

## FIGURES

Figure 1

Common Light Chain	SEQ ID No.	Amino Acid Sequence
Variable Region	25	DIQMTQSPSSLSASVGDRTITCRASQSISSYLNWYQQKPKAPK LLIYAASSLQSGVPSRFSGSGSGTDFTLTISSLQPEDFATYYCQQS YSTPPTFGQGTKVEIK
Constant Region	29	RTVAAPSVFIFPPSDEQLKSGTASVVCLLNNFYPREAKVQWKVD NALQSGNSQESVTEQDSKSTYLSSTLTLSKADYEKHKVYACE VTHQGLSSPVTKSFNRGEC

Figure 2

Common Light Chain	SEQ ID No.	CDR1	SEQ ID No.	CDR2	SEQ ID No.	CDR3
CDRs	26	RASQSISSYLN	27	AASSLQS	28	QQSYSTPPT

Figure 3

Germline V gene	SEQ ID No.	Amino Acid Sequence
IGHV7-4-1	21	QVQLVQSGSELKKPGASVKVCSKASGYTFTSYAMNWVRQ APGQGLEWMGWINTNTGNPTYAQQFTGRFVSLDTSVST AYLQICSLKAEDTAVYYCAR
IGHV3-33	22	QVQLVESGGGVVQPGRSLRLSCAASGFTFSSYGMHWVRQ APGKGLEWVAVIWYDGSNKYYADSVKGRFTISRDNKNT LYLQMNSLRAEDTAVYYCAR

Figure 4

Alignment between each VH of PD1-1 to PD1-5 and IGHV7-4-1/JH6c

	-----FR1-----	-CDR1-	-----FR2-----	-----CDR2-----
IGHV7-4-1 (SEQ ID No. 21)	QVQLVQSGSELKKPGASVKVCSKASGYTFT	SYAMN	WVRQAPGQGLEWMG	WINTNTGNPTYAQQFTG
PD1-1 VH (SEQ ID No. 1)	-----Q-----	H-GLH	-----	-L-E-F-----
PD1-2 VH (SEQ ID No. 2)	-----Q-V-----	H-GLH	-----	-----
PD1-3 VH (SEQ ID No. 3)	-----M-----	H-LH	-----	-L-E-----
PD1-4 VH (SEQ ID No. 4)	-----Q-----	H-LH	-----	-L-E-F-----
PD1-5 VH (SEQ ID No. 5)	-----Q-----	H-LH	L-----	-L-E-F-----
	-----FR3-----	-----CDR3-----	-----FR4-----	
IGHV7-4-1 (SEQ ID No. 21)	RFVFSLDTSVSTAYLQICSLKAEDTAVYYCAR			
D gene (unknown)				
JH6c			HYYYYYMDV	WGKGTIVTVSS
PD1-1 VH (SEQ ID No. 1)	-----T-----S-----	GDMVPTTIWN-HF-		N-L-----
PD1-2 VH (SEQ ID No. 2)	-----S-----	GDLVPTTIWN-H-E-		L-----
PD1-3 VH (SEQ ID No. 3)	-----T-----N-----	GDMVPTTIWN-----		-----
PD1-4 VH (SEQ ID No. 4)	-----T-----S-----	GDMVPTTIWN-HF-		N-----
PD1-5 VH (SEQ ID No. 5)	-----T-----S-----	GDMVPTTIWN-HF-		Q-----

Figure 5

Clone No.	SEQ ID No.	Amino Acid Sequence
PD1-1	1	QVQLVQSGSELKQPGASVKVSKASGYTFTHYGLHWVRQAPGQGLEWMGW LNTNTENPTFAQGFTGRFVFLDTSVTTAYLQISSLKAEDTAVYYCARGDMV VPTTIWNYHYFMDVWGNGLTVTVSS
PD1-2	2	QVQLVQSGSELKQPGVSVKVSCKASGYTFTHYGLHWVRQAPGQGLEWMGWI NTNTGNPTYAQGFTGRFVFLDTSVSTAYLQISSLKAEDTAVYYCARGDLVV PTTIWNYHYHMEVWVGKGLTVTVSS
PD1-3	3	QVQLVQSGSELKPGASVMVSKASGYTFTHYALHWVRQAPGQGLEWMGW LNTNTENPTYAQGFTGRFVFLDTSVTTAYLQINSLKAEDTAVYYCARGDMV VPTTIWNYHYMDVWVGKGTTVTVSS
PD1-4	4	QVQLVQSGSELKQPGASVKVSKASGYTFTHYALHWLRQAPGQGLEWMGWL NTNTENPTFAQGFTGRFVFLDTSVTTAYLQISSLKAEDTAVYYCARGDMVV PTTIWNYHYFMDVWGNGLTVTVSS
PD1-5	5	QVQLVQSGSELKQPGASVKVSKASGYTFTHYALHWLRQAPGQGLEWMGWL NTNTENPTFAQGFTGRFVFLDTSVTTAYLQISSLKAEDTAVYYCARGDMVV PTTIWNYHYFMDVWVGQGTTVTVSS

Figure 6

Clone No.	SEQ ID No.	CDR1	SEQ ID No.	CDR2	SEQ ID No.	CDR3
PD1-1	6	HYGLH	7	WLNNTENPTFAQGFTG	8	GDMVVPTTIWNYHYFMDV
PD1-2	9	HYGLH	10	WINNTGNPTYAQGFTG	11	GDLVVPTTIWNYHYHMEV
PD1-3	12	HYALH	13	WLNNTENPTYAQGFTG	14	GDMVVPTTIWNYHYMDV
PD1-4	15	HYALH	16	WLNNTENPTFAQGFTG	17	GDMVVPTTIWNYHYFMDV
PD1-5	18	HYALH	19	WLNNTENPTFAQGFTG	20	GDMVVPTTIWNYHYFMDV

Figure 7

Clone No.	SEQ ID No.	Amino Acid Sequence
CD3-2	36	QVQLVQSGGGVVQPGRSLRLSCVASGFTFSSYGMHWVRQAPGKGLEWV AQIWYNARKQEYSDSVKGRFTISRDNKNTLYLQMNSLRAEDTAVYYCT RGTGYNWFDPWQGGLTVTVSS

Figure 8

Clone No.	SEQ ID No.	CDR1	SEQ ID No.	CDR2	SEQ ID No.	CDR3
CD3-2	37	SYGMH	38	QIWYNARKQEYSDSVKG	39	GTGYNWFDP

Figure 9

	SEQ ID No.	Amino Acid Sequence
Heavy chain constant region having the VH of the first arm specifically binding to PD-1	23	ASTKGPSVFPLAPSSKSTSGGTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPA VLQSSGLYSLSSVTVTPSSSLGTQTYICNVNHKPSNTKVDKRVEPKSCDKTHTCPP CPAPELGRGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVE VHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYCKVSNKALPAPIEKTISK AKGQPREPQVYTDPPSREEMTKNQVSLTCEVKGFYPSDIAVEWESNGQPENNYK TTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFCFSVMHEALHNHYTQKSLSLSPG
Heavy chain constant region having the VH of the second arm specifically binding to CD3	24	ASTKGPSVFPLAPSSKSTSGGTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPA VLQSSGLYSLSSVTVTPSSSLGTQTYICNVNHKPSNTKVDKRVEPKSCDKTHTCPP CPAPELGRGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVE VHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYCKVSNKALPAPIEKTISK AKGQPREPQVYTKPPSREEMTKNQVSLKCLVKGFYPSDIAVEWESNGQPENNYK TTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFCFSVMHEALHNHYTQKSLSLSPG

Figure 10

Amino acid sequence of the VH of the 15C3 clone

QVQLVQSGGGVVPGRSLRLSCVASGFTFSSYGMHWVRQAPGKGLEWVAIIWYNGRKQDYADSVKGRFTISRDN SKN  
TLYLQMNSLRAEDTAVYYCTRGTYNWFDPWGQGLTVTVSS

Figure 11

Binding activity to PD-1 of the first arm		
Clone No.	HumanPD-1	Cynomolgus monkey PD-1
	Kd (nmol/L)	Kd (nmol/L)
PD1-1(Bi)	0.6	0.3
PD1-2(Bi)	0.7	0.4
PD1-3(Bi)	3.8	2.0
PD1-4(Bi)	0.9	0.7
PD1-5(Bi)	0.7	0.4
PD1-6(Bi)	0.8	21.8
Binding activity to CD3 of the second arm		
Clone No.	Human CD3 $\delta$ /CD3 $\epsilon$	
	Kd (nmol/L)	
CD3-2	19.2	

Figure 12

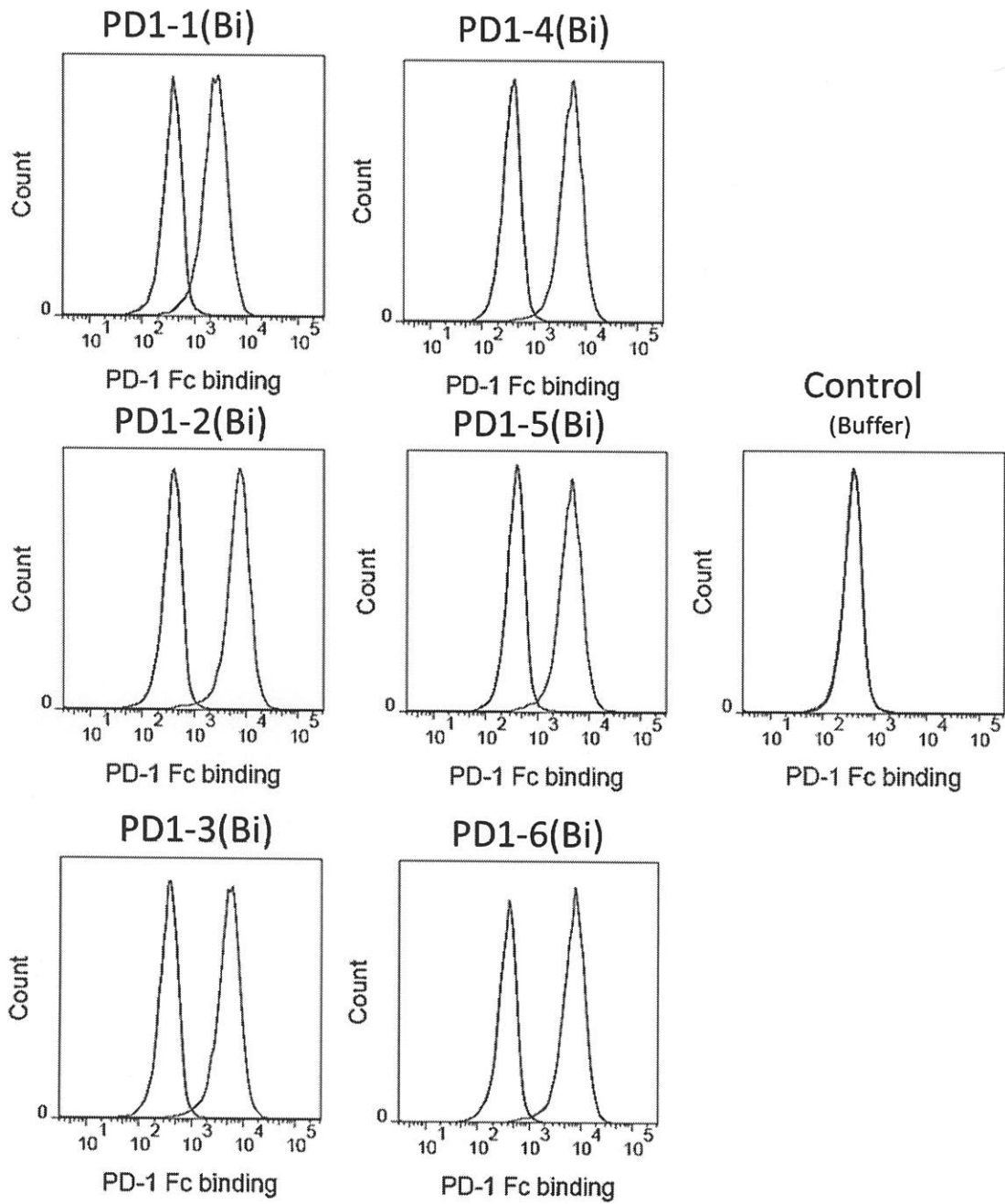


Figure 13

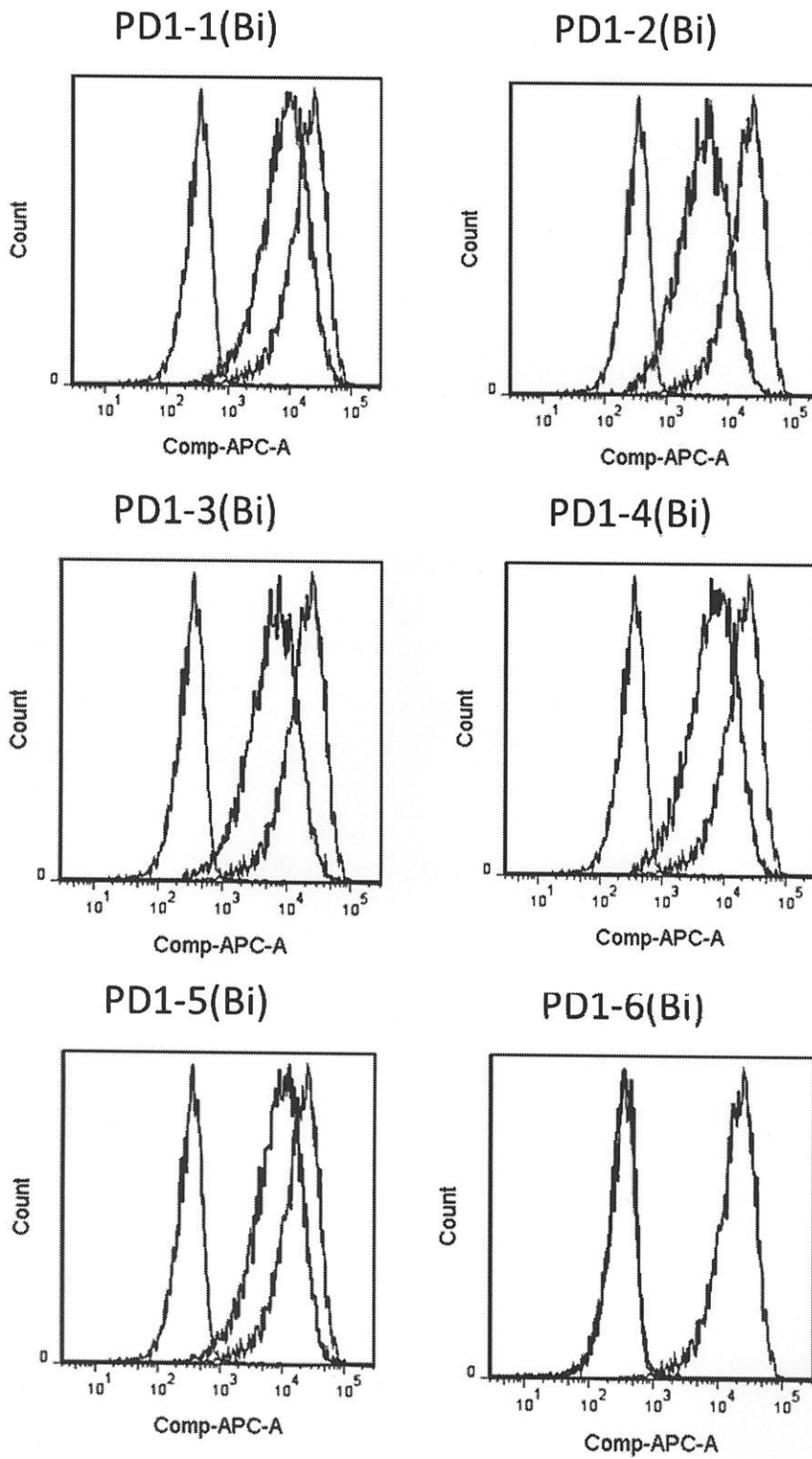


Figure 14

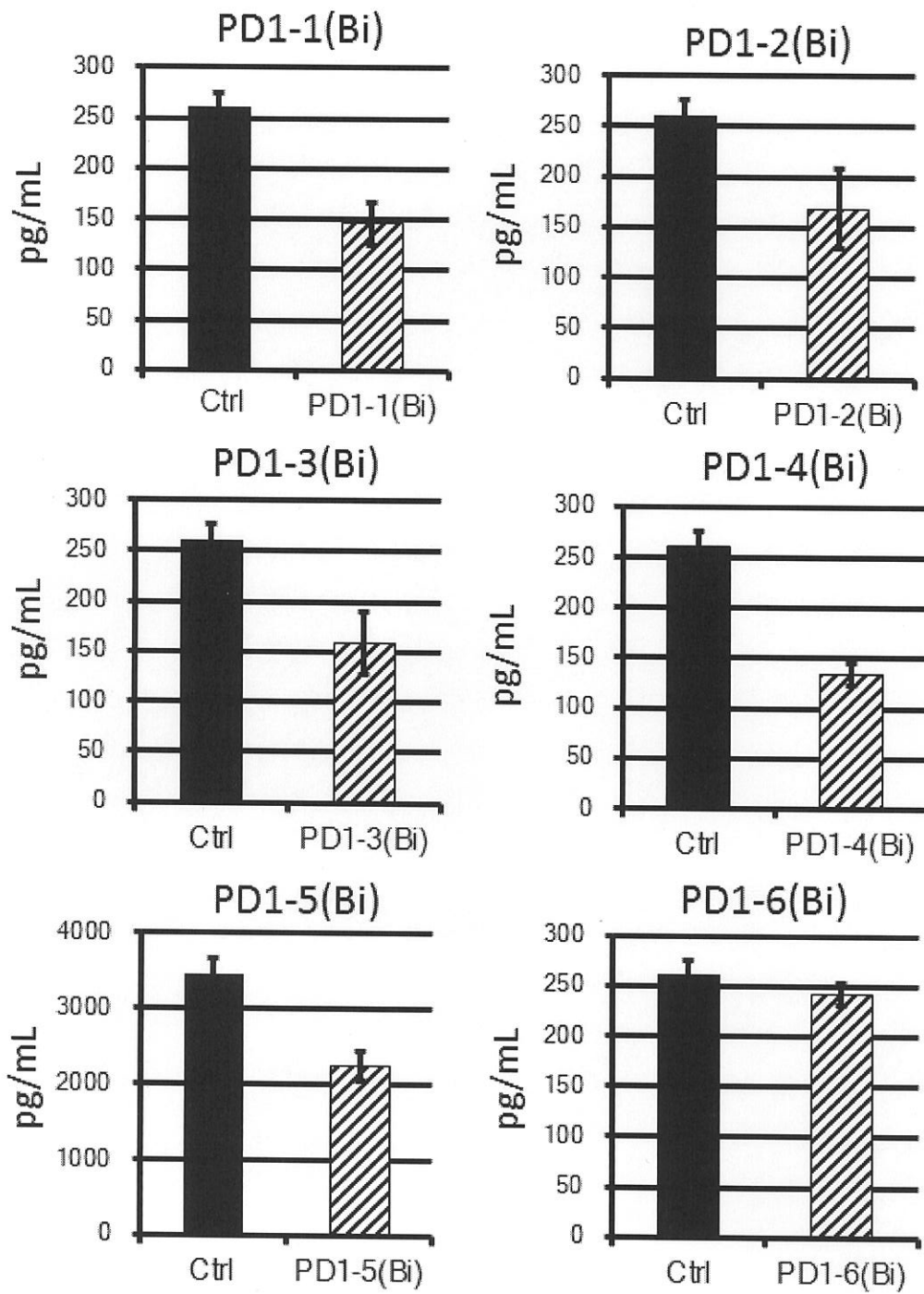


Figure 15

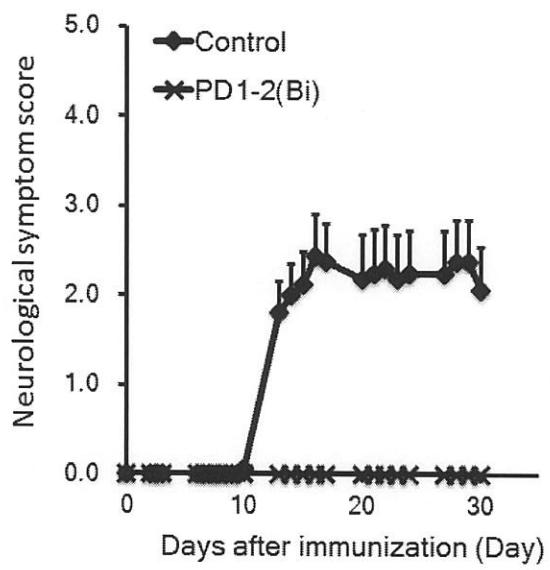
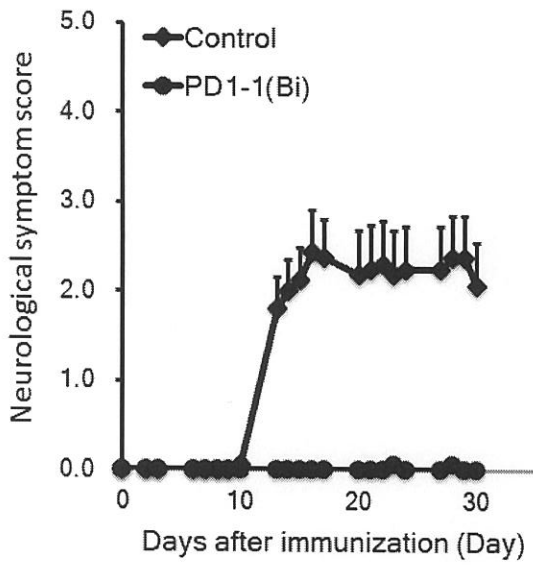


Figure 16

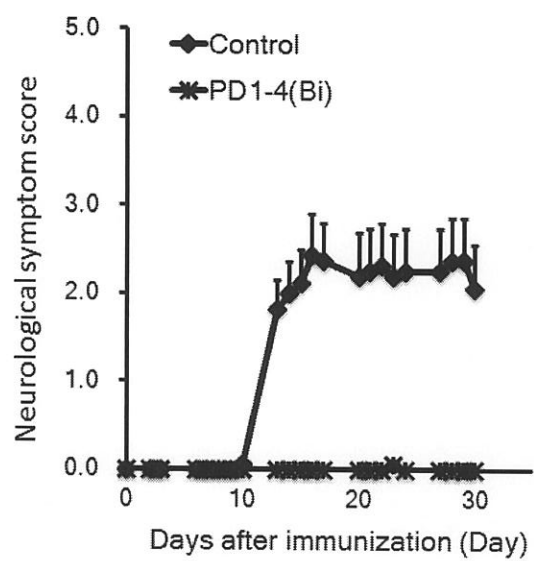
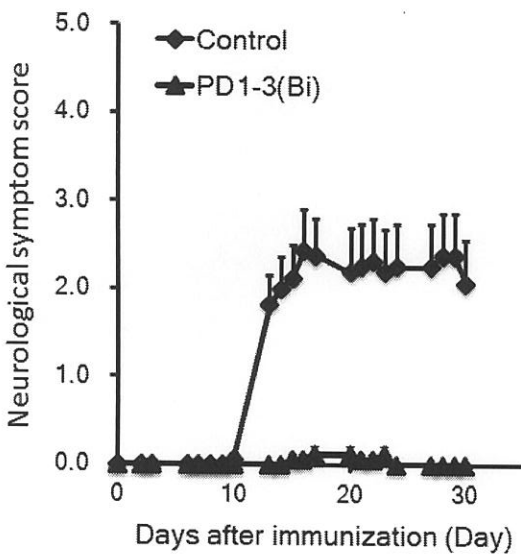


Figure 17

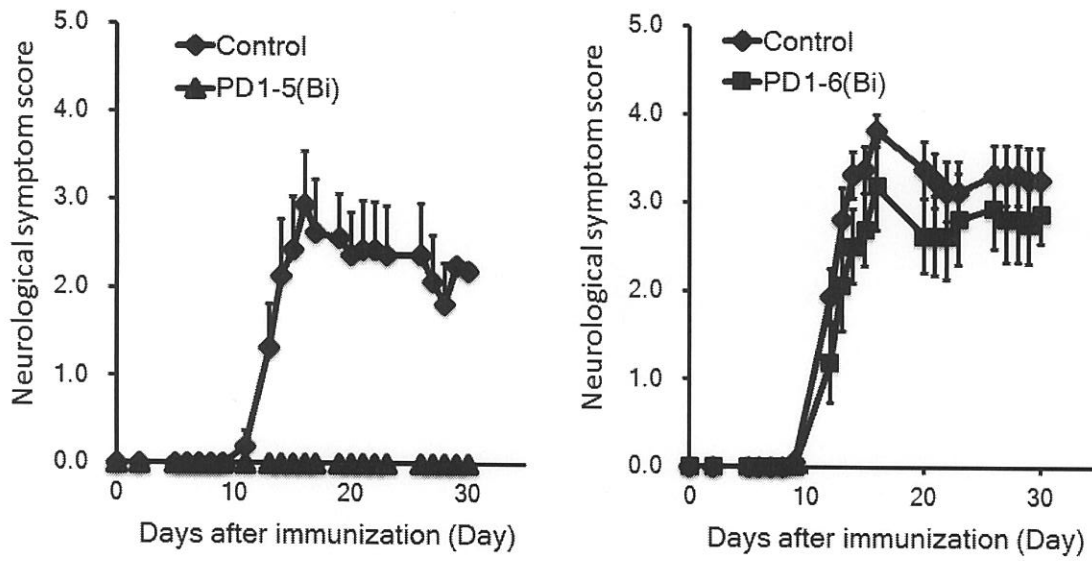


Figure 18

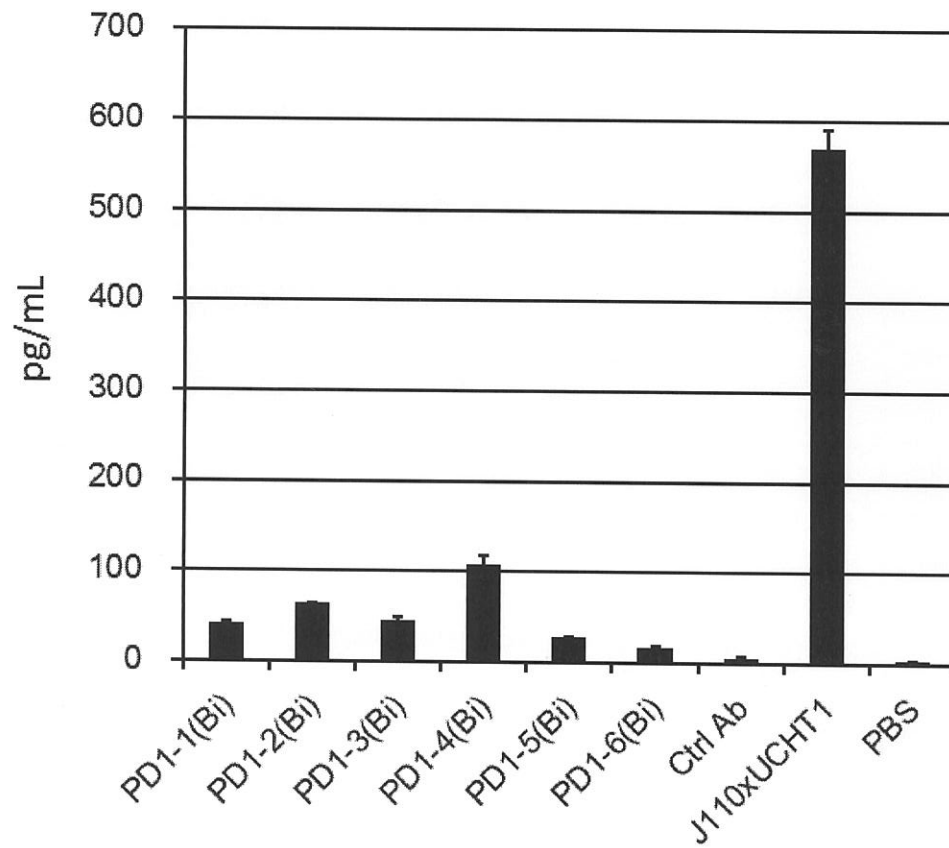


Figure 19

