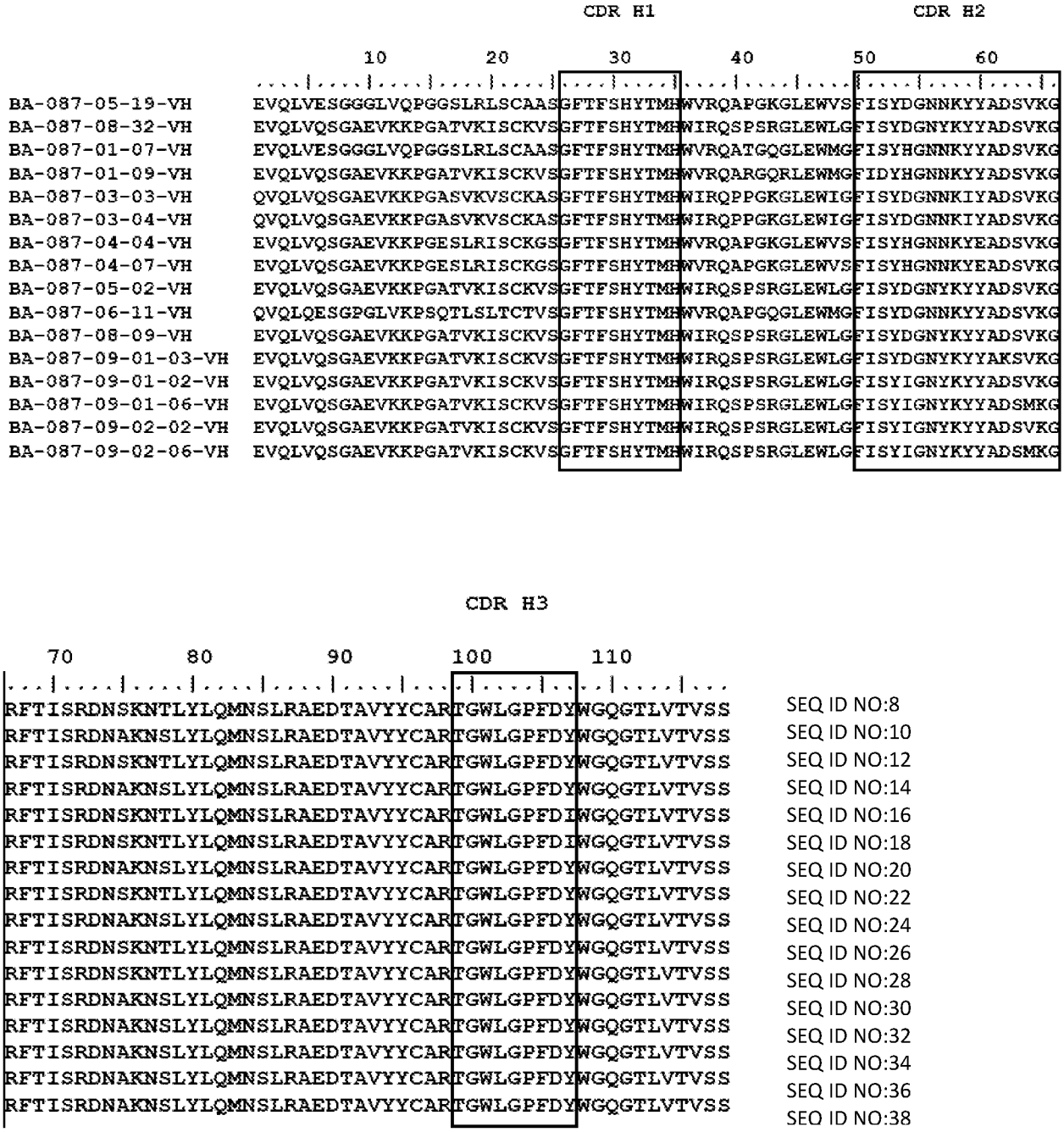

CDR H1
CDR H2
CDR H3
10
20
30
40
50
60
70
80
90
100
110
BA-087-05-19-VH EVQLVESGGGLVQPGGSLRLSCAASGFTFSHYTMHWVRQAPGKGLEWVSFISYDGNNKYYADSVKG
BA-087-08-32-VH EVQLVQSGAEVKKPGATVKISCKVSGFTFSHYTMHWIRQSPSRGLEWLGFISYDGNYKYYADSVKG
BA-087-01-07-VH EVQLVESGGGLVQPGGSLRLSCAASGFTFSHYTMHWVRQATGQGLEWMGFISYHGNNKYYADSVKG
BA-087-01-09-VH EVQLVQSGAEVKKPGATVKISCKVSGFTFSHYTMHWVRQARGQRLEWMGFIDYHGNNKYYADSVKG
BA-087-03-03-VH QVQLVQSGAEVKKPGASVKVSCKASGFTFSHYTMHWIRQPPGKGLEWIGFISYDGNNKIYADSVKG
BA-087-03-04-VH QVQLVQSGAEVKKPGASVKVSCKASGFTFSHYTMHWIRQPPGKGLEWIGFISYDGNNKIYADSVKG
BA-087-04-04-VH EVQLVQSGAEVKKPGESLRISCKGSGFTFSHYTMHWVRQAPGKGLEWVSFISYHGNNKYEADSVKG
BA-087-04-07-VH EVQLVQSGAEVKKPGESLRISCKGSGFTFSHYTMHWVRQAPGKGLEWVSFISYHGNNKYEADSVKG
BA-087-05-02-VH EVQLVQSGAEVKKPGATVKISCKVSGFTFSHYTMHWIRQSPSRGLEWLGFISYDGNYKYYADSVKG
BA-087-06-11-VH QVQLQESGPGLVKPSQTLSLTCTVSGFTFSHYTMHWVRQAPGQGLEWMGFISYDGNNKYYADSVKG
BA-087-08-09-VH EVQLVQSGAEVKKPGATVKISCKVSGFTFSHYTMHWIRQSPSRGLEWLGFISYDGNYKYYADSVKG
BA-087-09-01-03-VH EVQLVQSGAEVKKPGATVKISCKVSGFTFSHYTMHWIRQSPSRGLEWLGFISYDGNYKYYAKSVKG
BA-087-09-01-02-VH EVQLVQSGAEVKKPGATVKISCKVSGFTFSHYTMHWIRQSPSRGLEWLGFISYIGNYKYYADSVKG
BA-087-09-01-06-VH EVQLVQSGAEVKKPGATVKISCKVSGFTFSHYTMHWIRQSPSRGLEWLGFISYIGNYKYYADSMKG
BA-087-09-02-02-VH EVQLVQSGAEVKKPGATVKISCKVSGFTFSHYTMHWIRQSPSRGLEWLGFISYIGNYKYYADSVKG
BA-087-09-02-06-VH EVQLVQSGAEVKKPGATVKISCKVSGFTFSHYTMHWIRQSPSRGLEWLGFISYIGNYKYYADSMKG
RFTISRDNSKNTLYLQMNSLRAEDTAVYYCARTGWLGPFDYWGQGTLVTVSS SEQ ID NO:8
RFTISRDNAKNSLYLQMNSLRAEDTAVYYCARTGWLGPFDYWGQGTLVTVSS SEQ ID NO:10
RFTISRDNSKNTLYLQMNSLRAEDTAVYYCARTGWLGPFDYWGQGTLVTVSS SEQ ID NO:12
RFTISRDNAKNSLYLQMNSLRAEDTAVYYCARTGWLGPFDYWGQGTLVTVSS SEQ ID NO:14
RFTISRDNSKNTLYLQMNSLRAEDTAVYYCARTGWLGPFDIWGQGTLVTVSS SEQ ID NO:16
RFTISRDNSKNTLYLQMNSLRAEDTAVYYCARTGWLGPFDIWGQGTLVTVSS SEQ ID NO:18
RFTISRDNAKNSLYLQMNSLRAEDTAVYYCARTGWLGPFDYWGQGTLVTVSS SEQ ID NO:20
RFTISRDNSKNTLYLQMNSLRAEDTAVYYCARTGWLGPFDYWGQGTLVTVSS SEQ ID NO:22
RFTISRDNAKNSLYLQMNSLRAEDTAVYYCARTGWLGPFDYWGQGTLVTVSS SEQ ID NO:24
RFTISRDNSKNTLYLQMNSLRAEDTAVYYCARTGWLGPFDYWGQGTLVTVSS SEQ ID NO:26
RFTISRDNSKNTLYLQMNSLRAEDTAVYYCARTGWLGPFDYWGQGTLVTVSS SEQ ID NO:28
RFTISRDNAKNSLYLQMNSLRAEDTAVYYCARTGWLGPFDYWGQGTLVTVSS SEQ ID NO:30
RFTISRDNAKNSLYLQMNSLRAEDTAVYYCARTGWLGPFDYWGQGTLVTVSS SEQ ID NO:32
RFTISRDNAKNSLYLQMNSLRAEDTAVYYCARTGWLGPFDYWGQGTLVTVSS SEQ ID NO:34
RFTISRDNAKNSLYLQMNSLRAEDTAVYYCARTGWLGPFDYWGQGTLVTVSS SEQ ID NO:36
RFTISRDNAKNSLYLQMNSLRAEDTAVYYCARTGWLGPFDYWGQGTLVTVSS SEQ ID NO:38

Fig. 1

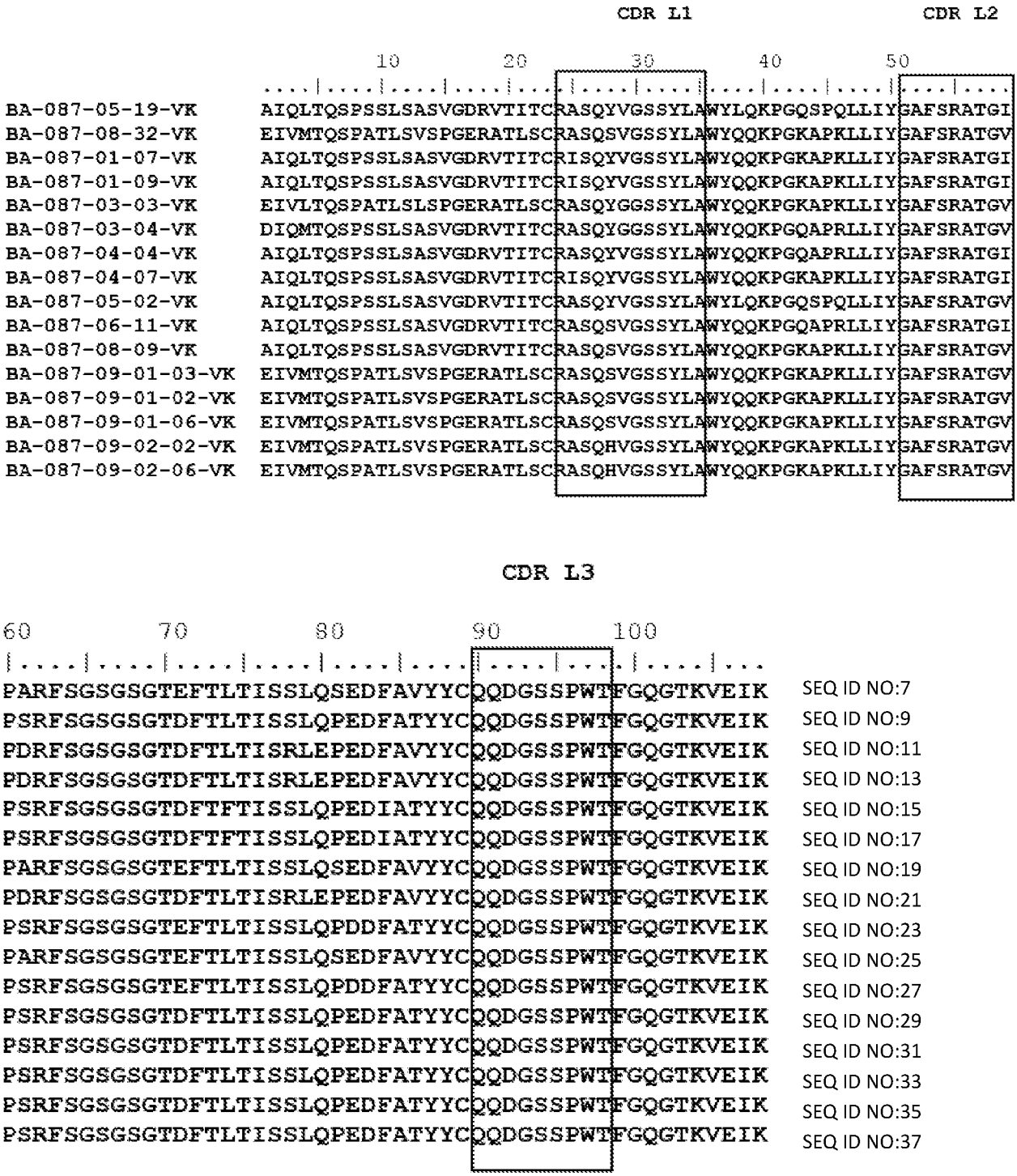

CDR L1
CDR L2
10
20
30
40
50
BA-087-05-19-VK AIQLTQSPSSLSASVGDRVTITCRASQYVGSSYLAWYLQKPGQSPQLLIYGAFSRATGI
BA-087-08-32-VK EIVMTQSPATLSVSPGERATLSCRASQSVGSSYLAWYQQKPGKAPKLLIYGAFSRATGV
BA-087-01-07-VK AIQLTQSPSSLSASVGDRVTITCRISQYVGSSYLAWYQQKPGKAPKLLIYGAFSRATGI
BA-087-01-09-VK AIQLTQSPSSLSASVGDRVTITCRISQYVGSSYLAWYQQKPGKAPKLLIYGAFSRATGI
BA-087-03-03-VK EIVLTQSPATLSLSPGERATLSCRASQYGGSSYLAWYQQKPGKAPKLLIYGAFSRATGV
BA-087-03-04-VK DIQMTQSPSSLSASVGDRVTITCRASQYGGSSYLAWYQQKPGQAPRLLIYGAFSRATGV
BA-087-04-04-VK AIQLTQSPSSLSASVGDRVTITCRASQYVGSSYLAWYQQKPGQAPRLLIYGAFSRATGI
BA-087-04-07-VK AIQLTQSPSSLSASVGDRVTITCRISQYVGSSYLAWYQQKPGKAPKLLIYGAFSRATGI
BA-087-05-02-VK AIQLTQSPSSLSASVGDRVTITCRASQYVGSSYLAWYLQKPGQSPQLLIYGAFSRATGV
BA-087-06-11-VK AIQLTQSPSSLSASVGDRVTITCRASQSVGSSYLAWYQQKPGQAPRLLIYGAFSRATGI
BA-087-08-09-VK AIQLTQSPSSLSASVGDRVTITCRASQSVGSSYLAWYQQKPGKAPKLLIYGAFSRATGV
BA-087-09-01-03-VK EIVMTQSPATLSVSPGERATLSCRASQSVGSSYLAWYQQKPGKAPKLLIYGAFSRATGV
BA-087-09-01-02-VK EIVMTQSPATLSVSPGERATLSCRASQSVGSSYLAWYQQKPGKAPKLLIYGAFSRATGV
BA-087-09-01-06-VK EIVMTQSPATLSVSPGERATLSCRASQSVGSSYLAWYQQKPGKAPKLLIYGAFSRATGV
BA-087-09-02-02-VK EIVMTQSPATLSVSPGERATLSCRASQHVGSSYLAWYQQKPGKAPKLLIYGAFSRATGV
BA-087-09-02-06-VK EIVMTQSPATLSVSPGERATLSCRASQHVGSSYLAWYQQKPGKAPKLLIYGAFSRATGV
CDR L3
60
70
80
90
100
PARFSGSGSGTEFTLTISSLQSEDFAVYYCQQDGSSPWTFGQGTKVEIK SEQ ID NO:7
PSRFSGSGSGTDFTLTISSLQPEDFATYYCQQDGSSPWTFGQGTKVEIK SEQ ID NO:9
PDRFSGSGSGTDFTLTISRLEPEDFAVYYCQQDGSSPWTFGQGTKVEIK SEQ ID NO:11
PDRFSGSGSGTDFTLTISRLEPEDFAVYYCQQDGSSPWTFGQGTKVEIK SEQ ID NO:13
PSRFSGSGSGTDFTFTISSLQPEDIATYYCQQDGSSPWTFGQGTKVEIK SEQ ID NO:15
PSRFSGSGSGTDFTFTISSLQPEDIATYYCQQDGSSPWTFGQGTKVEIK SEQ ID NO:17
PARFSGSGSGTEFTLTISSLQSEDFAVYYCQQDGSSPWTFGQGTKVEIK SEQ ID NO:19
PDRFSGSGSGTDFTLTISRLEPEDFAVYYCQQDGSSPWTFGQGTKVEIK SEQ ID NO:21
PSRFSGSGSGTEFTLTISSLQPDDFATYYCQQDGSSPWTFGQGTKVEIK SEQ ID NO:23
PARFSGSGSGTEFTLTISSLQSEDFAVYYCQQDGSSPWTFGQGTKVEIK SEQ ID NO:25
PSRFSGSGSGTEFTLTISSLQPDDFATYYCQQDGSSPWTFGQGTKVEIK SEQ ID NO:27
PSRFSGSGSGTDFTLTISSLQPEDFATYYCQQDGSSPWTFGQGTKVEIK SEQ ID NO:29
PSRFSGSGSGTDFTLTISSLQPEDFATYYCQQDGSSPWTFGQGTKVEIK SEQ ID NO:31
PSRFSGSGSGTDFTLTISSLQPEDFATYYCQQDGSSPWTFGQGTKVEIK SEQ ID NO:33
PSRFSGSGSGTDFTLTISSLQPEDFATYYCQQDGSSPWTFGQGTKVEIK SEQ ID NO:35
PSRFSGSGSGTDFTLTISSLQPEDFATYYCQQDGSSPWTFGQGTKVEIK SEQ ID NO:37

FIG. 2

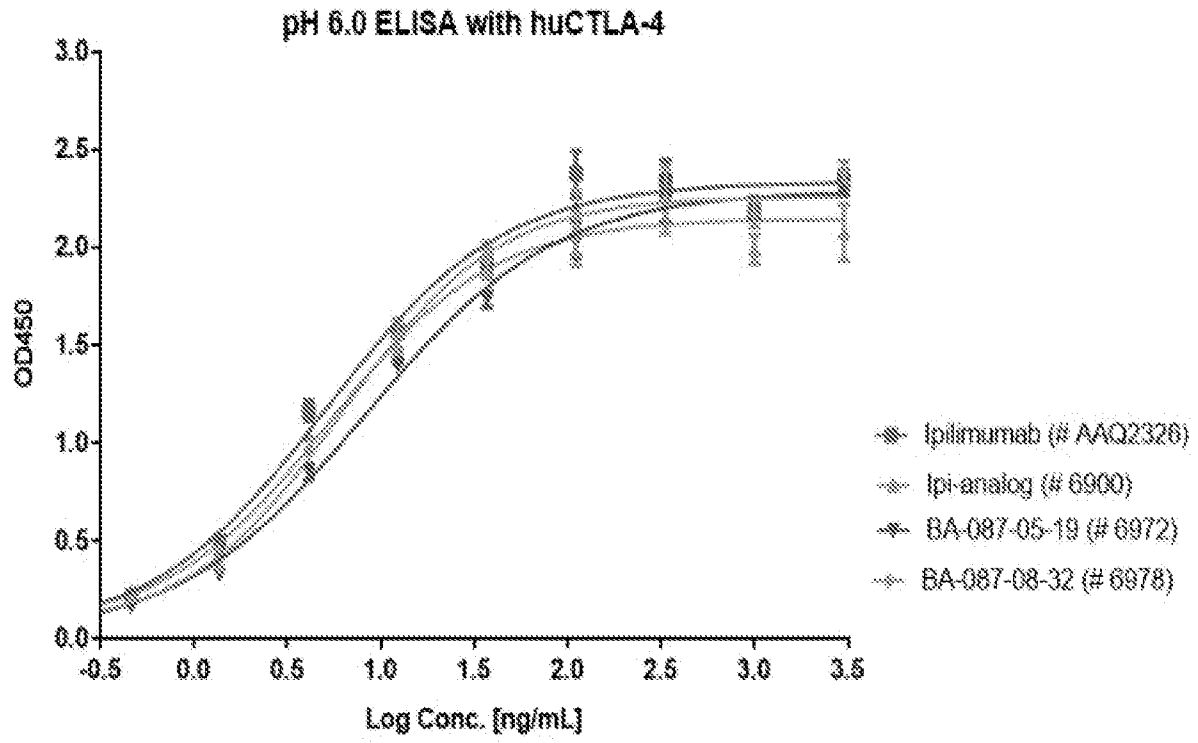

pH 6.0 ELISA with huCTLA-4
OD450
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
Log Conc. [ng/mL]
Ipilimumab (# AAQ2326)
Ipi-analog (# 6900)
BA-087-05-19 (# 6972)
BA-087-08-32 (# 6978)

FIG. 3A

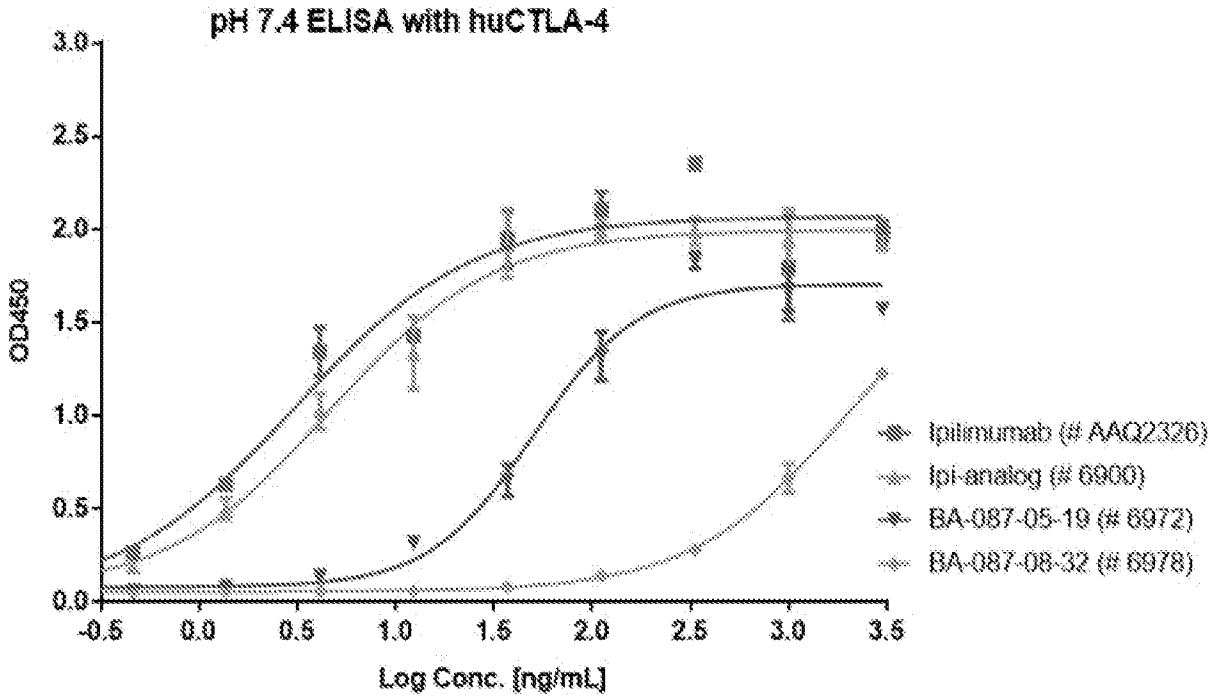

pH 7.4 ELISA with huCTLA-4
OD450
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
Log Conc. [ng/mL]
Ipilimumab (# AAQ2326)
Ipi-analog (# 6900)
BA-087-05-19 (# 6972)
BA-087-08-32 (# 6978)

FIG. 3B

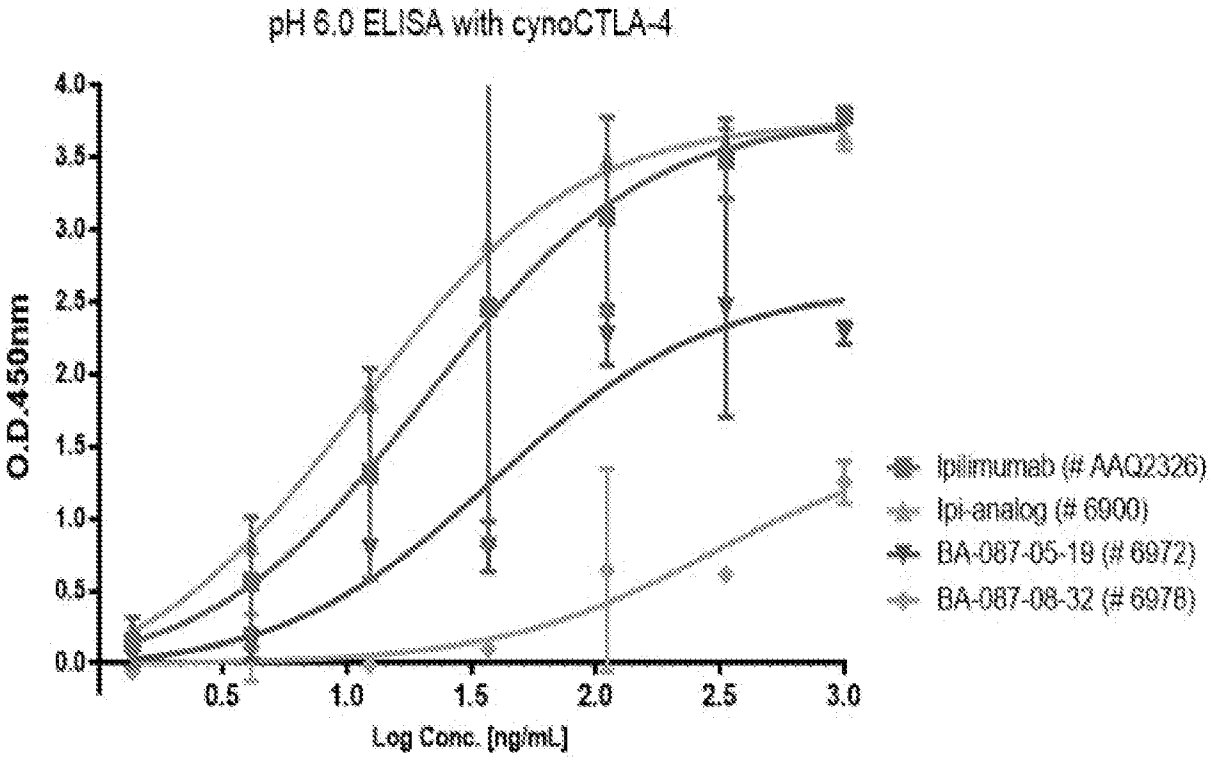

pH 6.0 ELISA with cynoCTLA-4
O.D.450nm
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Log Conc. [ng/mL]
Ipilimumab (# AAQ2326)
Ipi-analog (# 6900)
BA-087-05-19 (# 6972)
BA-087-08-32 (# 6978)

FIG. 4A

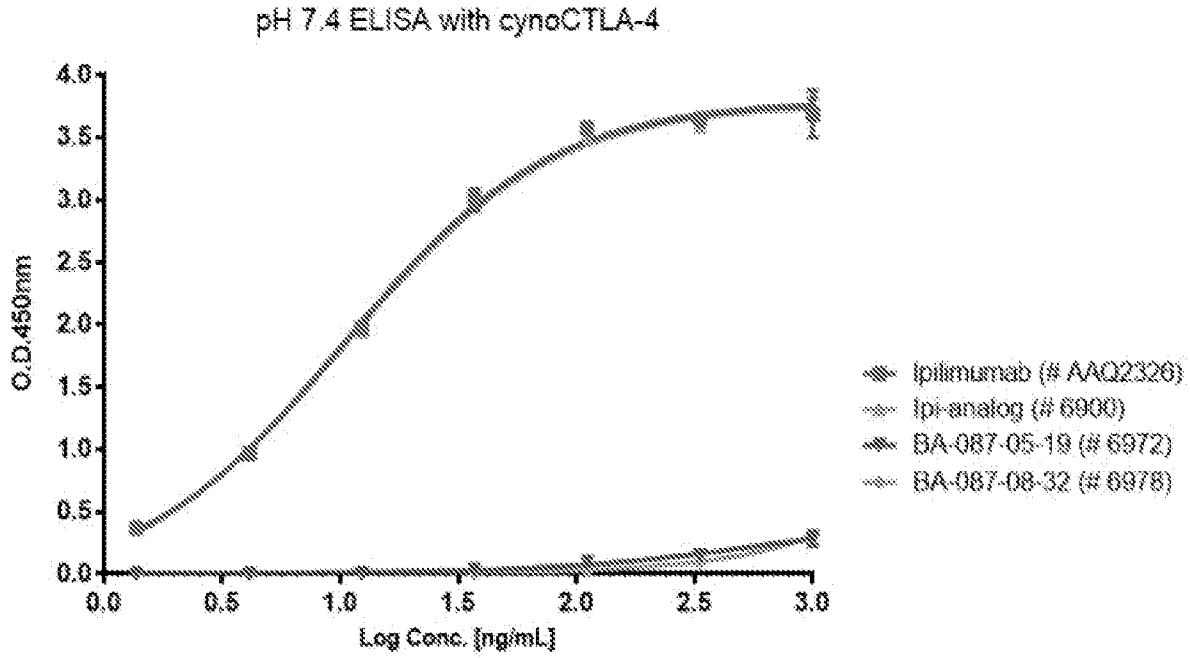

pH 7.4 ELISA with cynoCTLA-4
O.D.450nm
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Log Conc. [ng/mL]
Ipilimumab (# AAQ2326)
Ipi-analog (# 6900)
BA-087-05-19 (# 6972)
BA-087-08-32 (# 6978)

FIG. 4B

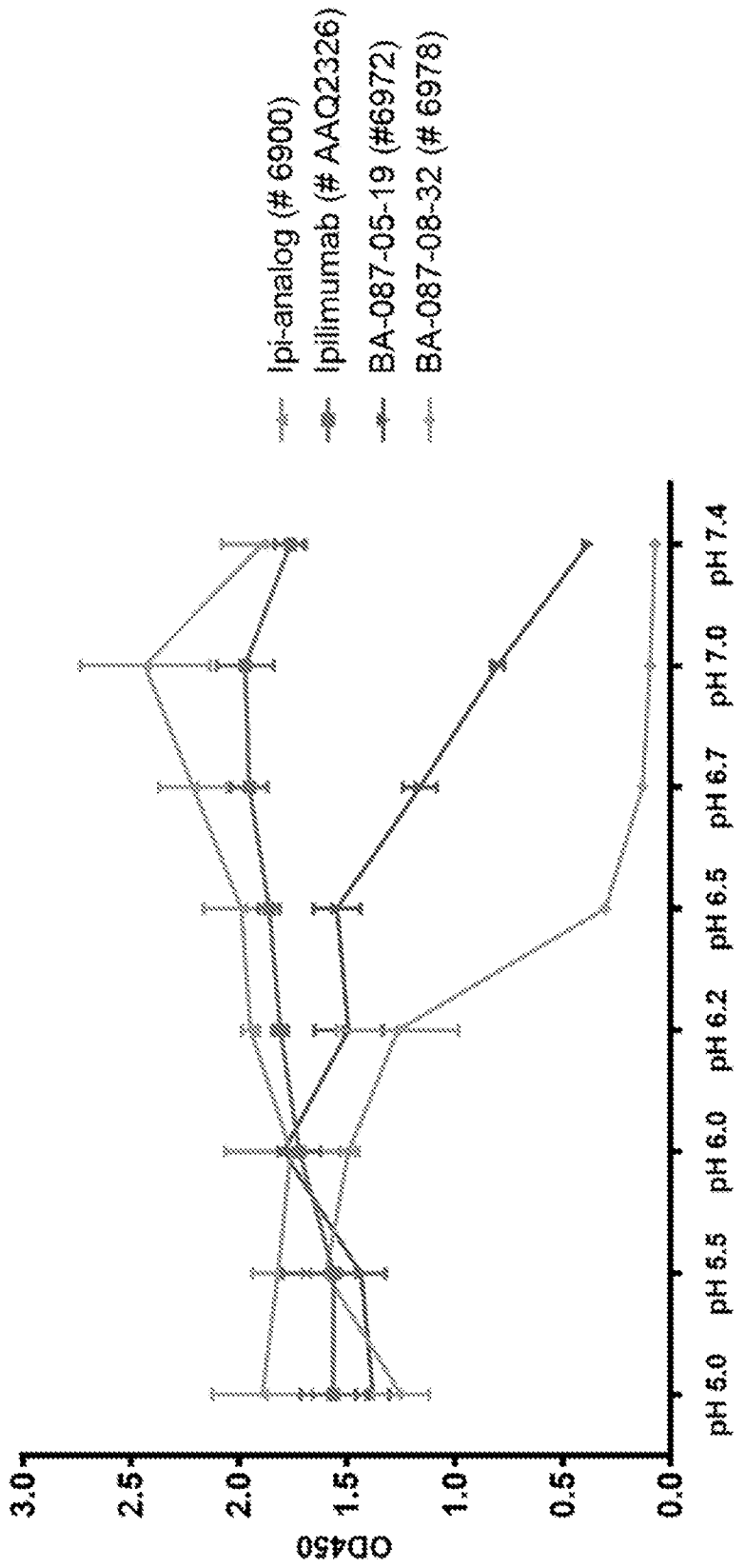
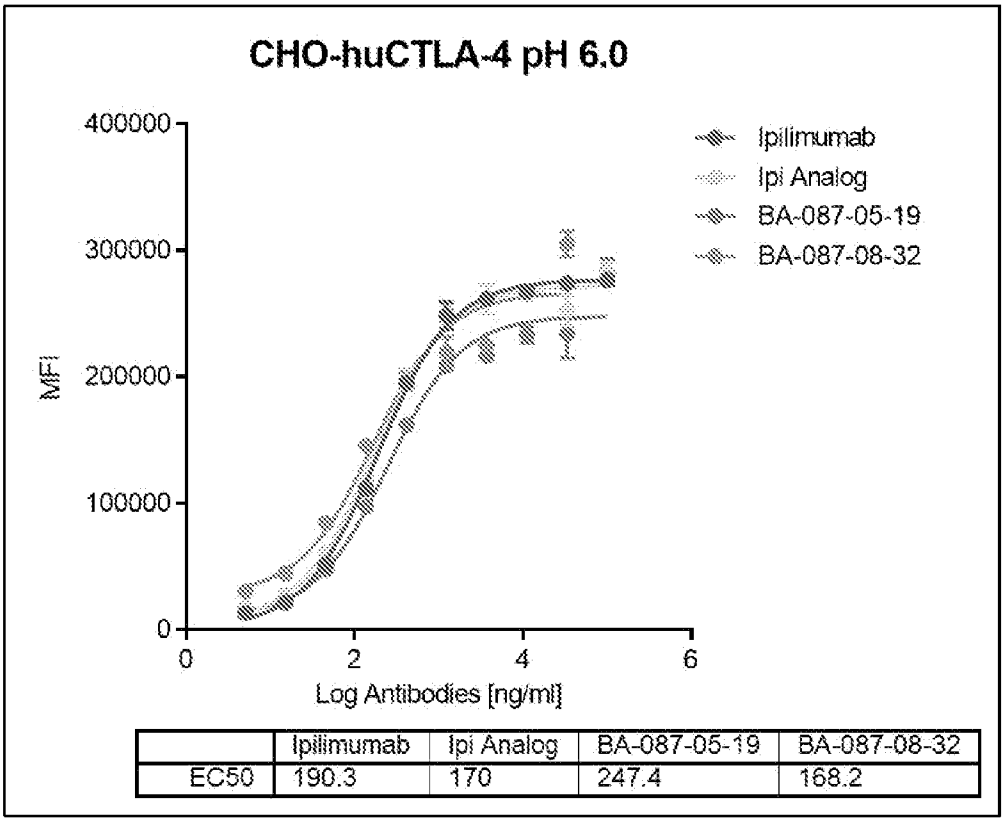
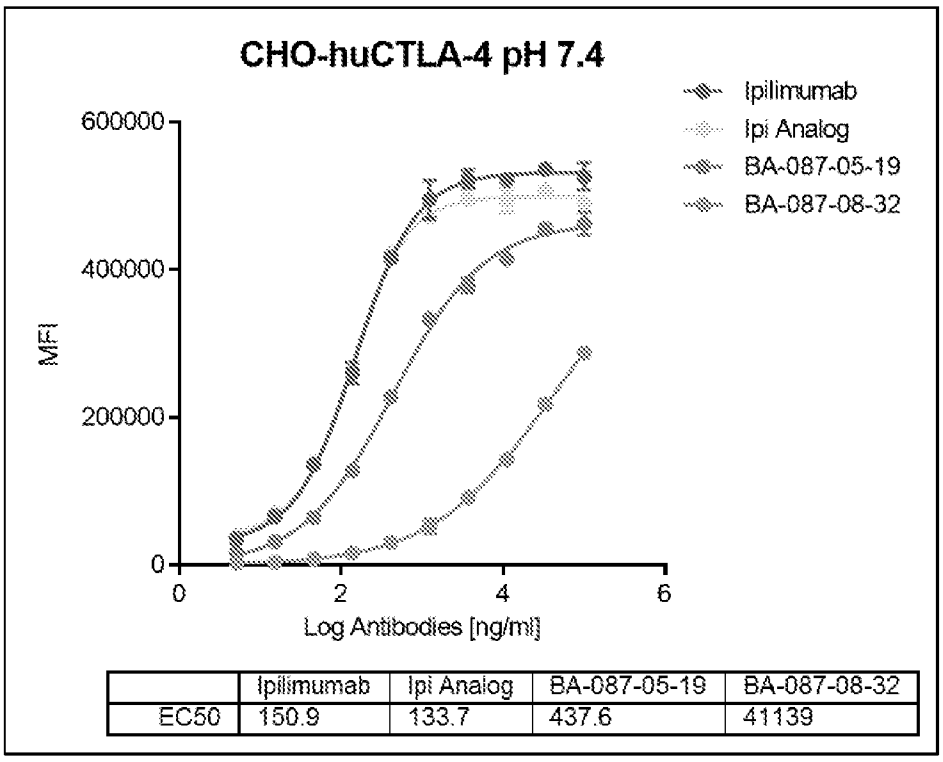

Ipi-analog (# 6900)
Ipilimumab (# AAQ2326)
BA-087-05-19 (#6972)
BA-087-08-32 (# 6978)
OD450
3.0
2.5
2.0
1.5
1.0
0.5
0.0
pH 5.0
pH 5.5
pH 6.0
pH 6.2
pH 6.5
pH 6.7
pH 7.0
pH 7.4

FIG. 5



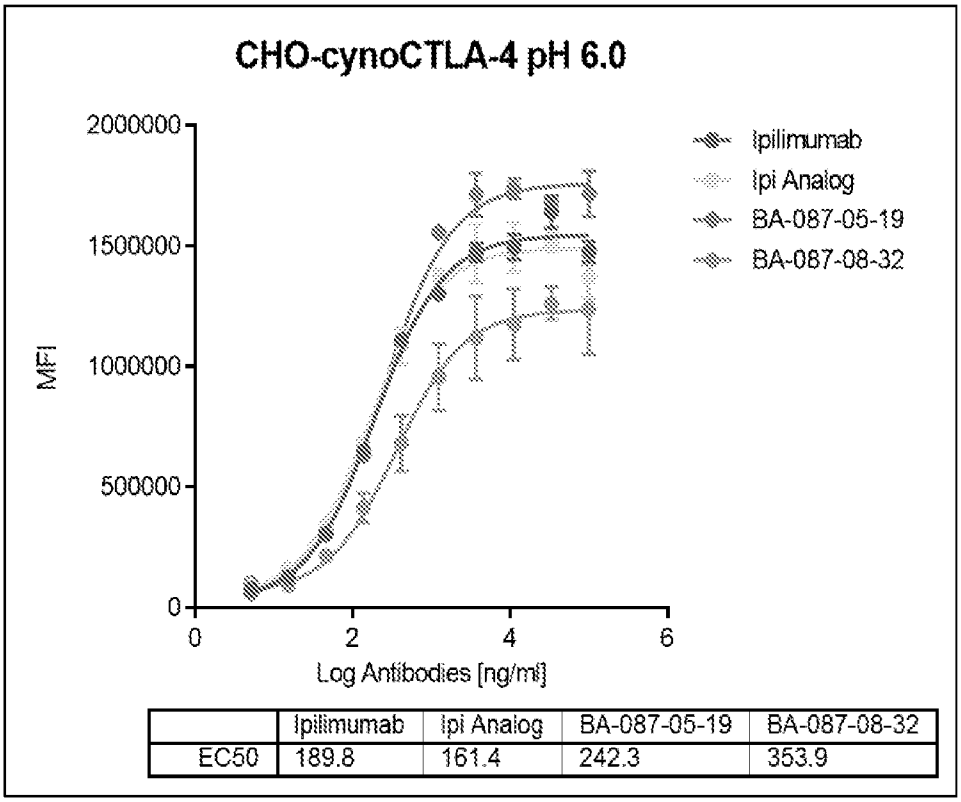
	Ipilimumab	Ipi Analog	BA-087-05-19	BA-087-08-32
EC50	190.3	170	247.4	168.2

FIG. 6A



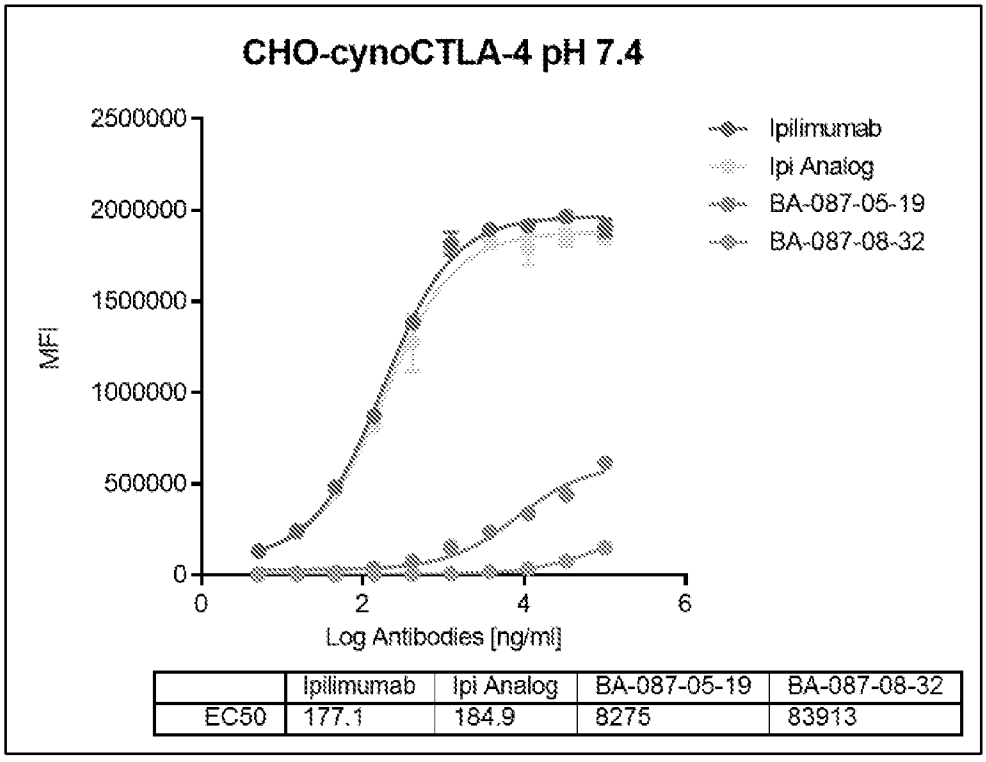
	Ipilimumab	Ipi Analog	BA-087-05-19	BA-087-08-32
EC50	150.9	133.7	437.6	41139

FIG. 6B



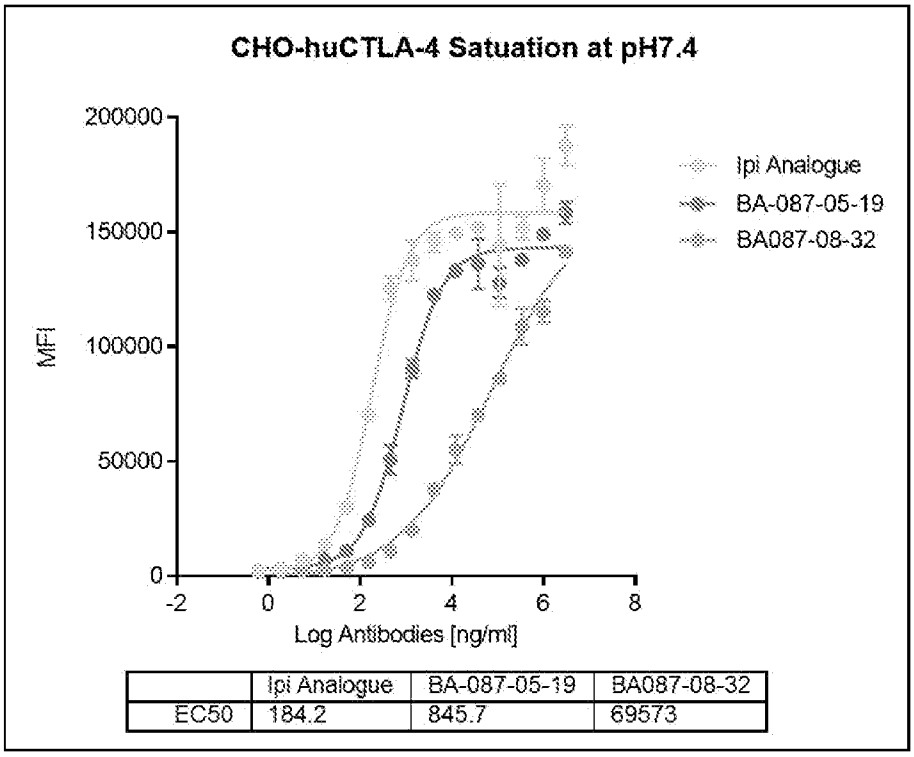
	Ipilimumab	Ipi Analog	BA-087-05-19	BA-087-08-32
EC50	189.8	161.4	242.3	353.9

FIG. 7A



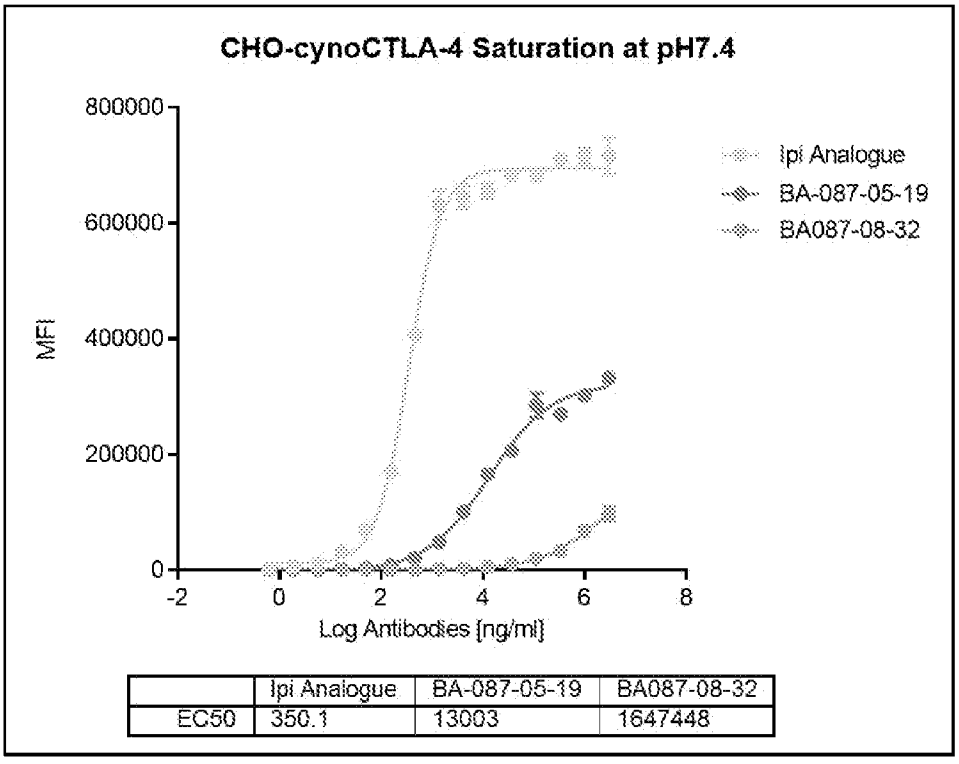
	Ipilimumab	Ipi Analog	BA-087-05-19	BA-087-08-32
EC50	177.1	184.9	8275	83913

FIG. 7B



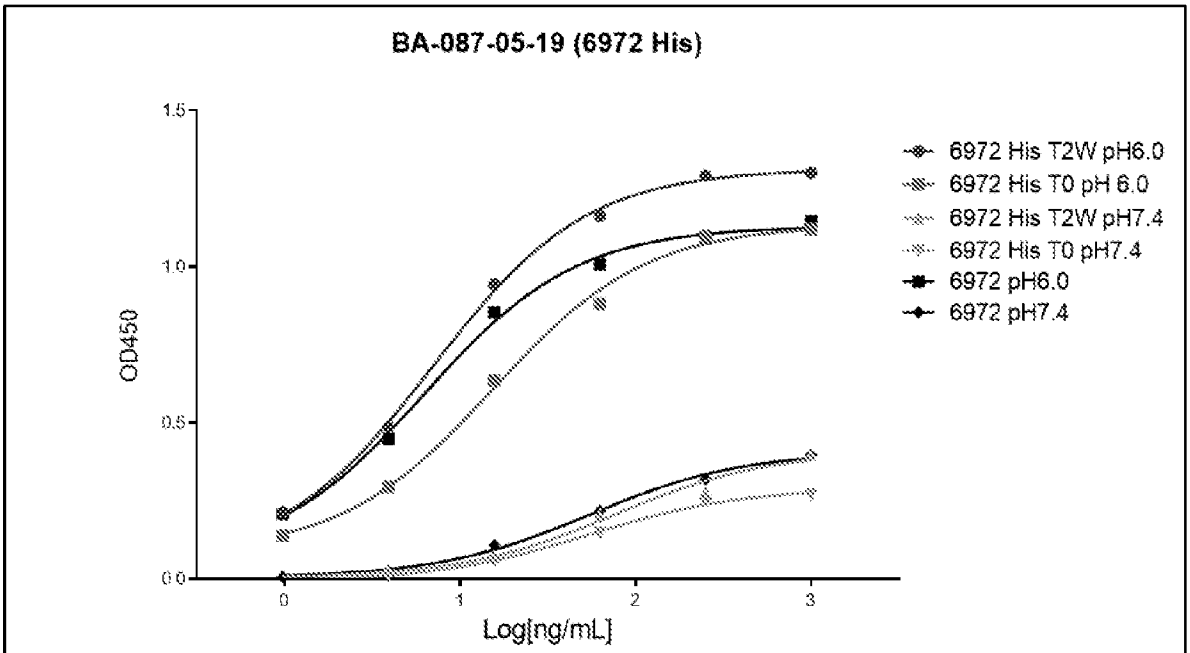
	Ipi Analogue	BA-087-05-19	BA087-08-32
EC50	184.2	845.7	69573

FIG. 8A



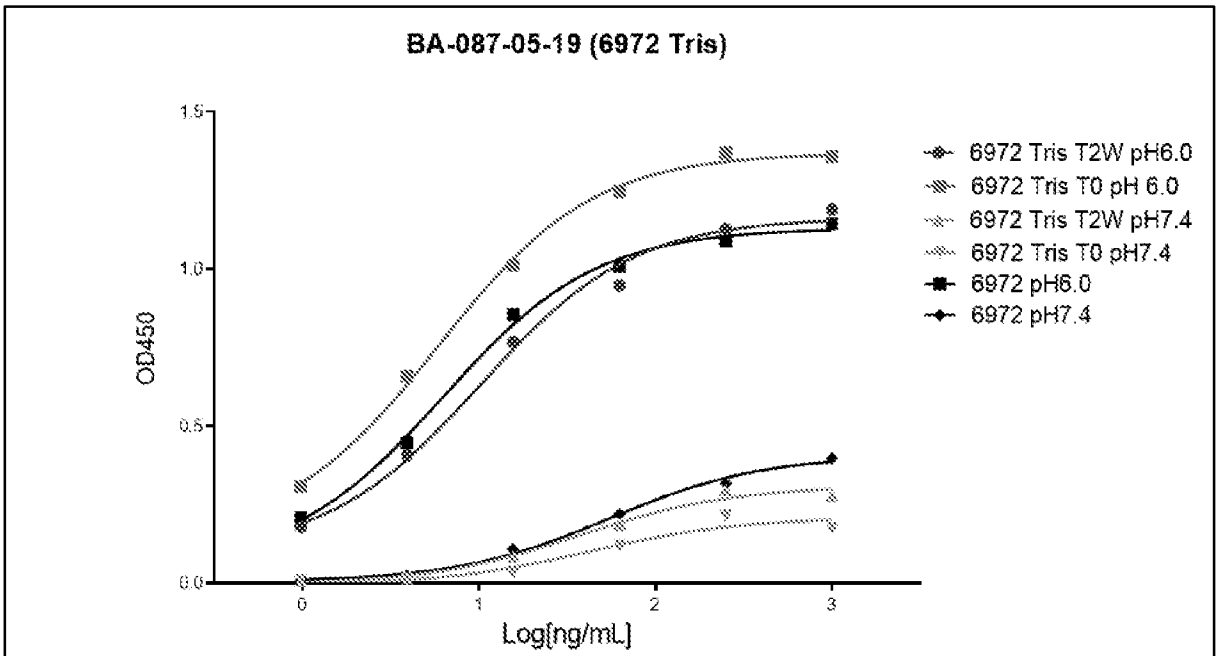
	Ipi Analogue	BA-087-05-19	BA087-08-32
EC50	350.1	13003	1647448

FIG. 8B



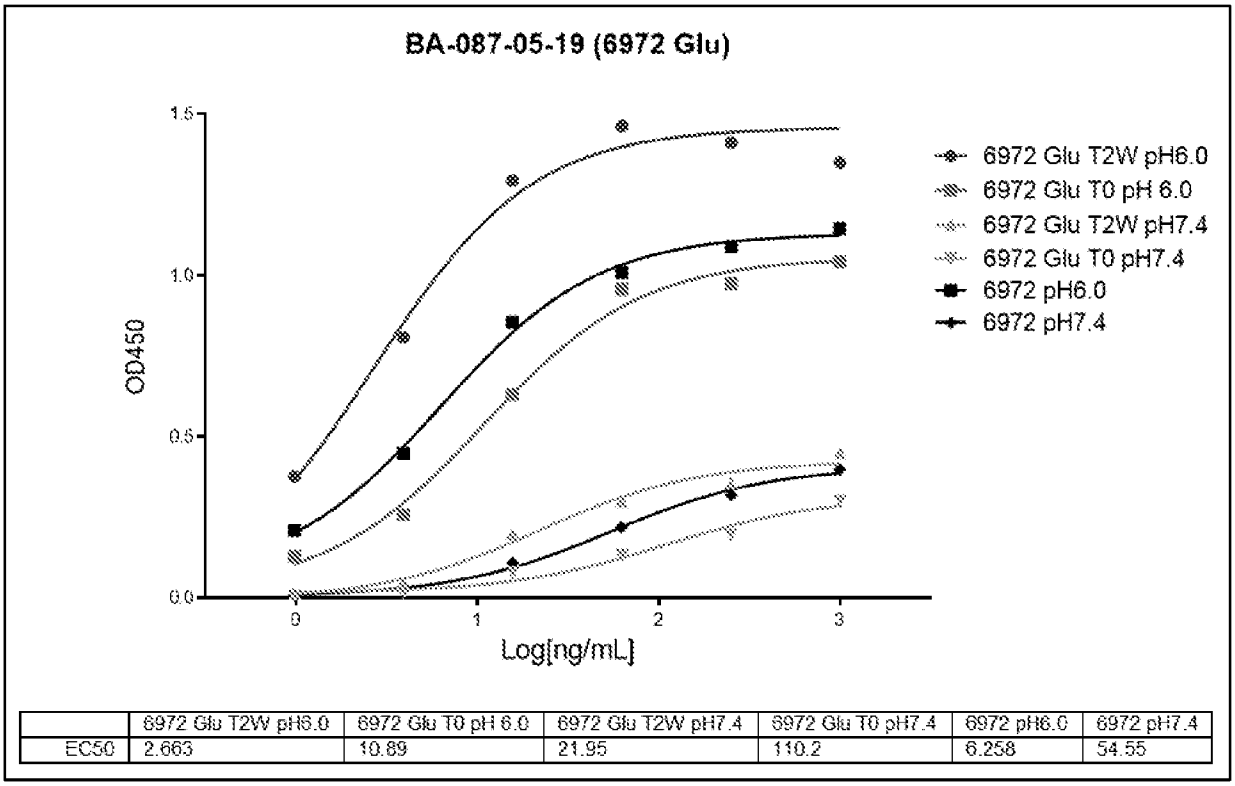
	6972 His T2W pH6.0	6972 His T0 pH 6.0	6972 His T2W pH7.4	6972 His T0 pH7.4	6972 pH6.0	6972 pH7.4
EC50	7.042	15.41	75.81	54.36	6.258	54.55

FIG. 9A



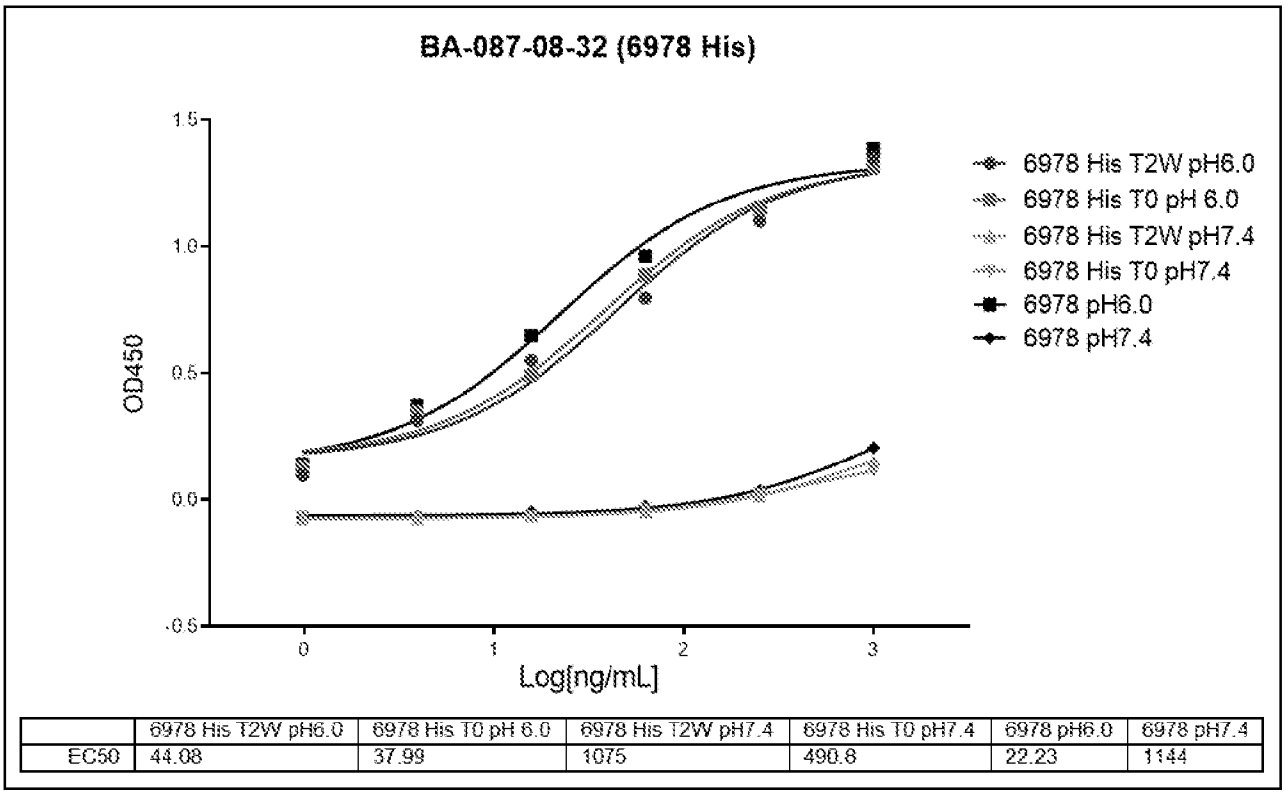
	6972 Tris T2W pH6.0	6972 Tris T0 pH 6.0	6972 Tris T2W pH7.4	6972 Tris T0 pH7.4	6972 pH6.0	6972 pH7.4
EC50	10.14	5.913	36.54	42.37	6.258	54.55

FIG. 9B



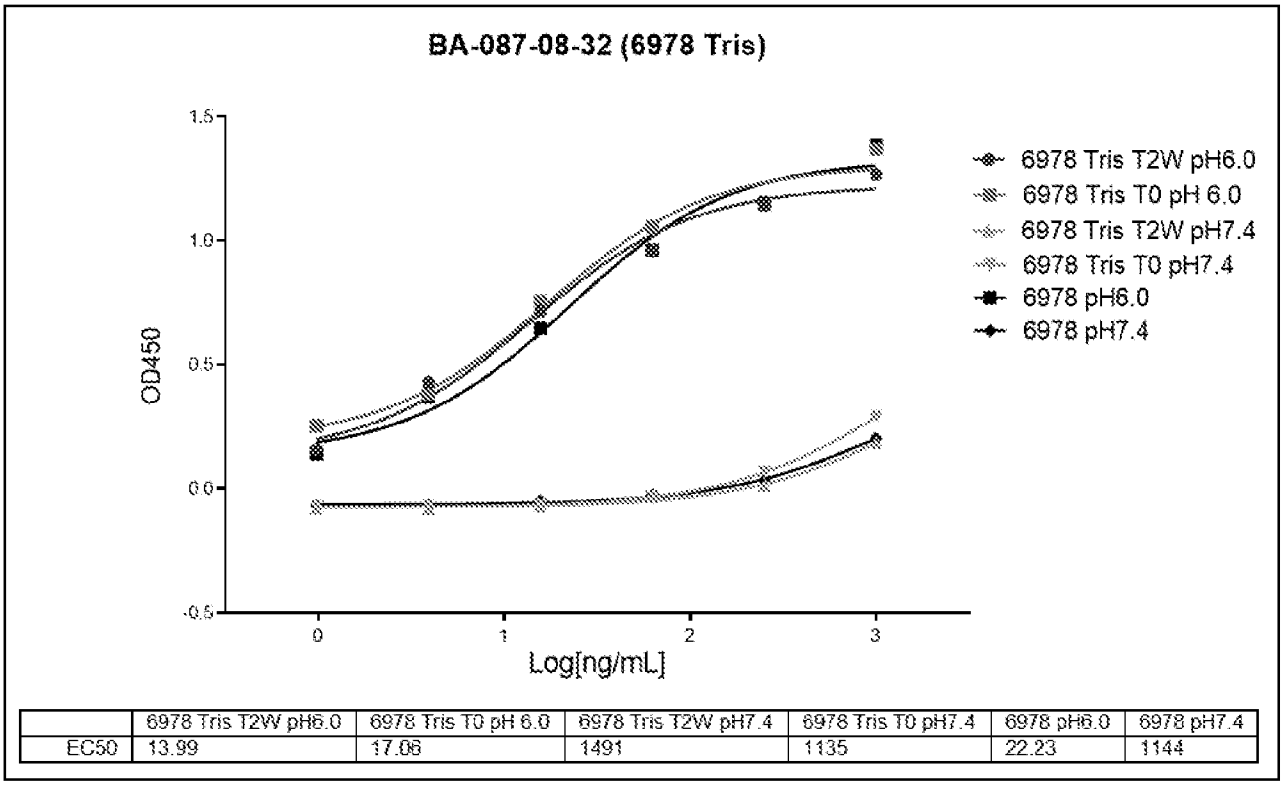
	6972 Glu T2W pH6.0	6972 Glu T0 pH 6.0	6972 Glu T2W pH7.4	6972 Glu T0 pH7.4	6972 pH6.0	6972 pH7.4
EC50	2.663	10.89	21.95	110.2	6.258	54.55

FIG. 9C



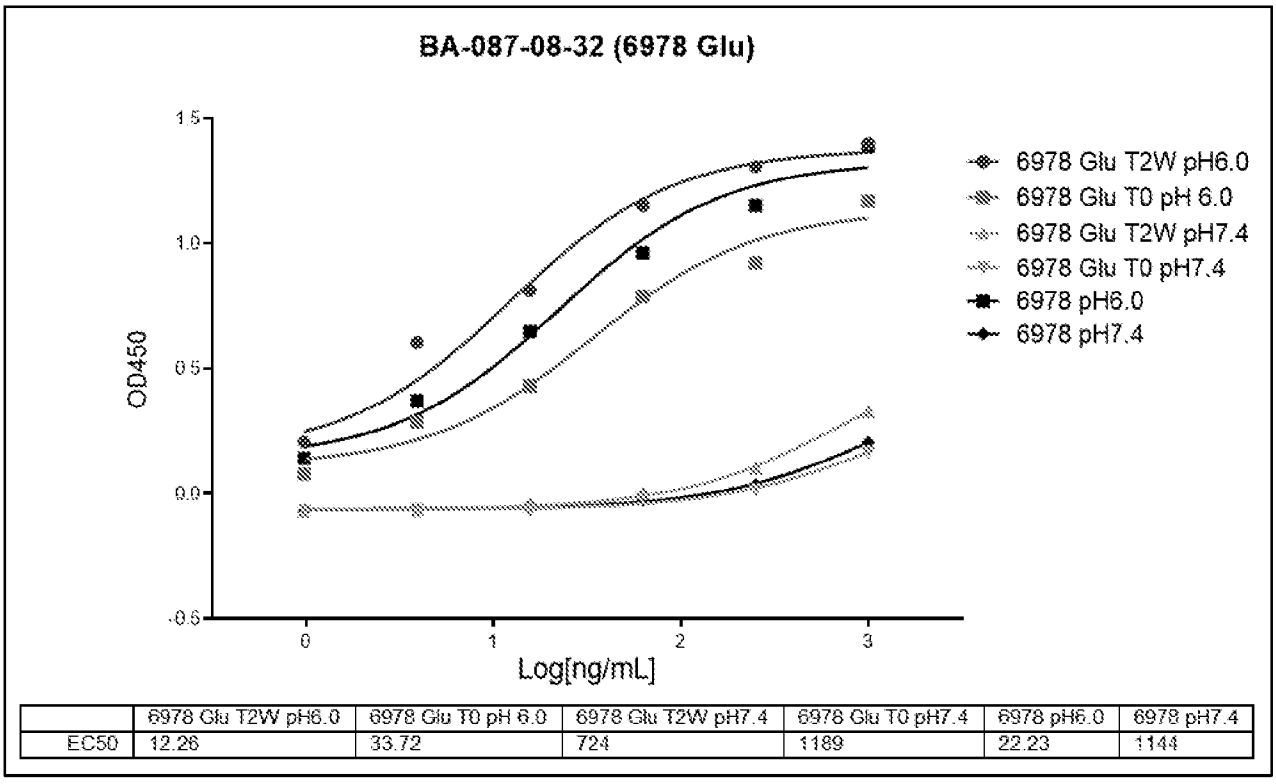
	6978 His T2W pH6.0	6978 His T0 pH 6.0	6978 His T2W pH7.4	6978 His T0 pH7.4	6978 pH6.0	6978 pH7.4
EC50	44.08	37.99	1075	490.8	22.23	1144

FIG. 9D



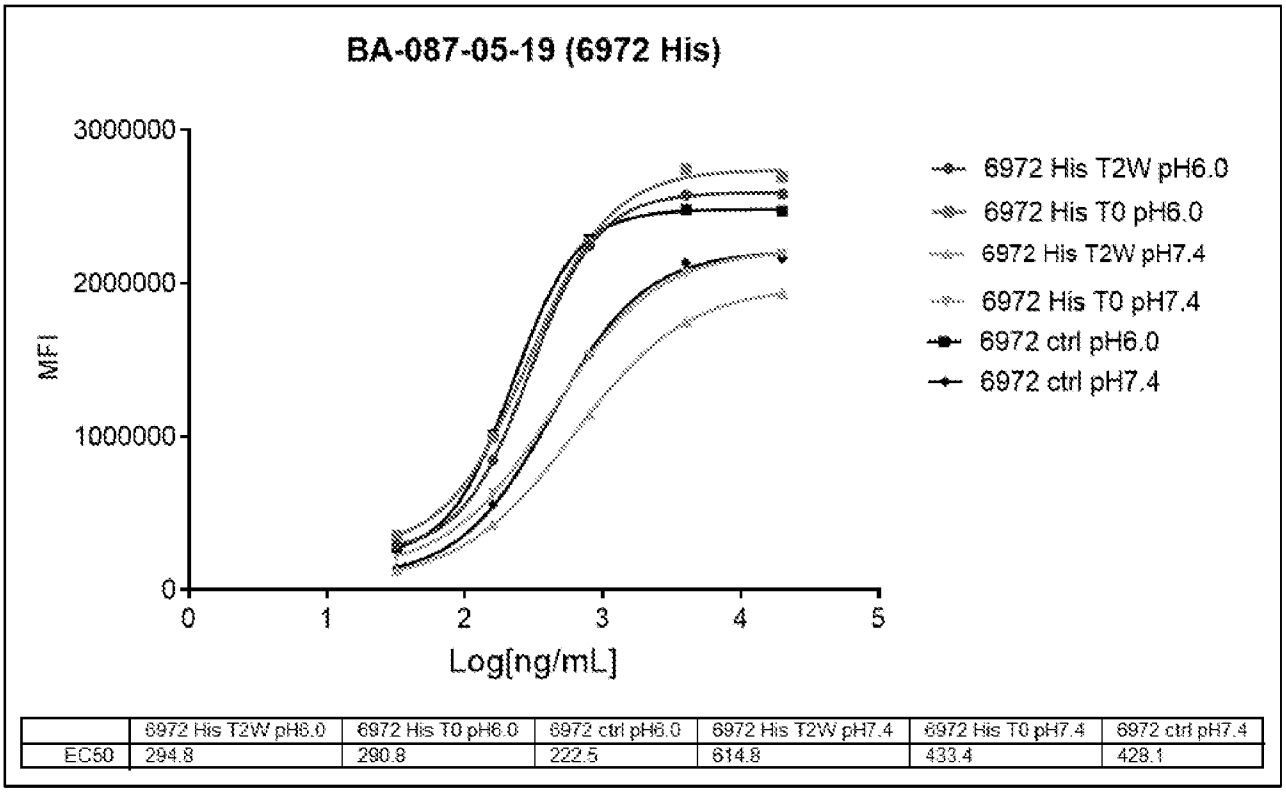
	6978 Tris T2W pH6.0	6978 Tris T0 pH 6.0	6978 Tris T2W pH7.4	6978 Tris T0 pH7.4	6978 pH6.0	6978 pH7.4
EC50	13.99	17.06	1491	1135	22.23	1144

FIG. 9E



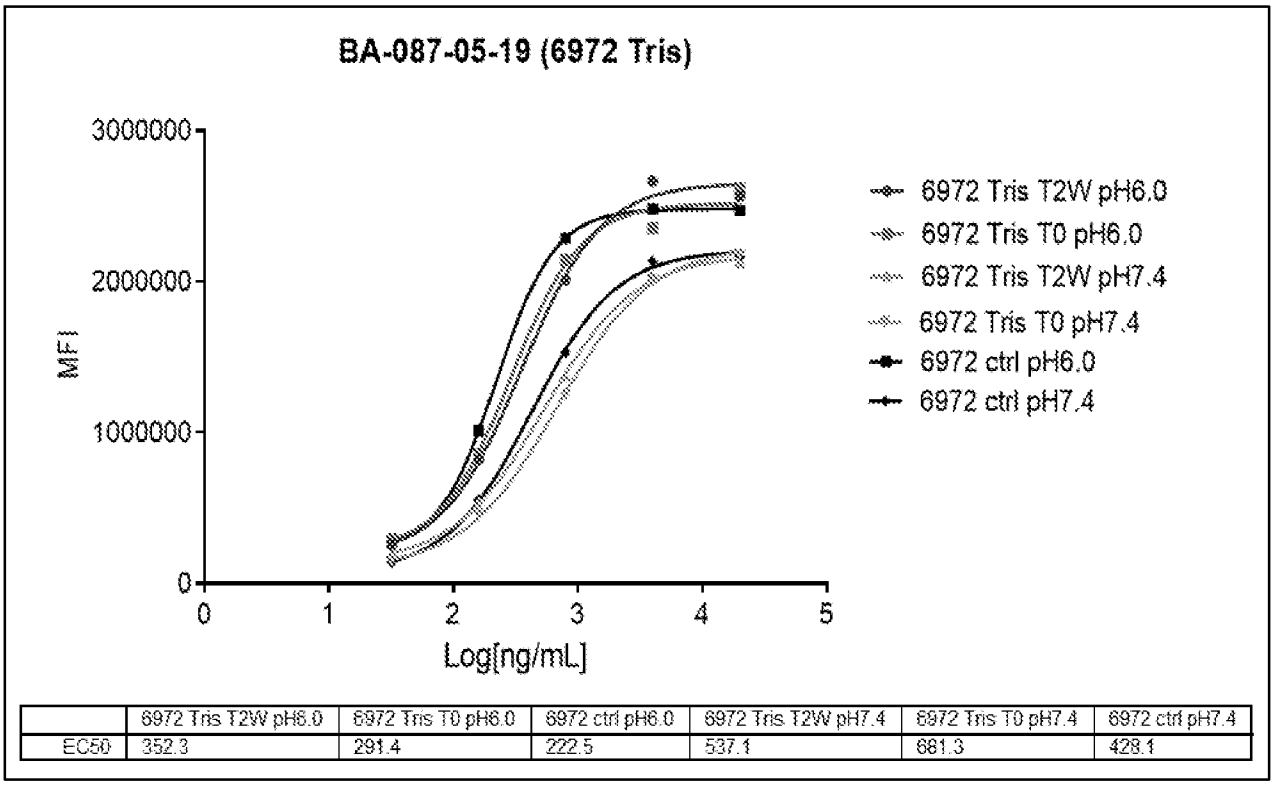
	6978 Glu T2W pH6.0	6978 Glu T0 pH 6.0	6978 Glu T2W pH7.4	6978 Glu T0 pH7.4	6978 pH6.0	6978 pH7.4
EC50	12.26	33.72	724	1189	22.23	1144

FIG. 9F



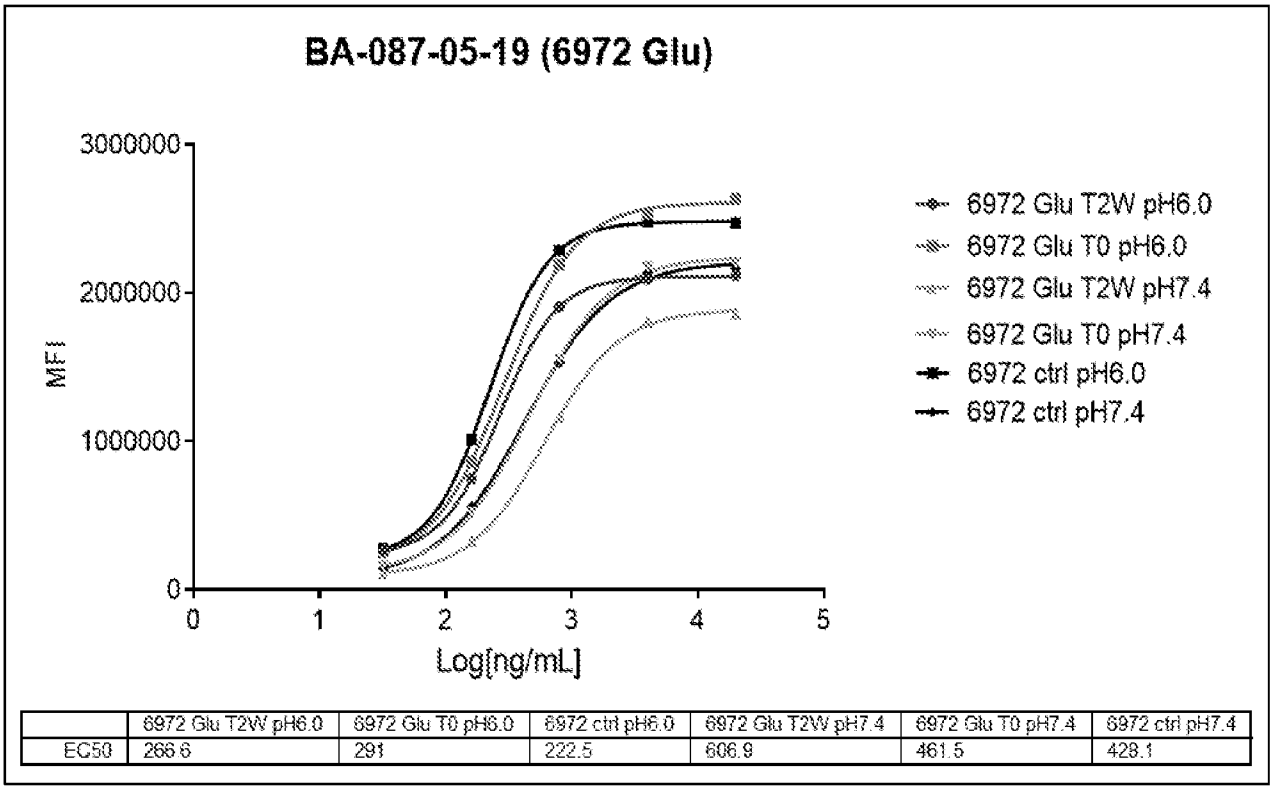
	6972 His T2W pH6.0	6972 His T0 pH6.0	6972 ctrl pH6.0	6972 His T2W pH7.4	6972 His T0 pH7.4	6972 ctrl pH7.4
EC50	294.8	290.8	222.5	614.8	433.4	428.1

FIG. 10A



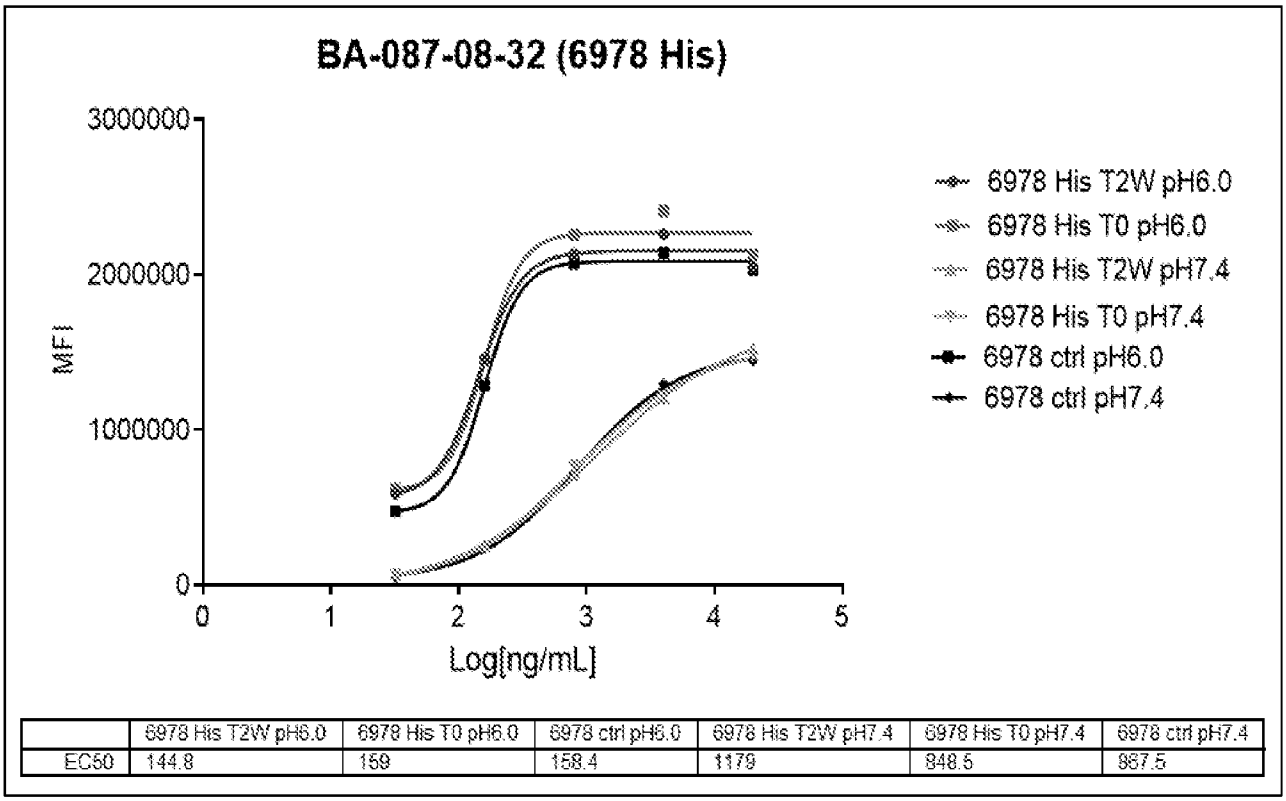
	6972 Tris T2W pH6.0	6972 Tris T0 pH6.0	6972 ctrl pH6.0	6972 Tris T2W pH7.4	6972 Tris T0 pH7.4	6972 ctrl pH7.4
EC50	352.3	291.4	222.5	537.1	681.3	428.1

FIG. 10B



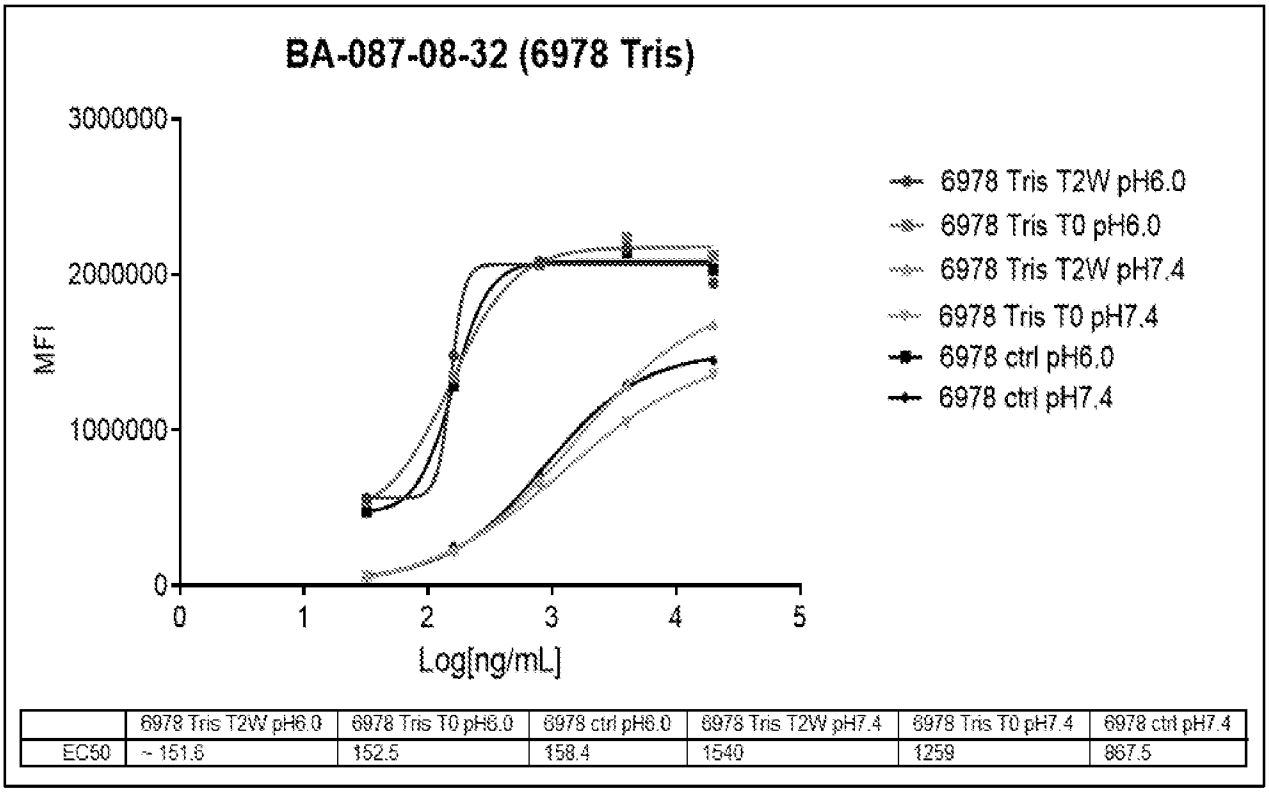
	6972 Glu T2W pH6.0	6972 Glu T0 pH6.0	6972 ctrl pH6.0	6972 Glu T2W pH7.4	6972 Glu T0 pH7.4	6972 ctrl pH7.4
EC50	266.6	291	222.5	606.9	461.5	428.1

FIG. 10C



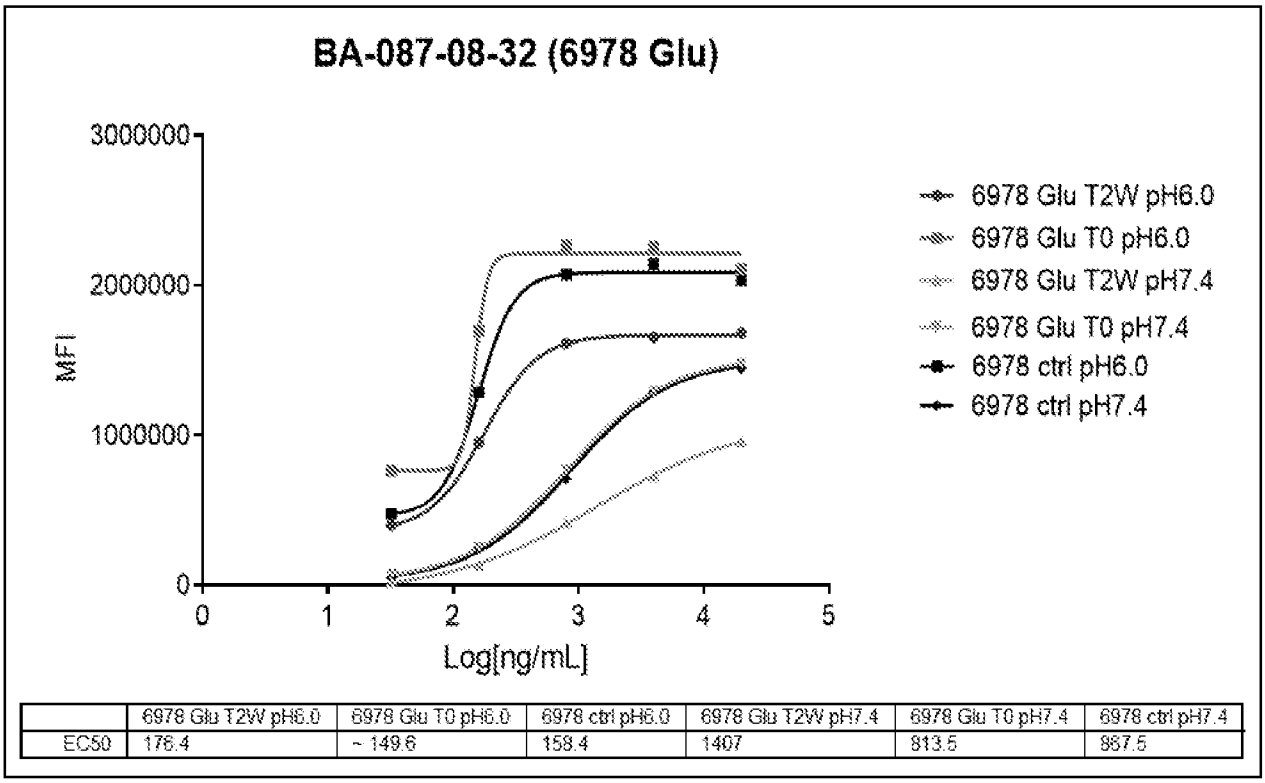
	6978 His T2W pH6.0	6978 His T0 pH6.0	6978 ctrl pH6.0	6978 His T2W pH7.4	6978 His T0 pH7.4	6978 ctrl pH7.4
EC50	144.8	159	158.4	1179	848.5	867.5

FIG. 10D



	6978 Tris T2W pH6.0	6978 Tris T0 pH6.0	6978 ctrl pH6.0	6978 Tris T2W pH7.4	6978 Tris T0 pH7.4	6978 ctrl pH7.4
EC50	~ 151.6	152.5	158.4	1540	1259	867.5

FIG. 10E



	6978 Glu T2W pH6.0	6978 Glu T0 pH6.0	6978 ctrl pH6.0	6978 Glu T2W pH7.4	6978 Glu T0 pH7.4	6978 ctrl pH7.4
EC50	176.4	~ 149.6	158.4	1407	813.5	867.5

FIG. 10F

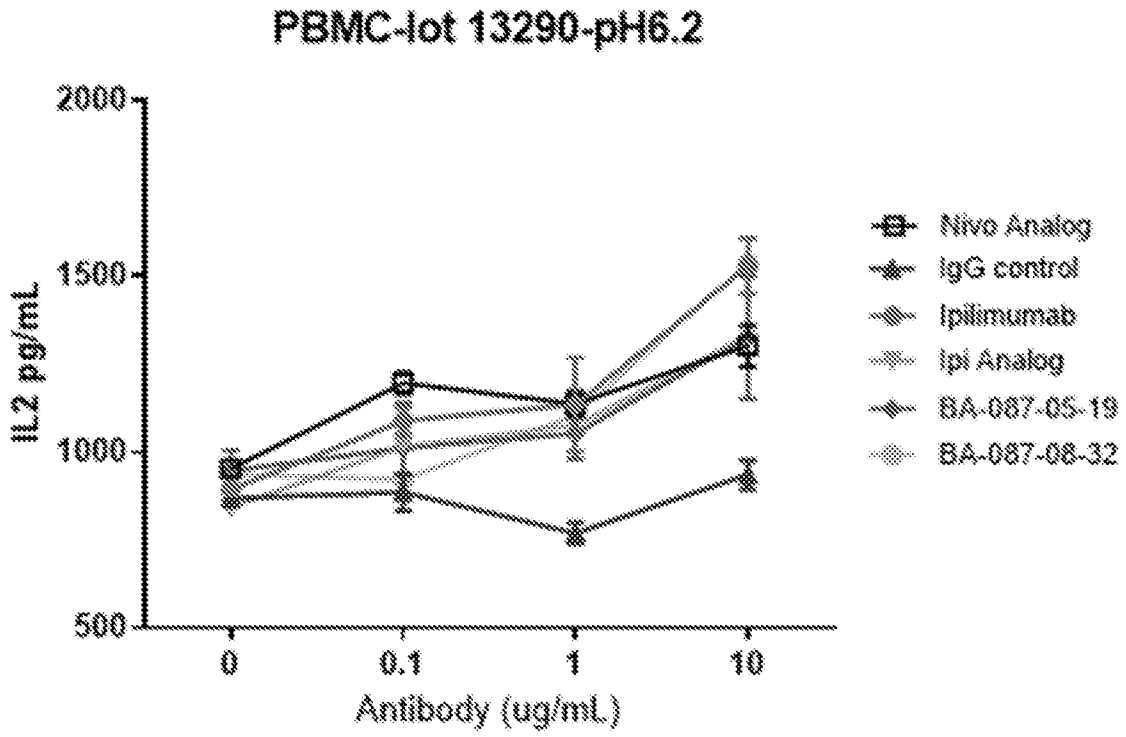


FIG. 11A

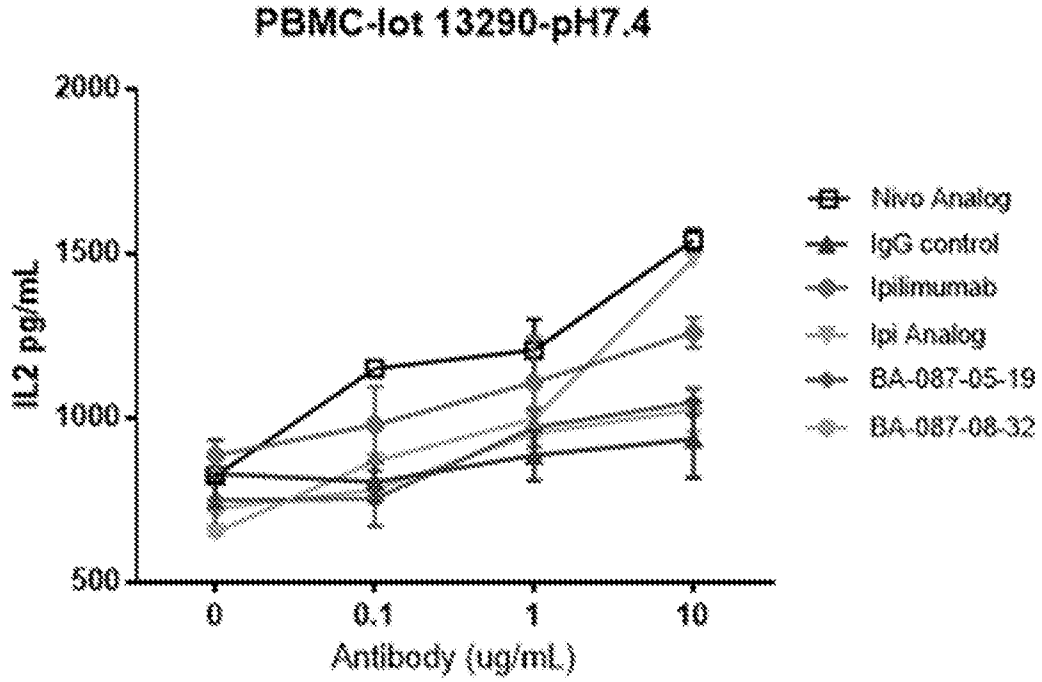
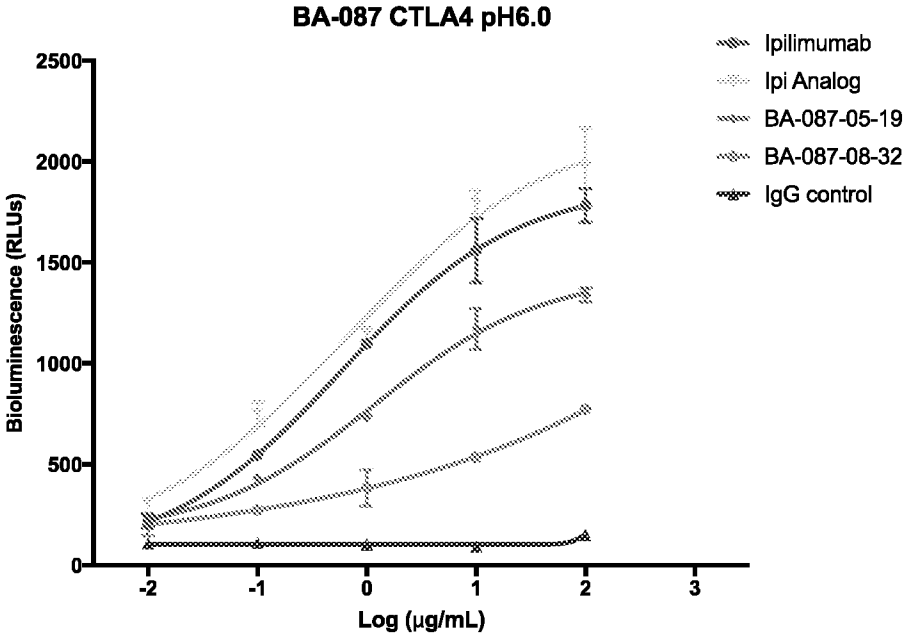
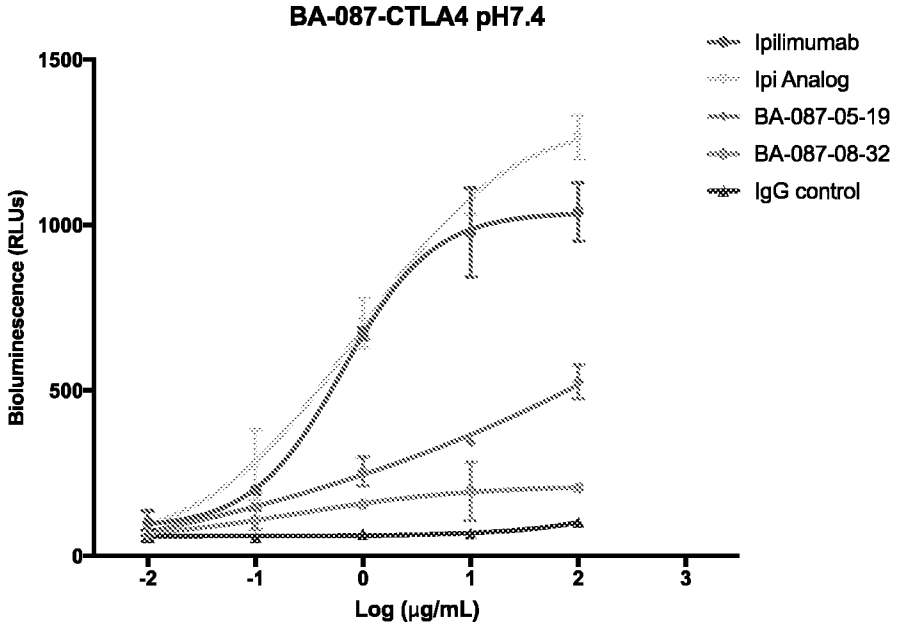


FIG. 11B



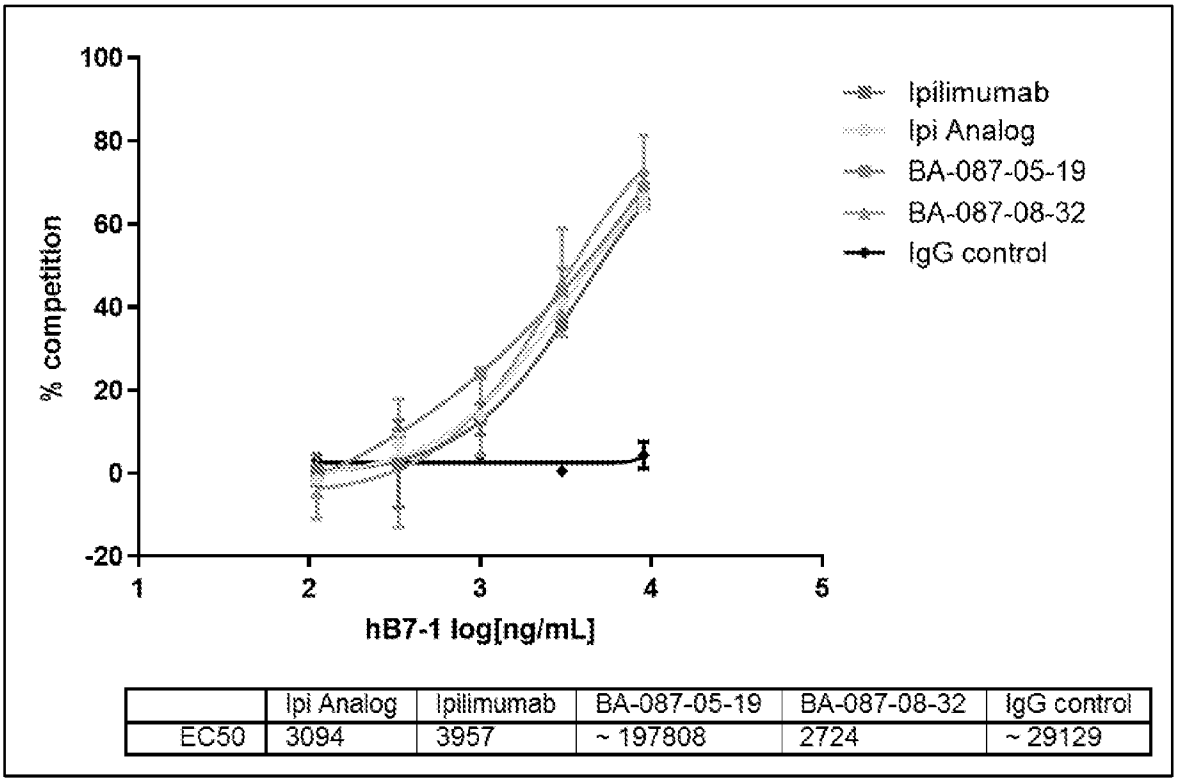
	Ipilimumab	Ipi Analog	BA-087-05-19	BA-087-08-32	IgG control
EC50	0.5811	0.6523	1.195	~ 16504533325657	~ 91.71

FIG. 12A



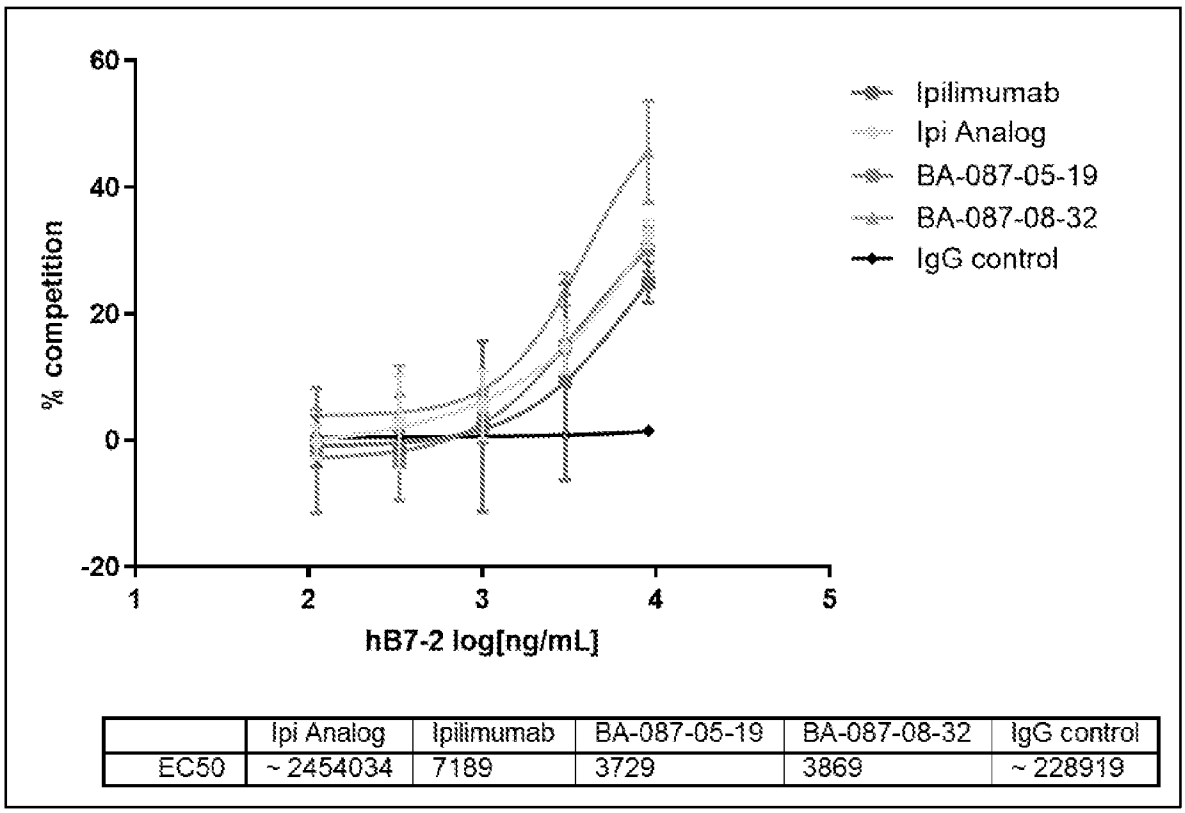
	Ipilimumab	Ipi Analog	BA-087-05-19	BA-087-08-32	IgG control
EC50	0.6488	0.9095	~ 1.258e+025	0.2449	~ 258563

FIG. 12B



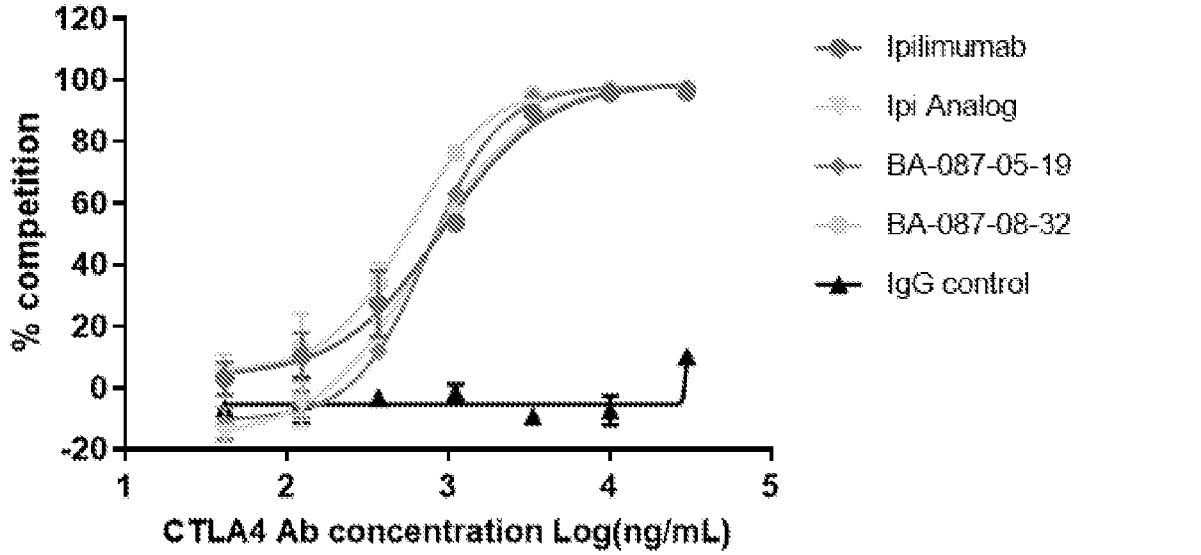
	Ipi Analog	Ipilimumab	BA-087-05-19	BA-087-08-32	IgG control
EC50	3094	3957	~ 197808	2724	~ 29129

FIG. 13A



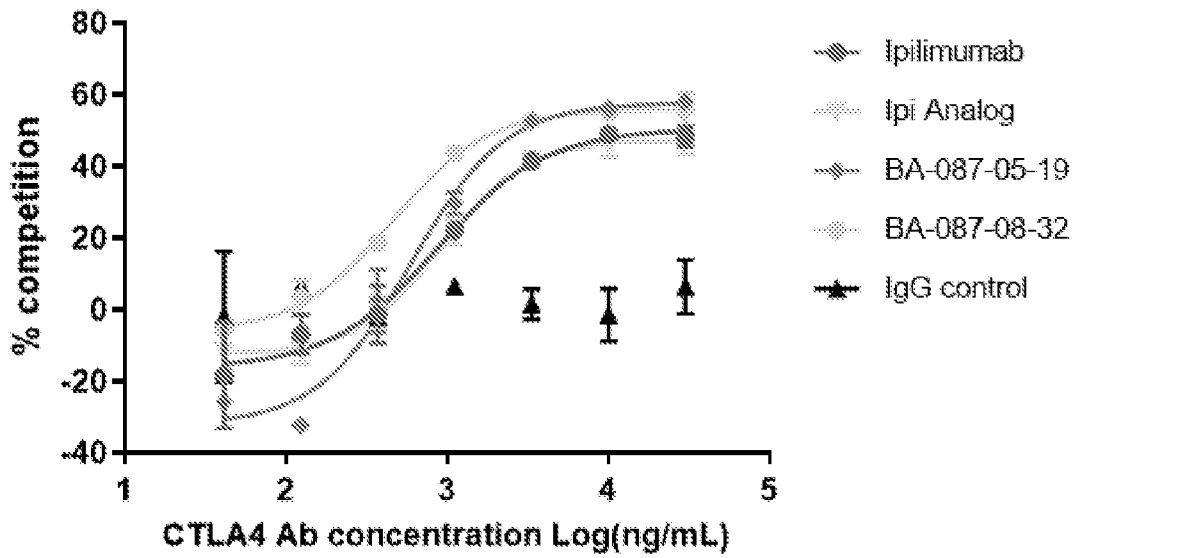
	Ipi Analog	Ipilimumab	BA-087-05-19	BA-087-08-32	IgG control
EC50	~ 2454034	7189	3729	3869	~ 228919

FIG. 13B



	Ipilimumab	Ipi Analog	BA-087-05-19	BA-087-08-32	IgG control
EC50	920.3	689.4	744.9	566.8	~ 29949

FIG. 14A



	Ipilimumab	Ipi Analog	BA-087-05-19	BA-087-08-32	IgG control
EC50	863.2	913.8	591.9	456.1	

FIG. 14B