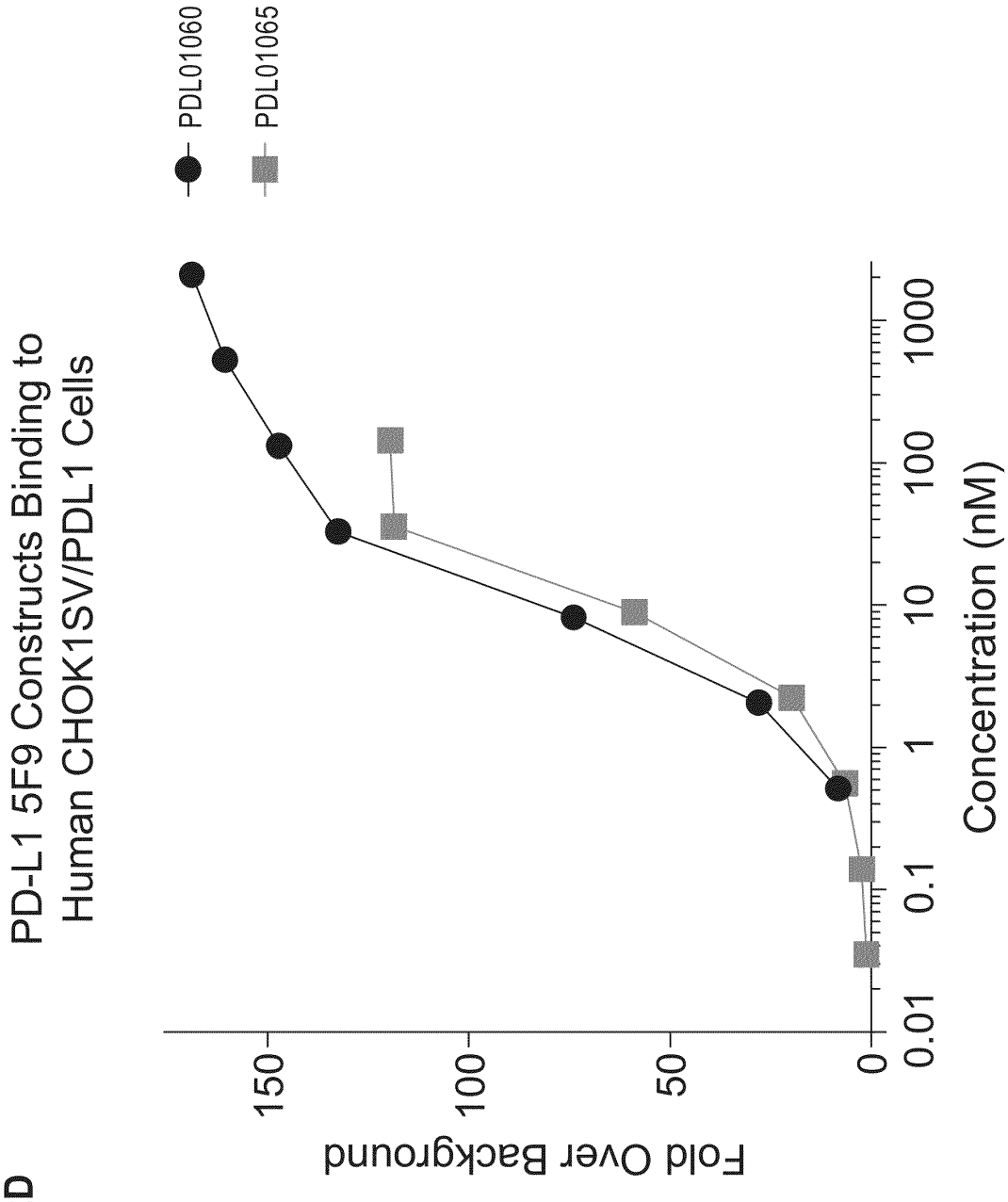

PD-L1 5F9 Constructs Binding to
Human CHOK1SV/PDL1 Cells
PDL01060
PDL01065
Fold Over Background
0
50
100
150
0.01
0.1
1
10
100
1000
Concentration (nM)

FIG. 2D

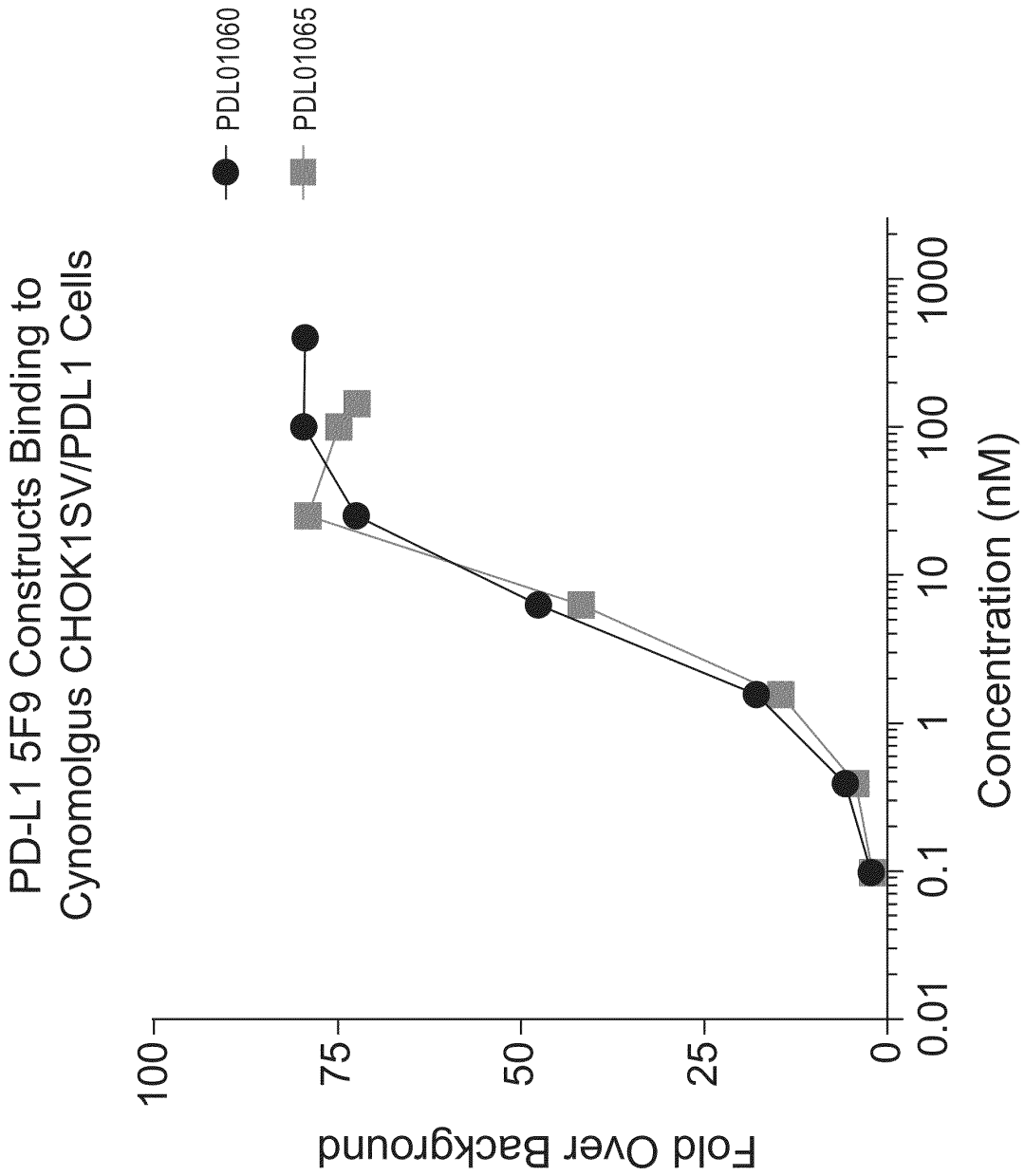

PD-L1 5F9 Constructs Binding to Cynomolgus CHOK1SV/PDL1 Cells
PDL01060
PDL01065
Fold Over Background
100
75
50
25
0
0.01
0.1
1
10
100
1000
Concentration (nM)

FIG. 2E

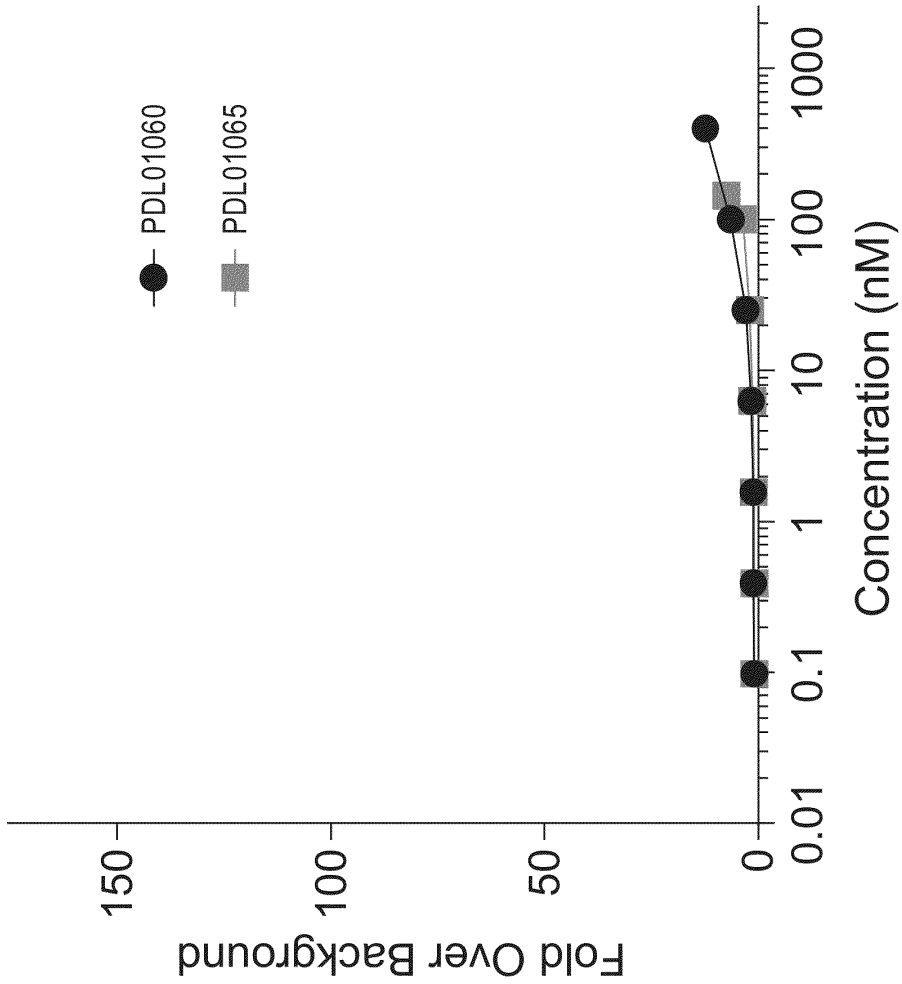

PD-L1 5F9 Constructs Binding to Parental CHOK1SV Cells
PDL01060
PDL01065
Fold Over Background
150
100
50
0
0.01
0.1
1
10
100
1000
Concentration (nM)

FIG. 2F

FIG. 3A

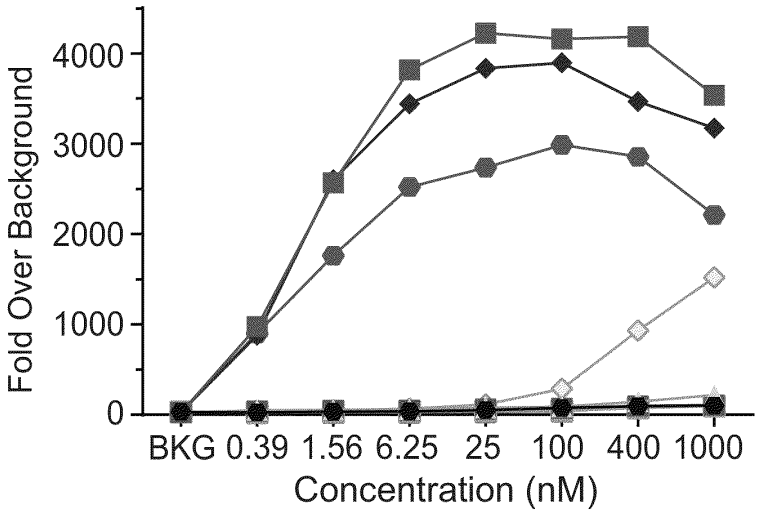

Binding of PDL01034 to Cells
Fold Over Background
4000
3000
2000
1000
0
BKG 0.39 1.56 6.25 25 100 400 1000
Concentration (nM)

FIG. 3B

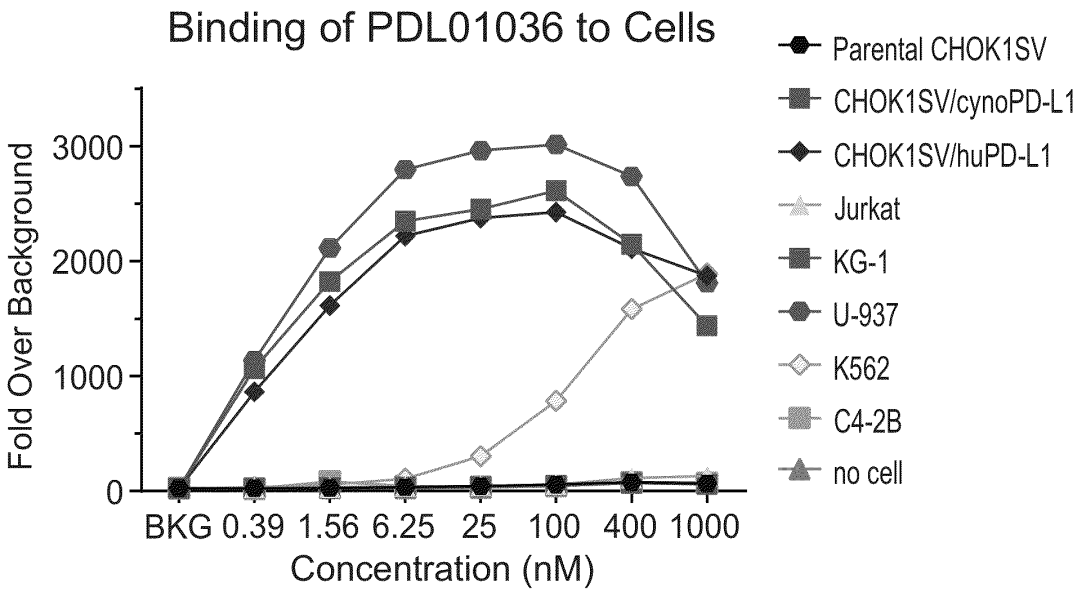

Binding of PDL01036 to Cells
Fold Over Background
3000
2000
1000
0
BKG 0.39 1.56 6.25 25 100 400 1000
Concentration (nM)
Parental CHOK1SV
CHOK1SV/cynoPD-L1
CHOK1SV/huPD-L1
Jurkat
KG-1
U-937
K562
C4-2B
no cell

FIG. 4A

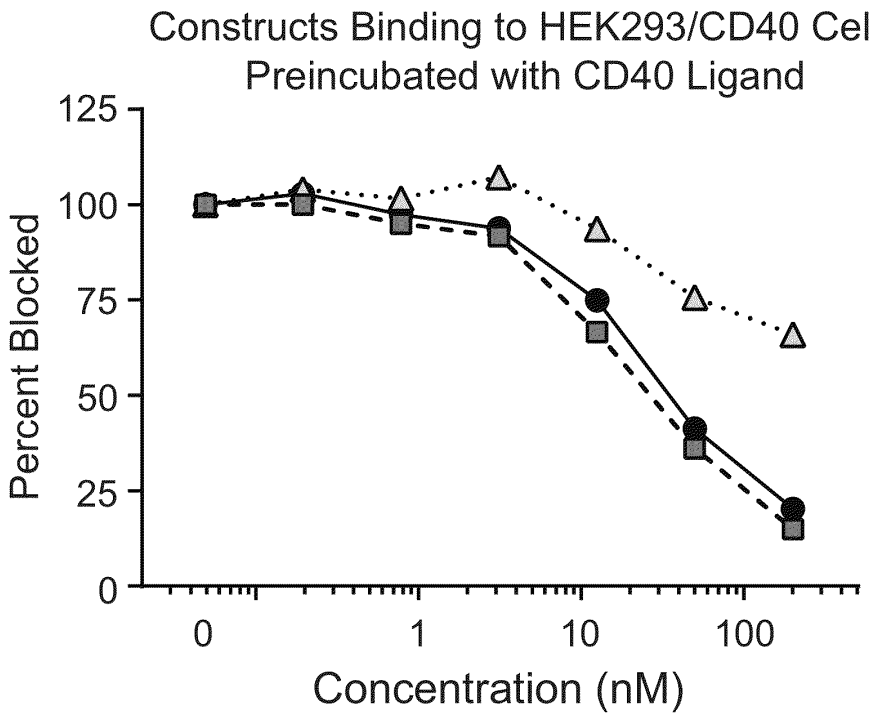

Constructs Binding to HEK293/CD40 Cells
Preincubated with CD40 Ligand
Percent Blocked
125
100
75
50
25
0
0
1
10
100
Concentration (nM)

FIG. 4B

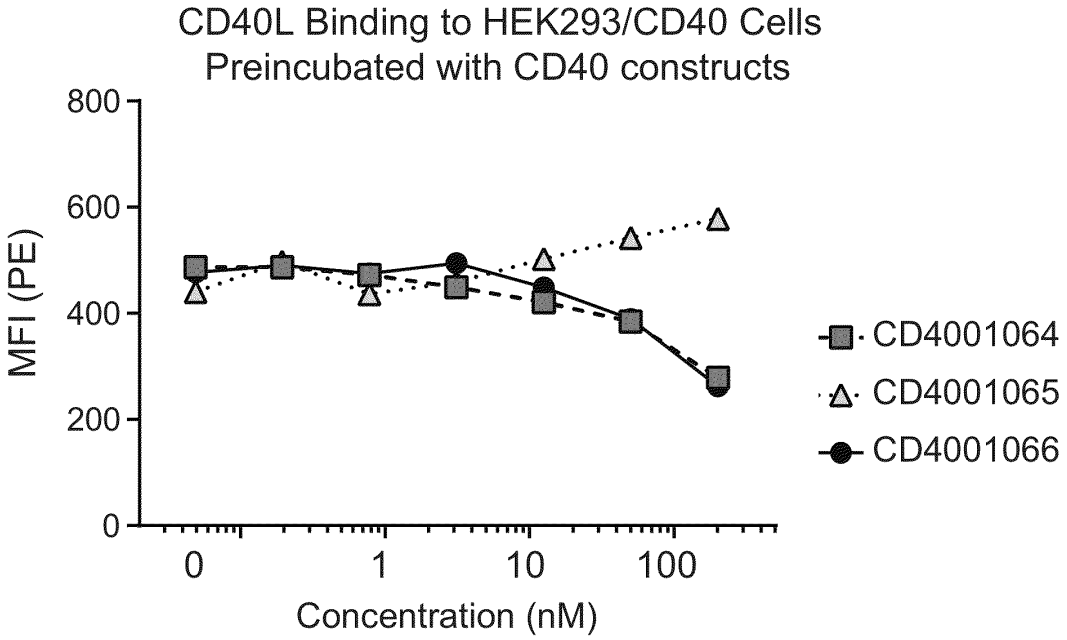
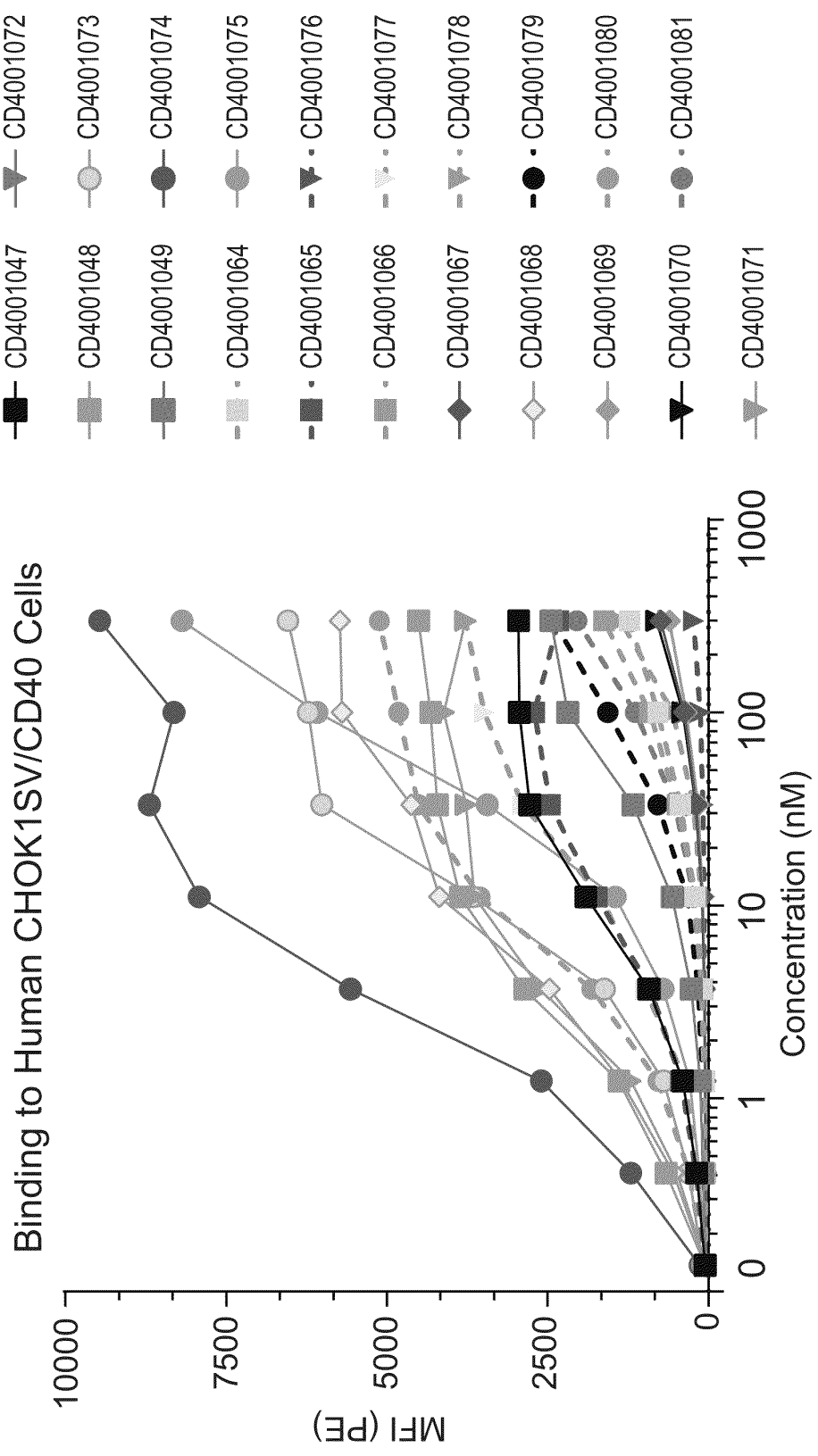

CD40L Binding to HEK293/CD40 Cells
Preincubated with CD40 constructs
MFI (PE)
800
600
400
200
0
0
1
10
100
Concentration (nM)
CD4001064
CD4001065
CD4001066

FIG. 5A


Binding to Human CHOK1SV/CD40 Cells
MFI (PE)
10000
7500
5000
2500
0
0
1
10
100
1000
Concentration (nM)
CD4001047
CD4001048
CD4001049
CD4001064
CD4001065
CD4001066
CD4001067
CD4001068
CD4001069
CD4001070
CD4001071
CD4001072
CD4001073
CD4001074
CD4001075
CD4001076
CD4001077
CD4001078
CD4001079
CD4001080
CD4001081

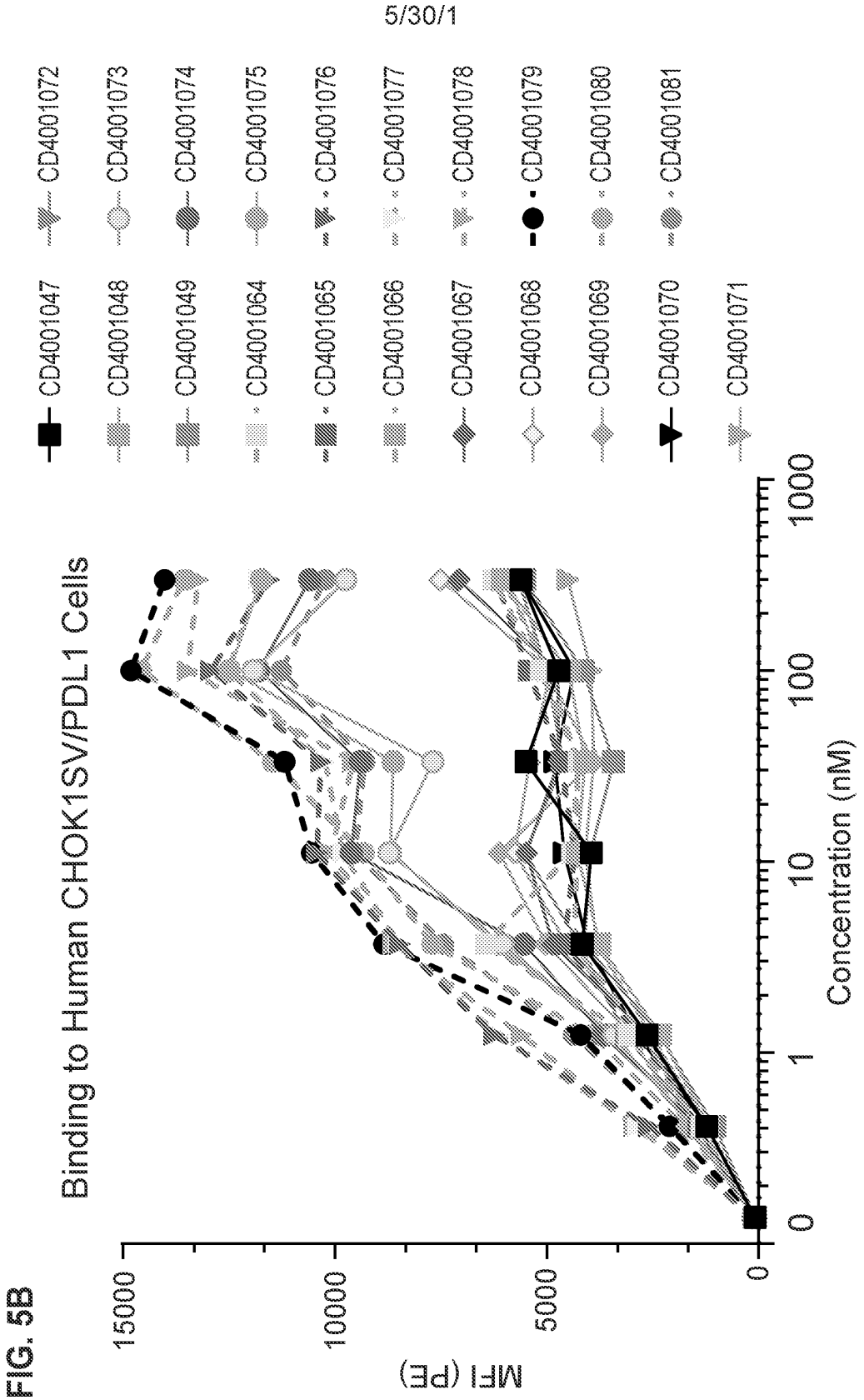
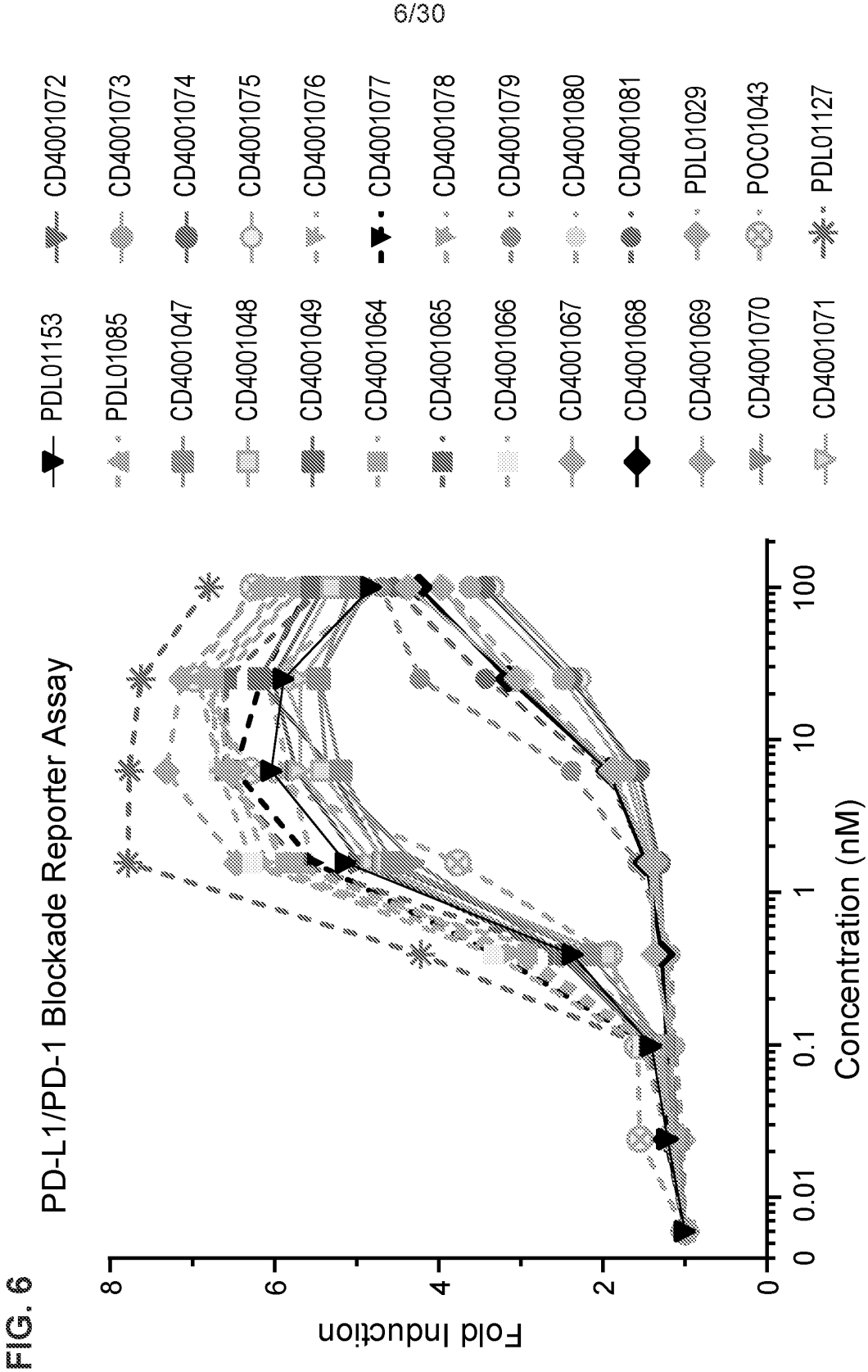

Binding to Human CHOK1SV/PDL1 Cells
MFI (PE)
15000
10000
5000
0
0
1
10
100
1000
Concentration (nM)
CD4001047
CD4001048
CD4001049
CD4001064
CD4001065
CD4001066
CD4001067
CD4001068
CD4001069
CD4001070
CD4001071
CD4001072
CD4001073
CD4001074
CD4001075
CD4001076
CD4001077
CD4001078
CD4001079
CD4001080
CD4001081

FIG. 5B

FIG. 6


PD-L1/PD-1 Blockade Reporter Assay
Fold Induction
Concentration (nM)
0
2
4
6
8
0
0.01
0.1
1
10
100
PDL01153
PDL01085
CD4001047
CD4001048
CD4001049
CD4001064
CD4001065
CD4001066
CD4001067
CD4001068
CD4001069
CD4001070
CD4001071
CD4001072
CD4001073
CD4001074
CD4001075
CD4001076
CD4001077
CD4001078
CD4001079
CD4001080
CD4001081
PDL01029
POC01043
PDL01127

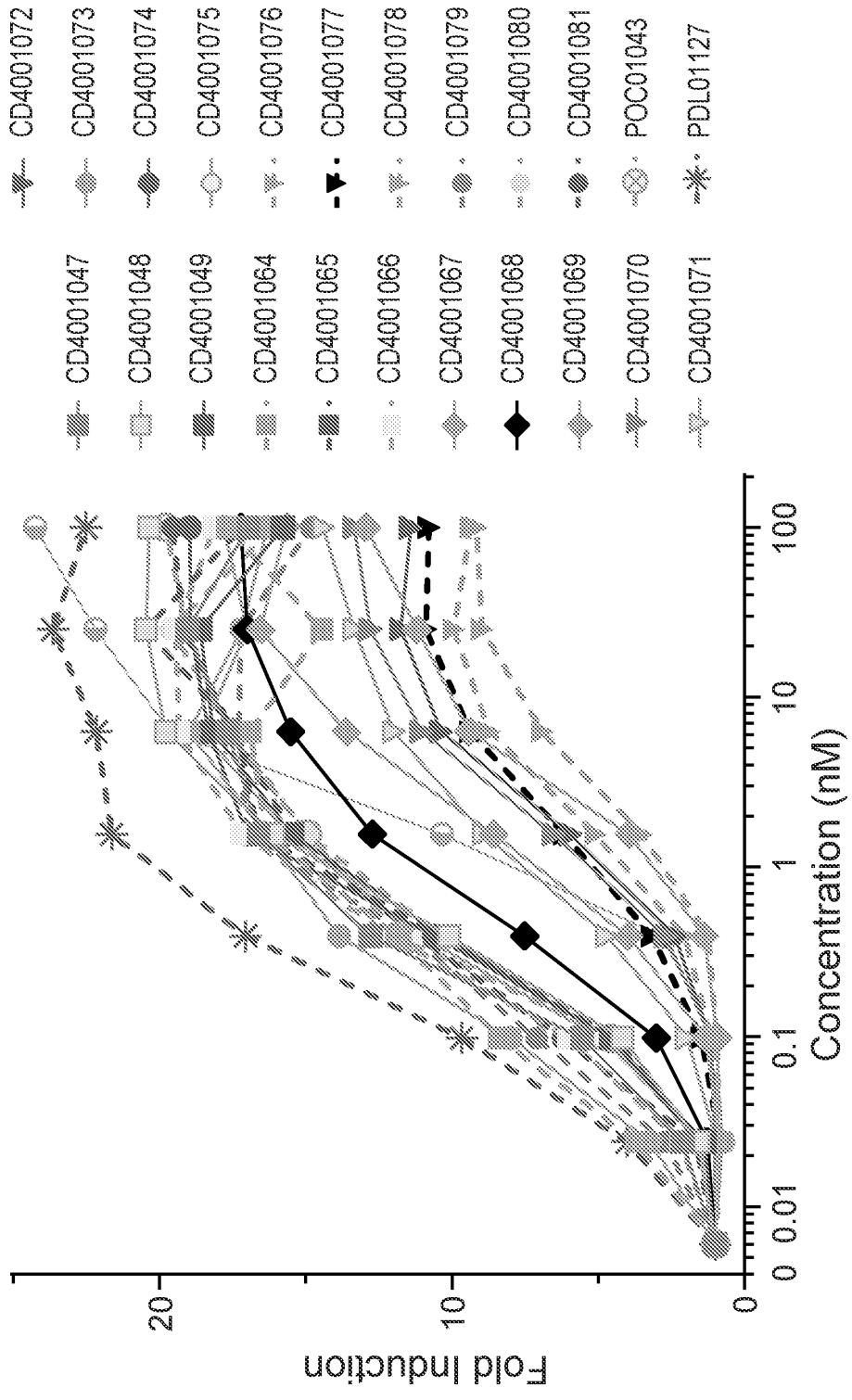

CD40 Reporter Assay
CHOK1SV/PD-L1 Target Cells
Fold Induction
0
10
20
0 0.01 0.1 1 10 100
Concentration (nM)
CD4001072
CD4001073
CD4001074
CD4001075
CD4001076
CD4001077
CD4001078
CD4001079
CD4001080
CD4001081
POC01043
PDL01127
CD4001047
CD4001048
CD4001049
CD4001064
CD4001065
CD4001066
CD4001067
CD4001068
CD4001069
CD4001070
CD4001071

FIG. 7A

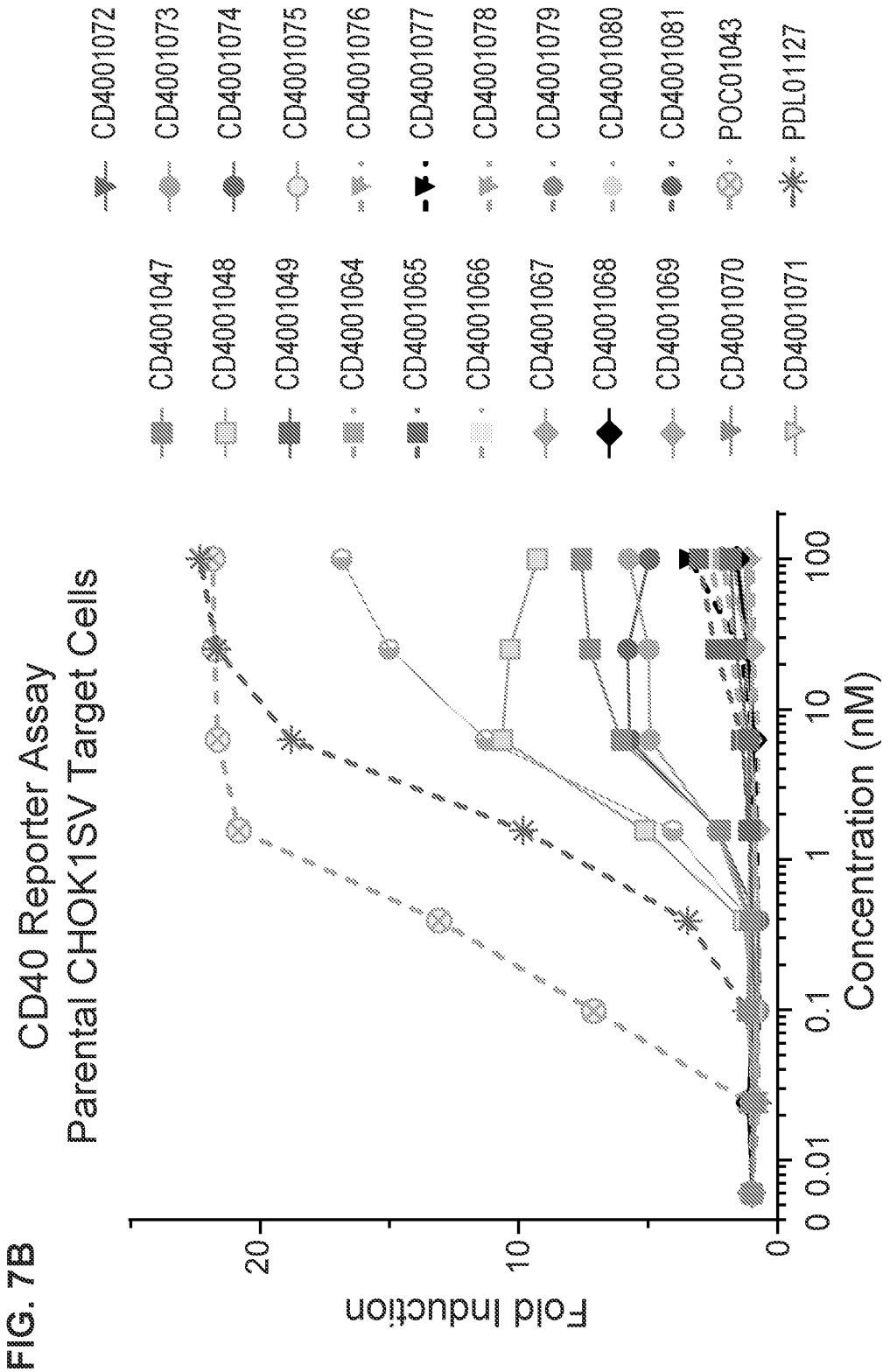

CD40 Reporter Assay
Parental CHOK1SV Target Cells
Fold Induction
0
10
20
0 0.01 0.1 1 10 100
Concentration (nM)
CD4001072
CD4001073
CD4001074
CD4001075
CD4001076
CD4001077
CD4001078
CD4001079
CD4001080
CD4001081
POC01043
PDL01127
CD4001047
CD4001048
CD4001049
CD4001064
CD4001065
CD4001066
CD4001067
CD4001068
CD4001069
CD4001070
CD4001071

FIG. 7B

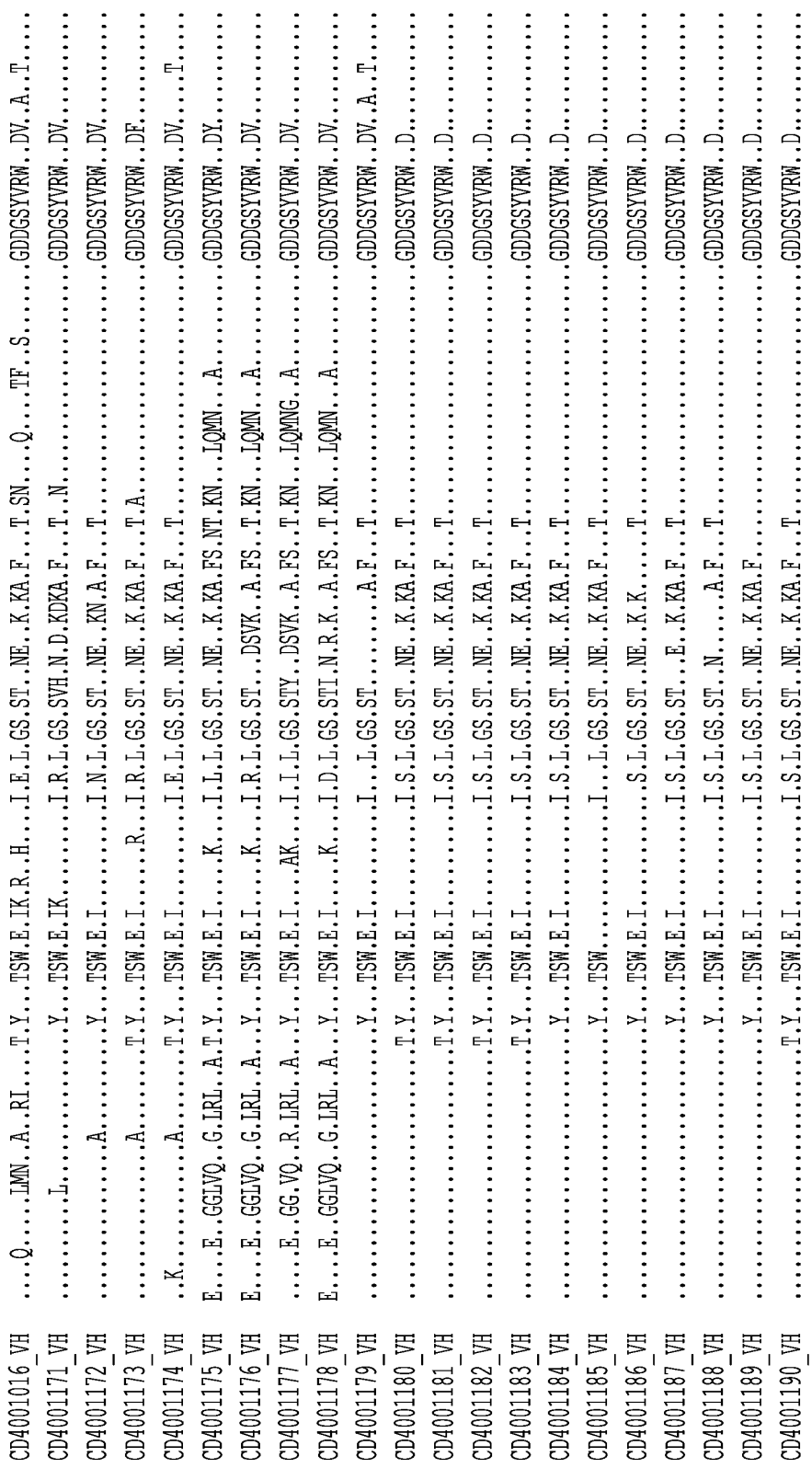
FIG. 8A

```
CD4001016_VH  ....Q.....LMN.....RI.....T....STSWIE.IK.R..H....I.E.L.GS...N.NE..K.KA.F.A...SN.A..Q....TF..S.....GDDGSYVRWY.....A..T.....
CD4001101_VH  ..............................STSWIE.IK.....I.E.L.GS...N.NEN.RNKA.F.A...I..A.....R...D.....GDDGSYVRWY.....L.....
CD4001102_VH  ..............................STSWIE.IK.....I.E.L.GS...N.NEN.RNKA.F.A...I..A.....R...D.....GDDGSYVRWY.....L.....
CD4001103_VH  ..K...........................STSWIE.I.....I.E.L.GS...N.....A.F.A.....A.....A.....GDDGSYVRWY.....T.....
CD4001134_VH  ..K...........................STSWIE.I.....I.E.L.GS...N.....A.F.A.....A.....A.....GDDGSYVRWY.....T.....
CD4001135_VH  ..............................STSWIE.....I.E.L.GS...N.....A.F.A.....A.....A.....GDDGSYVRWY.....T.....
CD4001136_VH  ..............................STSW.E.....E.L.GS...N.....A.F.A.....A.....A.....GDDGSYVRWY.....T.....
CD4001137_VH  ..............................STSW.E.....E.L.GS...N.....A.F.A.....A.....A.....GDDGSYVRWY.....T.....
CD4001138_VH  ..............................STSW.E.....E.L.GS...N.....A.F.A.....A.....A.....GDDGSYVRWY.....T.....
CD4001152_VH  ..............................STSWIE.....I.E.L.GS...N.....A.F.A.....A.....A.....GDDGSYVRWY.....T.....
CD4001153_VH  ..............................STSWIE.....I.E.L.GS...N.....A.F.A.....A.....A.....GDDGSYVRWY.....T.....
CD4001154_VH  ..............................STSWIE.....I.E.L.GS...N.....A.F.A.....A.....A.....GDDGSYVRWY.....T.....
CD4001155_VH  ..............................STSWIE.....I.E.L.GS...N.....A.F.A.....A.....A.....GDDGSYVRWY.....T.....
CD4001156_VH  ..............................STSWIE.....I.E.L.GS...N.....A.F.A.....A.....A.....GDDGSYVRWY.....T.....
CD4001157_VH  ..............................STSWIE.....I.E.L.GS...N.....A.F.A.....A.....A.....GDDGSYVRWY.....T.....
CD4001158_VH  ..............................STSW.E.....E.L.GS...N.....A.F.A.....A.....A.....GDDGSYVRWY.....T.....
CD4001160_VH  ..............................STSW.E.....E.L.GS...N.....A.F.A.....A.....A.....GDDGSYVRWY.....T.....
CD4001161_VH  ..............................STSW.E.....E.L.GS...N.....A.F.A.....A.....A.....GDDGSYVRWY.....T.....
CD4001162_VH  ..............................STSW.E.....E.L.GS...N.....A.F.A.....A.....A.....GDDGSYVRWY.....T.....
CD4001163_VH  ..............................STSW.E.....E.L.GS...N.....A.F.A.....A.....A.....GDDGSYVRWY.....T.....
CD4001164_VH  ..K...........................STSWIE.I.....I.E.L.GS...N.....A.F.A.....A.....A.....GDDGSYVRWY.....T.....
IGHV1-46+IGHJ3 QVQLVQSGAEVKKPGASVKVSCKASGYTFTSYYMHWVRQAPGQGLEWMGIINPSGGSTSYAQKFQGRVTMTRDTSTSTVYMELSSLRSEDTAVYYCARDA------FDVWGQGTMVTVSS
```

FIG. 8B

```
CD4001016_VL  ....S...S.....V..KV.MS.....L.F.V.Q.....S.....T.....G.VK...L.....H...Y.W..G.....
CD4001101_VL  ..Q.....ST.SA.V.D.V..T.....L.F.V.Q.....KA.....A.....E.....PD.F.T....H...Y.W.....V.V.
CD4001102_VL  ..Q.....S..SA.V.D.V..T.....L.F.V.Q.....KA.....S.....F.....P.I.T....H...Y.W..G...V...
CD4001103_VL  Q.....GT.SL.P.....MT.....L.F.V.Q.....A.R.....R.EP..A.T....H...Y.W..A.....
CD4001134_VL  .....L.....M.....L.F.V.Q.....H...Y.W.....
CD4001135_VL  .....L.....M.....L.F.V.Q.....H...Y.W.....
CD4001136_VL  .....L.....M.....L.F.V.Q.....H...Y.W.....
CD4001137_VL  Q.....GT.SL.P.....MT.....L.F.V.Q.....A.R.....R.EP..A.T....H...Y.W..A.....
CD4001138_VL  .....L.F.V.Q.....H...Y.W.....V...
CD4001152_VL  Q.....L.....M.....L.F.V.Q.....A.R.....R.EP....T....H...Y.W..A.....
CD4001153_VL  .....L.....M.....L.F.V.Q.....A.R.....R.EP....T....H...Y.W..A.....
CD4001154_VL  Q.....L.....M.....L.F.V.Q.....R.EP....T....H...Y.W..A.....
CD4001155_VL  Q.....L.....M.....L.F.V.Q.....A.R.....R.EP.....H...Y.W.....
CD4001156_VL  Q.....L.....M.....L.F.V.Q.....A.R.....T....H...Y.W..A.....
CD4001157_VL  Q.....L.F.V.Q.....A.R.....R.EP....T....H...Y.W..A...V...
CD4001158_VL  Q.....L.....M.....L.F.V.Q.....A.R.....R.EP....T....H...Y.W..A.....
CD4001160_VL  Q.....L.....M.....L.F.V.Q.....R.EP....T....H...Y.W..A.....
CD4001161_VL  Q.....L.....M.....L.F.V.Q.....A.R.....R.EP.....H...Y.W.....
CD4001162_VL  Q.....L.....M.....L.F.V.Q.....A.R.....T....H...Y.W..A.....
CD4001163_VL  Q.....L.F.V.Q.....A.R.....R.EP....T....H...Y.W..A...V...
CD4001164_VL  Q.....GT.SL.P.....MT.....L.F.V.Q.....A.R.....R.EP..A.T....H...Y.W..A.....
IGKV4-1+IGKJ2 DIVMTQSPDSLAVSLGERATINCKSSQSVLYSSNNKNYLAWYQQKPGQPPKLLIYWASTRESGVPDRFSGSGSGTDFTLTISSLQAEDVAVYYCQQYYSTPYTFGQGTKLEIK
```

FIG. 8C


CD4001016_VH ....Q.....LMN..A..RI....T.Y...TSW.E.IK.R..H....I.E.L.GS.ST..NE..K.KA.F...T.SN....Q....TF..S.....GDDGSVVRW..DV..A..T.....
CD4001171_VH .....L.....Y...TSW.E.IK.....I.R.L.GS.SVH.N.D.KDKA.F...T..N.....GDDGSVVRW..DV.....
CD4001172_VH .....A.....Y...TSW.E.I.....I.N.L.GS.ST..NE..KN.A.F...T.....GDDGSVVRW..DV.....
CD4001173_VH .....A.....T.Y...TSW.E.I.....R...I.R.L.GS.ST..NE..K.KA.F...T.A.....GDDGSVVRW..DF.....
CD4001174_VH ..K.....A.....T.Y...TSW.E.I.....I.E.L.GS.ST..NE..K.KA.F...T.....GDDGSVVRW..DV.....T.....
CD4001175_VH E...E..GGLVQ..G.LRL..A.T.Y...TSW.E.I.....K....I.L.L.GS.ST..NE..K.KA.FS.NT.KN...LQMN...A.....GDDGSVVRW..DY.....
CD4001176_VH E...E..GGLVQ..G.LRL..A....Y...TSW.E.I.....K....I.R.L.GS.ST...DSVK..A.FS..T.KN...LQMN...A.....GDDGSVVRW..DV.....
CD4001177_VH ....E..GG.VQ..R.LRL..A....Y...TSW.E.I....AK....I.I.L.GS.STY..DSVK..A.FS..T.KN...LQMNG..A.....GDDGSVVRW..DV.....
CD4001178_VH E...E..GGLVQ..G.LRL..A....Y...TSW.E.I.....K....I.D.L.GS.STI.N.R.K..A.FS..T.KN...LQMN...A.....GDDGSVVRW..DV.....
CD4001179_VH .....Y...TSW.E.I.....I...L.GS.ST.....A.F...T.....GDDGSVVRW..DV.A..T.....
CD4001180_VH .....T.Y...TSW.E.I.....I.S.L.GS.ST..NE..K.KA.F...T.....GDDGSVVRW..D.....
CD4001181_VH .....T.Y...TSW.E.I.....I.S.L.GS.ST..NE..K.KA.F...T.....GDDGSVVRW..D.....
CD4001182_VH .....T.Y...TSW.E.I.....I.S.L.GS.ST..NE..K.KA.F...T.....GDDGSVVRW..D.....
CD4001183_VH .....T.Y...TSW.E.I.....I.S.L.GS.ST..NE..K.KA.F...T.....GDDGSVVRW..D.....
CD4001184_VH .....Y...TSW.E.I.....I.S.L.GS.ST..NE..K.KA.F...T.....GDDGSVVRW..D.....
CD4001185_VH .....Y...TSW.....I...L.GS.ST..NE..K.KA.F...T.....GDDGSVVRW..D.....
CD4001186_VH .....Y...TSW.E.I.....S.L.GS.ST..NE..K.K.....T.....GDDGSVVRW..D.....
CD4001187_VH .....Y...TSW.E.I.....I.S.L.GS.ST...E..K.KA.F...T.....GDDGSVVRW..D.....
CD4001188_VH .....Y...TSW.E.I.....I.S.L.GS.ST..N.....A.F...T.....GDDGSVVRW..D.....
CD4001189_VH .....Y...TSW.E.I.....I.S.L.GS.ST..NE..K.KA.F.....GDDGSVVRW..D.....
CD4001190_VH .....T.Y...TSW.E.I.....I.S.L.GS.ST..NE..K.KA.F...T.....GDDGSVVRW..D.....

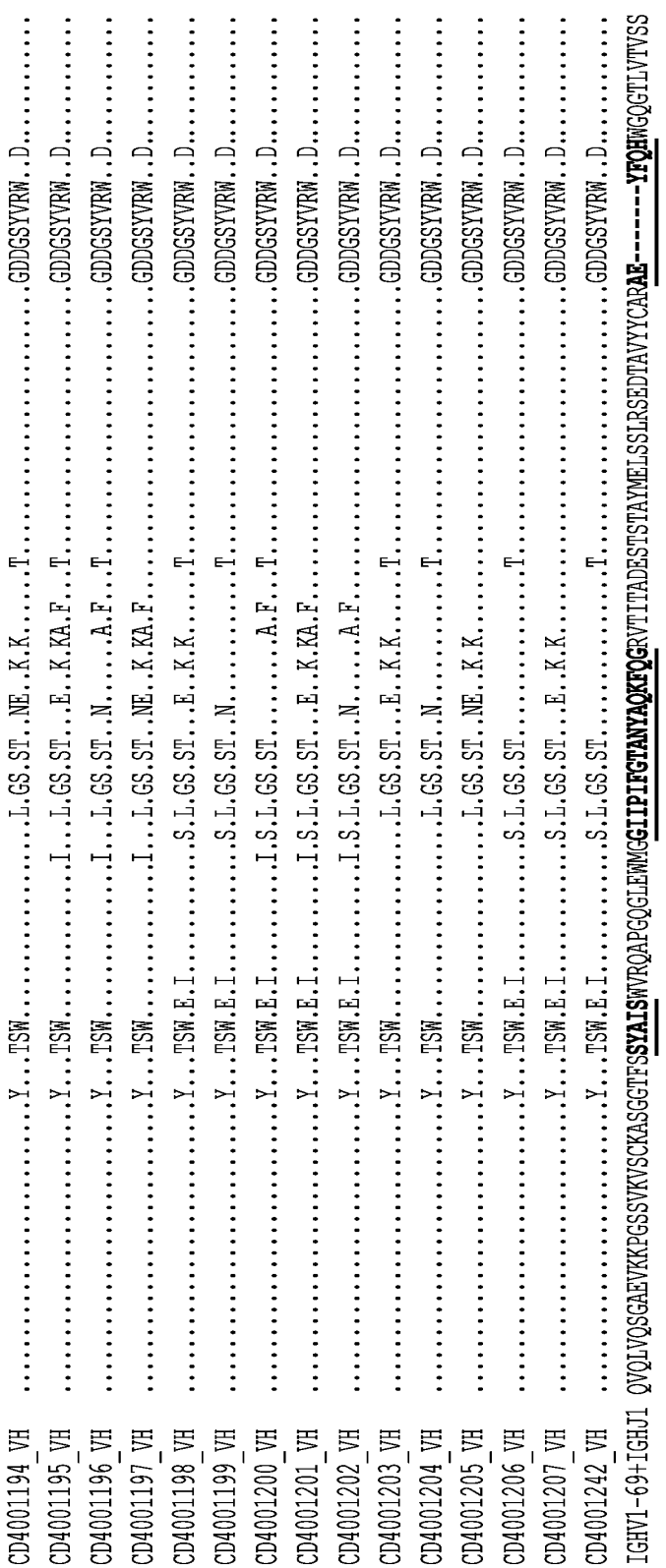

CD4001194_VH .....Y...TSW.....L.GS.ST..NE..K.K.....T.....GDDGSVTRW..D.....
CD4001195_VH .....Y...TSW.....I...L.GS.ST...E..K.KA.F...T.....GDDGSVTRW..D.....
CD4001196_VH .....Y...TSW.....I...L.GS.ST..N.....A.F...T.....GDDGSVTRW..D.....
CD4001197_VH .....Y...TSW.....I...L.GS.ST..NE..K.KA.F.....GDDGSVTRW..D.....
CD4001198_VH .....Y...TSW.E.I.....S.I.GS.ST...E..K.K.....T.....GDDGSVTRW..D.....
CD4001199_VH .....Y...TSW.E.I.....S.I.GS.ST..N.....T.....GDDGSVTRW..D.....
CD4001200_VH .....Y...TSW.E.I.....I.S.I.GS.ST.....A.F...T.....GDDGSVTRW..D.....
CD4001201_VH .....Y...TSW.E.I.....I.S.I.GS.ST...E..K.KA.F.....GDDGSVTRW..D.....
CD4001202_VH .....Y...TSW.E.I.....I.S.I.GS.ST..N.....A.F.....GDDGSVTRW..D.....
CD4001203_VH .....Y...TSW.....L.GS.ST...E..K.K.....T.....GDDGSVTRW..D.....
CD4001204_VH .....Y...TSW.....L.GS.ST..N.....T.....GDDGSVTRW..D.....
CD4001205_VH .....Y...TSW.....L.GS.ST..NE..K.K.....GDDGSVTRW..D.....
CD4001206_VH .....Y...TSW.E.I.....S.I.GS.ST.....T.....GDDGSVTRW..D.....
CD4001207_VH .....Y...TSW.E.I.....S.I.GS.ST...E..K.K.....GDDGSVTRW..D.....
CD4001242_VH .....Y...TSW.E.I.....S.I.GS.ST.....T.....GDDGSVTRW..D.....
IGHV1-69+IGHJ1 QVQLVQSGAEVKKPGSSVKVSCKASGGTFS**SYAIS**WVRQAPGQGLEWMG**GIIPIFGTANYAQKFQG**RVTITADESTSTAYMELSSLRSEDTAVYYCAR**AE------YFQH**WGQGTLVTVSS

FIG. 8C (cont.)

FIG. 8D

```
CD4001016_VL  .V.S.....AV...EK..MS.KS..SLLFSVNQK.....Y.....QS..L...W..TRE....D..T.....G.VKA..L.V....H.Y.....G...L...
CD4001171_VL  .........T.....................KS..SLLFSVNQK.....Y.....L...W..TRE.....D.....H.Y.....V.
CD4001172_VL  .V.....D..AV.L.E.A..N.KS..SLLFSVNQK.....Y.....QP..L...W..YRE....D.....A..V.V....H.Y.....G.....
CD4001173_VL  E.V.....AT..L.P.E.A.LS..S..SLLFSVNQK..I..Y.....Q..RL...W..TRE....D.....E....V....H.Y.....L...
CD4001174_VL  .....................QS..SLLFSVNQK.....Y.....L...W..TRE....D.....F.....I.....H.Y.....G.....
CD4001175_VL  .....................S..SLLFSVNQK..V..Y.....L...W..TRE....D.....H.Y.....E.....
CD4001176_VL  .....................S..SLLFSVNQK..V..Y.....L...W..F.Y.....H.Y.....
CD4001177_VL  E.V.....DFQ.VTPKEK.....S..SLLFSVNQK.....Y.....DQS..L...W..QSF.....N..EA..A.A....H.Y.....P....D..
CD4001178_VL  .....................KS..SLLFSVNQK..V..Y.....L...W..YRYT.....H.Y.....
CD4001179_VL  .V.....D..AV.L.E.A..N.KS..SLLFSVNQK.....Y.....QP..L...W..TRE....D.....A..V.V....H.Y.....G...L...
CD4001180_VL  .........V.....................S..SLLFSVNQK.....Y.....L...W..TRE....D.....H.Y.....
CD4001181_VL  .........V.....................SLLFSVNQK.....Y.....L...W..TRE....D.....H.Y.....
CD4001182_VL  .........V.....................S..SLLFSVNQK.....Y.....L...W...R.....D.....H.Y.....
CD4001183_VL  .........V.....................S..SLLFSVNQK.....Y.....L...W..T.E.....H.Y.....
CD4001184_VL  .........V.....................S..SLLFSVNQK.....Y.....L...W..TRE....D.....H.Y.....
CD4001185_VL  .........V.....................S..SLLFSVNQK.....Y.....L...W..TRE....D.....H.Y.....
CD4001186_VL  .........V.....................S..SLLFSVNQK.....Y.....L...W..TRE....D.....H.Y.....
CD4001187_VL  .........V.....................S..SLLFSVNQK.....Y.....L...W..TRE....D.....H.Y.....
CD4001188_VL  .........V.....................S..SLLFSVNQK.....Y.....L...W..TRE....D.....H.Y.....
CD4001189_VL  .........V.....................S..SLLFSVNQK.....Y.....L...W..TRE....D.....H.Y.....
```

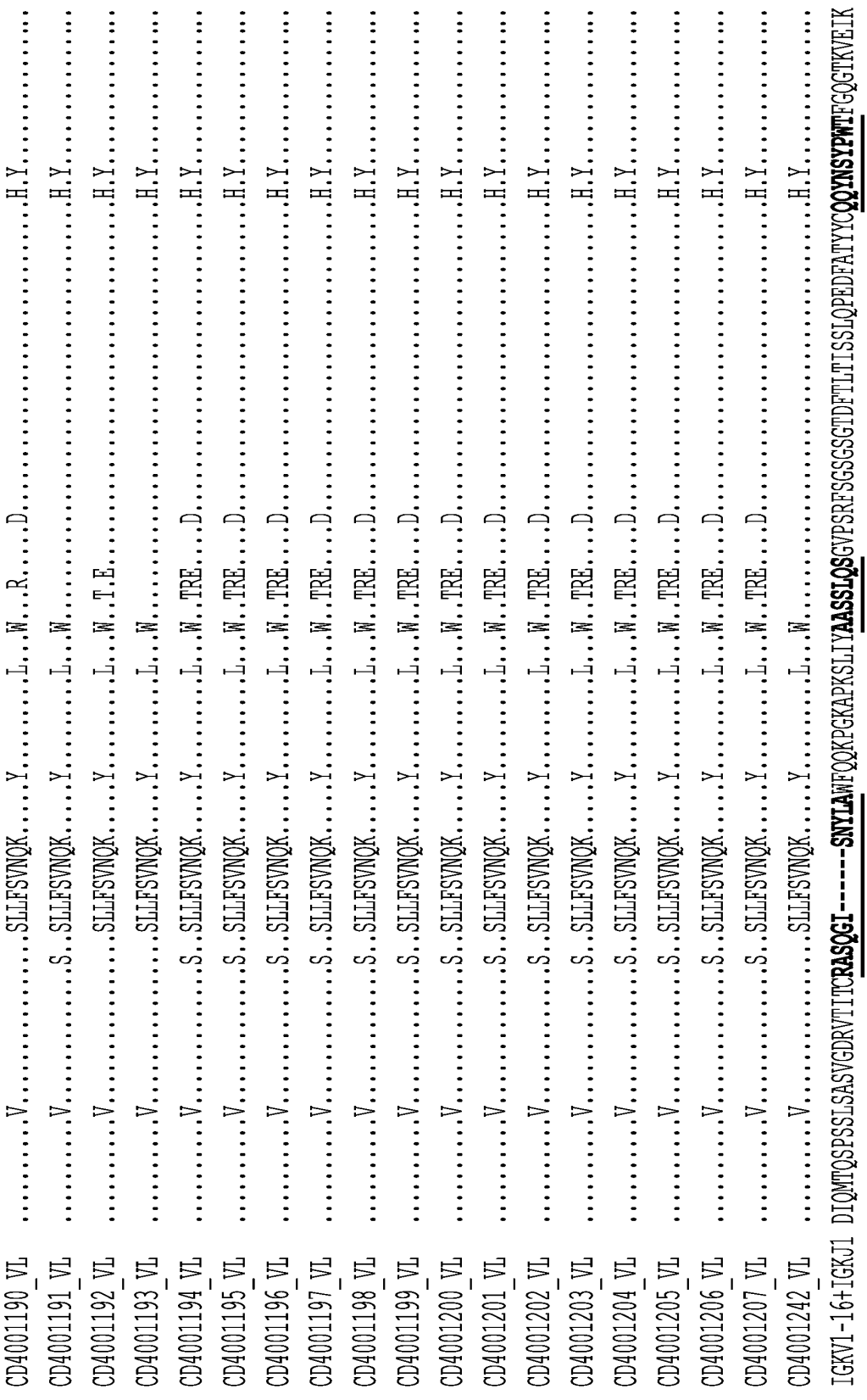

CD4001190_VL .....V.....SLLFSVNQK.....Y.....L..W..R.....D.....H.Y.....
CD4001191_VL .....V.....S..SLLFSVNQK.....Y.....L..W.....H.Y.....
CD4001192_VL .....V.....SLLFSVNQK.....Y.....L..W.T.E.....H.Y.....
CD4001193_VL .....V.....SLLFSVNQK.....Y.....L..W.....H.Y.....
CD4001194_VL .....V.....S..SLLFSVNQK.....Y.....L..W.TRE...D.....H.Y.....
CD4001195_VL .....V.....S..SLLFSVNQK.....Y.....L..W.TRE...D.....H.Y.....
CD4001196_VL .....V.....S..SLLFSVNQK.....Y.....L..W.TRE...D.....H.Y.....
CD4001197_VL .....V.....S..SLLFSVNQK.....Y.....L..W.TRE...D.....H.Y.....
CD4001198_VL .....V.....S..SLLFSVNQK.....Y.....L..W.TRE...D.....H.Y.....
CD4001199_VL .....V.....S..SLLFSVNQK.....Y.....L..W.TRE...D.....H.Y.....
CD4001200_VL .....V.....S..SLLFSVNQK.....Y.....L..W.TRE...D.....H.Y.....
CD4001201_VL .....V.....S..SLLFSVNQK.....Y.....L..W.TRE...D.....H.Y.....
CD4001202_VL .....V.....S..SLLFSVNQK.....Y.....L..W.TRE...D.....H.Y.....
CD4001203_VL .....V.....S..SLLFSVNQK.....Y.....L..W.TRE...D.....H.Y.....
CD4001204_VL .....V.....S..SLLFSVNQK.....Y.....L..W.TRE...D.....H.Y.....
CD4001205_VL .....V.....S..SLLFSVNQK.....Y.....L..W.TRE...D.....H.Y.....
CD4001206_VL .....V.....S..SLLFSVNQK.....Y.....L..W.TRE...D.....H.Y.....
CD4001207_VL .....V.....S..SLLFSVNQK.....Y.....L..W.TRE...D.....H.Y.....
CD4001242_VL .....V.....SLLFSVNQK.....Y.....L..W.....H.Y.....
IGKV1-16+IGKJ1 DIQMTQSPSSLSASVGDRVTITC**RASQGI-----SNYLA**WFQQKPGKAPKSLIY**AASSLQS**GVPSRFSGSGSGTDFTLTISSLQPEDFATYYC**QQYNSYPWT**FGQGTKVEIK

FIG. 8D (cont.)

FIG. 9A

```
CD4001018_VH  ..M.V.....K.....K.....T.ERR....AS..SA.TYI..P.....A.I.....S....M....RHGNG.DPLWYF....A.....
CD4001086_VH  ...V.....R.....AS..SA.TYI.....Q.....G.S.....L....RHGNG.DPLWYF.....M.....
CD4001087_VH  ...V.....R.....AS..SA.TYI.....Q.....G.S.....L....RHGNG.DPLWYF.....M.....
CD4001088_VH  ...V.....R.....AS..SA.TYI.....Q.....G.S.....L....RHGNG.DPLWYF.....M.....
CD4001089_VH  ...V.....R.....AS..SA.TYI.....Q.....G.S.....L....RHGNG.DPLWYF.....M.....
CD4001090_VH  ...V....V....R.....AS..SA.TYI.....G.....RHGNG.DPLWYF.....L.....
CD4001091_VH  ...V....V....R.....AS..SA.TYI.....G.....RHGNG.DPLWYF.....L.....
CD4001092_VH  ...V....V....R.....AS..SA.TYI.....G.....RHGNG.DPLWYF.....L.....
CD4001093_VH  .....AS..SA.TYI..T.....S.....RHGNG.DPLWYF.....
CD4001094_VH  .....AS..SA.TYI..T.....S.....RHGNG.DPLWYF.....
CD4001095_VH  Q...V.....V..AS..SA.TYI.....A.....T.....I....RHGNG.DPLWYF.....AL.....
CD4001096_VH  Q...V.....V..AS..SA.TYI.....A.....T.....I....RHGNG.DPLWYF.....AL.....
CD4001097_VH  Q...V.....K.....AS..SA.TYI.....A..S.....RHGNG.DPLWYF....A.....
CD4001098_VH  Q...V.....K.....AS..SA.TYI.....A..S.....RHGNG.DPLWYF....A.....
CD4001099_VH  ....V.....E.....AS..SA.TYI.....RHGNG.DPLWYF.....
CD4001100_VH  ....V.....E.....AS..SA.TYI.....RHGNG.DPLWYF.....
CD4001132_VH  ....V.....SA.TYI.....RHGNG.DPLWYF.....
CD4001133_VH  ....V.....SA.TYI.....RHGNG.DPLWYF.....
IGHV3-23+IGHJ6 EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSAISGSGGSTYYADSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAKYYYYG----MDVWGQGTTVTVSS
```

FIG. 9B

```
CD4001018_VL  .VV...T.L..PV.L..QAS.S..S...LVHYNGYT..H..L....QS.....KV.NRF....D.....................K..RVEA..LGV.F.S.TTHV.L...A...L.IR
CD4001086_VL  EVV.....GT..L.P.E.A.LS..S...LVHYNGYT..H.....Q..R.....KV.NRF..I.A.....................R.E...L.V.F.S.TTHV.L.....
CD4001087_VL  EVV.....DT..V.P.E.A.LS..S...LVHYNGYT..H.....QV.R.....KV.NRF....A.T.....E.....S....V.F.S.TTHV.L.....L...
CD4001088_VL  EVV.....DFQ.VTPKEK.....S...LVHYNGYT..H.....DQS.....KV.NRF.....................N..EA..A.A.F.S.TTHV.L...P....D..
CD4001089_VL  .V.....IL.....S...LVHYNGYT.VH....RTNGS.R....KV.NRF....D.....................I.D.F...TTHV.L...A.....
CD4001090_VL  EVV.....DFQ.VTPKEK.....S...LVHYNGYT..H.....DQS.....KV.NRF.....................N..EA..A.A.F.S.TTHV.L...P....D..
CD4001091_VL  .V.....IL.....S...LVHYNGYT.VH....RTNGS.R....KV.NRF....D.....................I.D.F...TTHV.L...A.....
CD4001092_VL  .VV.....D..AV.L.E.A..N..S...LVHYNGYT..H.....QP.....KV.NRF....D.....................A..V.V.F.S.TTHV.L...A...L.IR
CD4001093_VL  .VV.....DT..L.P.E.A.LS..S...LVHYNGYT..H....Q..Q..R....KV.NRF..I.D.....................R.E.....V.F.S.TTHV.L.....L...
CD4001094_VL  .V.....IL.....S...LVHYNGYT.VH....RTNGS.R....KV.NRF....D.....................I.D.F...TTHV.L...A.....
CD4001095_VL  .VV.....DT..L.P.E.A.LS..S...LVHYNGYT..H....Q..Q..R....KV.NRF..I.D.....................R.E.....V.F.S.TTHV.L.....L...
CD4001096_VL  .V.....IL.....S...LVHYNGYT.VH....RTNGS.R....KV.NRF....D.....................I.D.F...TTHV.L...A.....
CD4001097_VL  EVV.....GT..L.P.E.A.LS..S...LVHYNGYT..H.....Q..R.....KV.NRF..I.A.....................R.E...L.V.F.S.TTHV.L.....
CD4001098_VL  .V.....IL.....S...LVHYNGYT.VH....RTNGS.R....KV.NRF....D.....................I.D.F...TTHV.L...A.....
CD4001099_VL  EVV.....DFQ.VTPKEK.....S...LVHYNGYT..H.....DQS.....KV.NRF.....................N..EA..A.A.F.S.TTHV.L...P....D..
CD4001100_VL  .V.....IL.....S...LVHYNGYT.VH....RTNGS.R....KV.NRF....D.....................I.D.F...TTHV.L...A.....
CD4001132_VL  .V.....IL.....S...LVHYNGYT.VH.....................KV.N.F.....................I.D.F...TTHV.L...A.....
CD4001133_VL  ..........LVHYNGYT.....................KV.NRF....D.....................TTHV.L.....
IGKV1-39-IGKJ1 DIQMTQSPSSLSASVGDRVTITC RASQSTS----SYLN WYQQKPGKAPKLLIY AASSLQS GVPSRFSGSGSGTDFTLTISSLQPEDFATYYC QQSYSTPWT FGQGTKVEIK
```

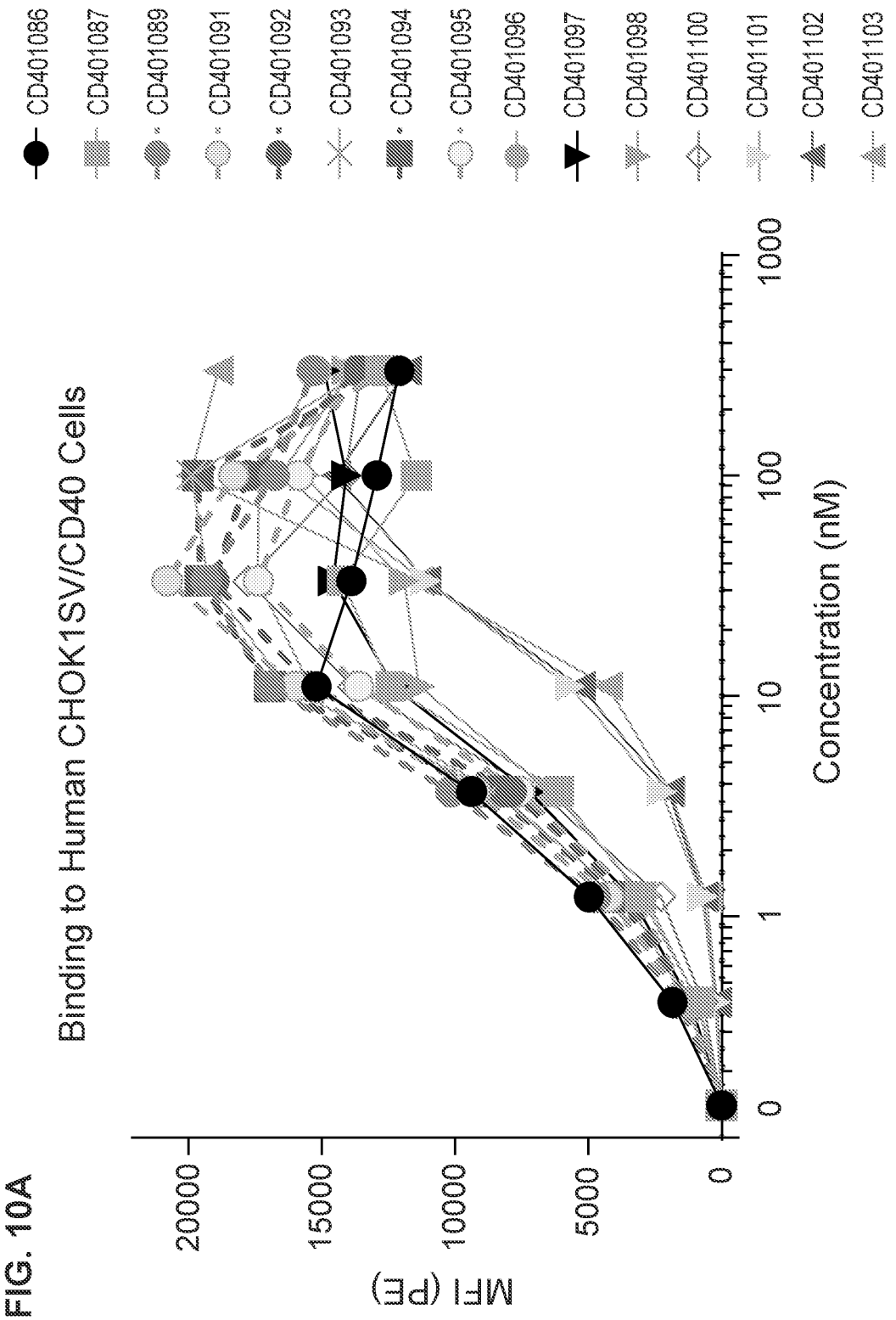

Binding to Human CHOK1SV/CD40 Cells
MFI (PE)
20000
15000
10000
5000
0
0
1
10
100
1000
Concentration (nM)
CD401086
CD401087
CD401089
CD401091
CD401092
CD401093
CD401094
CD401095
CD401096
CD401097
CD401098
CD401100
CD401101
CD401102
CD401103

FIG. 10A

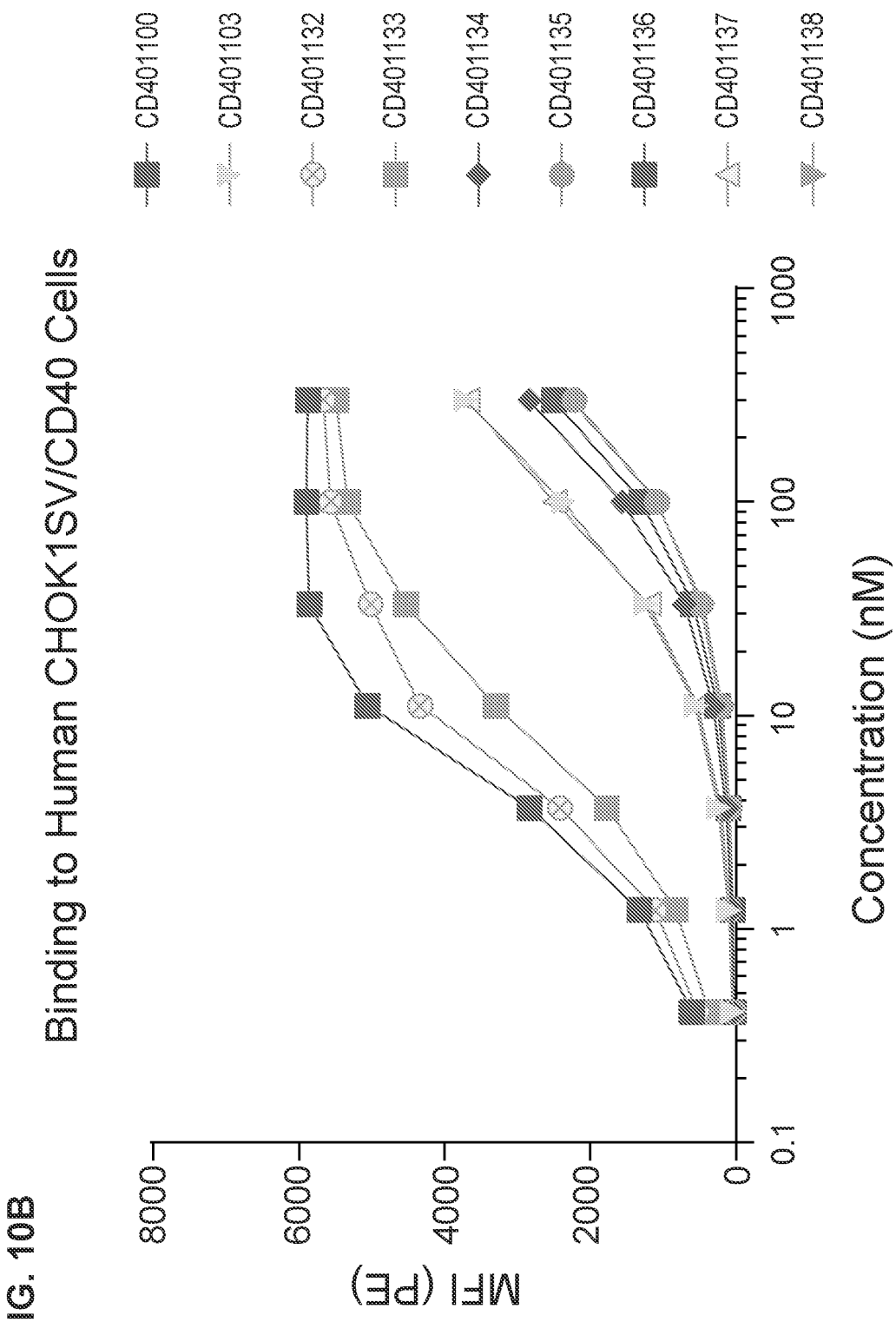

Binding to Human CHOK1SV/CD40 Cells
CD401100
CD401103
CD401132
CD401133
CD401134
CD401135
CD401136
CD401137
CD401138
MFI (PE)
8000
6000
4000
2000
0
0.1
1
10
100
1000
Concentration (nM)

FIG. 10B

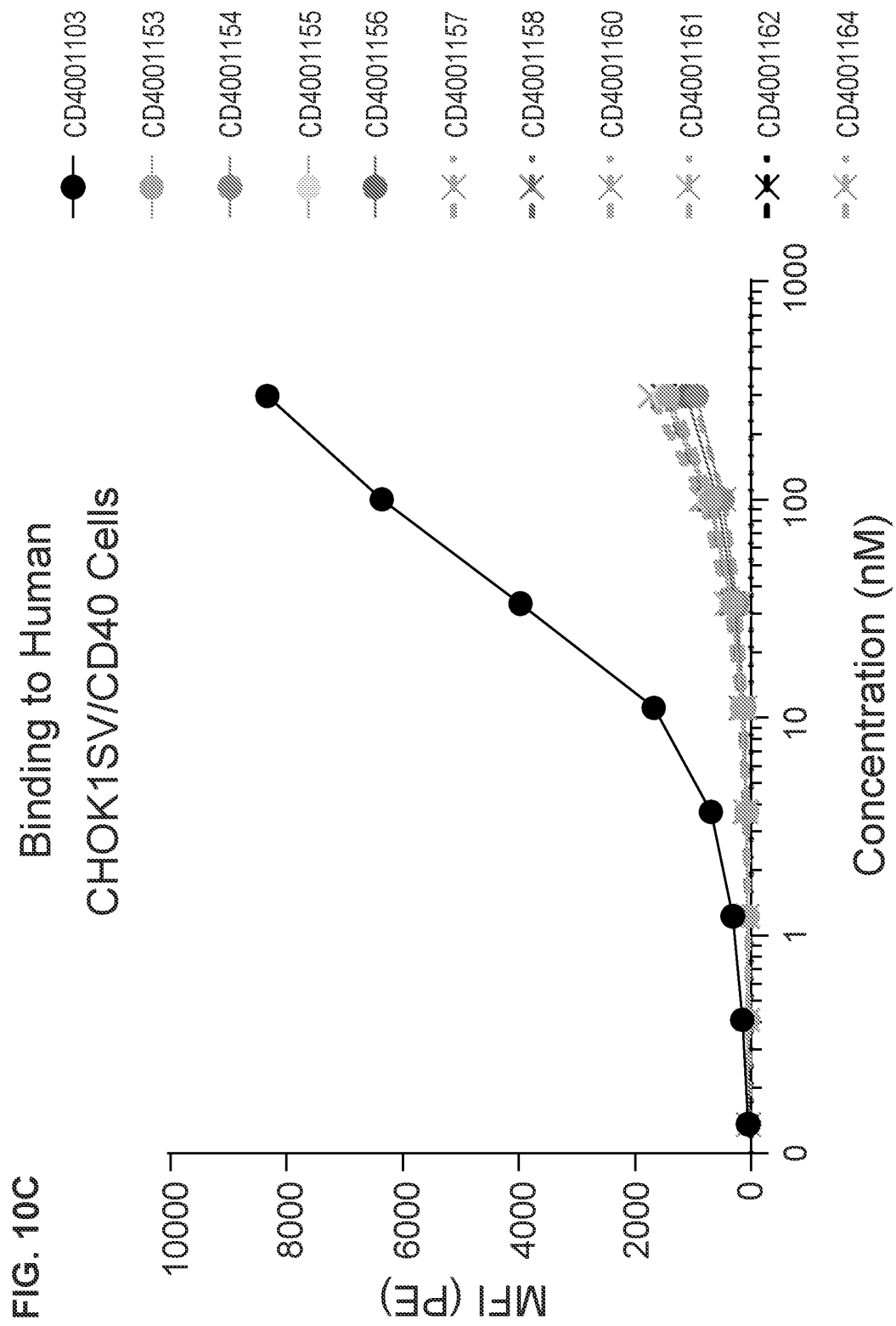

Binding to Human
CHOK1SV/CD40 Cells
MFI (PE)
10000
8000
6000
4000
2000
0
0
1
10
100
1000
Concentration (nM)
CD4001103
CD4001153
CD4001154
CD4001155
CD4001156
CD4001157
CD4001158
CD4001160
CD4001161
CD4001162
CD4001164

FIG. 10C

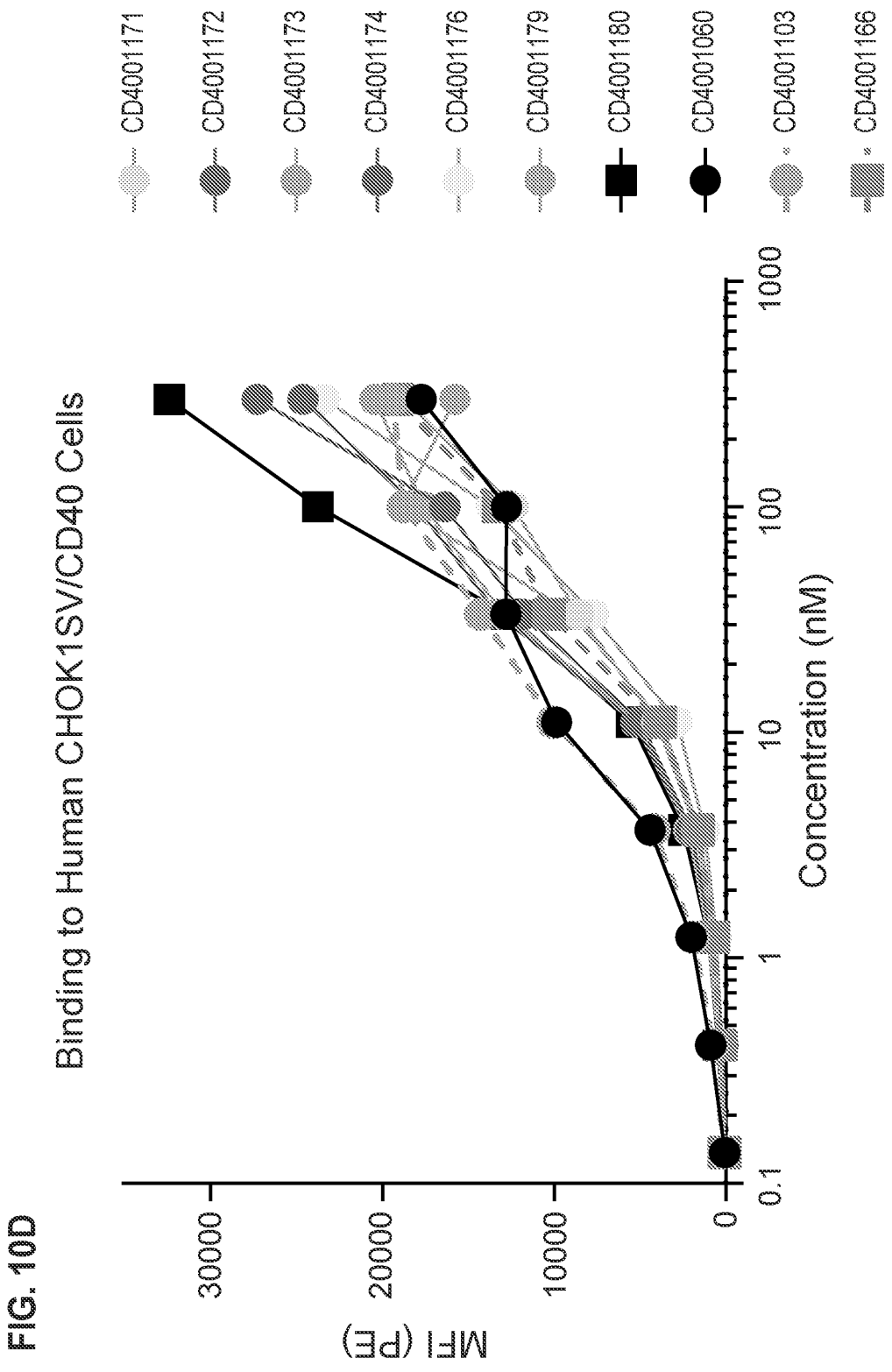

Binding to Human CHOK1SV/CD40 Cells
MFI (PE)
30000
20000
10000
0
0.1
1
10
100
1000
Concentration (nM)
CD4001171
CD4001172
CD4001173
CD4001174
CD4001176
CD4001179
CD4001180
CD4001060
CD4001103
CD4001166

FIG. 10D

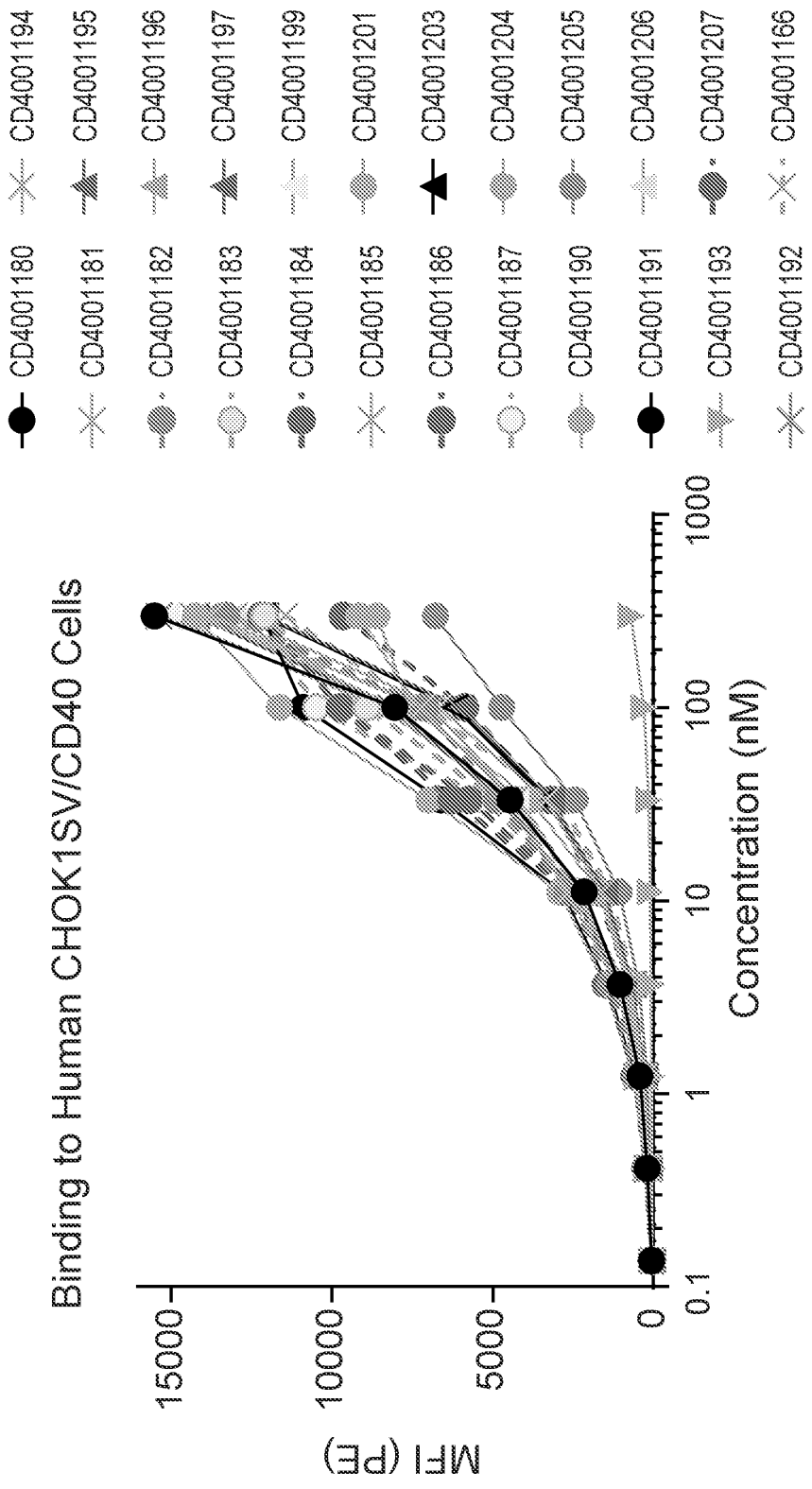

Binding to Human CHOK1SV/CD40 Cells
MFI (PE)
15000
10000
5000
0
0.1
1
10
100
1000
Concentration (nM)
CD4001180
CD4001181
CD4001182
CD4001183
CD4001184
CD4001185
CD4001186
CD4001187
CD4001190
CD4001191
CD4001193
CD4001192
CD4001194
CD4001195
CD4001196
CD4001197
CD4001199
CD4001201
CD4001203
CD4001204
CD4001205
CD4001206
CD4001207
CD4001166

FIG. 10E

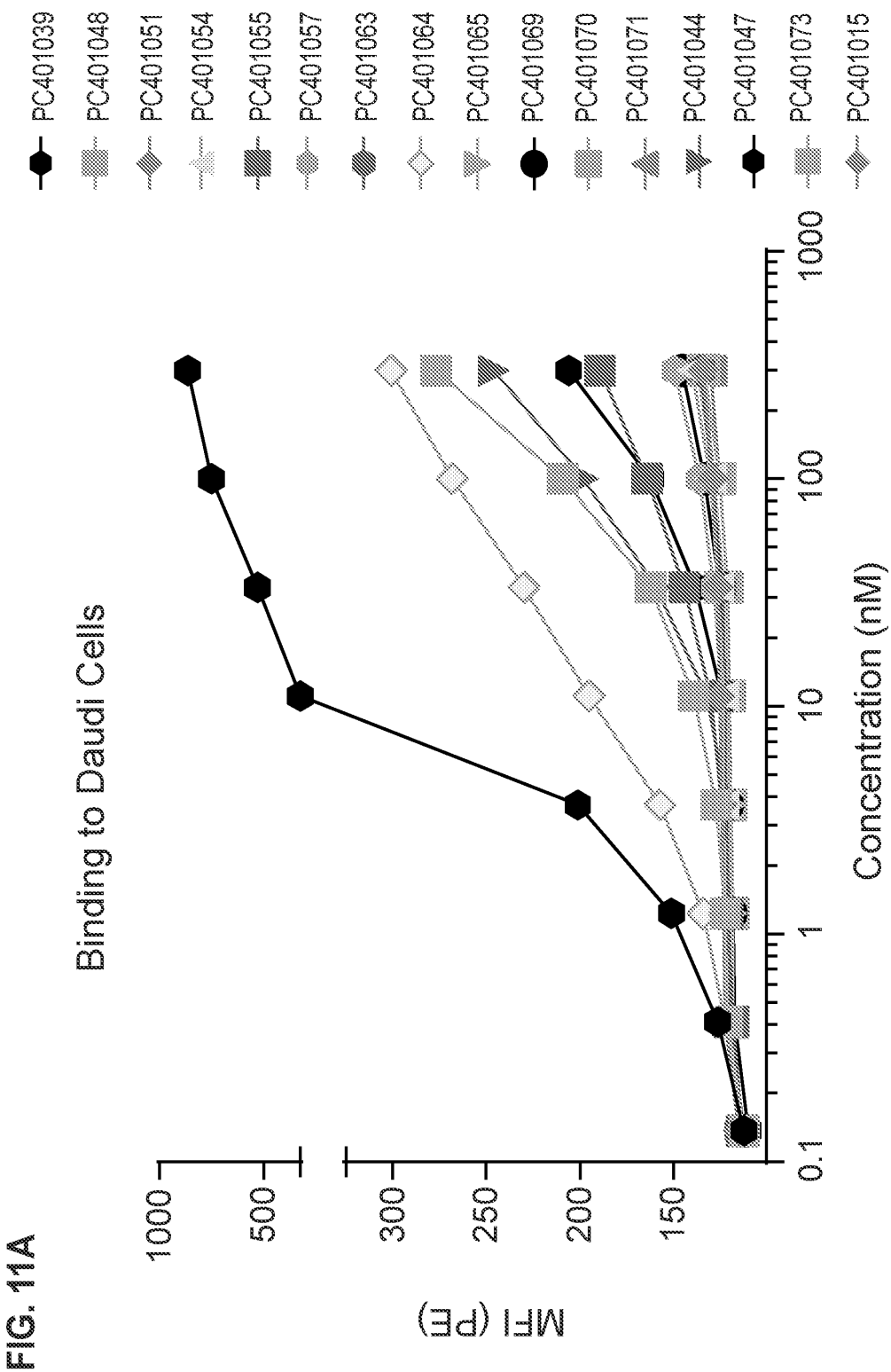

Binding to Daudi Cells
MFI (PE)
1000
500
300
250
200
150
0.1
1
10
100
1000
Concentration (nM)
PC401039
PC401048
PC401051
PC401054
PC401055
PC401057
PC401063
PC401064
PC401065
PC401069
PC401070
PC401071
PC401044
PC401047
PC401073
PC401015

FIG. 11A

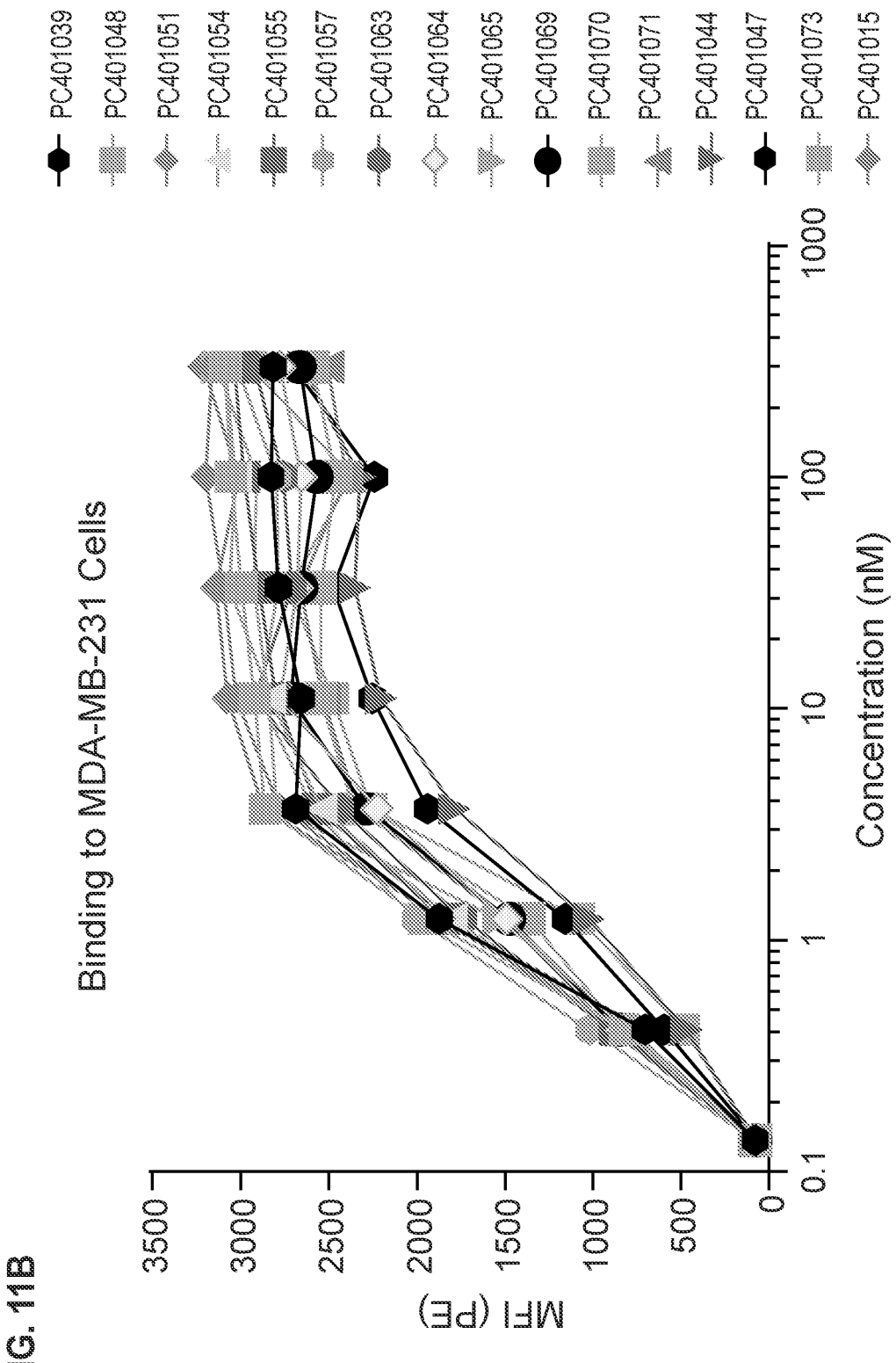

Binding to MDA-MB-231 Cells
MFI (PE)
0
500
1000
1500
2000
2500
3000
3500
0.1
1
10
100
1000
Concentration (nM)
PC401039
PC401048
PC401051
PC401054
PC401055
PC401057
PC401063
PC401064
PC401065
PC401069
PC401070
PC401071
PC401044
PC401047
PC401073
PC401015

FIG. 11B

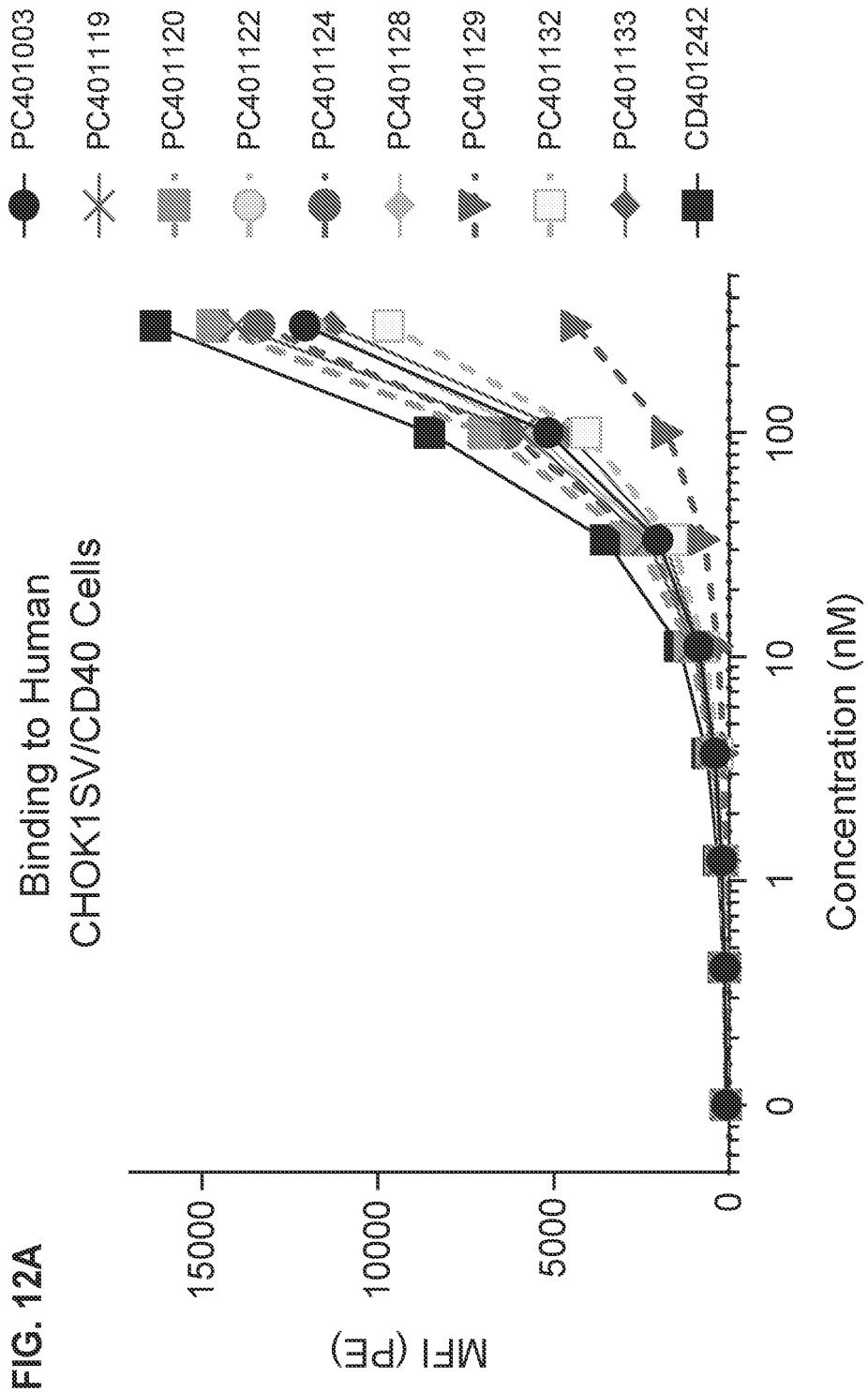

Binding to Human
CHOK1SV/CD40 Cells
MFI (PE)
15000
10000
5000
0
0
1
10
100
Concentration (nM)
PC401003
PC401119
PC401120
PC401122
PC401124
PC401128
PC401129
PC401132
PC401133
CD401242

FIG. 12A

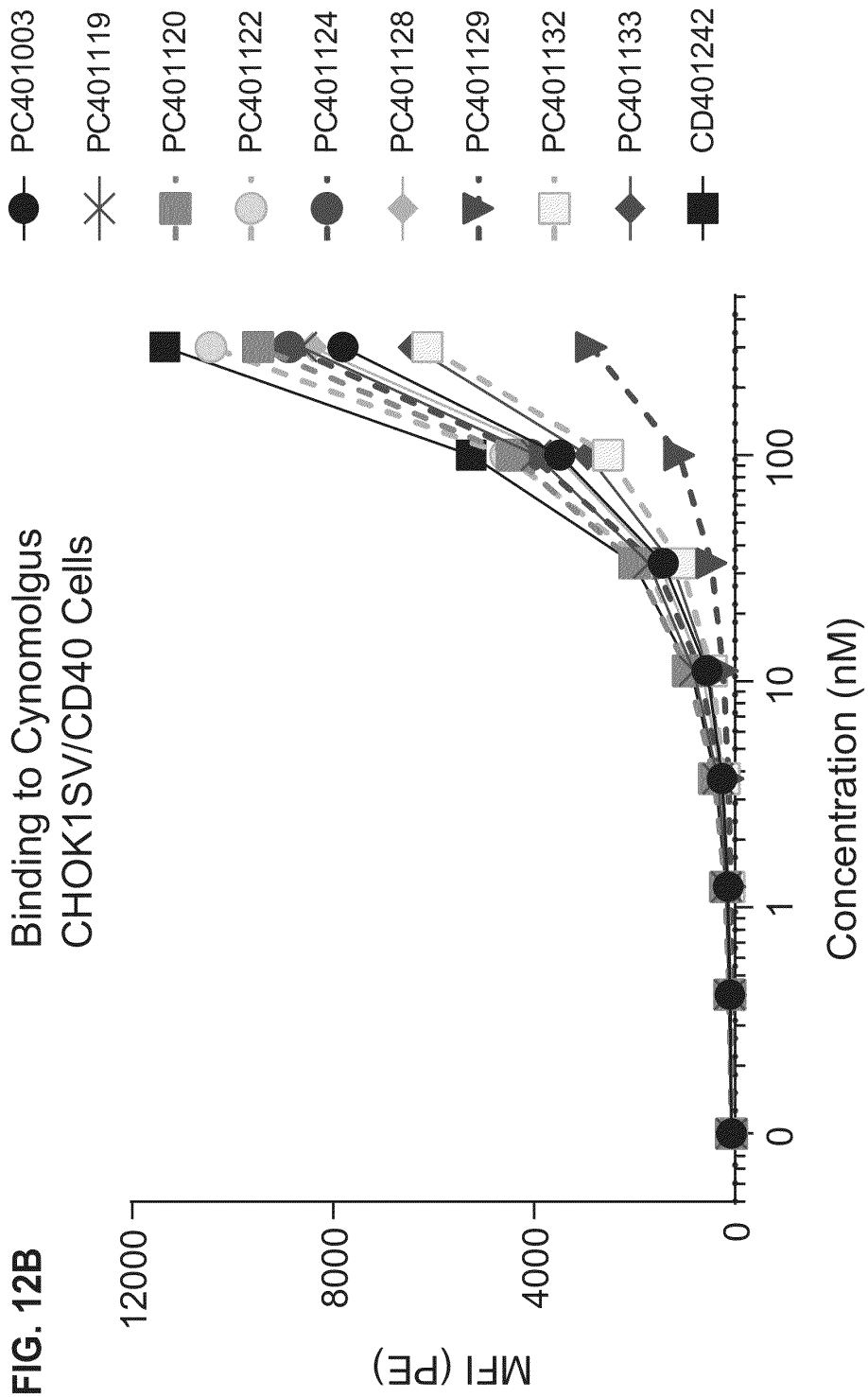

PC401003
PC401119
PC401120
PC401122
PC401124
PC401128
PC401129
PC401132
PC401133
CD401242
Binding to Cynomolgus
CHOK1SV/CD40 Cells
MFI (PE)
12000
8000
4000
0
0
1
10
100
Concentration (nM)

FIG. 12B

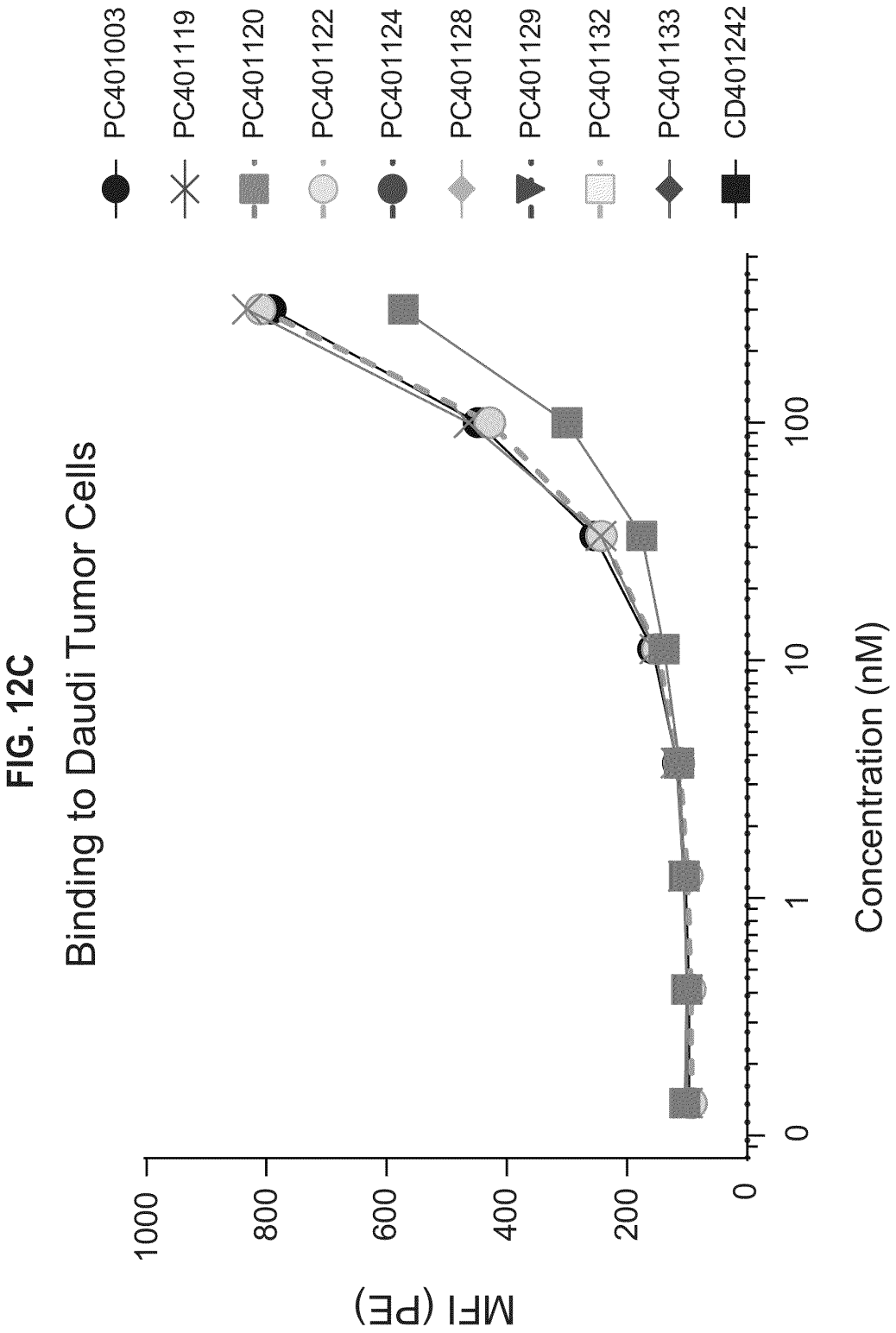

PC401003
PC401119
PC401120
PC401122
PC401124
PC401128
PC401129
PC401132
PC401133
CD401242
Binding to Daudi Tumor Cells
MFI (PE)
0
200
400
600
800
1000
0
1
10
100
Concentration (nM)

FIG. 12C

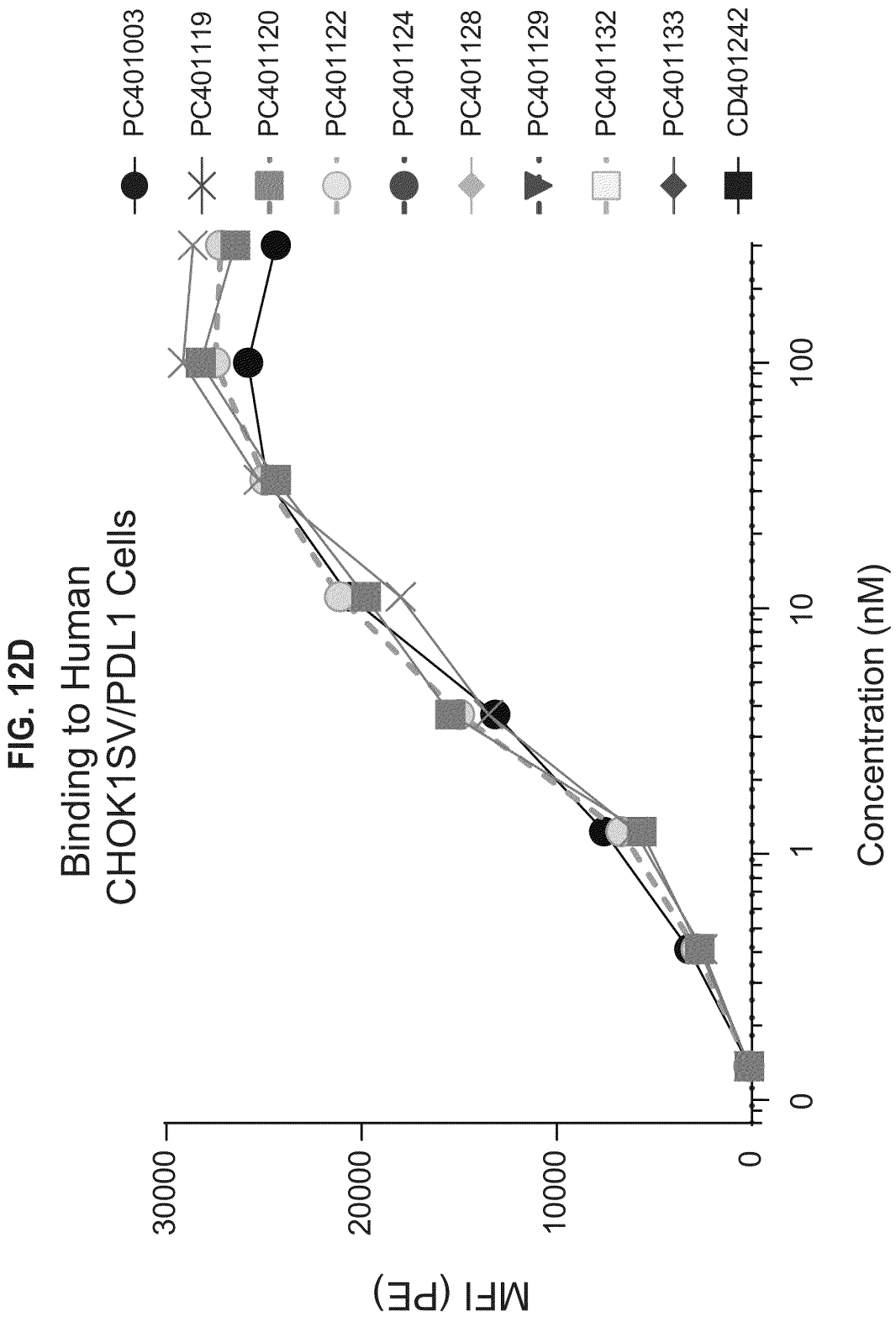


FIG. 12D
Binding to Human CHOK1SV/PDL1 Cells

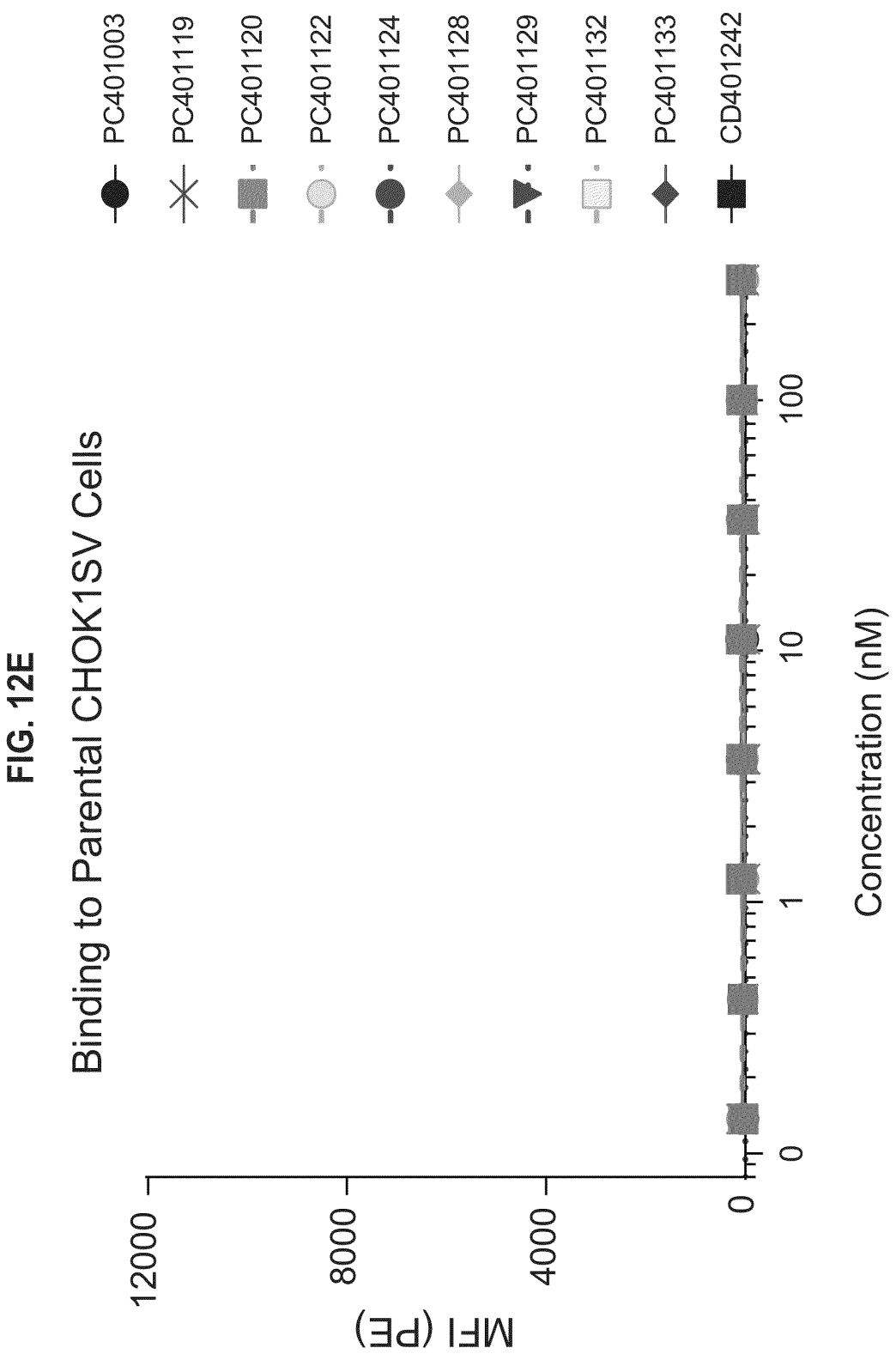

PC401003
PC401119
PC401120
PC401122
PC401124
PC401128
PC401129
PC401132
PC401133
CD401242
Binding to Parental CHOK1SV Cells
MFI (PE)
12000
8000
4000
0
0
1
10
100
Concentration (nM)

FIG. 12E

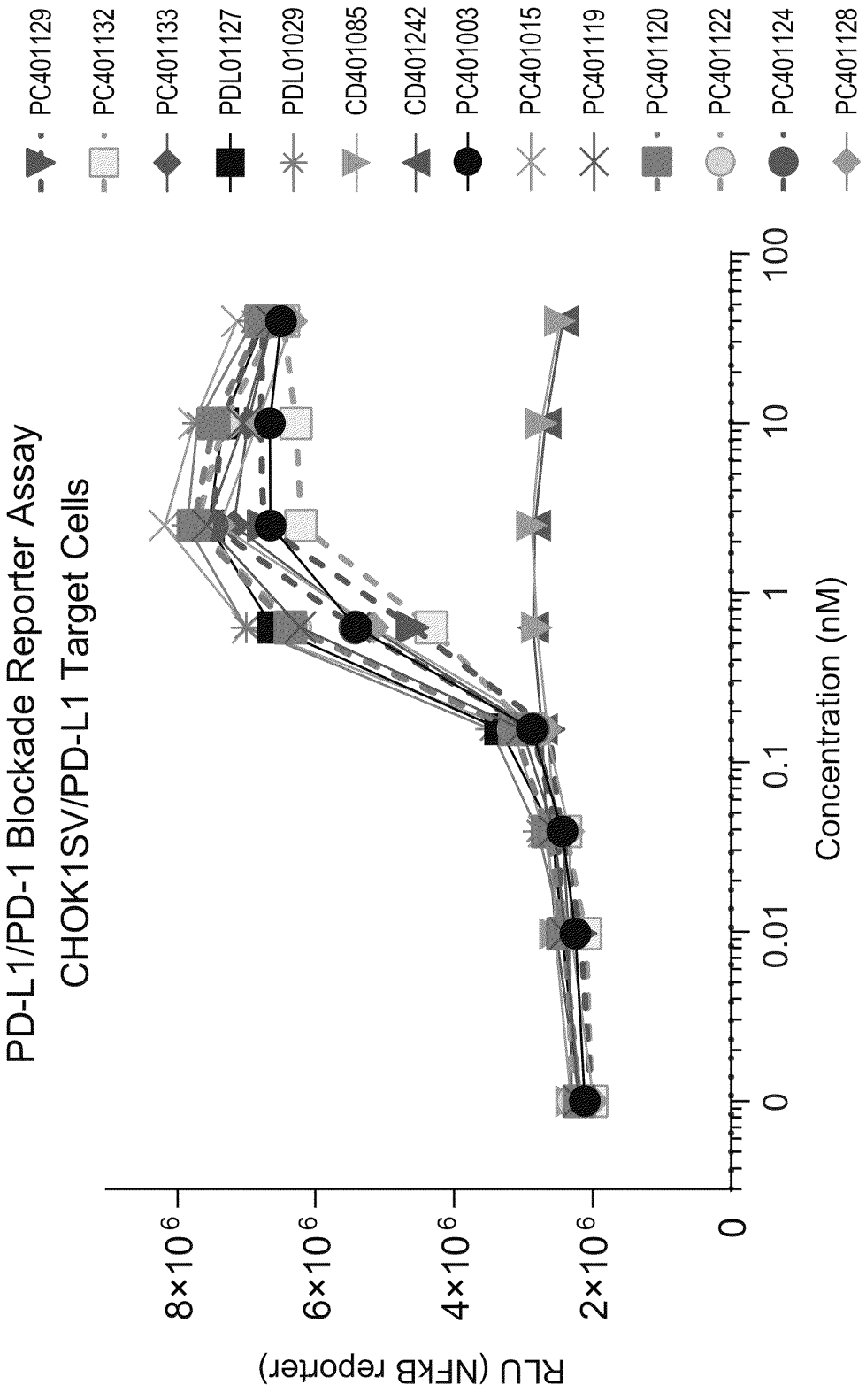

PD-L1/PD-1 Blockade Reporter Assay
CHOK1SV/PD-L1 Target Cells
RLU (NFkB reporter)
8×10^6
6×10^6
4×10^6
2×10^6
0
0
0.01
0.1
1
10
100
Concentration (nM)
PC401129
PC401132
PC401133
PDL01127
PDL01029
CD401085
CD401242
PC401003
PC401015
PC401119
PC401120
PC401122
PC401124
PC401128

FIG. 13A

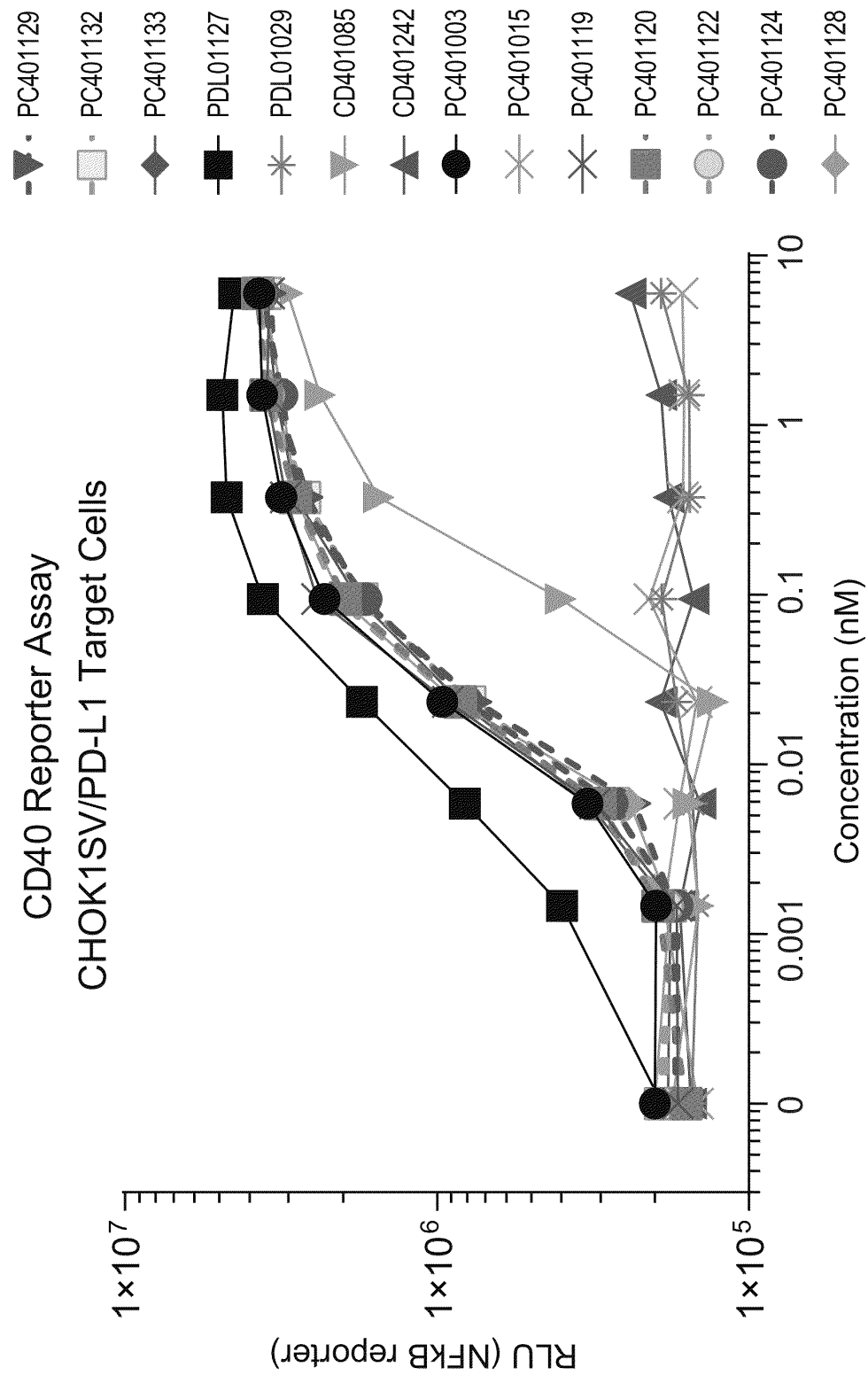

CD40 Reporter Assay
CHOK1SV/PD-L1 Target Cells
RLU (NFkB reporter)
1×10^7
1×10^6
1×10^5
0
0.001
0.01
0.1
1
10
Concentration (nM)
PC401129
PC401132
PC401133
PDL01127
PDL01029
CD401085
CD401242
PC401003
PC401015
PC401119
PC401120
PC401122
PC401124
PC401128

FIG. 13B

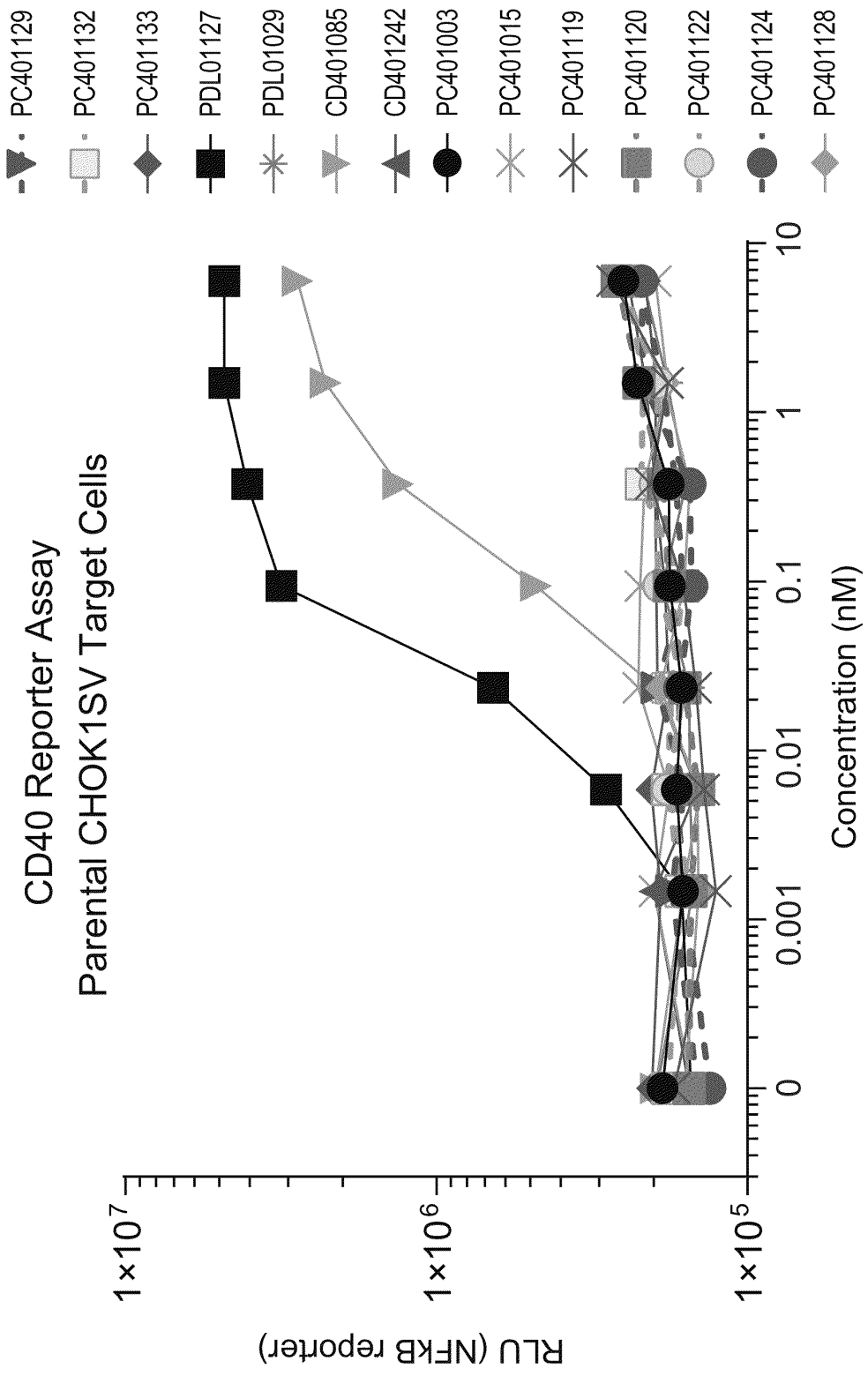
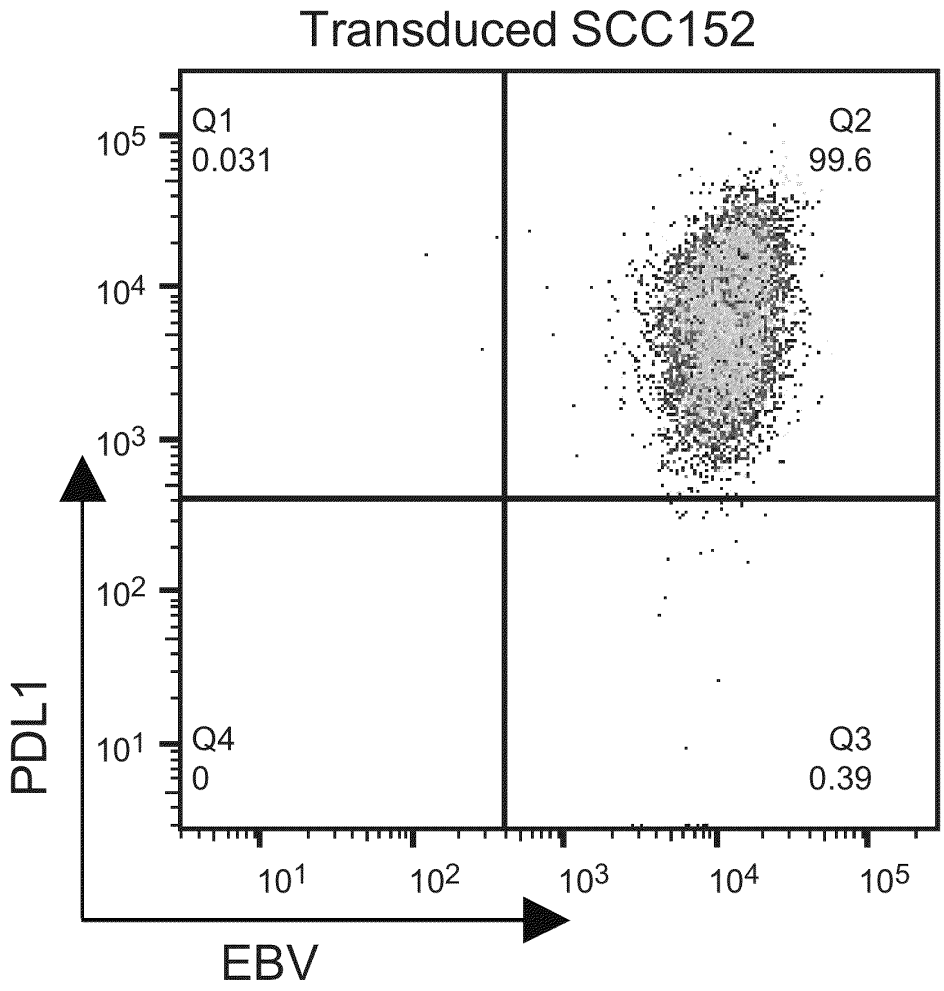

CD40 Reporter Assay
Parental CHOK1SV Target Cells
RLU (NFkB reporter)
1×10^7
1×10^6
1×10^5
0
0.001
0.01
0.1
1
10
Concentration (nM)
PC401129
PC401132
PC401133
PDL01127
PDL01029
CD401085
CD401242
PC401003
PC401015
PC401119
PC401120
PC401122
PC401124
PC401128

FIG. 13C

FIG. 14A


Transduced SCC152
Q1
0.031
Q2
99.6
Q4
0
Q3
0.39
10^5
10^4
10^3
10^2
10^1
10^1
10^2
10^3
10^4
10^5
PDL1
EBV

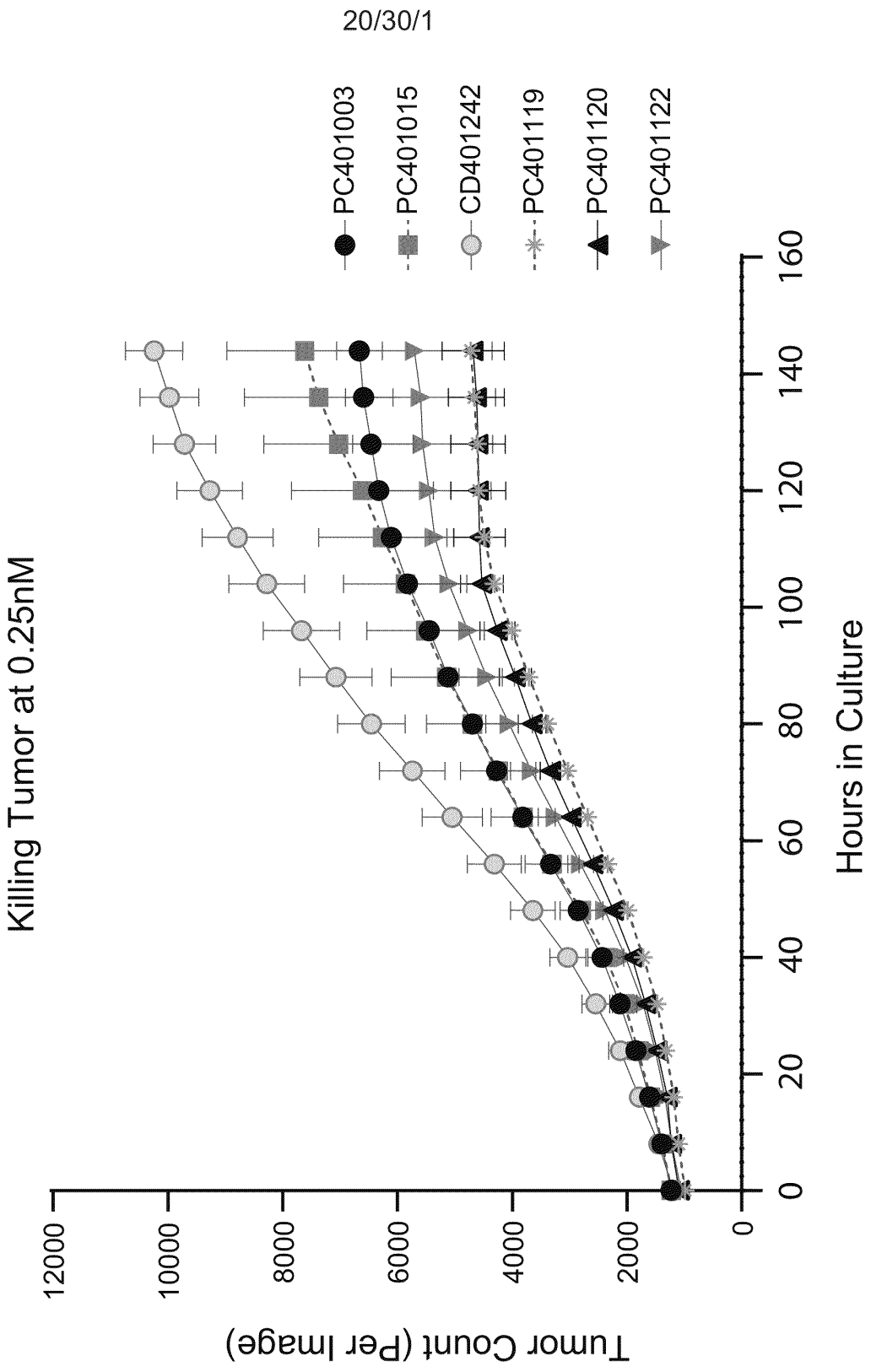

Killing Tumor at 0.25nM
PC401003
PC401015
CD401242
PC401119
PC401120
PC401122
Tumor Count (Per Image)
0
2000
4000
6000
8000
10000
12000
Hours in Culture
0
20
40
60
80
100
120
140
160

FIG. 14B

FIG. 15

30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190
huCD40_ECD EPPTACREKQ YLINSQCCSL CQPGQKLVSD CTEFTETECL PCGESEFLDT WNRETHCHQH KYCDPNLGLR VQQKGTSETD TICTCEEGWH CTSEACESCV LHRSCSPGFG VKQIATGVSD TICEPCPVGF FSNVSSAFEK CHPWTSCETK DLVVQQAGTN KTDVVCGPQD RLR 100%
muCD40_ECD .....SD.. .HDG..D. ....SR.T.H ..ALEK.Q.H ..DSG..SAQ ....TR.... RH.E..Q... .KKE..A.S. .V..K..Q. ..KD..A.A Q.TP.I.... .MEM..ETT. .V.H..... ..Q..L... .Y.....D. N.E.L.K..S Q.N.I..LKS .M. 6%
hu/mu1_CD40_ECD .....SD.. .HDG..D. ....SR.T.H ..ALEK.Q.H ..DSG..SAQ ....TR.... .... 100%
hu/mu2_CD40_ECD .... RH.E..Q... .KKE..A.S. .V..K..Q. ..KD..A.A Q..... .... 221%
hu/mu3&4_CD40_ECD .... .TP.I.... .MEM..ETT. .V.H..... ..Q..L... .Y.....D. N.E.L.K..S Q.N.I..LKS .M. 111%
hu/mu31_CD40_ECD .... K..Q. ..KD..A.A Q..... .... 132%
hu/mu32_CD40_ECD .... .TP.I.... .... 155%
hu/mu33_CD40_ECD 36%
hu/mu4_CD40_ECD 116%
hu/muK132M_CD40_ECD 141%
hu/muQ133E_CD40_ECD 121%
hu/muI134M_CD40_ECD 131%
hu/muG137E_CD40_ECD 145%
hu/muV138T_CD40_ECD 120%
hu/muS139T_CD40_ECD 104%
hu/muT142Y_CD40_ECD 97%
hu/muE144H_CD40_ECD 29%
hu/muH162Y_CD40_ECD 122%
huS126A_CD40_ECD 94%
huE129A_CD40_ECD 70%
huK132A_CD40_ECD 46%
huQ133A_CD40_ECD 50%

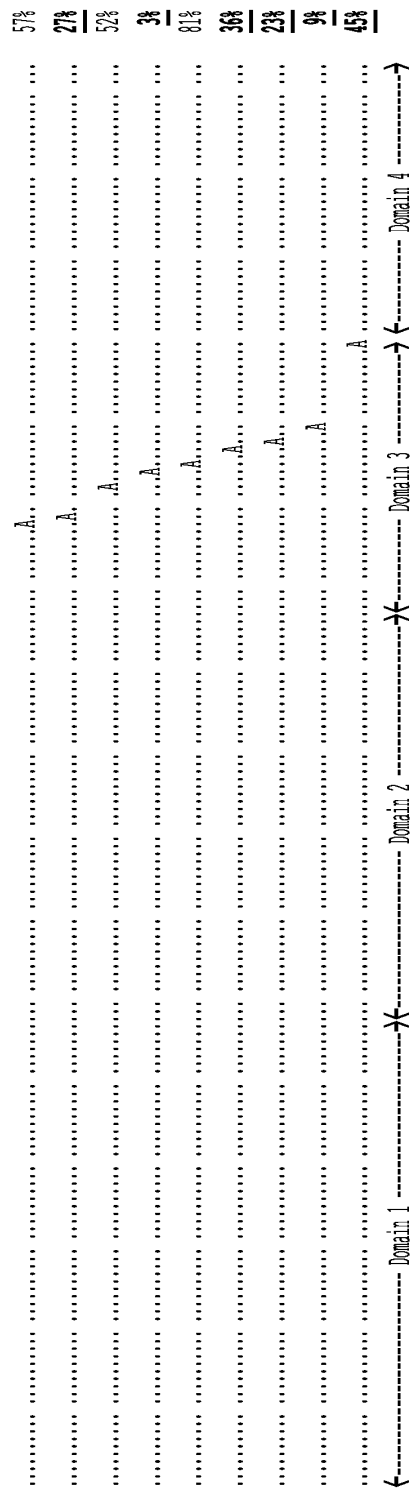

huV138A_CD40_ECD
huS139A_CD40_ECD
huL142A_CD40_ECD
huE144A_CD40_ECD
huP145A_CD40_ECD
huP147A_CD40_ECD
huV148A_CD40_ECD
huF150A_CD40_ECD
huK160A_CD40_ECD
57%
27%
52%
3%
81%
36%
23%
9%
45%
Domain 1
Domain 2
Domain 3
Domain 4

FIG. 15 (cont.)

FIG. 16A

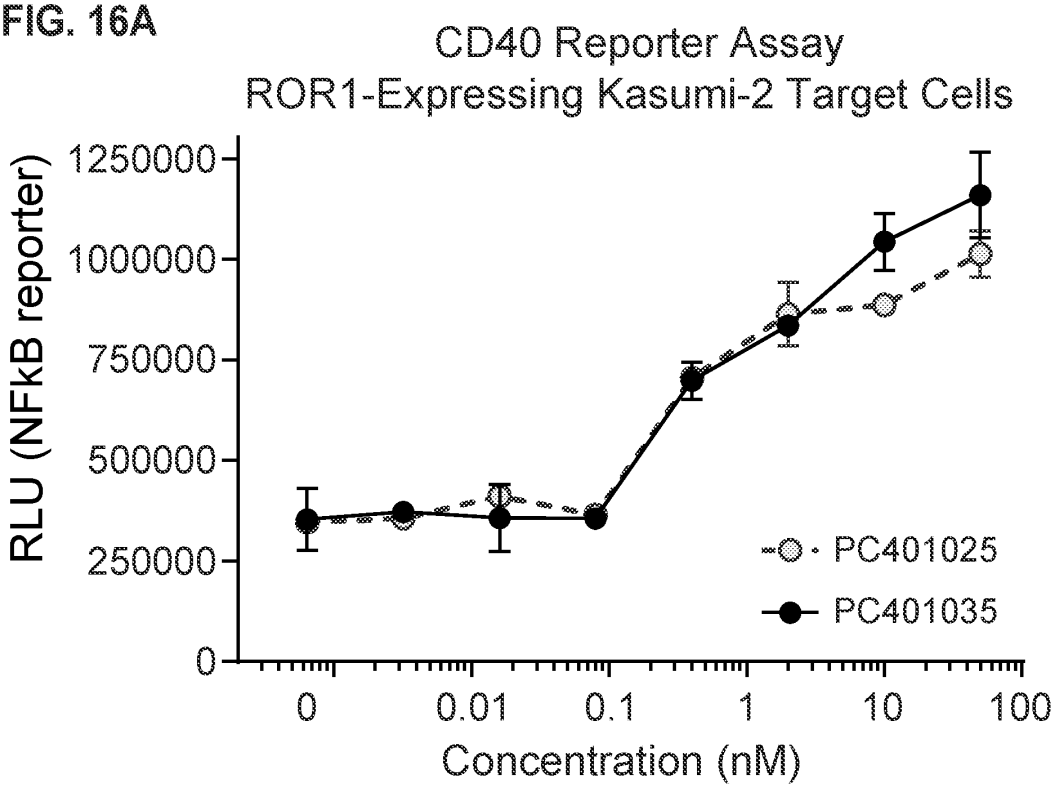
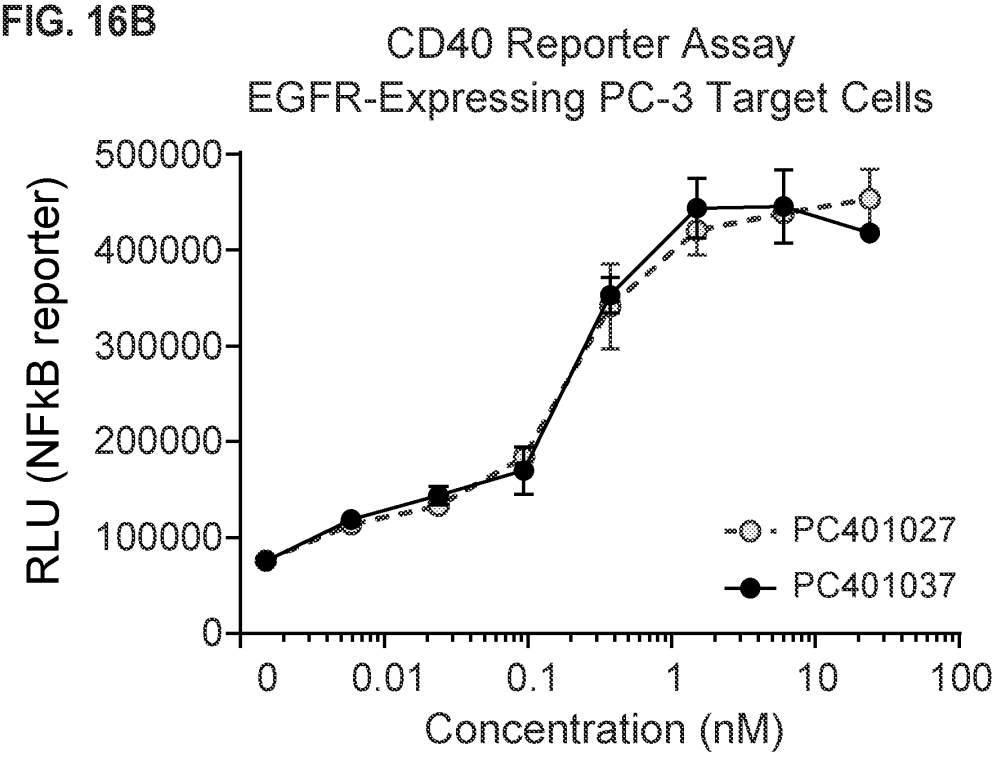


FIG. 16B



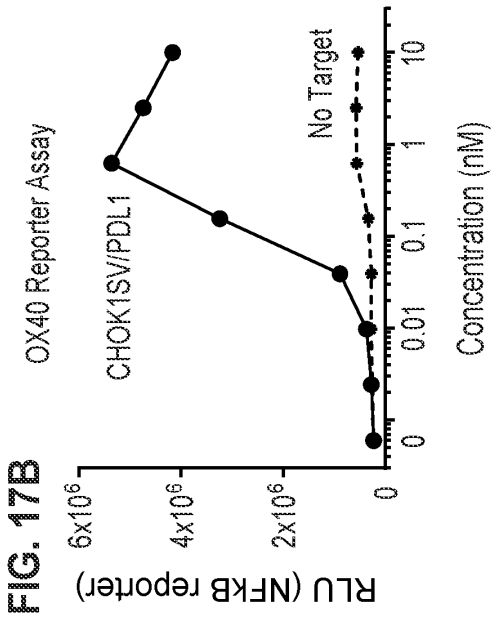


FIG. 17B
OX40 Reporter Assay
CHOK1SV/PDL1
No Target
RLU (NFkB reporter)
6x10^6
4x10^6
2x10^6
0
0
0.01
0.1
1
10
Concentration (nM)

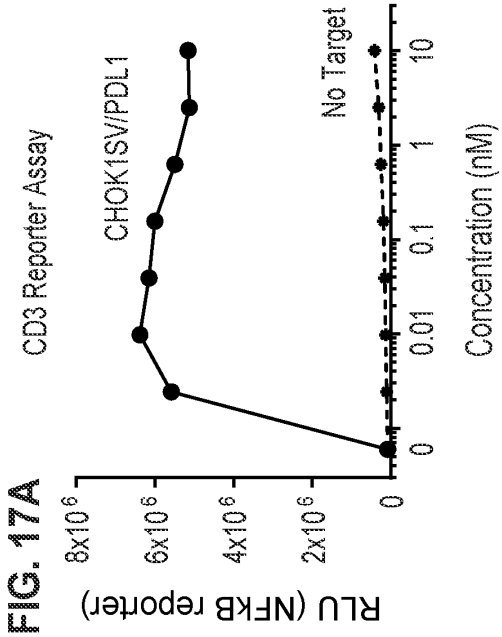


FIG. 17A
CD3 Reporter Assay
CHOK1SV/PDL1
No Target
RLU (NFkB reporter)
8x10^6
6x10^6
4x10^6
2x10^6
0
0
0.01
0.1
1
10
Concentration (nM)

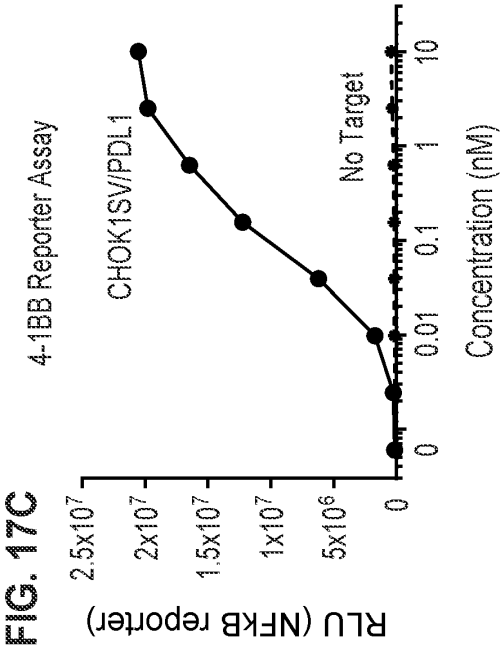


FIG. 17C
4-1BB Reporter Assay
CHOK1SV/PDL1
No Target
RLU (NFkB reporter)
2.5x10^7
2x10^7
1.5x10^7
1x10^7
5x10^6
0
0
0.01
0.1
1
10
Concentration (nM)

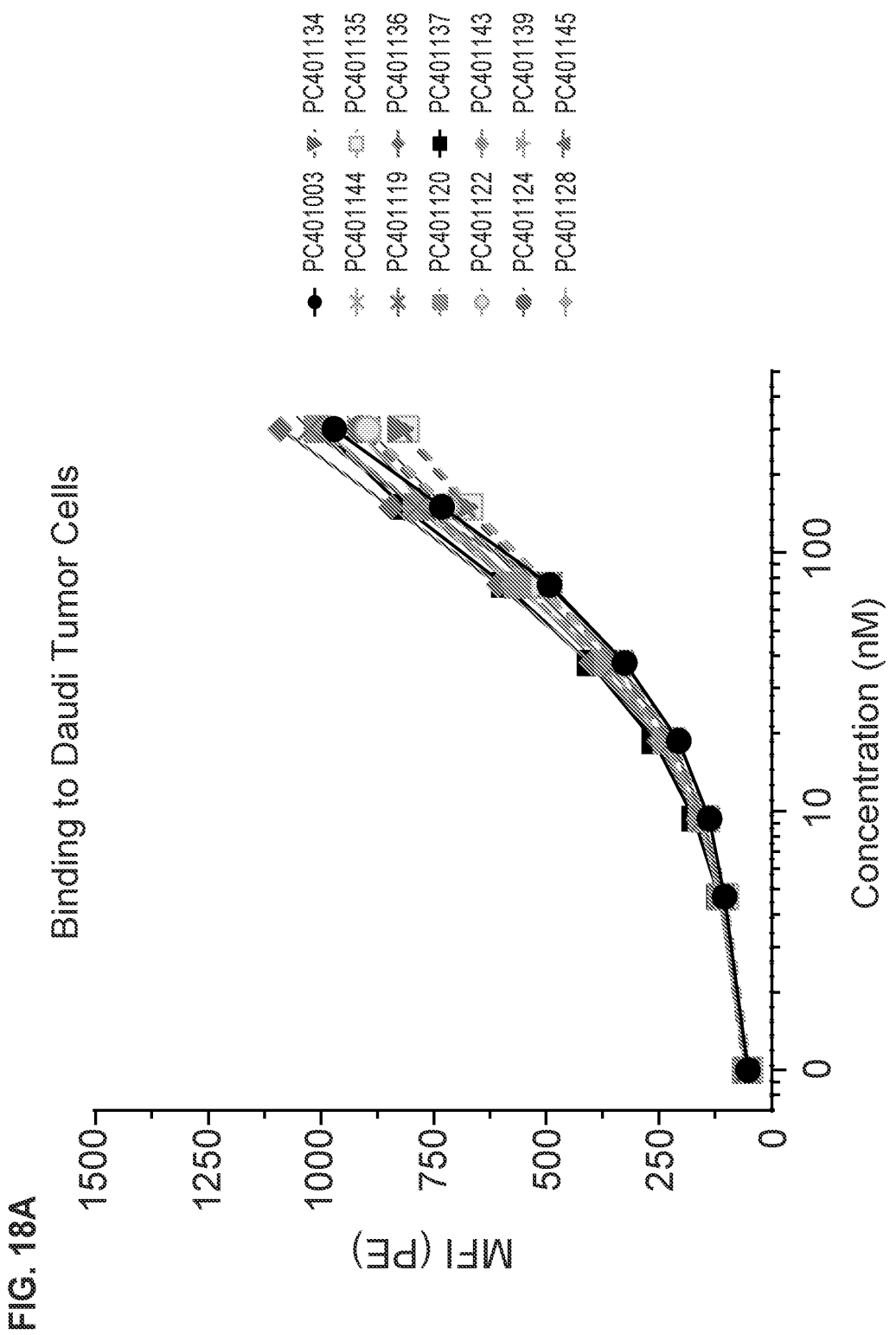

Binding to Daudi Tumor Cells
MFI (PE)
1500
1250
1000
750
500
250
0
0
10
100
Concentration (nM)
PC401003
PC401134
PC401144
PC401135
PC401119
PC401136
PC401120
PC401137
PC401122
PC401143
PC401124
PC401139
PC401128
PC401145

FIG. 18A

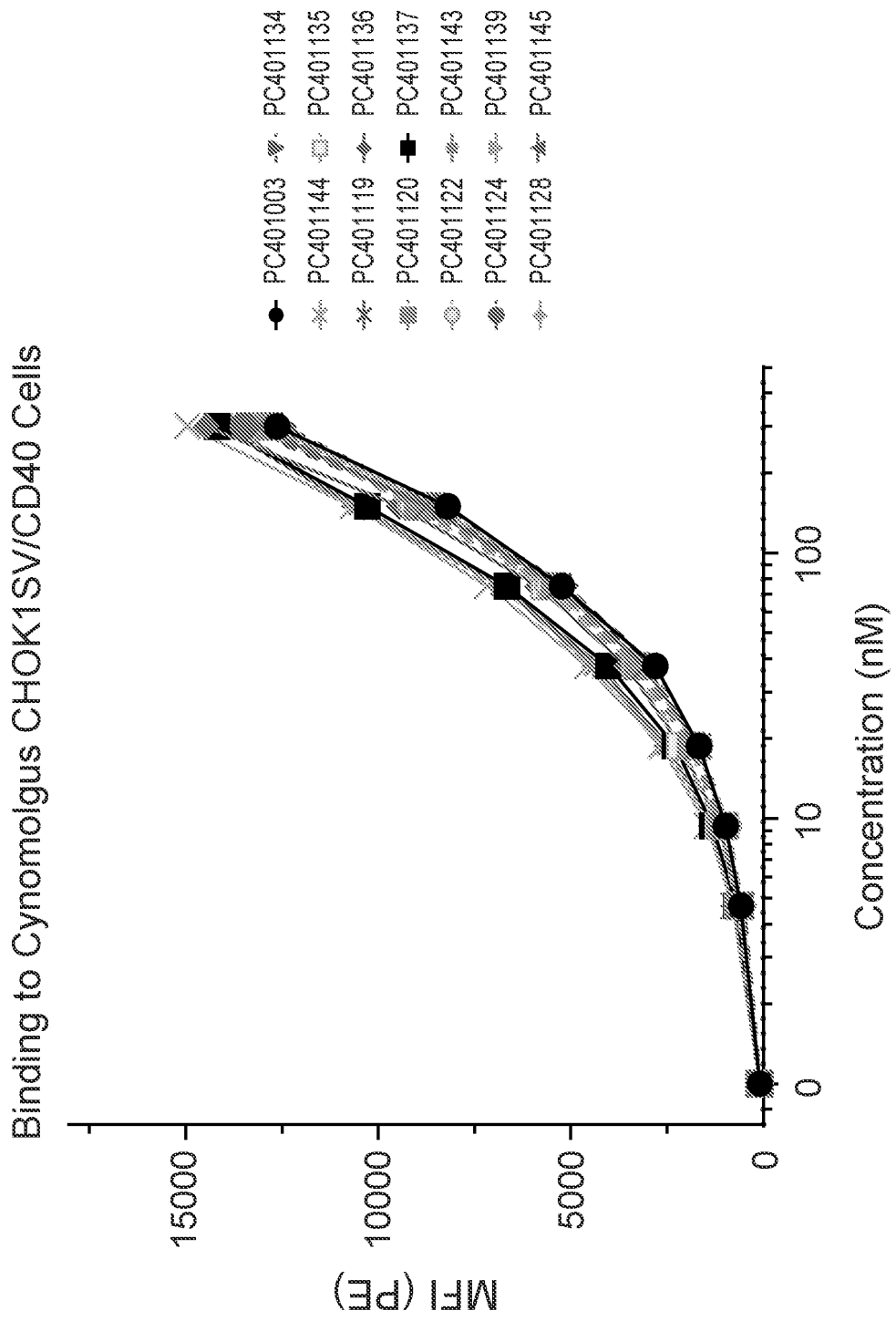

Binding to Cynomolgus CHOK1SV/CD40 Cells
MFI (PE)
15000
10000
5000
0
0
10
100
Concentration (nM)
PC401003
PC401134
PC401144
PC401135
PC401119
PC401136
PC401120
PC401137
PC401122
PC401143
PC401124
PC401139
PC401128
PC401145

FIG. 18B

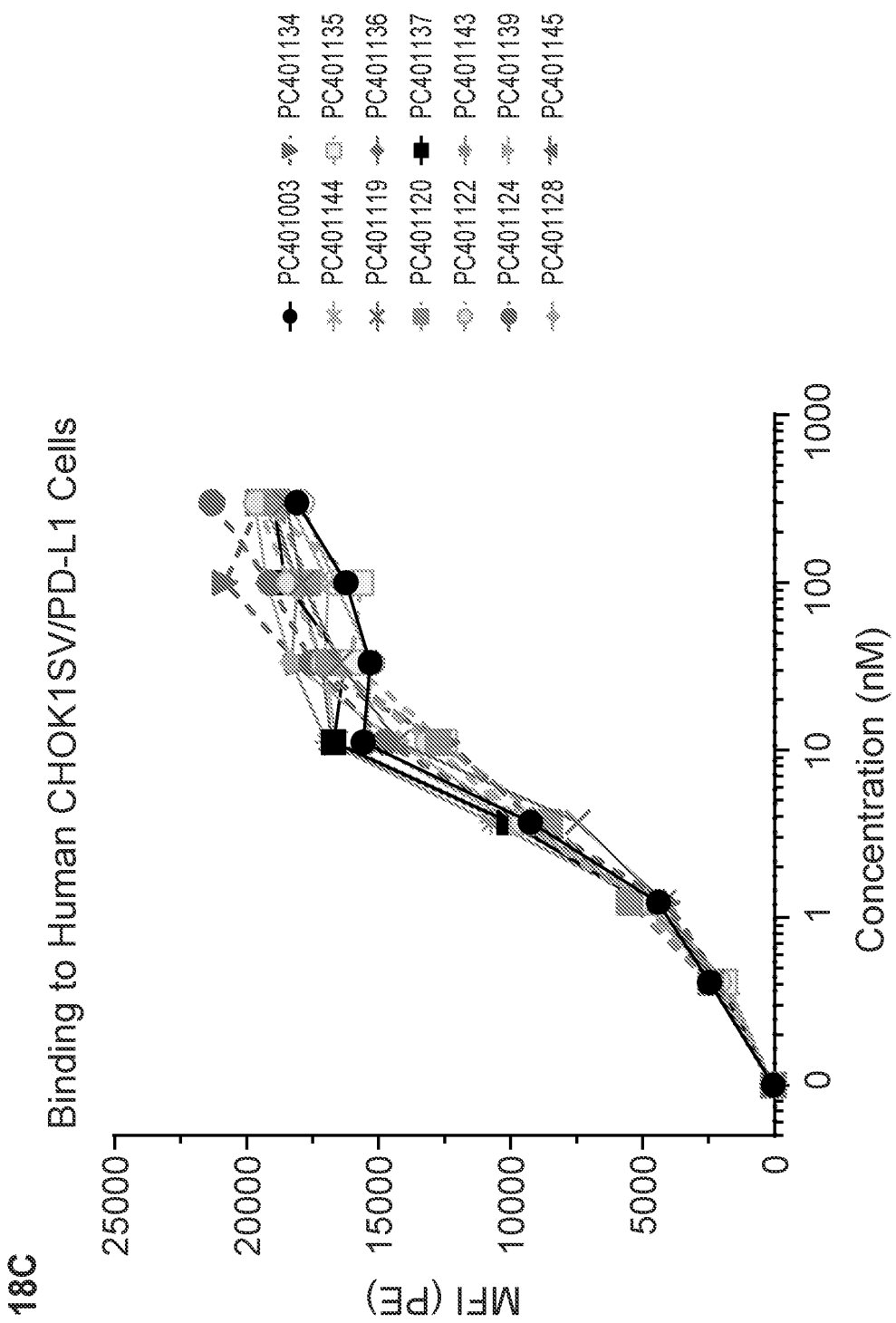

Binding to Human CHOK1SV/PD-L1 Cells
MFI (PE)
25000
20000
15000
10000
5000
0
0
1
10
100
1000
Concentration (nM)
PC401003
PC401134
PC401144
PC401135
PC401119
PC401136
PC401120
PC401137
PC401122
PC401143
PC401124
PC401139
PC401128
PC401145

FIG. 18C

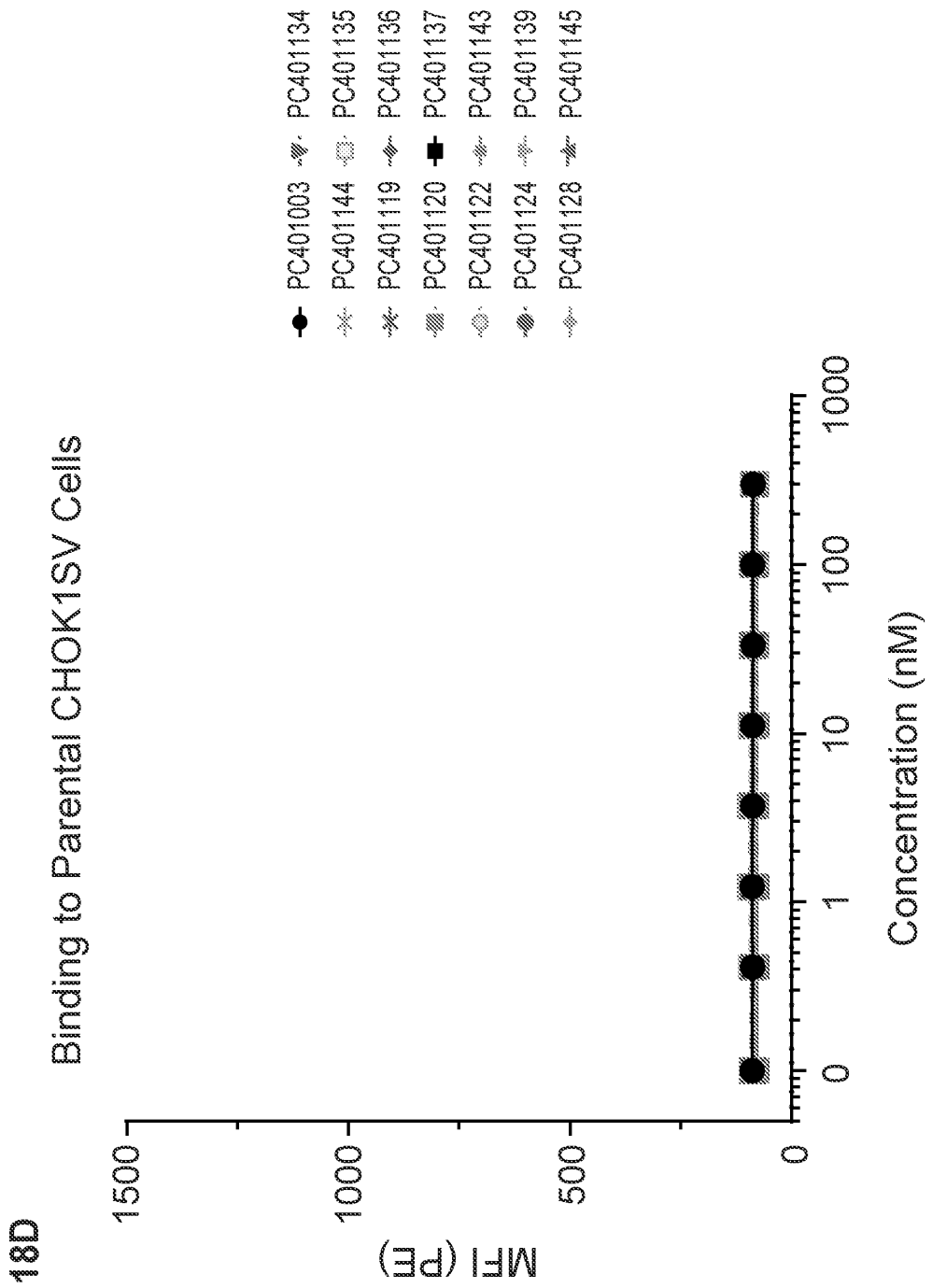

Binding to Parental CHOK1SV Cells
MFI (PE)
1500
1000
500
0
0
1
10
100
1000
Concentration (nM)
PC401003
PC401134
PC401144
PC401135
PC401119
PC401136
PC401120
PC401137
PC401122
PC401143
PC401124
PC401139
PC401128
PC401145

FIG. 18D

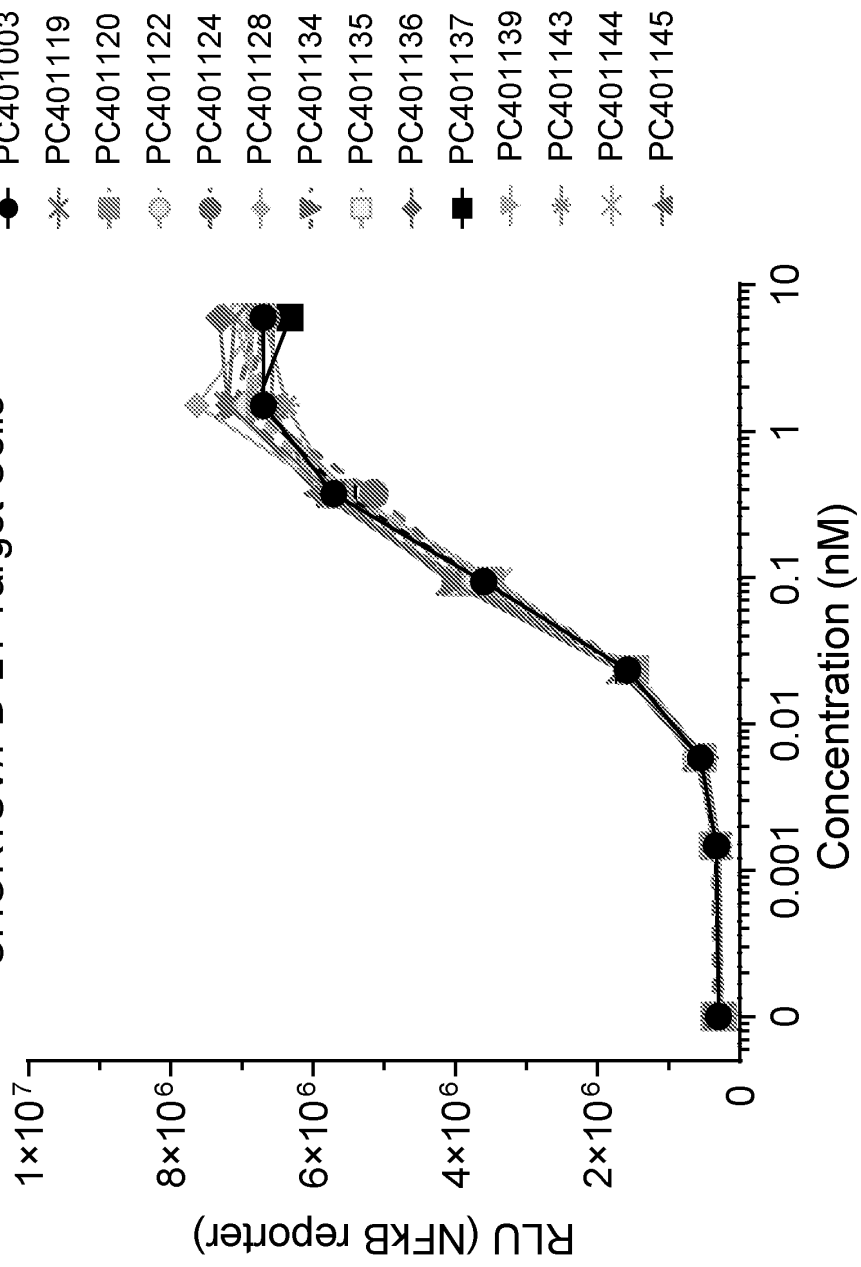

CD40 Reporter Assay
CHOK1SV/PD-L1 Target Cells
PC401003
PC401119
PC401120
PC401122
PC401124
PC401128
PC401134
PC401135
PC401136
PC401137
PC401139
PC401143
PC401144
PC401145
RLU (NFkB reporter)
1×10^7
8×10^6
6×10^6
4×10^6
2×10^6
0
0
0.001
0.01
0.1
1
10
Concentration (nM)

FIG. 19A

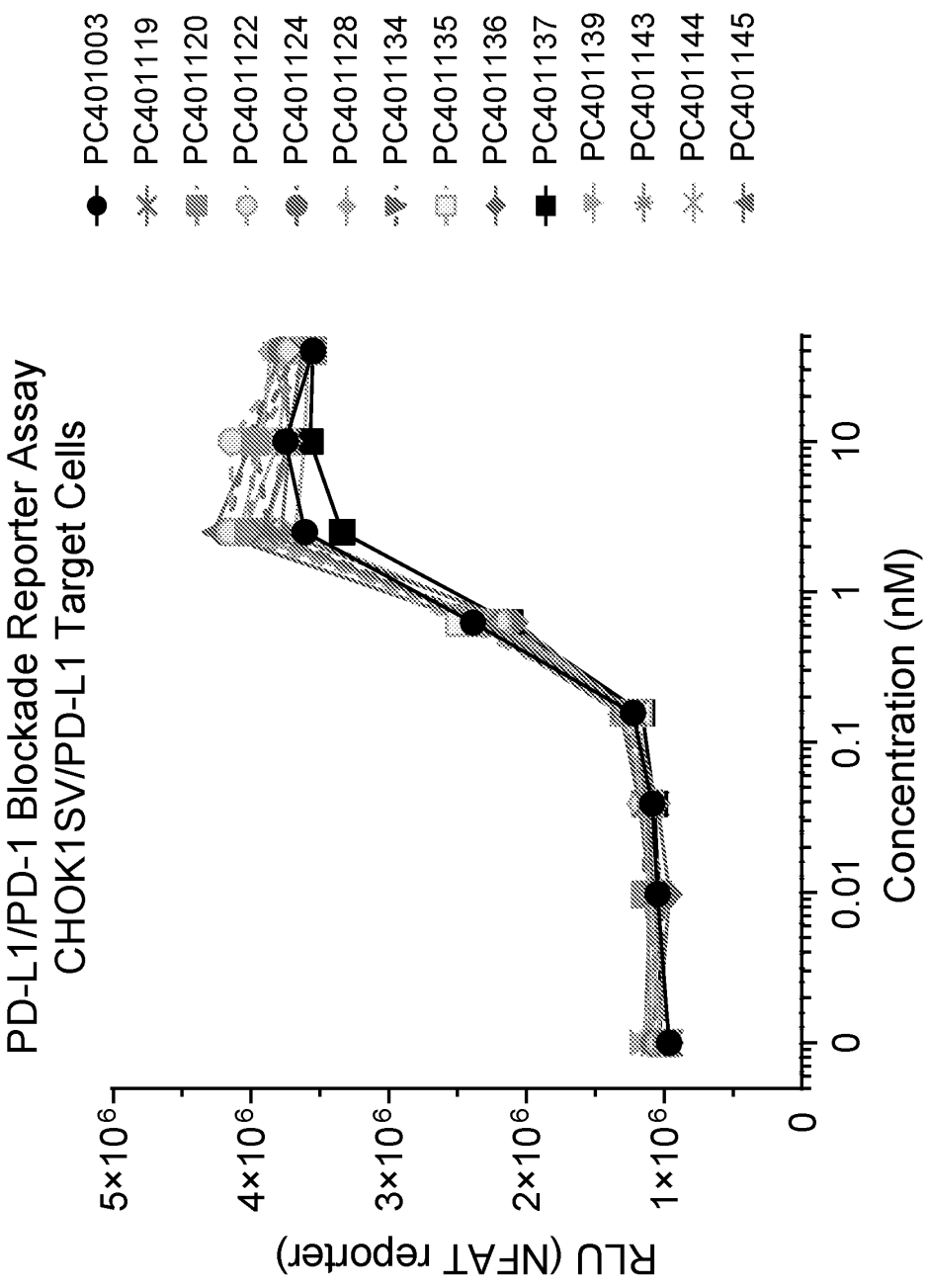

PD-L1/PD-1 Blockade Reporter Assay
CHOK1SV/PD-L1 Target Cells
PC401003
PC401119
PC401120
PC401122
PC401124
PC401128
PC401134
PC401135
PC401136
PC401137
PC401139
PC401143
PC401144
PC401145
RLU (NFAT reporter)
5×10^6
4×10^6
3×10^6
2×10^6
1×10^6
0
0
0.01
0.1
1
10
Concentration (nM)

FIG. 19B

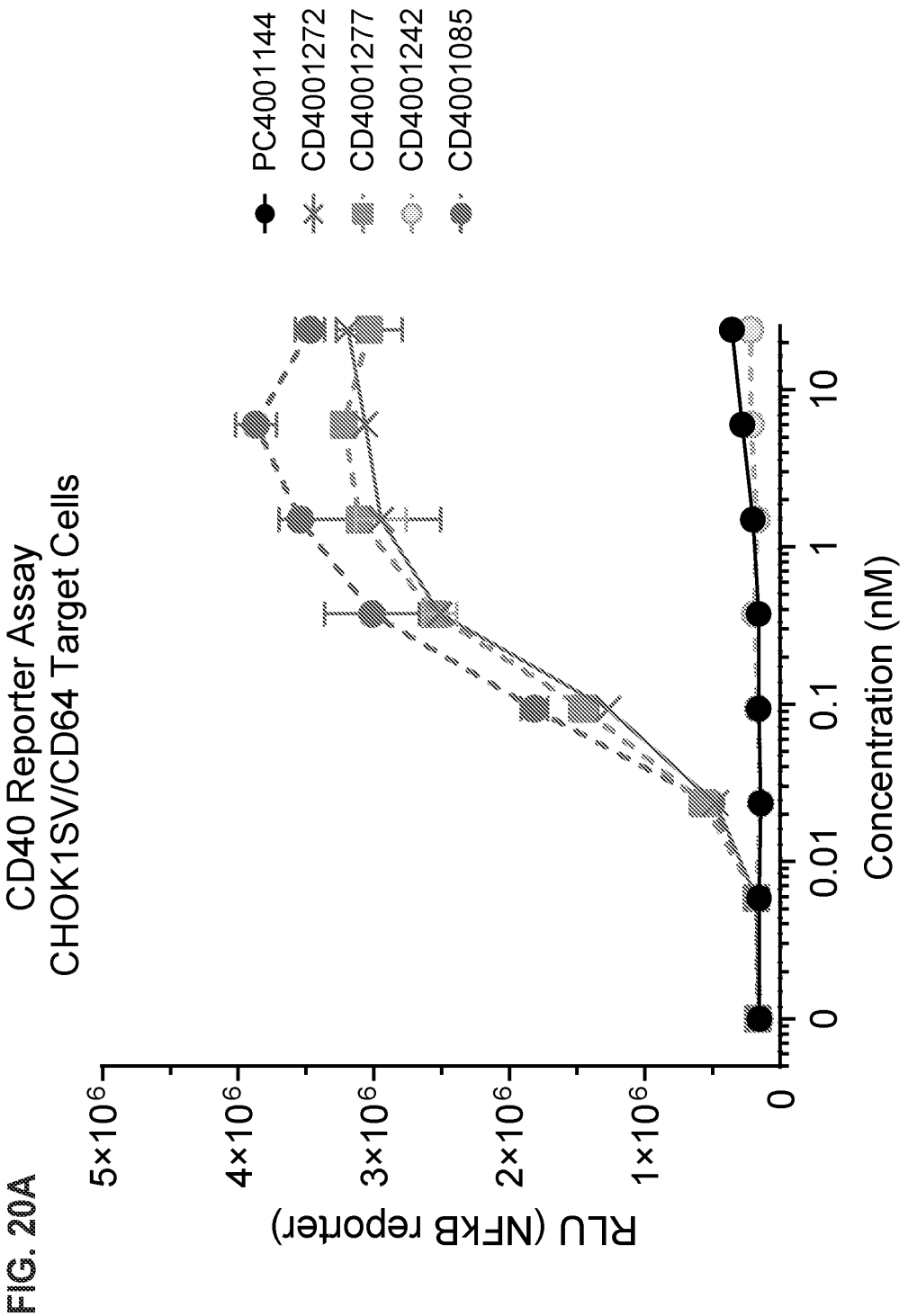

CD40 Reporter Assay
CHOK1SV/CD64 Target Cells
PC4001144
CD4001272
CD4001277
CD4001242
CD4001085
RLU (NFkB reporter)
5×10^6
4×10^6
3×10^6
2×10^6
1×10^6
0
0
0.01
0.1
1
10
Concentration (nM)

FIG. 20A

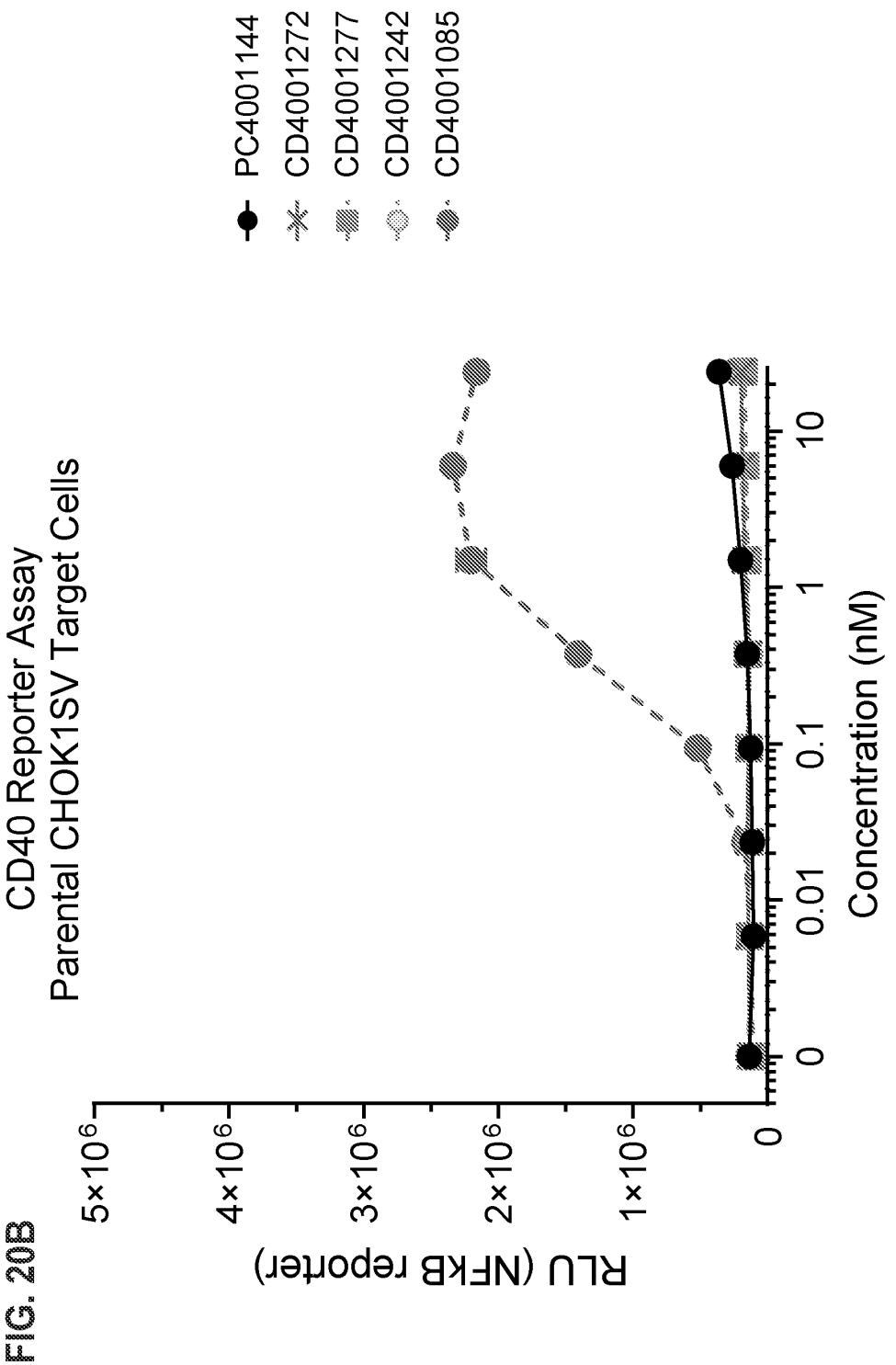

CD40 Reporter Assay
Parental CHOK1SV Target Cells
PC4001144
CD4001272
CD4001277
CD4001242
CD4001085
RLU (NFkB reporter)
5×10^6
4×10^6
3×10^6
2×10^6
1×10^6
0
0
0.01
0.1
1
10
Concentration (nM)

FIG. 20B

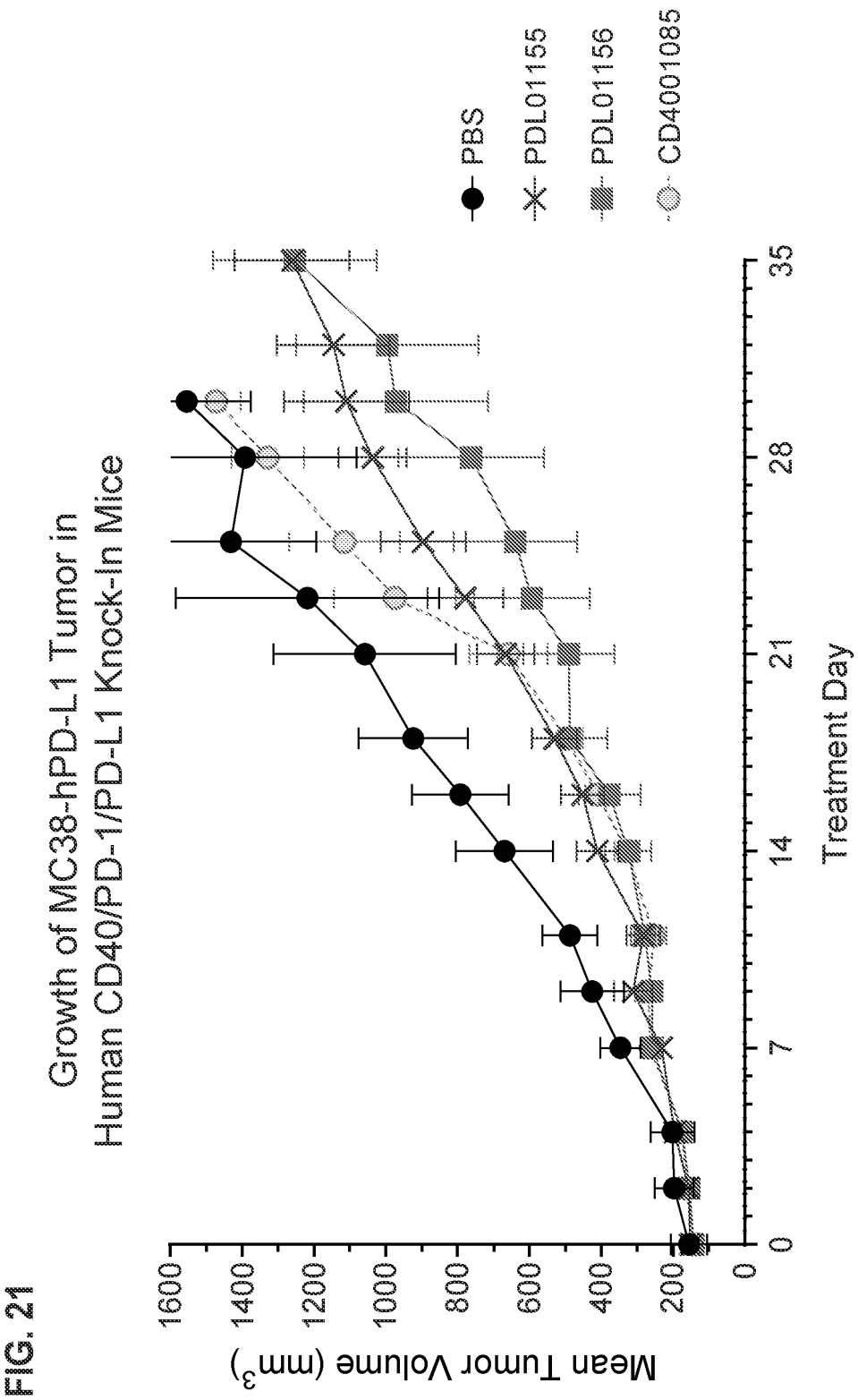

Growth of MC38-hPD-L1 Tumor in
Human CD40/PD-1/PD-L1 Knock-In Mice
PBS
PDL01155
PDL01156
CD4001085
Mean Tumor Volume (mm3)
Treatment Day
0
200
400
600
800
1000
1200
1400
1600
0
7
14
21
28
35

FIG. 21

FIG. 22B

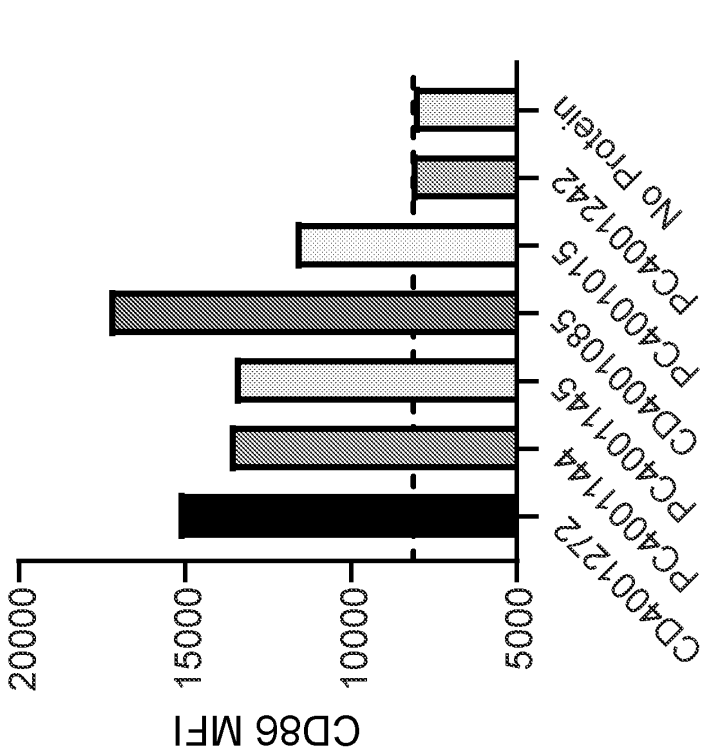
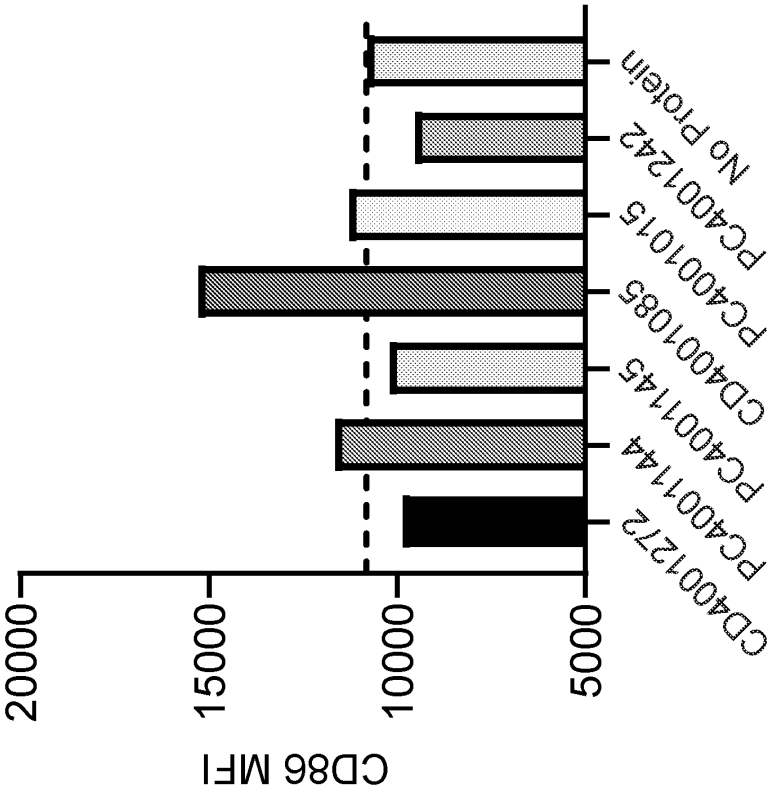


FIG. 22A



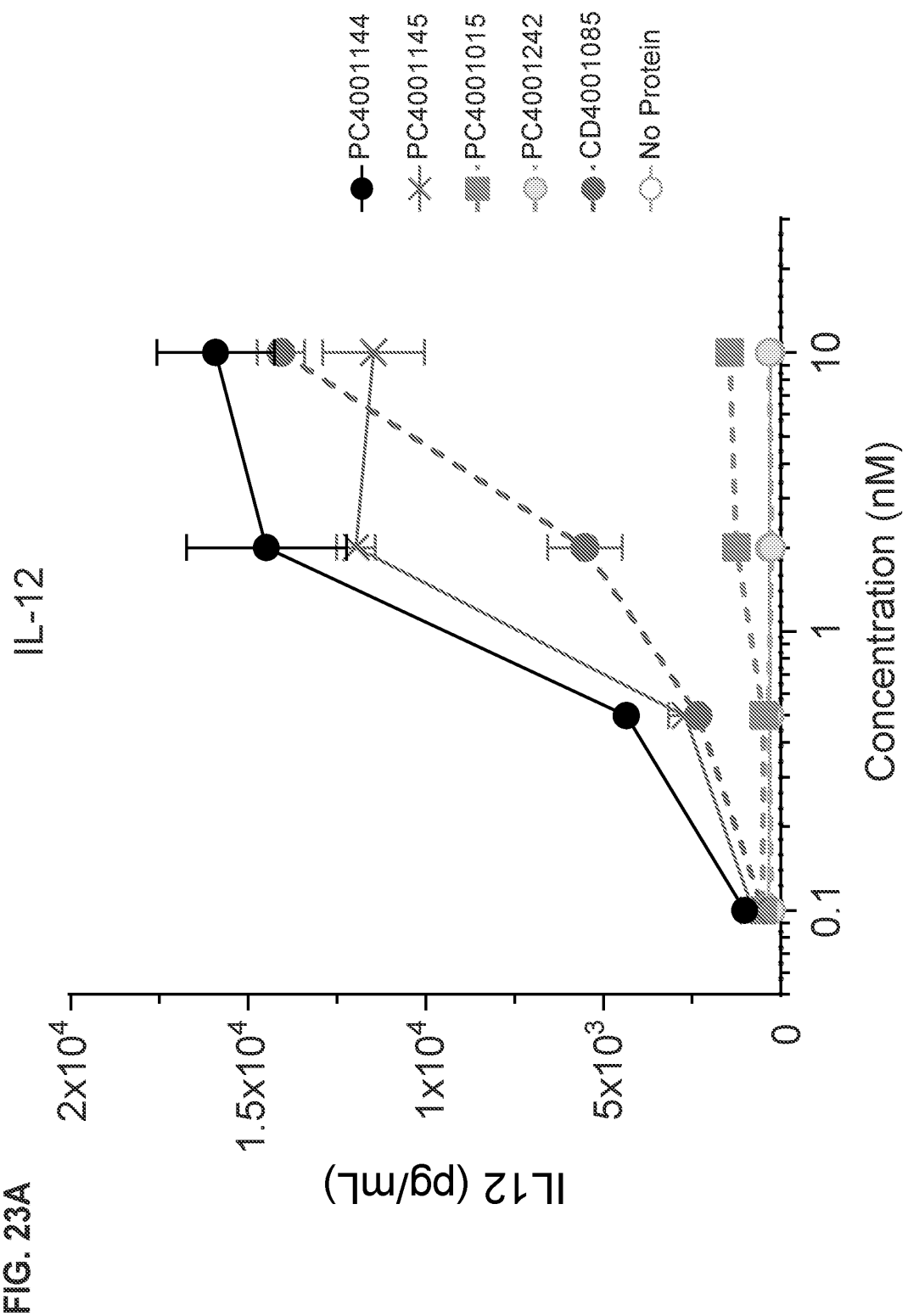

IL-12
PC4001144
PC4001145
PC4001015
PC4001242
CD4001085
No Protein
IL12 (pg/mL)
2x10^4
1.5x10^4
1x10^4
5x10^3
0
0.1
1
10
Concentration (nM)

FIG. 23A

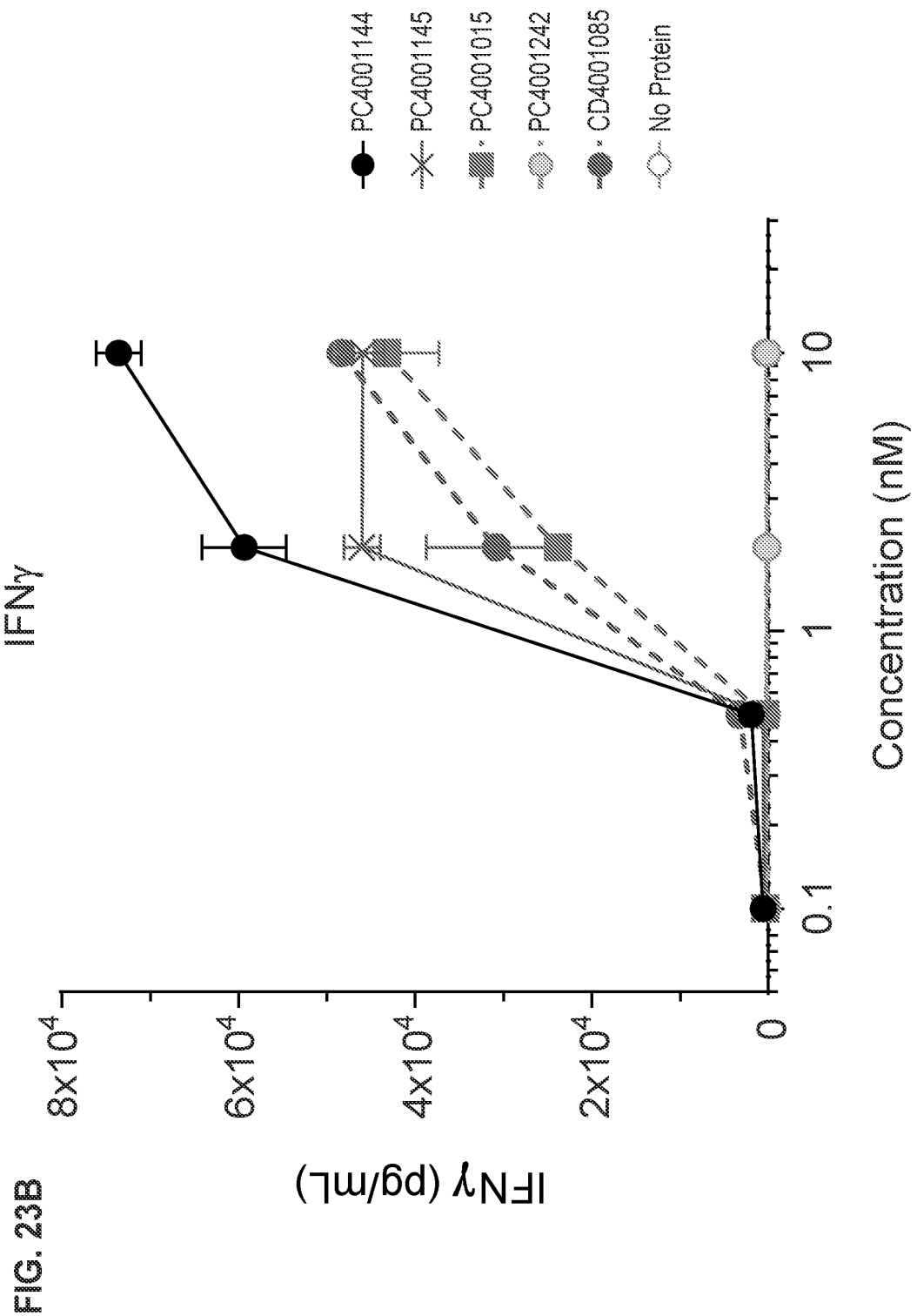

IFNγ
PC4001144
PC4001145
PC4001015
PC4001242
CD4001085
No Protein
IFNγ (pg/mL)
8x10^4
6x10^4
4x10^4
2x10^4
0
0.1
1
10
Concentration (nM)

FIG. 23B

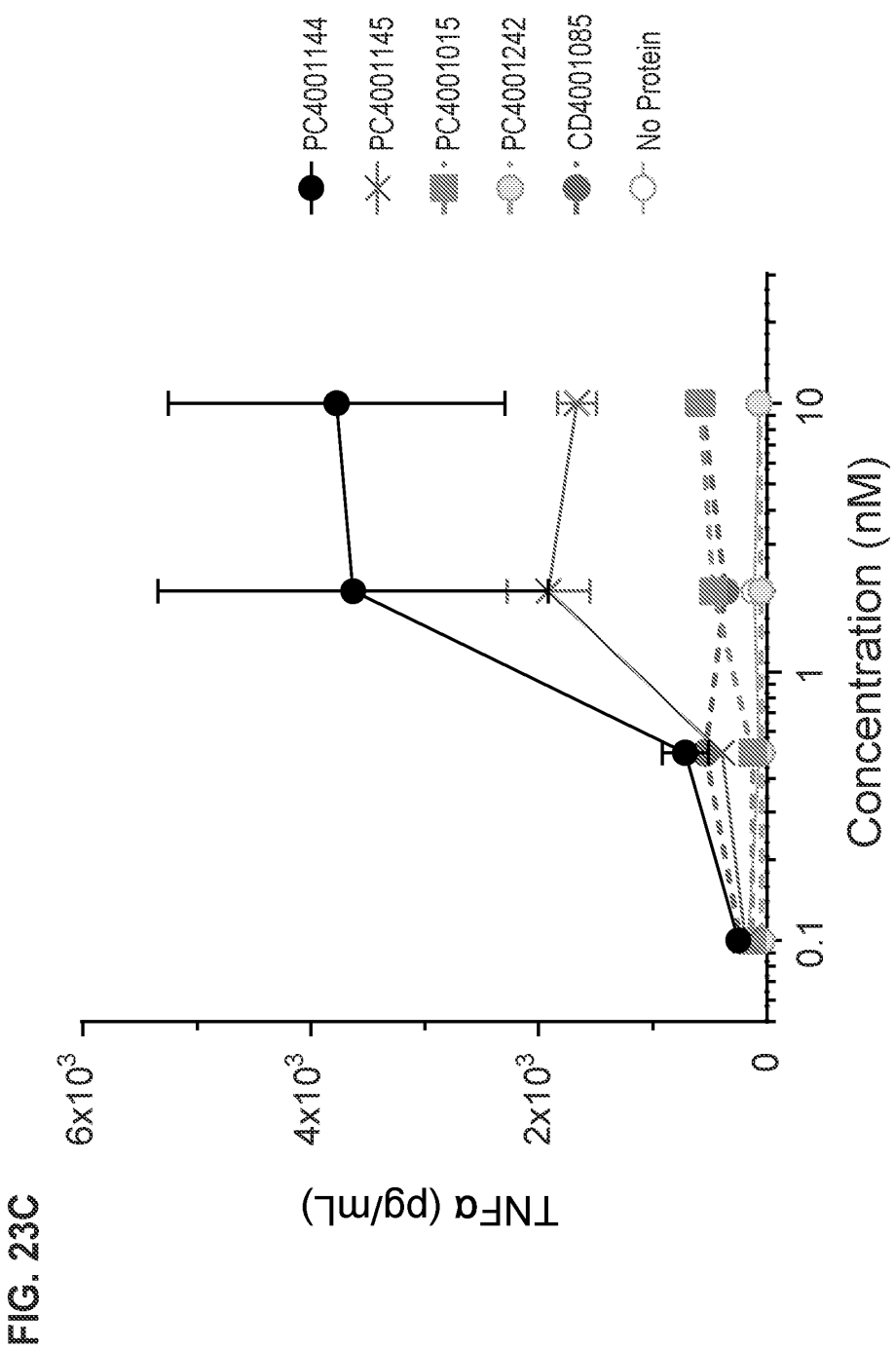

PC4001144
PC4001145
PC4001015
PC4001242
CD4001085
No Protein
TNFα (pg/mL)
6x10^3
4x10^3
2x10^3
0
0.1
1
10
Concentration (nM)

FIG. 23C

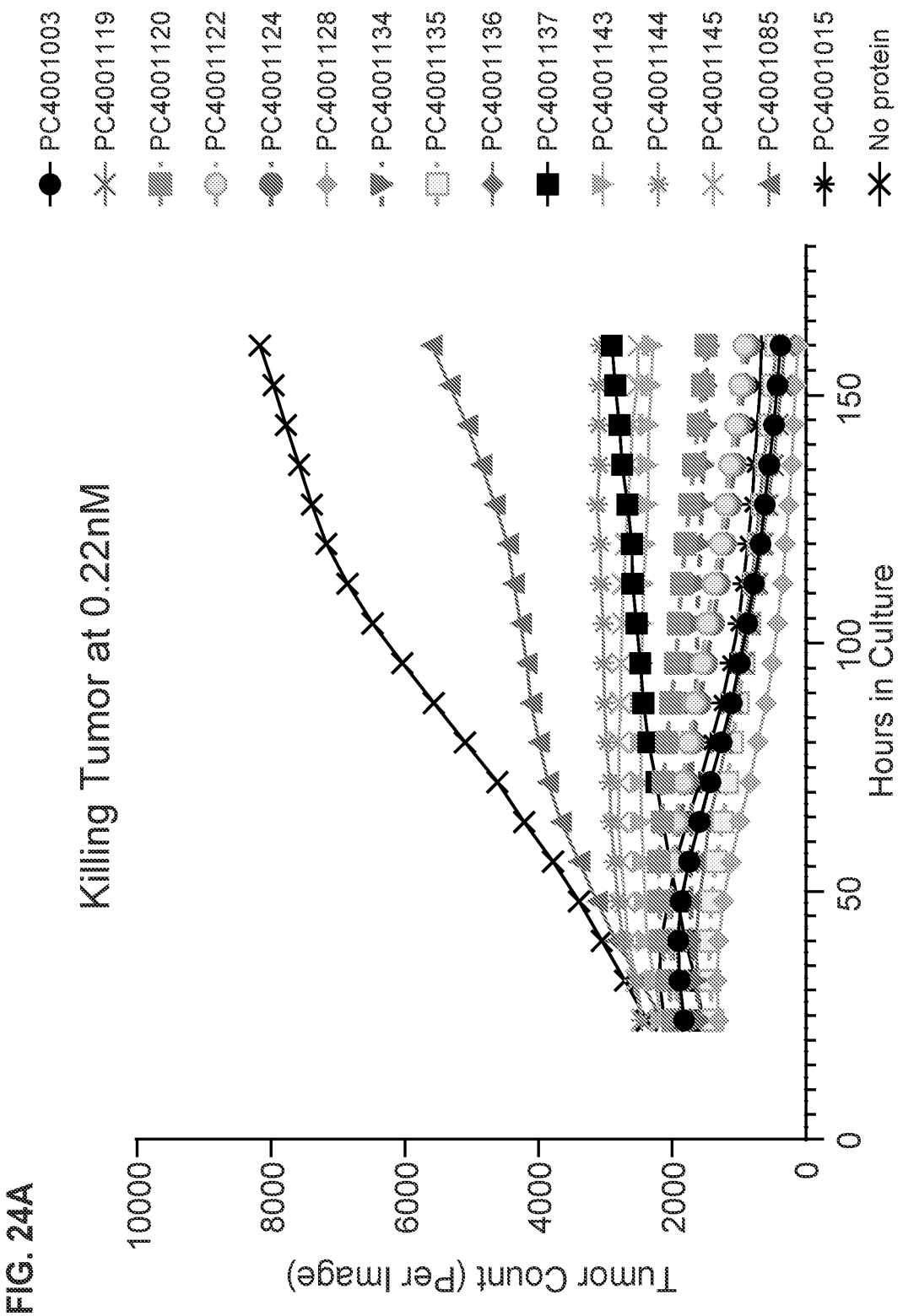

PC4001003
PC4001119
PC4001120
PC4001122
PC4001124
PC4001128
PC4001134
PC4001135
PC4001136
PC4001137
PC4001143
PC4001144
PC4001145
PC4001085
PC4001015
No protein
Killing Tumor at 0.22nM
Tumor Count (Per Image)
10000
8000
6000
4000
2000
0
0
50
100
150
Hours in Culture

FIG. 24A

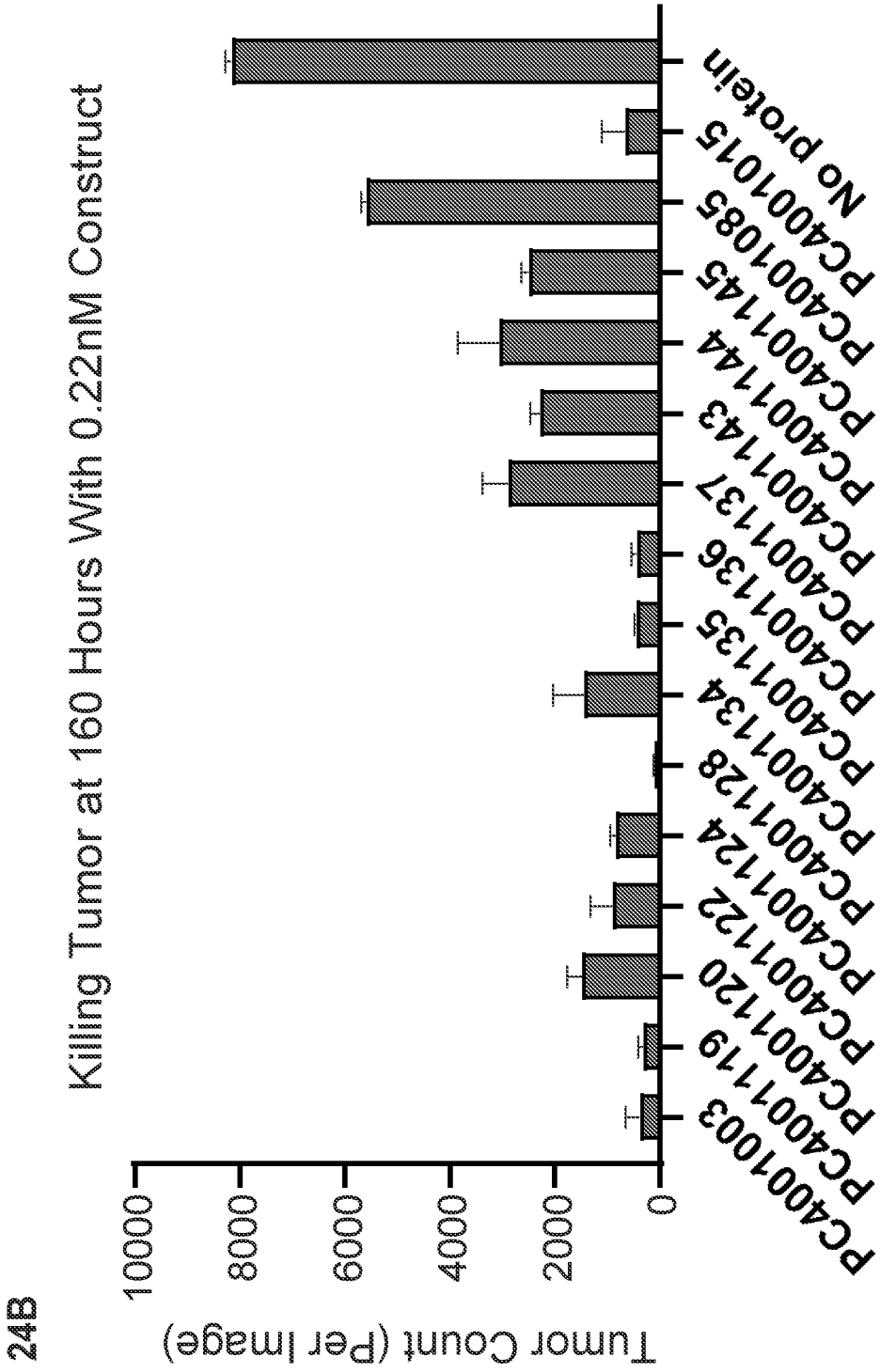

Killing Tumor at 160 Hours With 0.22nM Construct
Tumor Count (Per Image)
0
2000
4000
6000
8000
10000
PC400103
PC400119
PC400120
PC400122
PC400124
PC400128
PC400134
PC400135
PC400136
PC400137
PC400143
PC400144
PC400145
PC400185
No protein

FIG. 24B