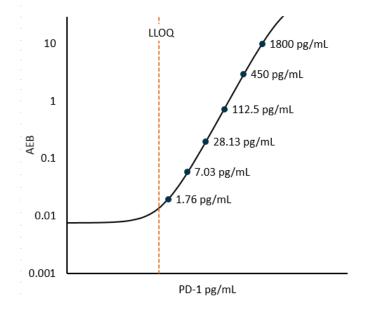


Description

Programmed cell death protein 1 (PD-1 or CD279) is a cell surface receptor that belongs to the immunoglobulin superfamily and is expressed on T cells, B cells, monocytes, and dendritic cells. PD-1 plays an important role as an immune checkpoint. PD-1 binds to two ligands, PD-L1 and PD-L2. The PD-1/PD-L1 or PD-L2 signaling pathway is a negative regulatory mechanism that inhibits T cell proliferation and cytokine production¹. PD-1 inhibitors play a role in activation of the immune system and can be used for cancer treatment. Blockade of the PD-1/PD-L1 interaction enhances anti-tumor immunity and shows potential for improving cancer immunotherapy². The PD-1 pathway plays a major role in the inhibition of self-reactive T cells and protection against autoimmune diseases^{3,4}. Rheumatoid arthritis patients were shown to have significantly elevated plasma levels of sPD-1⁵. Serum sPD-1 levels positively correlated with the severity of skin sclerosis⁶. Autoimmune hepatitis patients with active disease and incomplete response to standard treatment showed increased sPD-1 levels⁷. PD-1 was also shown to be a regulator of virus-specific CD8+ T cell survival in HIV infection⁸.

Calibration Curve: Calibrator concentrations and Lower Limit of Quantification depicted.



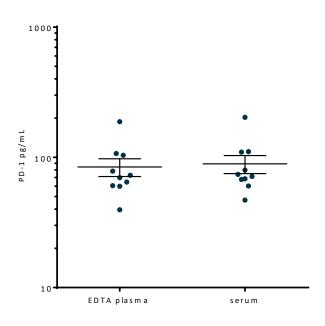
Lower Limit of Quantification (LLOQ): Triplicate measurements of serially diluted calibrator were read back on the calibration curve for 5 runs each for 1 reagent lot on a single instrument (5 runs total). The LLOQ is determined as the lowest dilution with a pooled CV \leq 20% and sample concentration recovery between 80-120% of the expected.

Limit of Detection (LOD): Calculated as 2.5 standard deviations from the mean of background signal read back on each calibration over 5 runs for 1 reagent lot on a single instrument (5 runs total).

LLOQ	0.879 pg/mL
	pooled CV 19%,
	mean recovery 98%
LOD	0.247 pg/mL
	range 0.109-0.370 pg/mL
Sample range	0–7200 pg/mL
	10
Diluted sample volume*	100 μL
	Per measurement
Tests per kit	192

*See Kit Instruction for details

Endogenous Sample Reading: Healthy donor matched EDTA plasma (n=10) and serum (n=10) samples were measured. Bars depict mean with SEM.



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Matched human samples (n=10)	Mean PD-1 pg/mL	Median PD-1 pg/mL	% Above LOD
EDTA plasma	84.4	71.3	100%
Serum	89.2	72.7	100%

Precision on HD-1: Measurements of 3 serum or plasma based panels. Triplicate measurements were made for 5 runs using 1 reagent lot and a single instrument (5 runs total, 15 measurements).

Sample	Mean (pg/mL)	Within run CV	Between run CV
Panel 1	158	2.8%	13.4%
Panel 2	924	5.1%	5.3%
Panel 3	480	2.3%	7.8%

Spike and Recovery: 2 EDTA plasma samples and 2 serum samples were spiked at high and low concentrations within the range of the assay.

Dilution Linearity: 1 spiked endogenous EDTA plasma sample and 1 spiked endogenous serum sample were diluted 2x serially from MRD (4x) to 256x with Sample Diluent.

Spike and Recovery	108%
(Serum/Plasma)	Range 89-132%
Spiked Plasma Dilution	Mean = 106%
Linearity (256x)	Range: 99-113%
Spiked Serum Dilution	Mean = 121%
Linearity (256x)	Range: 114-130%

Specificity: Normal serum (n=2) and EDTA plasma (n=2) were directly incubated with detector antibody and run at MRD. Average knock-down was **96.8%** with a range of **96.5% -97.1%**.

References:

- Li Y et al. (2015) Role of soluble programmed death-1 (sPD-1) and sPD-ligand 1 in patients with cystic echinococcosis. Exp Ther Med. 11(1):251-6.
- Dolan DE, Gupta S (2014) PD-1 pathway inhibitors: changing the landscape of cancer immunotherapy. Cancer Control. 21(3):231-7.
- 3. Zamani MR et al. (2016) PD-1/PD-L and autoimmunity: A growing relationship. Cell Immunol. Epub.
- 4. Dai S et al. (2014) The PD-1/PD-Ls pathway and autoimmune diseases. Cell Immunol. 290(1):72-9.
- 5. Greisen SR et al. (2014) Increased soluble programmed death-1 (sPD-1) is associated with disease activity and radiographic progression in early rheumatoid arthritis. Scand J Rheumatol. 43(2):101-8.
- Yanaba K et al. (2016) Serum levels of soluble programmed death-1 and programmed death ligand-1 in systemic sclerosis: Association with extent of skin sclerosis. J Dermatol. 43(8):954-7.
- 7. Aarslev K et al. (2017) Soluble programmed death-1 levels are associated with disease activity and treatment response in patients with autoimmune hepatitis. Scan J Gastroenterol. 52(1):93-99.
- 8. Petrovas C et al. (2016) PD-1 is a regulator of virusspecific CD8+ T cell survival in HIV infection. J Exp Med. 203(10):2281–2292.

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