CLAIMS

1. An antibody antigen binding domain which specifically binds human PD-1, and comprises a complementarity determining region (CDR) having a sequence selected from SEQ ID NOS 11-22, 31-42 and 59-63.

2. The domain of claim 1 comprising a heavy chain variable region (Vh) or a light chain variable region (Vk) comprising:

a) CDR-H1 (SEQ ID NO:11, 17, 31, or 37),	d) CDR-L1 (SEQ ID NO:14, 20, 34, or 40),
b) CDR-H2 (SEQ ID NO:12, 18, 32, or 38),	e) CDR-L2 (SEQ ID NO:15, 21, 35, or 41), or
c) CDR-H3 (SEQ ID NO:13, 19, 33, or 39);	f) CDR-L3 (SEQ ID NO:16, 22, 36, or 42).

3. The domain of claim 1 comprising a heavy chain variable region (Vh) or a light chain variable region (Vk) comprising:

a) mu317	CDR-H1, CDR-H2 and CDR-H3	(SEQ ID NOS:11-13); or
	CDR-L1, CDR-L2 and CDR-L3	(SEQ ID NOS:14-16);
b) mu326	CDR-H1, CDR-H2 and CDR-H3	(SEQ ID NOS:17-19); or
	CDR-L1, CDR-L2 and CDR-L3	(SEQ ID NOS:20-22);
c) 317-4B6	CDR-H1, CDR-H2 and CDR-H3	(SEQ ID NOS:31-33); or
	CDR-L1, CDR-L2 and CDR-L3	(SEQ ID NOS:34-36);
d) 326-4A3	CDR-H1, CDR-H2 and CDR-H3	(SEQ ID NOS:37-39); or
	CDR-L1, CDR-L2 and CDR-L3	(SEQ ID NOS:40-42);
e) 317-1H	CDR-H1, CDR-H2 and CDR-H3	(SEQ ID NOS:11, 59, 13); or
	CDR-L1, CDR-L2 and CDR-L3	(SEQ ID NOS:14-16);
f) 317-4B2	CDR-H1, CDR-H2 and CDR-H3	(SEQ ID NOS:11, 60, 13); or
	CDR-L1, CDR-L2 and CDR-L3	(SEQ ID NOS:61, 15, 16);
g) 317-4B5	CDR-H1, CDR-H2 and CDR-H3	(SEQ ID NOS:11, 60, 13); or
	CDR-L1, CDR-L2 and CDR-L3	(SEQ ID NOS:61, 15, 16);
h) 317-4B6	CDR-H1, CDR-H2 and CDR-H3	(SEQ ID NOS:11, 32, 13); or
	CDR-L1, CDR-L2 and CDR-L3	(SEQ ID NOS:61, 15, 16);
i) 326-1	CDR-H1, CDR-H2 and CDR-H3	(SEQ ID NOS:17, 62, 19); or
	CDR-L1, CDR-L2 and CDR-L3	(SEQ ID NOS:20-22);
j) 326-3B1	CDR-H1, CDR-H2 and CDR-H3	(SEQ ID NOS:17, 62, 19); or
	CDR-L1, CDR-L2 and CDR-L3	(SEQ ID NOS:20-22);
k) 326-3G1	CDR-H1, CDR-H2 and CDR-H3	(SEQ ID NOS:17, 62, 19); or
	CDR-L1, CDR-L2 and CDR-L3	(SEQ ID NOS:20-22).

4. The domain of claim 1 comprising a heavy chain variable region (Vh) and a light chain variable region (Vk) comprising:

a) mu317	CDR-H1, CDR-H2 and CDR-H3	(SEQ ID NOS:11-13); and
	CDR-L1, CDR-L2 and CDR-L3	(SEQ ID NOS:14-16);
b) mu326	CDR-H1, CDR-H2 and CDR-H3	(SEQ ID NOS:17-19); and
	CDR-L1, CDR-L2 and CDR-L3	(SEQ ID NOS:20-22);
c) 317-4B6	CDR-H1, CDR-H2 and CDR-H3	(SEQ ID NOS:31-33); and
	CDR-L1, CDR-L2 and CDR-L3	(SEQ ID NOS:34-36);
d) 326-4A3	CDR-H1, CDR-H2 and CDR-H3	(SEQ ID NOS:37-39); and
	CDR-L1, CDR-L2 and CDR-L3	(SEQ ID NOS:40-42);
e) 317-1H	CDR-H1, CDR-H2 and CDR-H3	(SEQ ID NOS:11, 59, 13); and
	CDR-L1, CDR-L2 and CDR-L3	(SEQ ID NOS:14-16);
f) 317-4B2	CDR-H1, CDR-H2 and CDR-H3	(SEQ ID NOS:11, 60, 13); and
	CDR-L1, CDR-L2 and CDR-L3	(SEQ ID NOS:61, 15, 16);
g) 317-4B5	CDR-H1, CDR-H2 and CDR-H3	(SEQ ID NOS:11, 60, 13); and
	CDR-L1, CDR-L2 and CDR-L3	(SEQ ID NOS:61, 15, 16);
h) 317-4B6	CDR-H1, CDR-H2 and CDR-H3	(SEQ ID NOS:11, 32, 13); and
	CDR-L1, CDR-L2 and CDR-L3	(SEQ ID NOS:61, 15, 16);
i) 326-1	CDR-H1, CDR-H2 and CDR-H3	(SEQ ID NOS:17, 62, 19); and
	CDR-L1, CDR-L2 and CDR-L3	(SEQ ID NOS:20-22);
j) 326-3B1	CDR-H1, CDR-H2 and CDR-H3	(SEQ ID NOS:17, 62, 19); and
	CDR-L1, CDR-L2 and CDR-L3	(SEQ ID NOS:20-22);
k) 326-3G1	CDR-H1, CDR-H2 and CDR-H3	(SEQ ID NOS:17, 62, 19); or
	CDR-L1, CDR-L2 and CDR-L3	(SEQ ID NOS:20-22).

5. The domain of claim 1 comprising a heavy chain variable region (Vh) and a light chain variable region (Vk) comprising:

(a) CDR-H1 (SEQ ID NO 31), CDR-H2 (SEQ ID NO 12, 32, 59 or 60) and CDR-H3 (SEQ ID NO 33),

CDR-L1 (SEQ ID NO 14, 34 or 61), CDR-L2 (SEQ ID NO 35) and CDR-L3 (SEQ ID NO 36); or

(b) CDR-H1 (SEQ ID NO 37), CDR-H2 (SEQ ID NO 18, 38 or 62) and CDR-H3 (SEQ ID NO 39),

CDR-L1 (SEQ ID NO 40), CDR-L2 (SEQ ID NO 41) and CDR-L3 (SEQ ID NO 42).

6. The domain of claim 1 comprising a heavy chain variable region (Vh) or a light chain variable region (Vk) comprising:

a) mu317	(SEQ ID NOS:4 or 6);	p) 317-3H1	(SEQ ID NOS:69);
b) mu326	(SEQ ID NOS:8 or 10);	q) 317-3I1	(SEQ ID NOS:70);
c) 317-4B6	(SEQ ID NOS:24 or 26);		
d) 326-4A3	(SEQ ID NOS:28 or 30);	r) 317-4B1	(SEQ ID NOS:71);
e) 317-4B2	(SEQ ID NOS:43 or 44);	s) 317-4B3	(SEQ ID NOS:72);
f) 317-4B5	(SEQ ID NOS:45 or 46);	t) 317-4B4	(SEQ ID NOS:73);
g) 317-1	(SEQ ID NOS:48 or 50);	u) 317-4A2	(SEQ ID NOS:74);
h) 326-3B1	(SEQ ID NOS:51 or 52);	v) 326-3A1	(SEQ ID NOS:75);
i) 326-3G1	(SEQ ID NOS:53 or 54);	w) 326-3C1	(SEQ ID NOS:76);
j) 326-1	(SEQ ID NOS:56 or 58);	x) 326-3D1	(SEQ ID NOS:77);
k) 317-3A1	(SEQ ID NOS:64);	y) 326-3E1	(SEQ ID NOS:78);
l) 317-3C1	(SEQ ID NOS:65);	z) 326-3F1	(SEQ ID NOS:79);
m) 317-3E1	(SEQ ID NOS:66);	aa) 326-3B N55D (SEQ ID NOS:80);	
n) 317-3F1	(SEQ ID NOS:67);	ab) 326-4A1	(SEQ ID NOS: 81); or
o) 317-3G1	(SEQ ID NOS:68);	ac) 326-4A2	(SEQ ID NOS: 82).

7. The domain of claim 1 comprising a heavy chain variable region (Vh) and a light chain variable region (Vk) comprising:

a) mu317	(SEQ ID NOS:4 and 6);	p) 317-3H1	(SEQ ID NOS:69 and 26);
b) mu326	(SEQ ID NOS:8 and 10);	q) 317-3I1	(SEQ ID NOS:70 and 26);
c) 317-4B6	(SEQ ID NOS:24 and 26);		
d) 326-4A3	(SEQ ID NOS:28 and 30);	r) 317-4B1	(SEQ ID NOS:71 and 26);
e) 317-4B2	(SEQ ID NOS:43 and 44);	s) 317-4B3	(SEQ ID NOS:72 and 26);
f) 317-4B5	(SEQ ID NOS:45 and 46);	t) 317-4B4	(SEQ ID NOS:73 and 26);
g) 317-1	(SEQ ID NOS:48 and 50);	u) 317-4A2	(SEQ ID NOS:74 and 26);
h) 326-3B1	(SEQ ID NOS:51 and 52);	v) 326-3A1	(SEQ ID NOS:75 and 30);
i) 326-3G1	(SEQ ID NOS:53 and 54);	w) 326-3C1	(SEQ ID NOS:76 and 30);
j) 326-1	(SEQ ID NOS:56 and 58);	x) 326-3D1	(SEQ ID NOS:77 and 30);
k) 317-3A1	(SEQ ID NOS:64 and 26);	y) 326-3E1	(SEQ ID NOS:78 and 30);
l) 317-3C1	(SEQ ID NOS:65 and 26);	z) 326-3F1	(SEQ ID NOS:79 and 30);

m) 317-3E1 (SEQ ID NOS:66 and 26); n) 317-3F1 (SEQ ID NOS:67 and 26); o) 317-3G1 (SEQ ID NOS:68 and 26);	aa) 326-3B N55D (SEQ ID NOS:80 and 30); ab) 326-4A1 (SEQ ID NOS:28 and 81); or ac) 326-4A2 (SEQ ID NOS:28 and 82).

8. A domain of claim 1 which specifically binds PD1 residues:

(a) K45 and I93 (AA numbering based on 2008 PNAS, 105:10483; equivalent to K58 and I106 in SEQ ID NO 2); or

(b) I93, L95 and P97(AA numbering based on 2008 PNAS, 105:10483; equivalent to I106, L108 and P110 in SEQ ID NO 2).

9. The domain of claim 1 which induces IL-2 release in HuT78/PD-1 cells co-cultured with HEK293/OS8/PD-L1 cells or with EK293/OS8/PD-L2 cells, and/or inhibits of IL-2 secretion in HuT78/P3Z cells co-cultured with HEK293/PD-L1 cells or with HEK293/PD-L2 cells.

10. An antibody IgG4 heavy chain effector or constant domain comprising any of SEQ ID NO:83-88.

11. An antibody, F(ab) or $F(ab)_2$ comprising a domain of any of claims 1-8.

12. An antibody comprising a domain of claim 7 and a IgG4 heavy chain effector or constant domain comprising SEQ ID NO 87 or 88.

13. A polynucleotide encoding a domain of claim 1.

14. A polynucleotide comprising a cDNA sequence encoding a domain of claim 1.

15. A fusion protein comprising:

(a) a single chain variable fragment (scFv) of an anti-human CD3 mAb OKT3 fused to the C-terminal domain (113-220) of mouse CD8α (SEQ ID NO:89); or

(b) the extracellular and transmembrane domains of human PD-1 fused to the cytoplasmic domain of human CD3ζ chain (SEQ ID NO: 90).

16 A method of using the fusion protein of claim, comprising assaying, screening or selecting anti-PD-1 antibodies with a cell line expressing the fusion protein.