

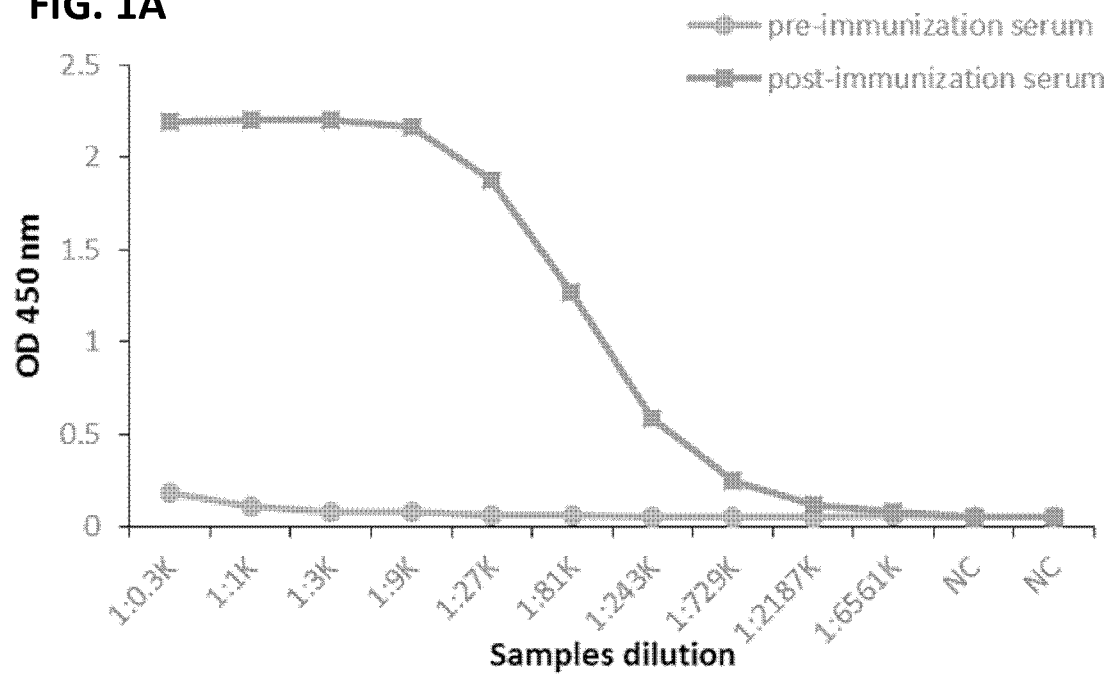
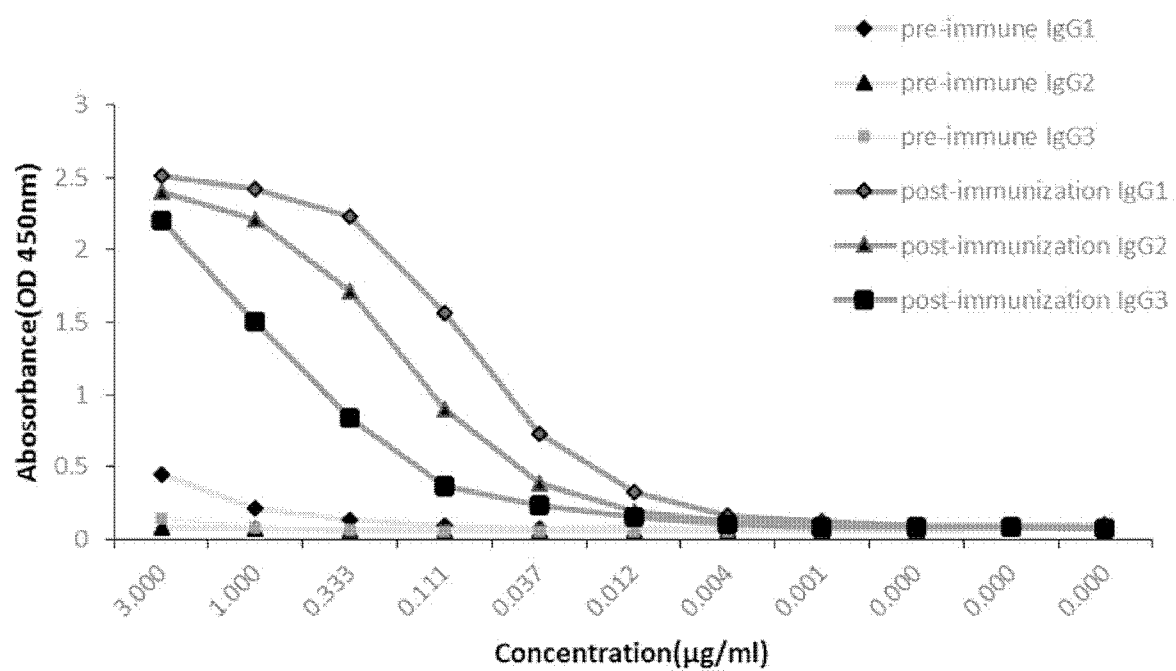
FIG. 1A**FIG. 1B**

FIG. 2A

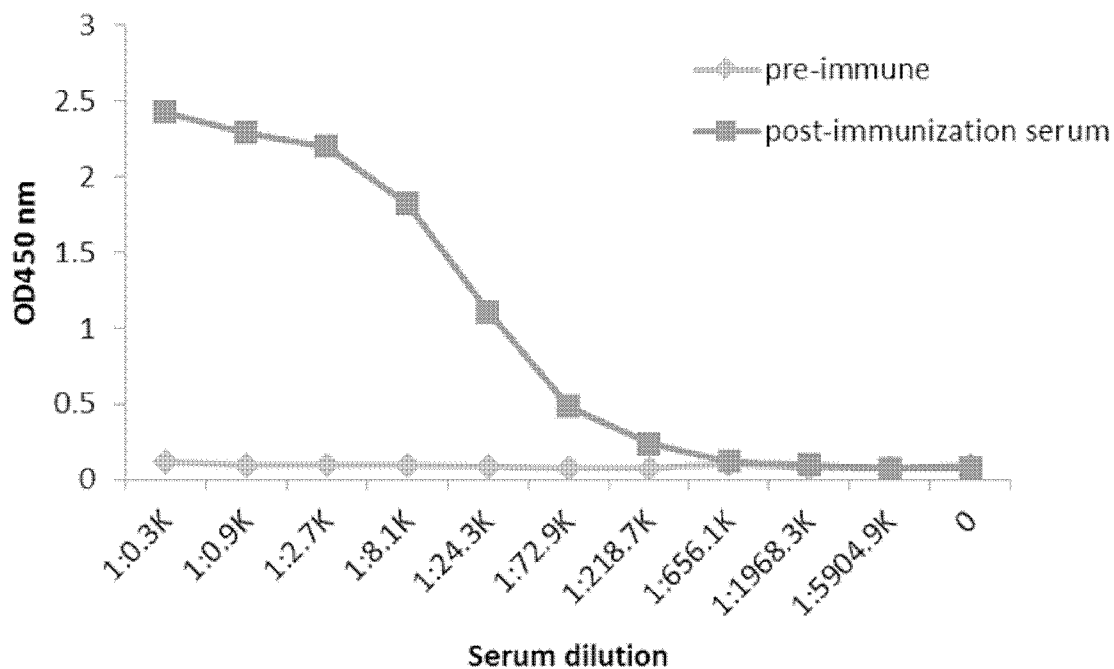


FIG. 2B

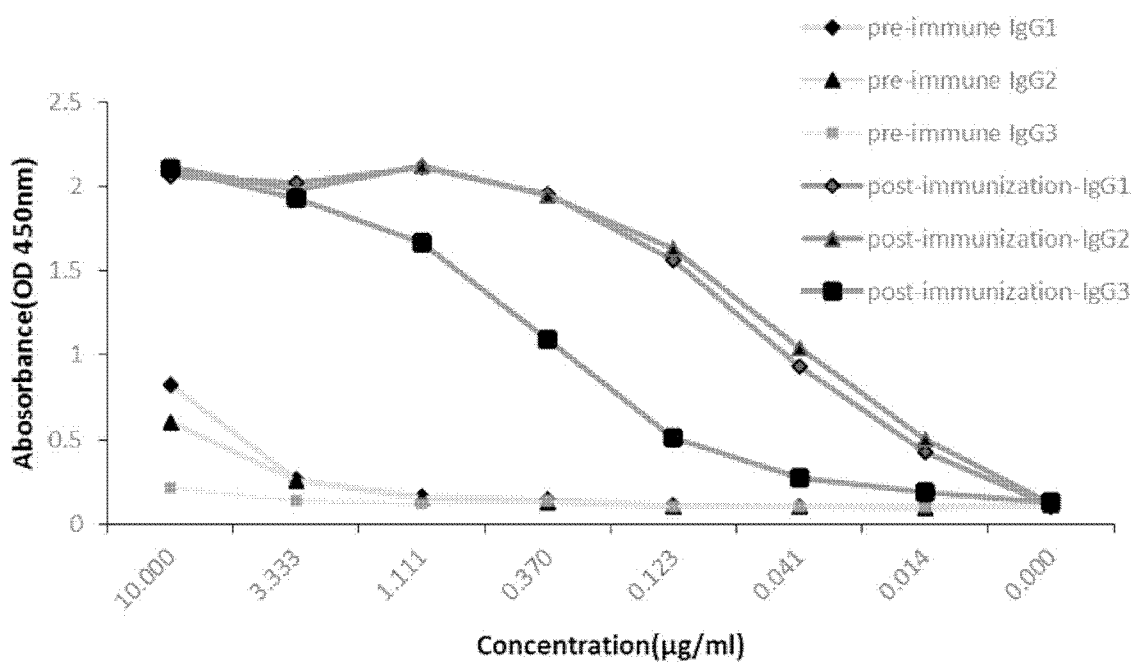


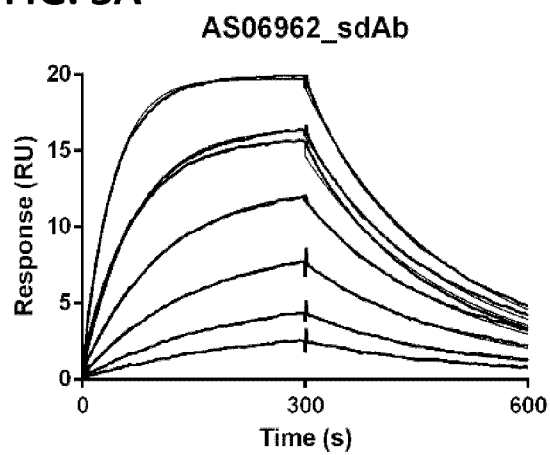
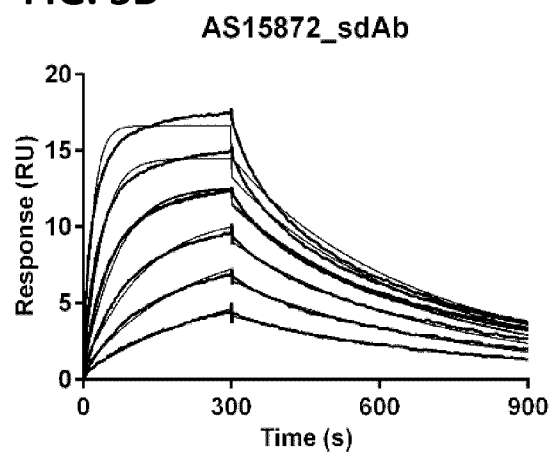
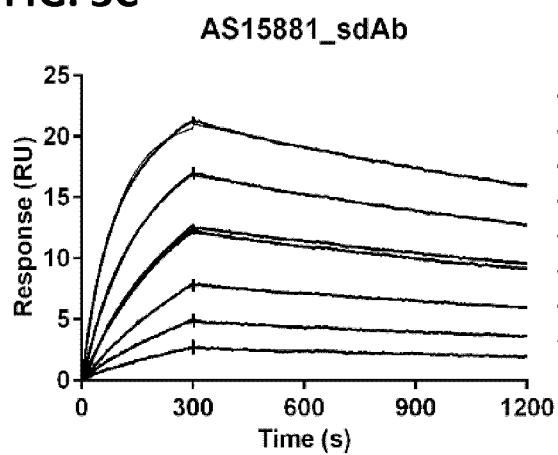
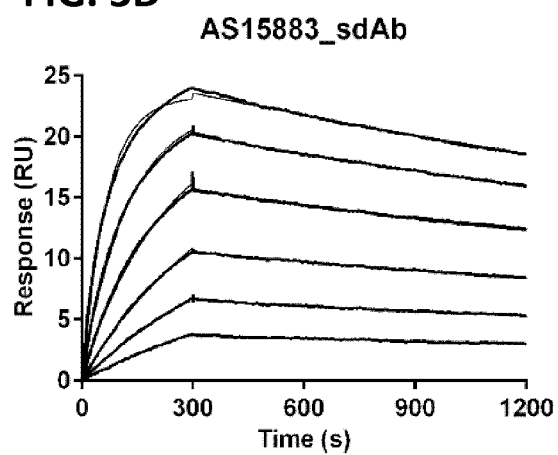
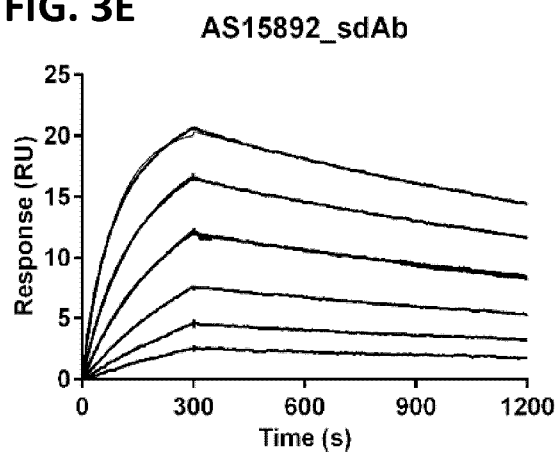
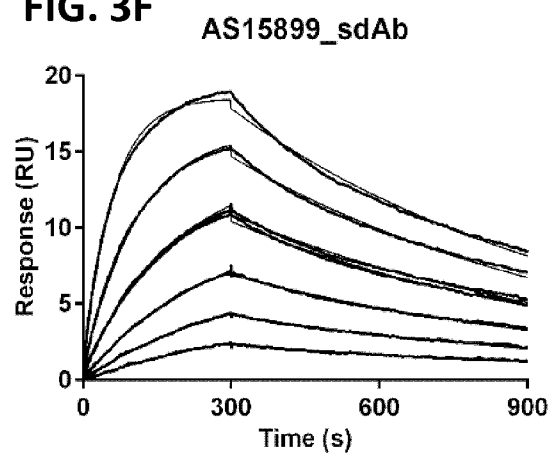
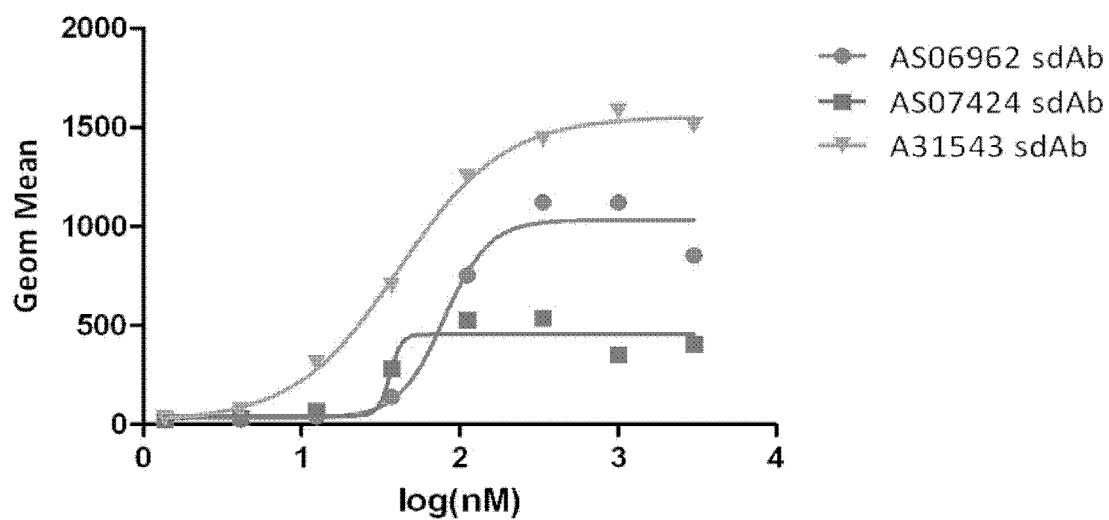
FIG. 3A**FIG. 3B****FIG. 3C****FIG. 3D****FIG. 3E****FIG. 3F**

FIG. 3G

Analyte	k_a (1/Ms)	k_d (1/s)	K_D (M)
AS06962_sdAb	1.26E+07	5.74E-03	4.54E-10
AS15872_sdAb	1.98E+05	2.86E-03	1.45E-08
AS15881_sdAb	1.36E+05	3.13E-04	2.31E-09
AS15883_sdAb	9.49E+04	2.64E-04	2.78E-09
AS15892_sdAb	1.45E+05	3.86E-04	2.67E-09
AS15899_sdAb	4.25E+05	1.37E-03	3.22E-09

FIG. 4A**FIG. 4B**

	AS06962 sdAb	AS07424 sdAb	A31543 sdAb
EC ₅₀ (nM)	79.24	36.7	41.17

FIG. 5A

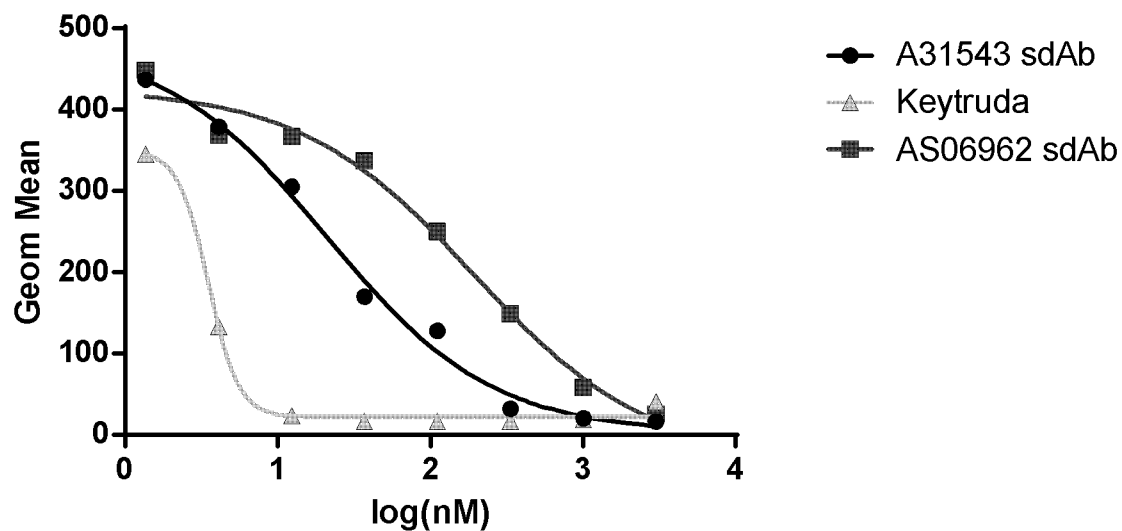


FIG. 5B

	AS06962 sdAb	A31543 sdAb	Keytruda
IC ₅₀	193.2	21.1	3.5

FIG. 6A

Ligand	Analyte	k_a (1/Ms)	k_d (1/s)	K_D (M)
AS15140_HCAb	PD-1 His	1.79E+05	1.88E-03	1.05E-08
AS15152_HCAb		1.94E+05	3.55E-03	1.83E-08
AS15156_HCAb		6.66E+04	1.78E-04	2.67E-09
AS15193_HCAb		7.90E+04	7.51E-05	9.51E-10
AS06962_HCAb		1.80E+05	7.10E-03	3.90E-08
AS15881_HCAb		1.00E+05	3.50E-04	3.30E-09
AS15883_HCAb		8.20E+04	3.20E-04	3.90E-09
AS15892_HCAb		1.10E+05	4.30E-04	4.00E-09
AS15899_HCAb		2.20E+05	8.40E-04	3.80E-09
AS25170_HCAb		5.60E+04	5.50E-04	9.80E-09
Keytruda		2.50E+05	2.60E-03	1.00E-08

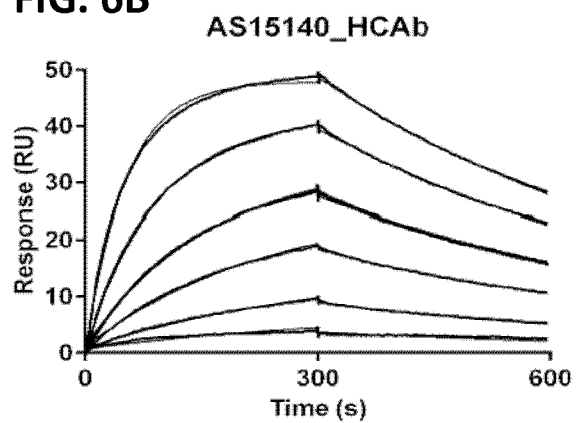
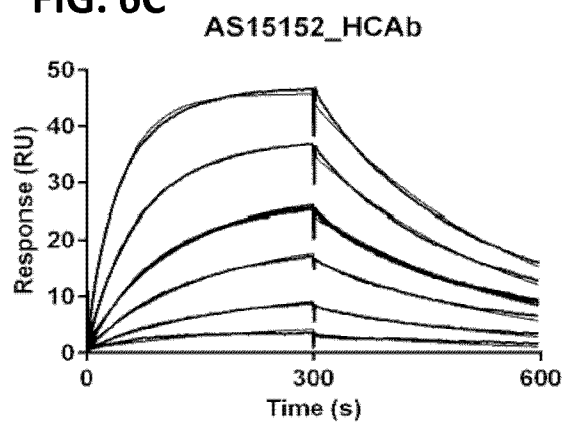
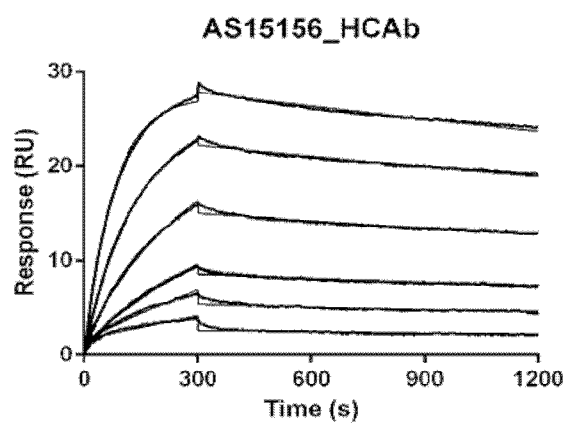
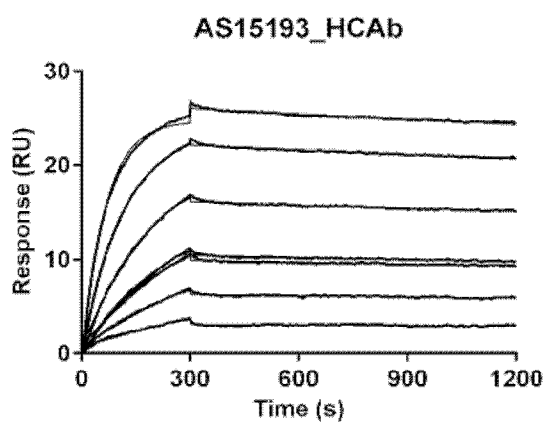
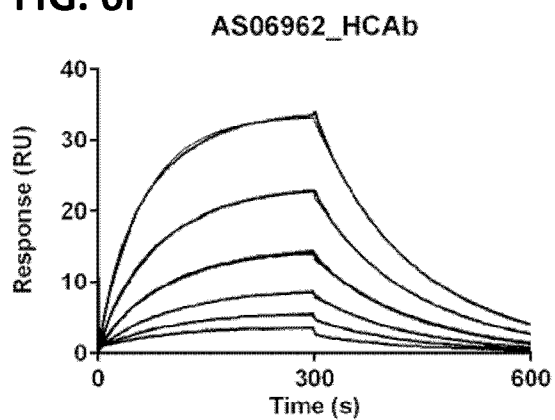
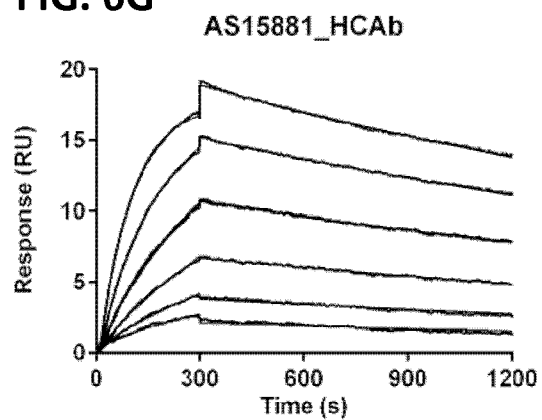
FIG. 6B**FIG. 6C****FIG. 6D****FIG. 6E****FIG. 6F****FIG. 6G**

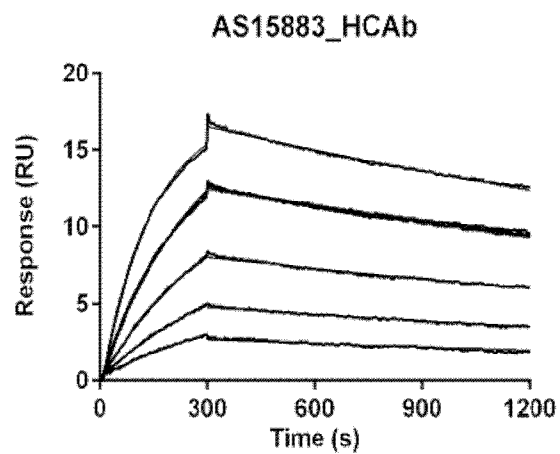
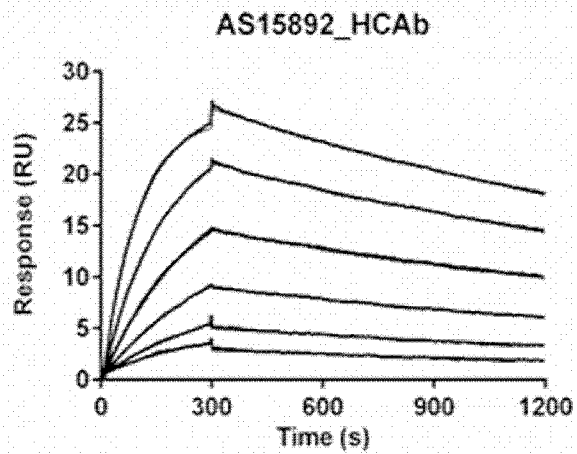
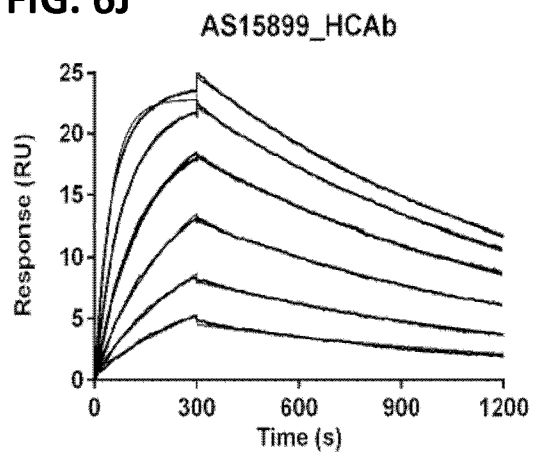
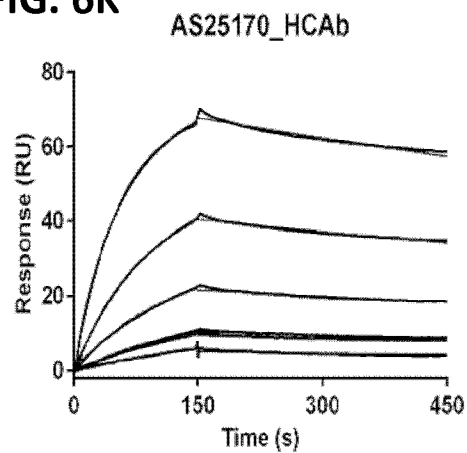
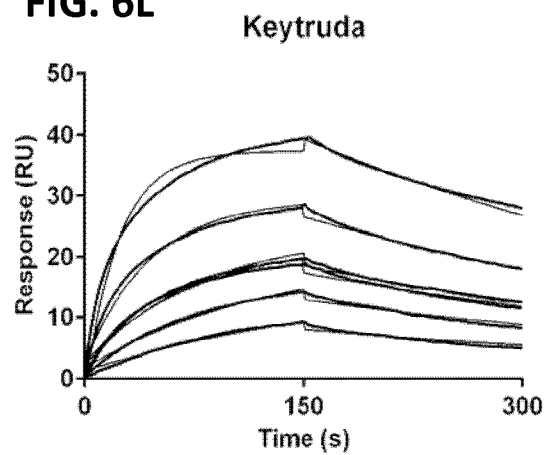
FIG. 6H**FIG. 6I****FIG. 6J****FIG. 6K****FIG. 6L**

FIG. 7A

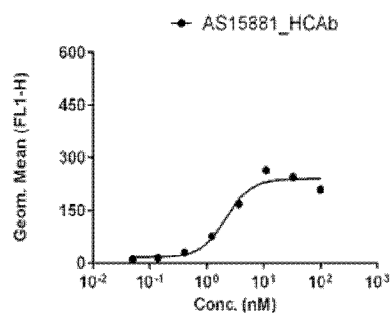


FIG. 7B

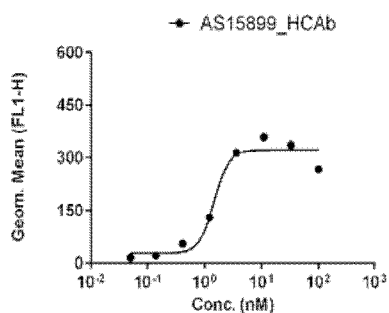


FIG. 7C

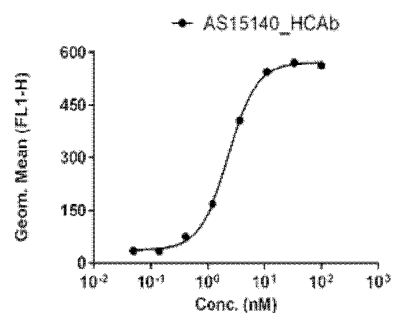


FIG. 7D

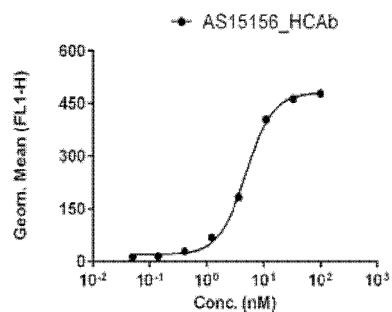


FIG. 7E

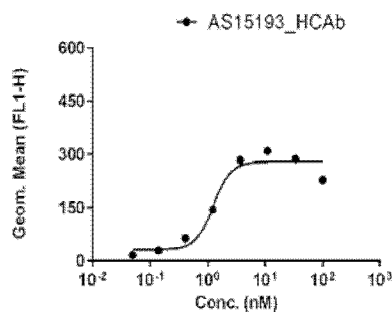


FIG. 7F

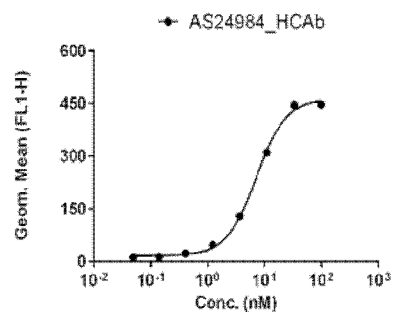


FIG. 7G

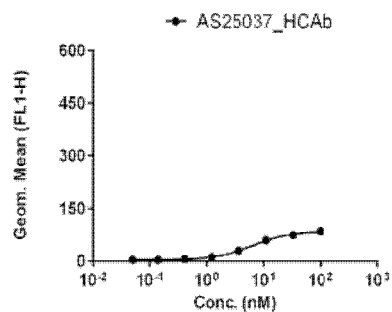


FIG. 7H

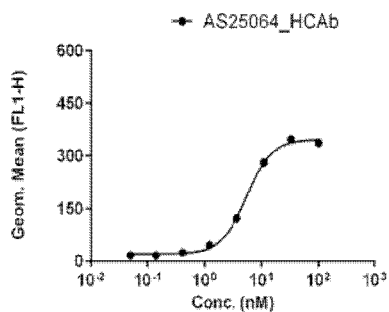


FIG. 7I

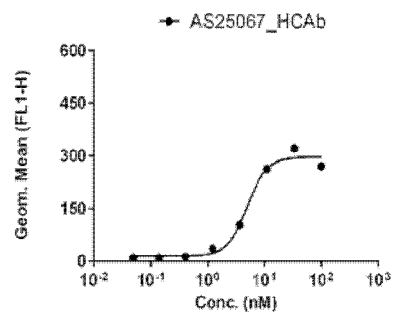


FIG. 7J

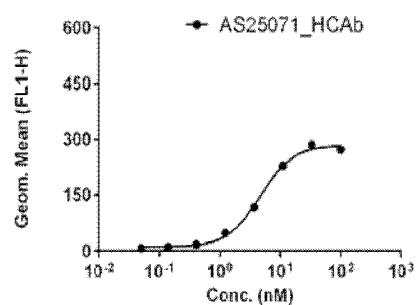


FIG. 7K

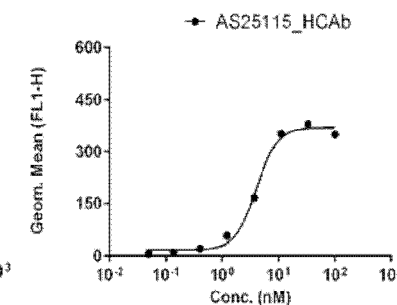


FIG. 7L

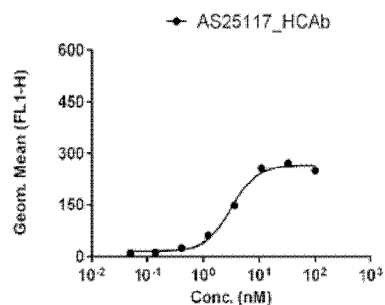


FIG. 7M

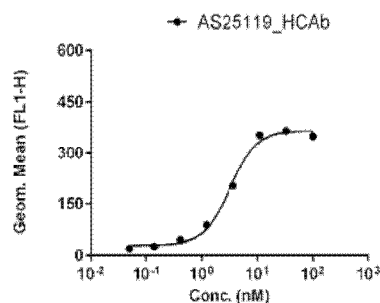


FIG. 7N

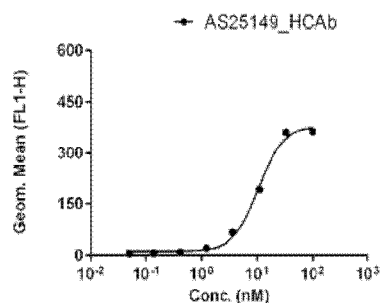


FIG. 7O

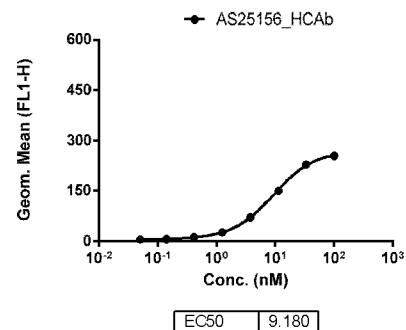


FIG. 7P

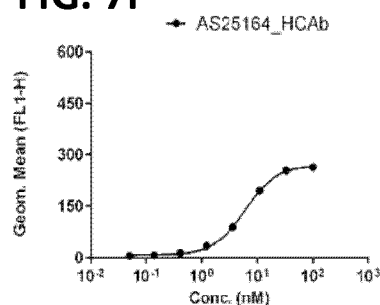


FIG. 7Q

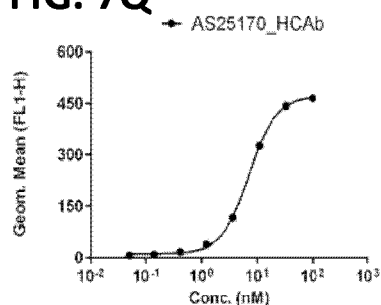


FIG. 7R

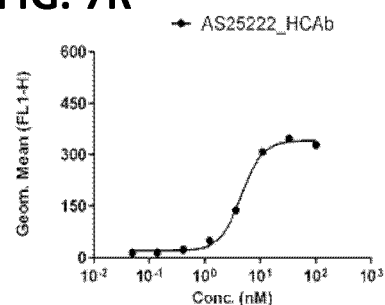


FIG. 7S

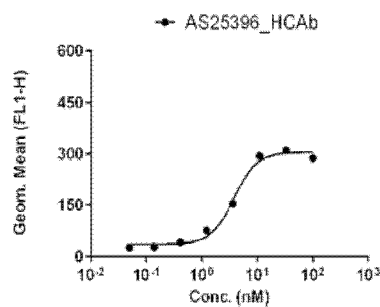


FIG. 7T

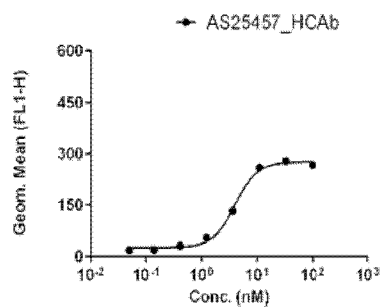


FIG. 7U

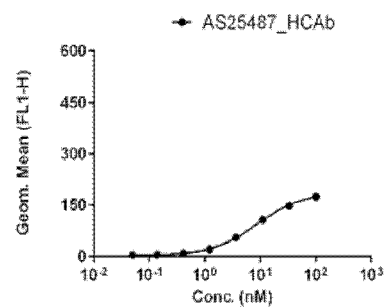


FIG. 7V

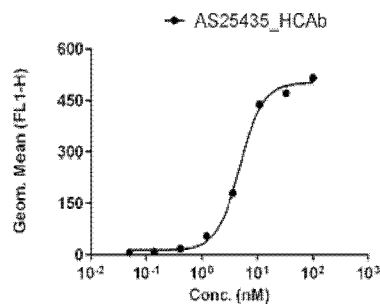


FIG. 7W

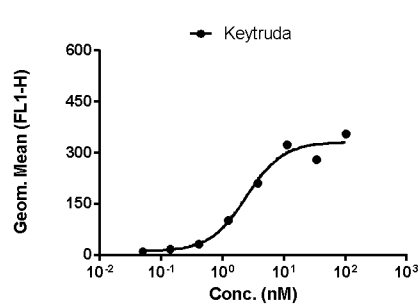


FIG. 7X

Sample	AS15881_ HCAb	AS15899_ HCAb	AS15140_ HCAb	AS15156_ HCAb	AS15193_ HCAb
EC₅₀ (nM)	2.18	1.48	2.32	4.91	1.26
Sample	AS25071_ HCAb	AS25115_ HCAb	AS25117_ HCAb	AS25119_ HCAb	AS25149_ HCAb
EC₅₀ (nM)	4.74	4.06	3.22	3.29	10.65
Sample	AS25396_ HCAb	AS25457_ HCAb	AS25487_ HCAb	AS25435_ HCAb	Keytruda
EC₅₀ (nM)	3.84	4.04	8.94	4.91	2.44
Sample	AS24984_ HCAb	AS25037_ HCAb	AS25064_ HCAb	AS25067_ HCAb	AS25156_ HCAb
EC₅₀ (nM)	7.22	6.62	5.46	4.96	9.18
Sample	AS25164_ HCAb	AS25170_ HCAb	AS25222_ HCAb		
EC₅₀ (nM)	6.15	7.20	4.59		

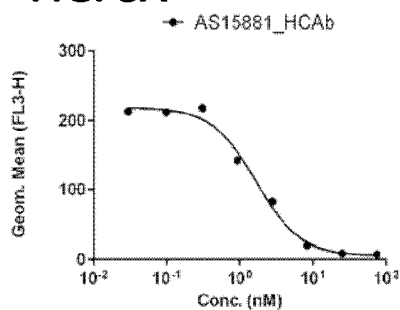
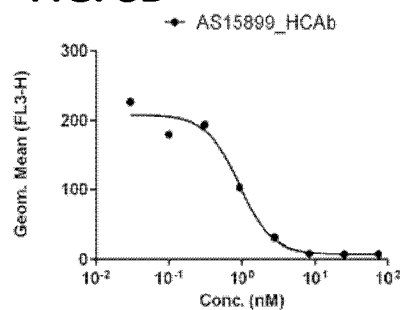
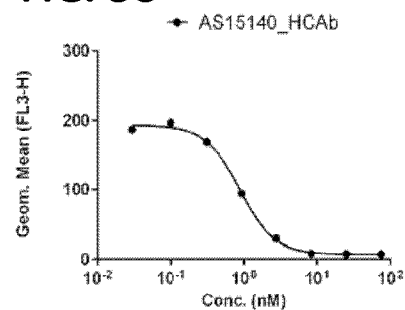
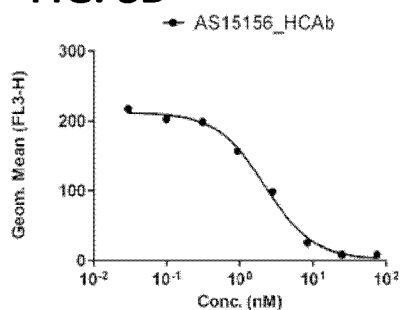
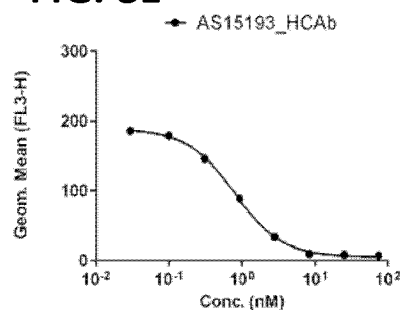
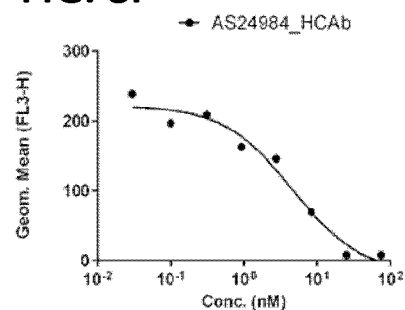
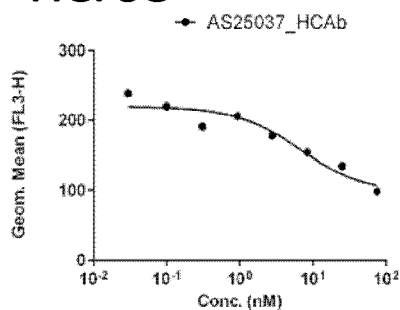
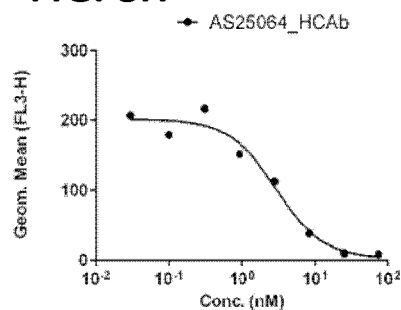
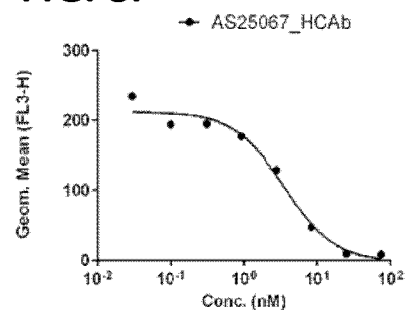
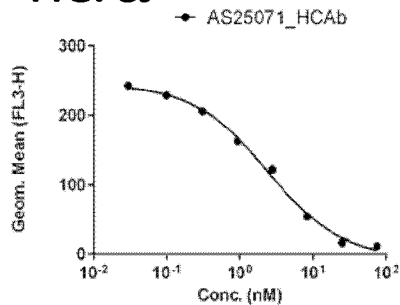
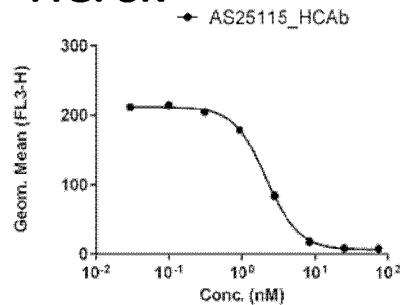
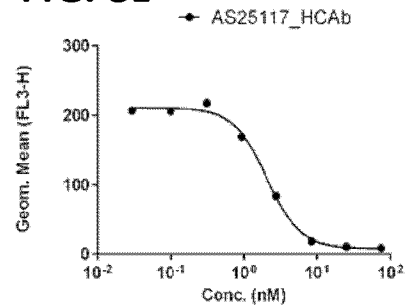
FIG. 8A**FIG. 8B****FIG. 8C****FIG. 8D****FIG. 8E****FIG. 8F****FIG. 8G****FIG. 8H****FIG. 8I****FIG. 8J****FIG. 8K****FIG. 8L**

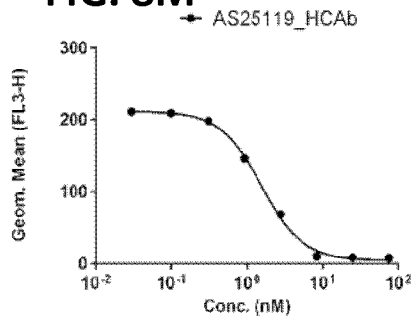
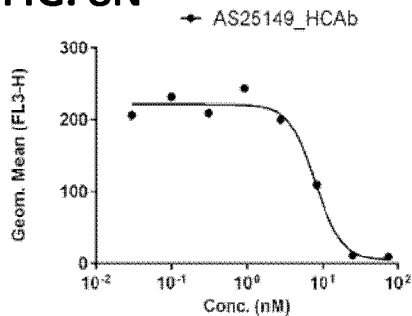
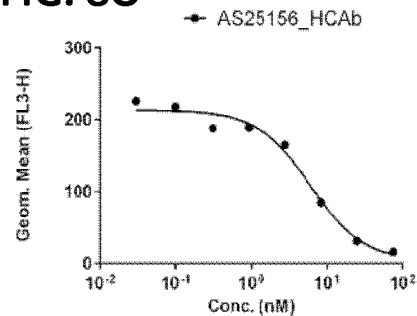
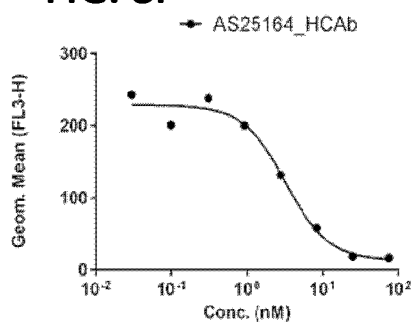
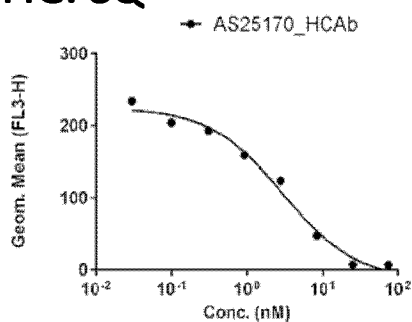
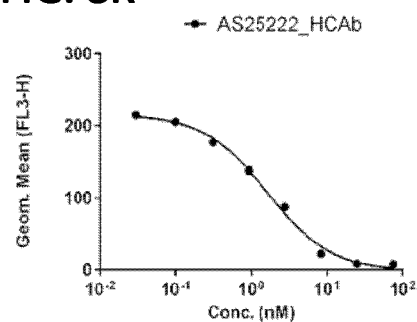
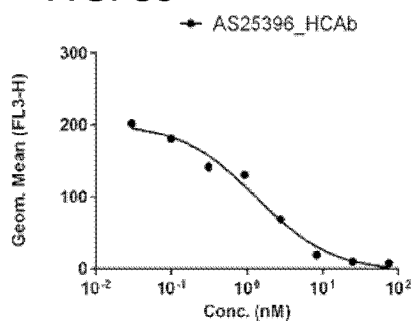
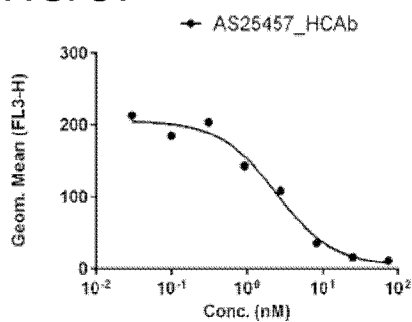
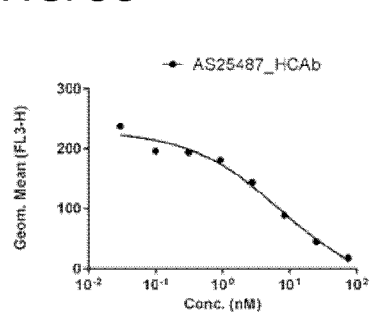
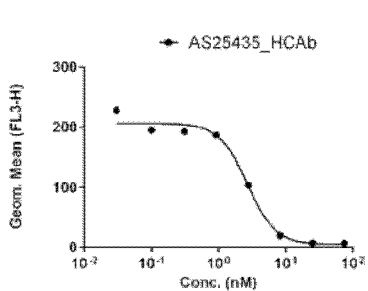
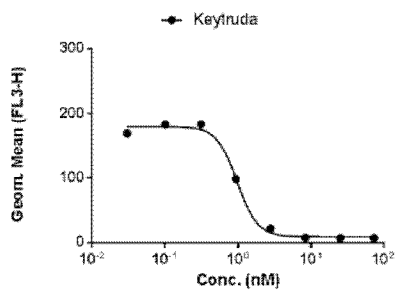
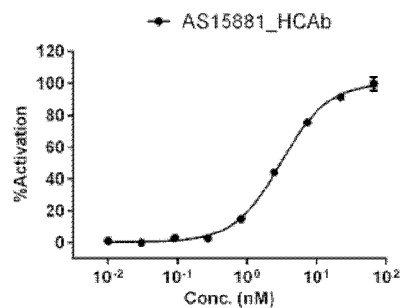
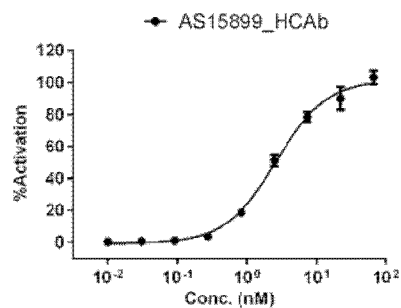
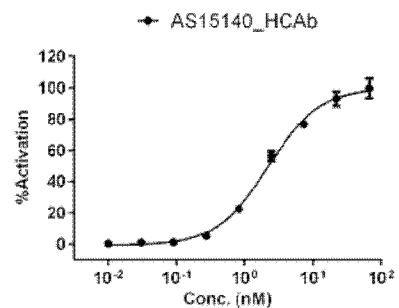
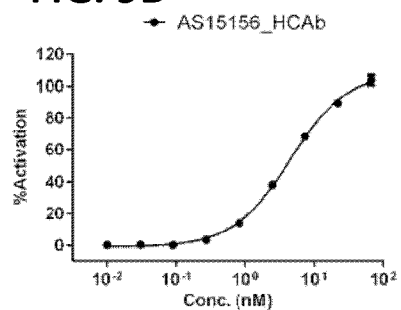
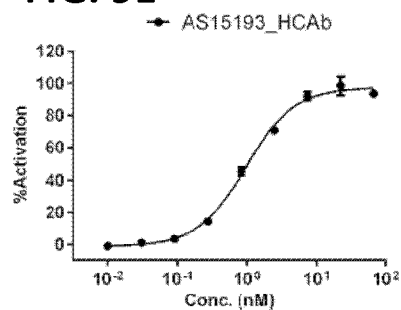
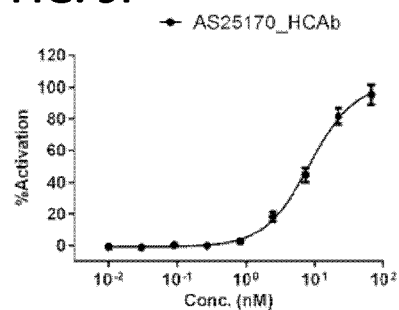
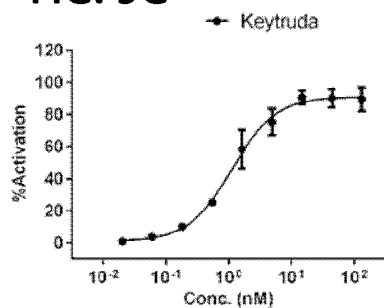
FIG. 8M**FIG. 8N****FIG. 8O****FIG. 8P****FIG. 8Q****FIG. 8R****FIG. 8S****FIG. 8T****FIG. 8U****FIG. 8V****FIG. 8W**

FIG. 8X

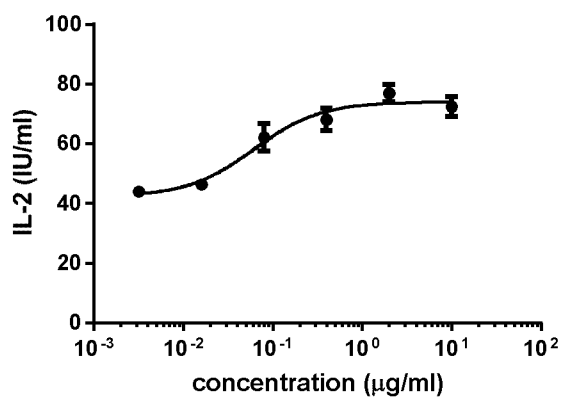
Sample	AS15881_ HCAb	AS15899_ HCAb	AS15140_ HCAb	AS15156_ HCAb	AS15193_ HCAb
IC₅₀ (nM)	1.66	0.91	0.88	2.20	0.79
Sample	AS25071_ HCAb	AS25115_ HCAb	AS25117_ HCAb	AS25119_ HCAb	AS25149_ HCAb
IC₅₀ (nM)	2.41	2.15	2.06	1.57	8.00
Sample	AS25396_ HCAb	AS25457_ HCAb	AS25487_ HCAb	AS25435_ HCAb	Keytruda
IC₅₀ (nM)	1.34	2.44	7.24	2.70	0.97
Sample	AS24984_ HCAb	AS25037_ HCAb	AS25064_ HCAb	AS25067_ HCAb	AS25156_ HCAb
IC₅₀ (nM)	4.59	6.58	2.91	3.51	6.04
Sample	AS25164_ HCAb	AS25170_ HCAb	AS25222_ HCAb		
IC₅₀ (nM)	3.25	3.01	1.66		

FIG. 9A**FIG. 9B****FIG. 9C****FIG. 9D****FIG. 9E****FIG. 9F****FIG. 9G****FIG. 9H**

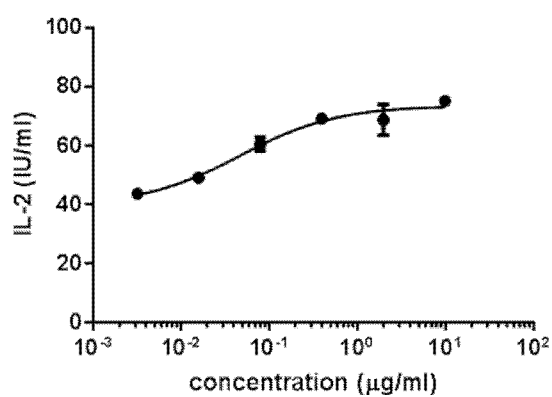
Sample	AS15881_HCAb	AS15899_HCAb	AS15140_HCAb	AS15156_HCAb
EC ₅₀ (nM)	3.09	2.60	2.21	4.51
Sample	AS15193_HCAb	AS25170_HCAb	Keytruda	
EC ₅₀ (nM)	0.97	8.36	1.59	

FIG. 10A

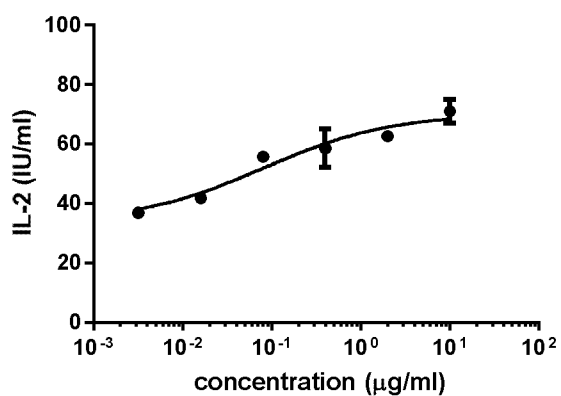
AS15140_HCAb

**FIG. 10B**

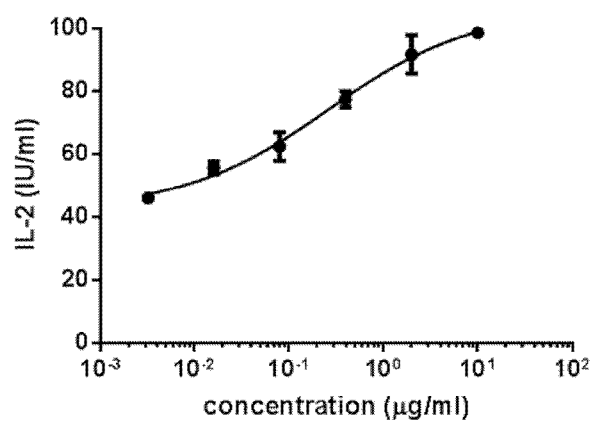
AS15156_HCAb

**FIG. 10C**

AS15193_HCAb

**FIG. 10D**

Keytruda

**FIG. 10E**

Sample ID	Best-fit values		
	Bottom	Top	EC ₅₀ (μg/ml)
AS15140_HCAb	42.26	74.11	0.062
AS15156_HCAb	40.08	73.57	0.048
AS15193_HCAb	33.56	85.39	0.082
Keytruda	46.59	98	0.330

FIG. 11

	(1)	1	10	20	30	40	50																																																			
Camelid AS15193 SEQ ID.No 295	(1)	Q	I	Q	L	V	E	S	G	G	S	A	Q	A	G	S	L	R	L	S	C	V	S	G	N	I	Y	N	R	N	F	M	G	W	F	R	Q	A	P	G	K	V	R	E	G	V	A	A	I	Y	T	G	T	S	R	T	Y	
Var AS15193VH8 SEQ ID.No 321	(1)	E	V	Q	L	V	E	S	G	G	G	L	V	Q	P	G	S	L	R	L	S	C	A	V	S	G	N	I	Y	N	R	N	F	M	G	W	F	R	Q	A	P	K	G	L	E	G	V	S	A	I	Y	T	G	T	S	R	T	Y
Var AS15193VH8M1 SEQ ID.No 322	(1)	E	V	Q	L	V	E	S	G	G	G	L	V	Q	P	G	S	L	R	L	S	C	A	V	S	G	N	I	Y	N	R	N	F	M	G	W	F	R	Q	A	P	K	G	L	E	G	V	S	A	I	Y	T	G	T	S	R	T	Y
Var AS15193VH18 SEQ ID.No 323	(1)	E	V	Q	L	V	E	S	G	G	G	L	V	Q	P	G	S	L	R	L	S	C	A	V	S	G	N	I	Y	N	R	N	F	M	G	W	F	R	Q	A	P	K	G	R	E	G	V	S	A	I	Y	T	G	T	S	R	T	Y
Var AS15193VH18M1 SEQ ID.No 324	(1)	E	V	Q	L	V	E	S	G	G	G	L	V	Q	P	G	S	L	R	L	S	C	A	V	S	G	N	I	Y	N	R	N	F	M	G	W	F	R	Q	A	P	K	G	R	E	G	V	S	A	I	Y	T	G	T	S	R	T	Y
human acceptor SEQ ID.No 366	(1)	Q	V	Q	L	V	E	S	G	G	G	V	Q	P	G	S	L	R	L	S	C	A	S	G	T	F	S	S	Y	G	N	H	W	V	R	Q	A	P	K	G	L	E	W	S	V	I	Y	S	G	G	S	T	Y					

	(1)	60	70	80	90	100	110	123																																																																																																																																																																																																																																																																																																																																																																																																																																		
Camelid AS15193 SEQ ID.No 295	(1)	Y	A	D	S	V	K	G	R	F	T	I	S	D	N	A	K	N	T	V	Y	L	Q	M	N	S	L	K	P	E	D	T	A	M	Y	C	A	A	D	L	R	G	E	F	W	E	T	G	V	W	N	T	W	G	Q	T	V	T	S	S																																																																																																																																																																																																																																																																																																																																																																														
Var AS15193VH8 SEQ ID.No 321	(1)	Y	A	D	S	V	K	G	R	F	T	I	S	R	D	N	S	K	N	T	V	Y	L	Q	M	N	S	L	R	A	E	D	T	A	V	Y	C	A	A	D	L	R	G	E	F	W	E	T	G	V	W	N	T	W	G	Q	T	V	T	S	S																																																																																																																																																																																																																																																																																																																																																																													
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Var AS15193VH18 SEQ ID.No 323	(1)	Y	A	D	S	V	K	G	R	F	T	I	S	R	D	N	A	K	N	T	V	Y	L	Q	M	N	S	L	R	P	E	D	T	A	V	Y	C	A	A	D	L	R	D	G	F	W	E	T	G	V	W	N	T	W	G	Q	T	V	T	S	S																																																																																																																																																																																																																																																																																																																																																																													
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human acceptor SEQ ID.No 366	(1)	Y	A	D	S	V	K	G	R	F	T	I	S	R	D	N	S	K	N	T	V	Y	L	Q	M	N	S	L	R	A	E	D	T	A	V	Y	C	A	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

FIG. 12A

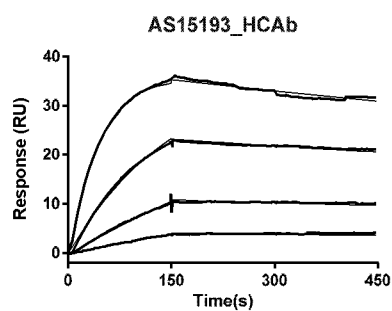


FIG. 12B

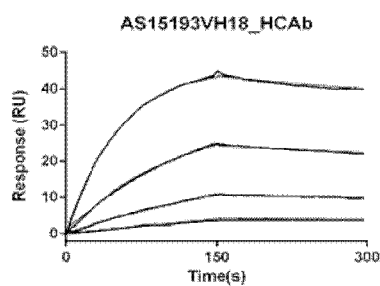


FIG. 12C

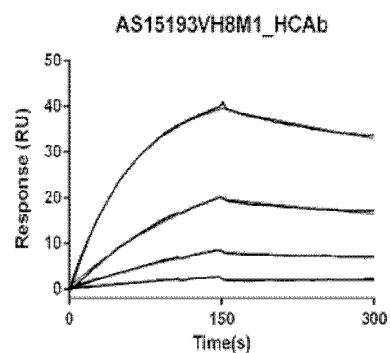


FIG. 12D

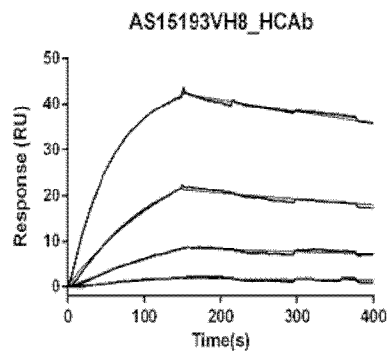


FIG. 12E

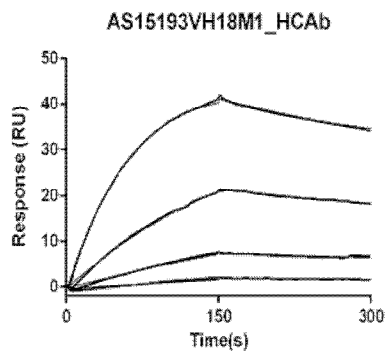
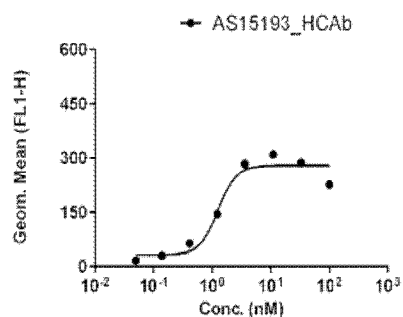
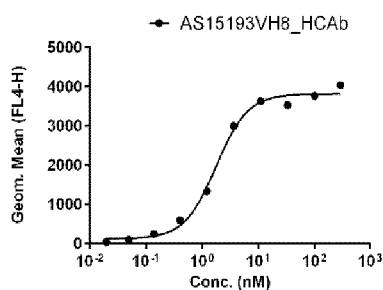
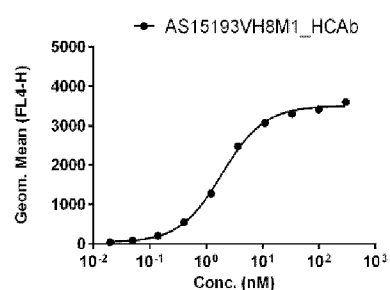
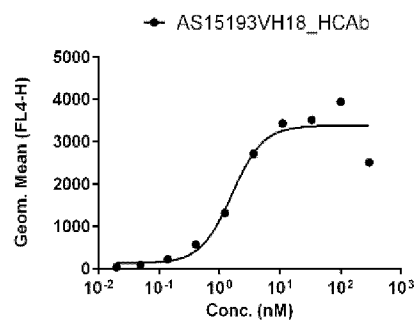
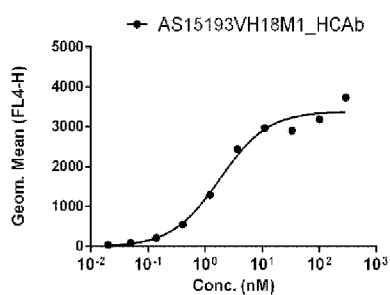
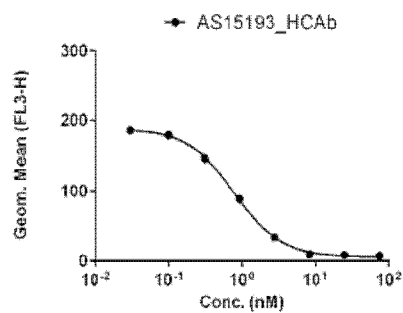
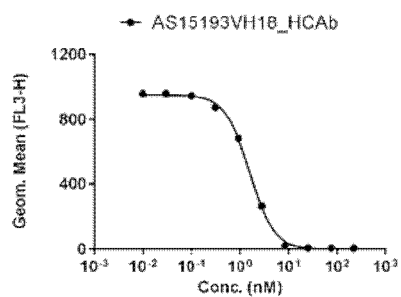
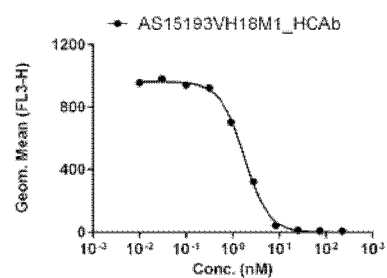
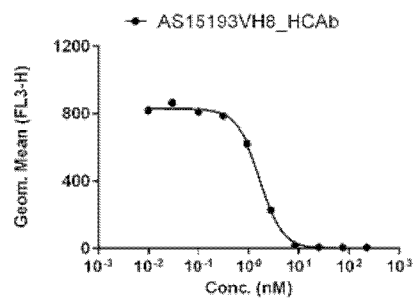
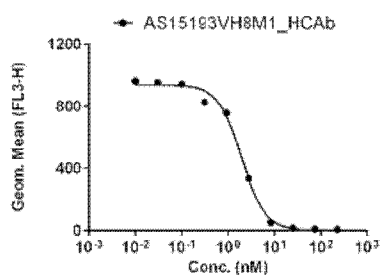


FIG. 12F

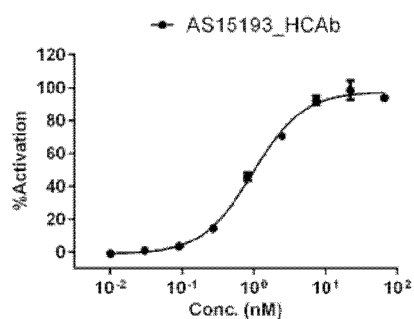
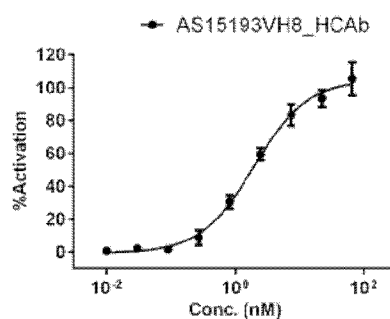
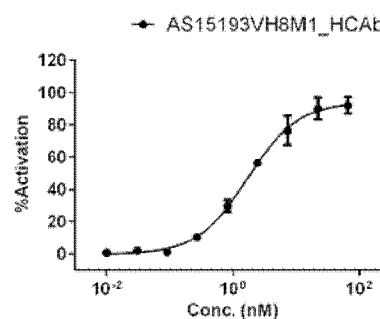
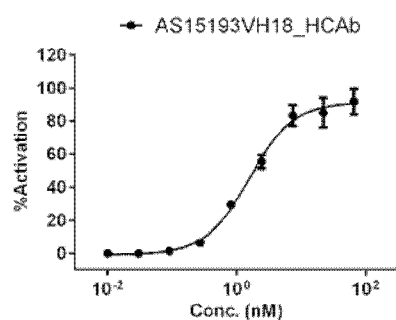
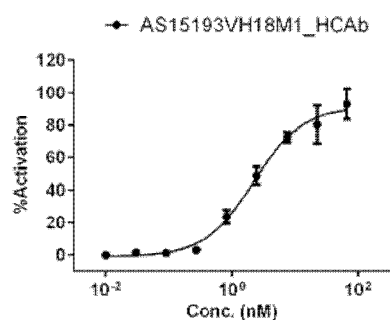
Ligand	Analyte	k_a (1/Ms)	k_d (1/s)	K_D (M)
AS15193_HCAb	PD-1 His	1.2E+05	4.7E-04	4.0E-09
AS15193VH8_HCAb		6.80E+04	6.60E-04	9.70E-09
AS15193VH8M1_HCAb		6.10E+04	1.20E-03	2.00E-08
AS15193VH18_HCAb		8.60E+04	6.00E-04	7.00E-09
AS15193VH18M1_HCAb		9.20E+04	1.40E-03	1.50E-08

FIG. 13A**FIG. 13B****FIG. 13C****FIG. 13D****FIG. 13E****FIG. 13F**

	AS15193_HCAb	AS15193VH8_HCAb	AS15193VH8M1_HCAb
EC₅₀ (nM)	1.26	1.78	1.92
	AS15193VH18_HCAb	AS15193VH18M1_HCAb	
EC₅₀ (nM)	1.61	1.80	

FIG. 14A**FIG. 14B****FIG. 14C****FIG. 14D****FIG. 14E****FIG. 14F**

	AS15193_HCAb	AS15193 VH8_HCAb	AS15193 VH8M1_HCAb
IC₅₀ (nM)	0.79	1.64	1.96
	AS15193 VH18_HCAb	AS15193 VH18M1_HCAb	
IC₅₀ (nM)	1.57	1.75	

FIG. 15A**FIG. 15B****FIG. 15C****FIG. 15D****FIG. 15E****FIG. 15F**

	AS15193_HCAb	AS15193VH8_HCAb	AS15193VH8M1_HCAb
EC ₅₀ (nM)	0.97	1.97	1.72
	AS15193VH18_HCAb	AS15193VH18M1_HCAb	
EC ₅₀ (nM)	1.58	2.21	

FIG. 16

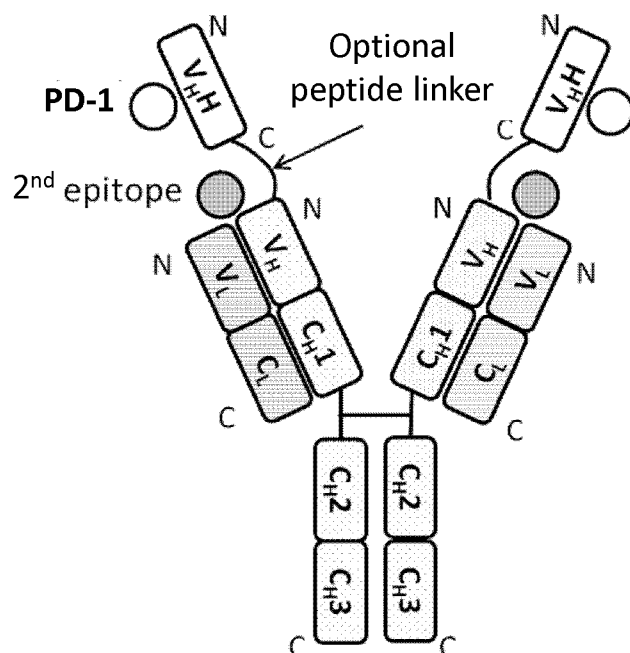
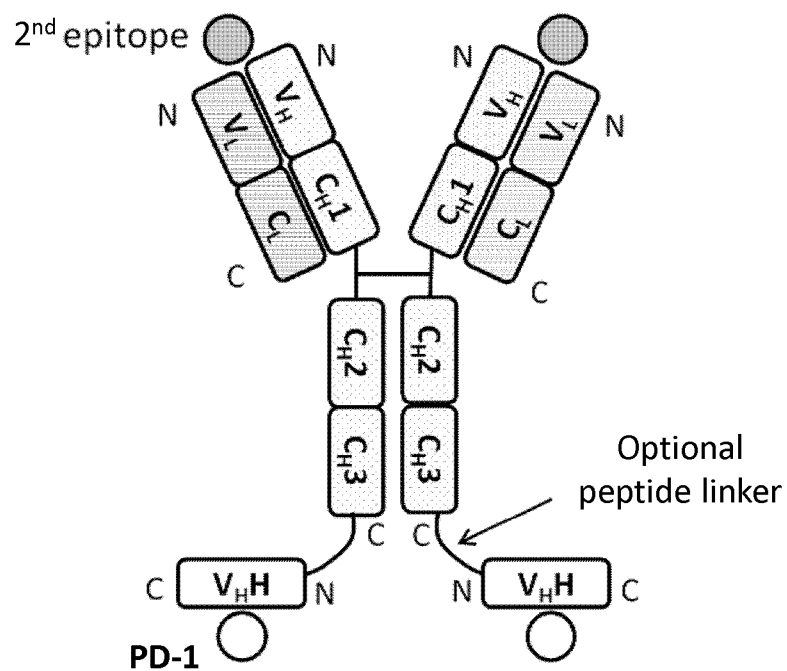


FIG. 17



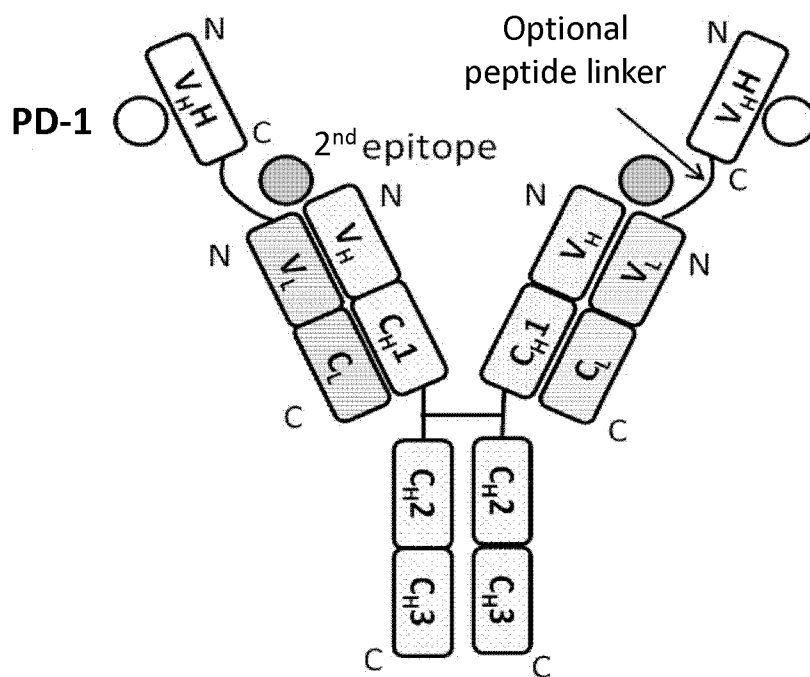
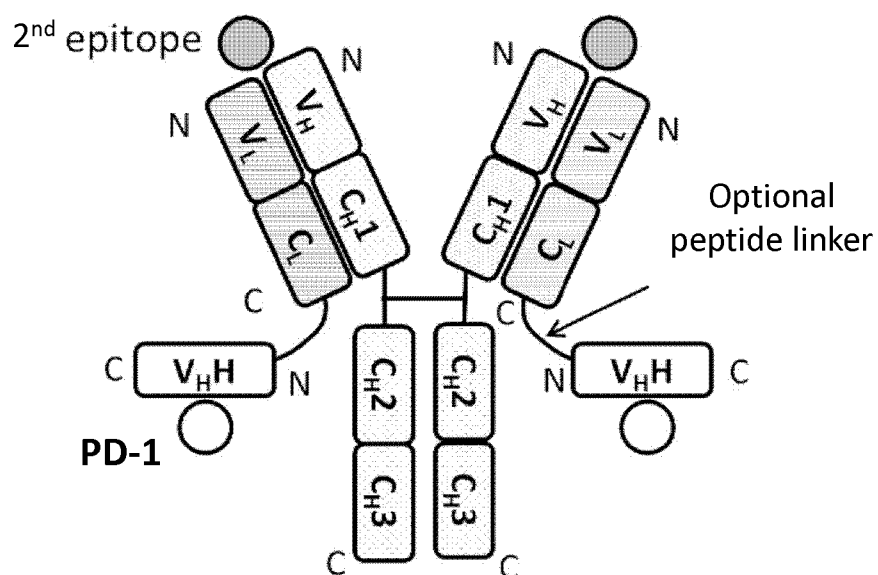


FIG. 20

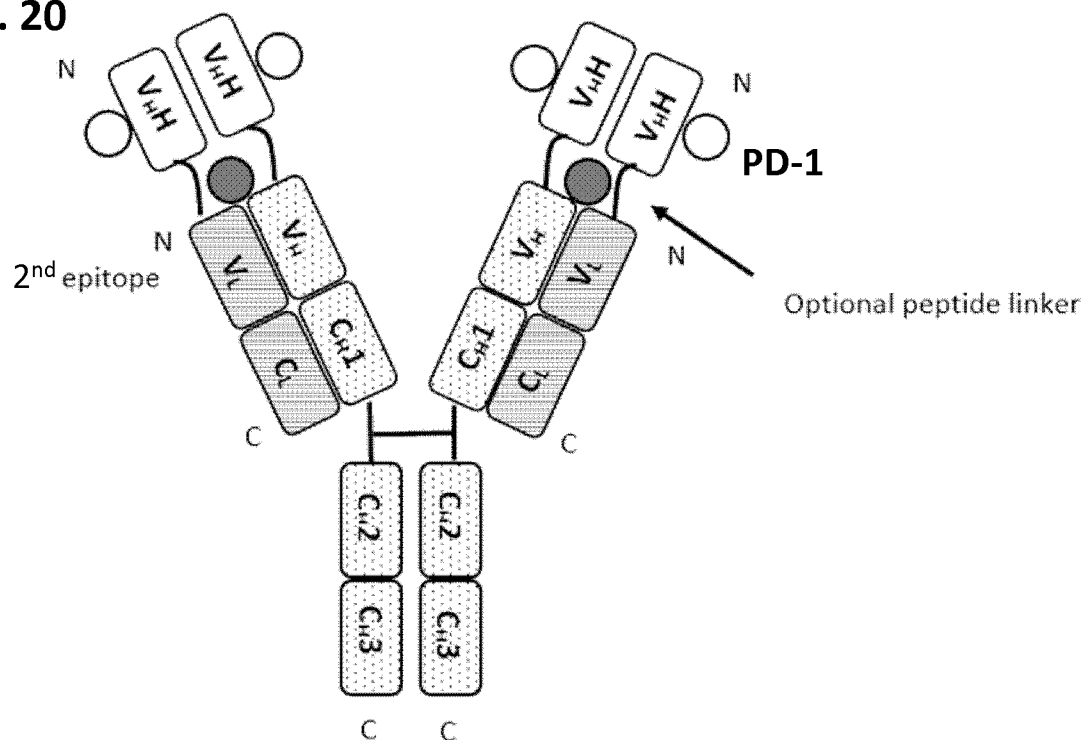


FIG. 21

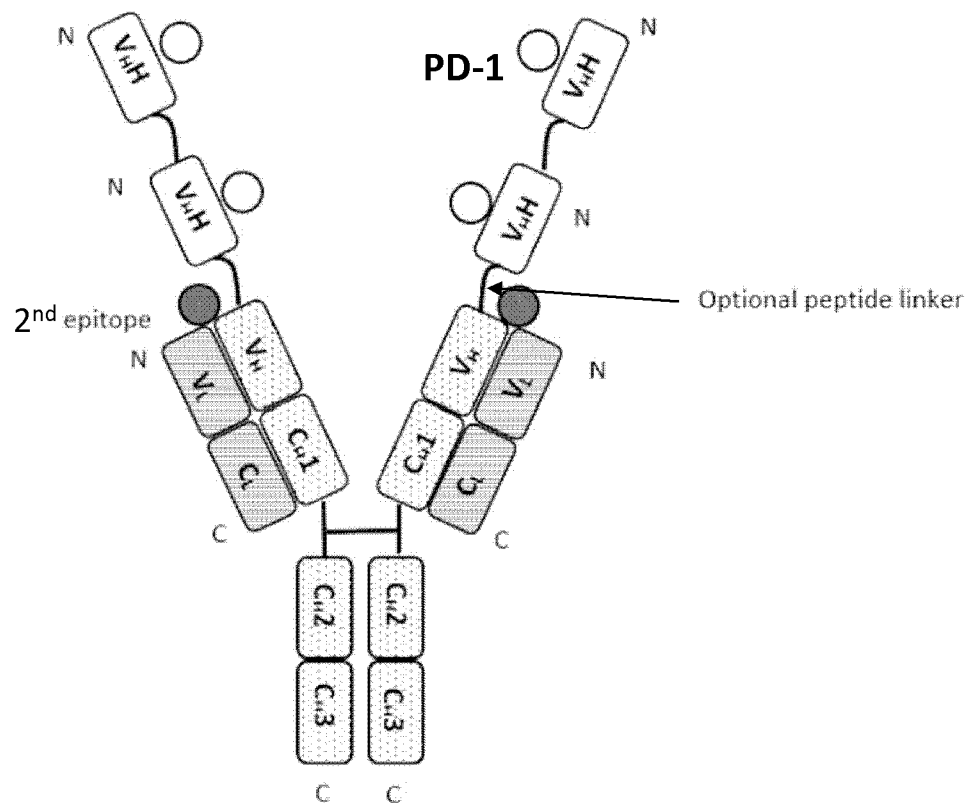


FIG. 22

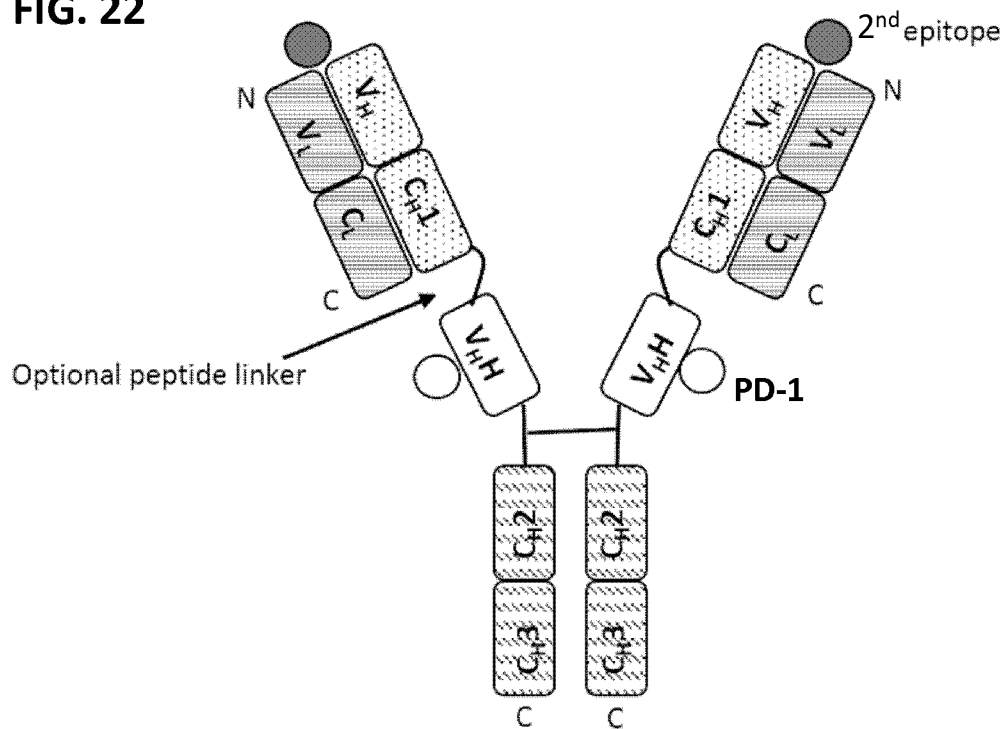


FIG. 23

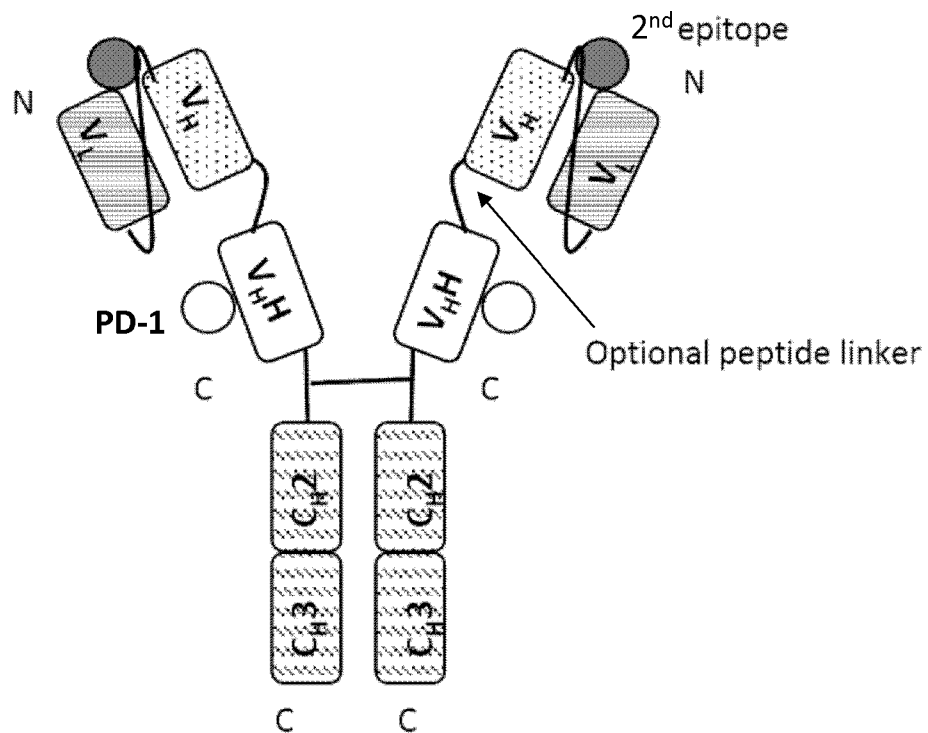


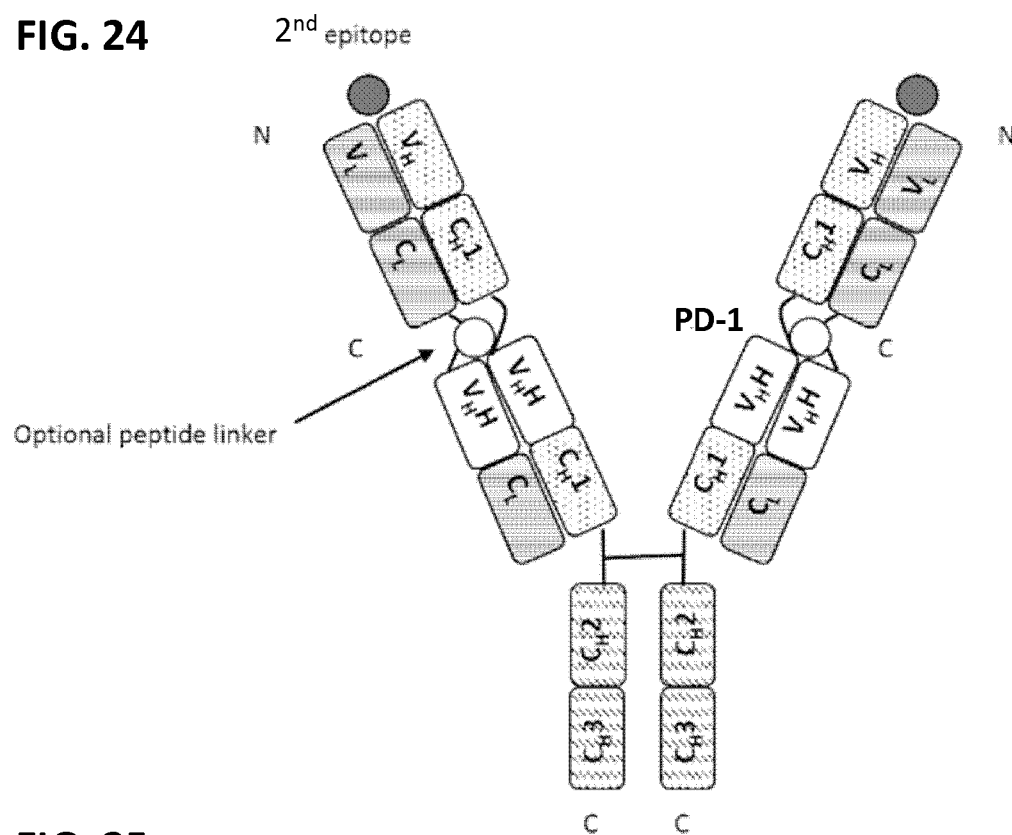
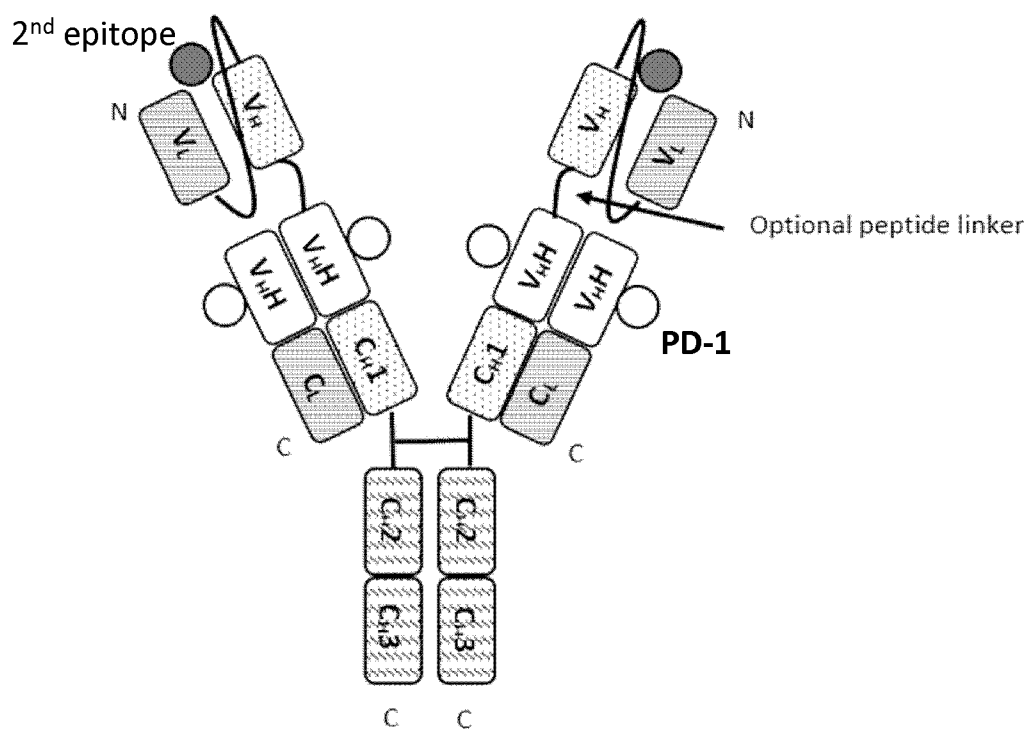
FIG. 24**FIG. 25**

FIG. 26A

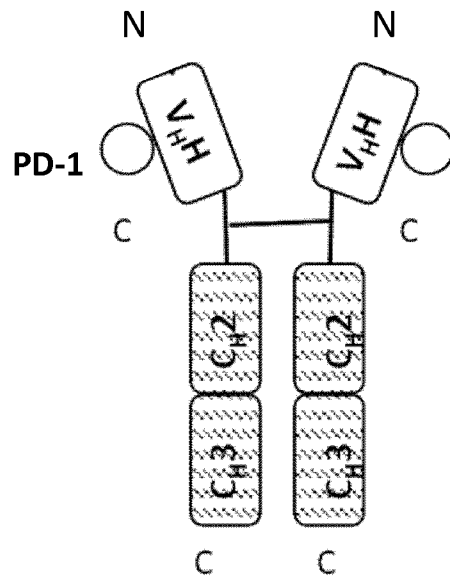


FIG. 26B

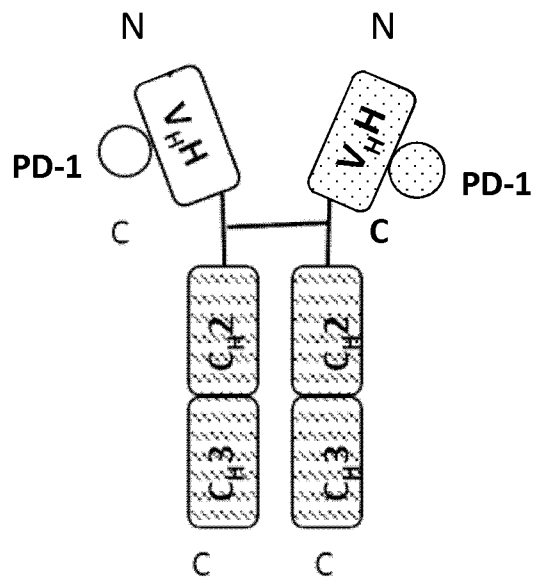
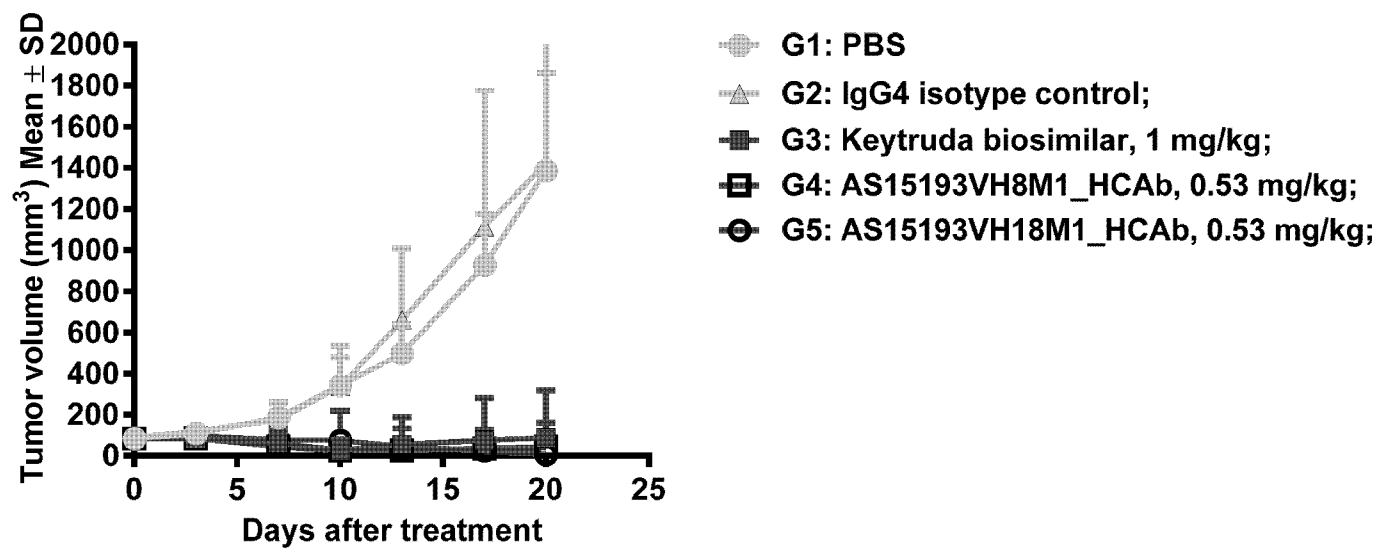


FIG. 27



[illegible]

[illegible]