Speedy™ Human/Cynomolgus Monkey IFN-gamma One-Step ELISA Kit Datasheet

Please read it entirely before use

Catalogue Number: SE50034

Size: 96T

Sensitivity: 1.1 pg/mL

Range: 7.8-500 pg/mL

Usage: For the quantitative detection of human/cynomolgus monkey IFN-gamma concentrations in serum, plasma and cell culture supernatant.

This product is for research use only and not for use in human or animal therapeutic or diagnostic.

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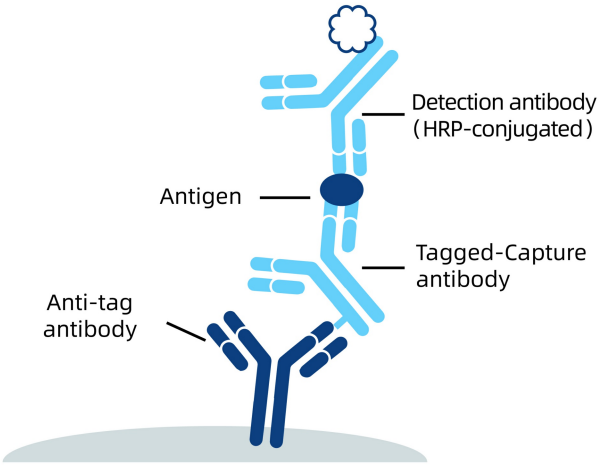
1. Background

Interferon gamma (IFNG) is a soluble cytokine that is the only member of the type II class of interferons. It is secreted by Th1 cells, cytotoxic T cells and NK cells. The cytokine is associated with antiviral, immunoregulatory and anti-tumor properties and is a potent activator of macrophages. It plays a crucial role in pathogen clearance. Aberrant IFNG expression is associated with a number of autoinflammatory and autoimmune diseases. It has been identified in many studies as a biomarker for pleural tuberculosis (TB). Mutations in this gene are associated with aplastic anemia.

2. Principle



An anti-tag antibody is pre-coated onto the bottom of wells. After adding antigen or samples, Tagged-Capture antibody and HRP-conjugated detection antibody, a sandwich complex is formed in the solution. TMB acts as a HRP substrate, and the solution color will change from colorless to blue. A stop solution containing sulfuric acid turns the solution yellow. The color intensity is proportional to the quantity of bound protein, which is measurable at 450 nm with the correction wavelength set at 630 nm.

3. Required Materials

3.1 A microplate reader capable of measuring absorbance at 450 nm with the correction wavelength set at 630 nm.

3.2 Calibrated, adjustable precision pipettes and disposable plastic tips. A manifold multi-channel pipette is recommended for large assays.

3.3 Plate washer: automated or manual.

3.4 Absorbent paper towels.

3.5 Glass or plastic tubes to prepare standard and sample dilutions.

3.6 Beakers and graduated cylinders.

3.7 Log-log or semi-log graph paper or computer and software for ELISA data analysis. A four-parameter logistic (4-PL) curve-fit is recommended. Proteintech data analysis website, https: //www.ptgcn.com/products/elisa-kits/.

3.8 Microplate thermostatic shaker.

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4. Kit Components and Storage

Microplate - 96 well microplate precoated an anti-tag antibody (8 well × 12 strips)	1 plate	**Unopened Kit:** Store at 2-8°C for 6 months or -20°C for 12 months. **Opened Kit:** All reagents stored at 2-8°C for 7 days. **Please use a new standard for each assay.**
Protein standard - 1000 pg/bottle; lyophilized	2 bottles	
Capture antibody (100×) - 60 µL/vial*	1 vial	
Detection antibody, HRP-conjugated (100×) - 60 µL/vial*	1 vial	
Sample Diluent PT 4B1 - 30 mL/bottle	1 bottle	
Detection Diluent - 15 mL/bottle	1 bottle	
Wash Buffer Concentrate (20×) - 30 mL/bottle	1 bottle	
Tetramethylbenzidine Substrate (TMB) - 12 mL/bottle	1 bottle	
Stop Solution - 12 mL/bottle	1 bottle	
Plate Cover Seals	4 pieces	

* Centrifugation immediately before use

5. Safety Notes

5.1 Avoid any skin and eye contact with Stop Solution and TMB. In case of contact, wash thoroughly with water.

5.2 Do not use the kit after the expiration date.

5.3 Do not mix or substitute reagents or materials from other kit lots or other sources.

5.4 Be sure to wear protective equipment such as gloves, masks and goggles during the experiment.

5.5 When using an automated plate washer, adding a 30 second soak period following the addition of Wash Buffer to improve assay precision

6. Sample Collection and Storage

6.1 Serum: Allow blood samples to clot for 30 minutes, followed by centrifugation for 15 minutes at 1000xg. Clear serum can be assayed immediately or aliquoted and stored at -20°C. Avoid repeated freeze-thaw cycles.

6.2 Plasma: Use EDTA, heparin, or citrate as an anticoagulant for plasma collection. Centrifuge for 15 minutes at 1000xg within 30 minutes of collection. The plasma can be assayed immediately or aliquoted and stored at -20°C. Avoid repeated freeze-thaw cycles.

6.3 Cell Culture Supernatant: Remove particulates by centrifugation for 5 minutes at 500xg and assay immediately or aliquot and store samples at ≤ -20°C. Avoid repeated freeze-thaw cycles.

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7. Regent Preparation

7.1 Wash Buffer (1X): If crystals have formed in the concentrate, warm to room temperature and mix gently until the crystals have completely dissolved. Add 30 mL of Wash Buffer Concentrate(20X) to 570 mL deionized or distilled water to prepare 1X Wash Buffer.

7.2 Antibody Cocktail (1X): Dilute 100X capture antibody and 100X HRP-conjugated detection antibody using Detection Diluent prior to assay. Suggested 1:100 dilution: 50 µL 100X capture antibody + 50 µL 100X Detection Antibody, HRP-conjugated + 4,900 µL Detection Diluent. Mix gently but thoroughly.

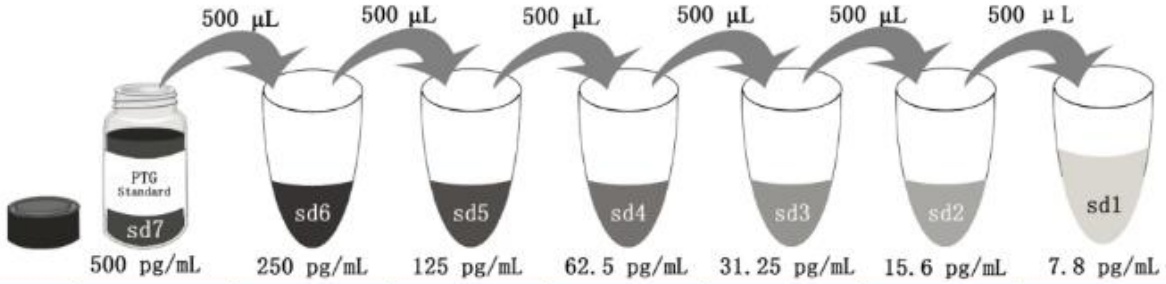
7.3 Sample Dilution: Different samples should be diluted with corresponding Sample Diluent. The minimum required dilution factor was 1:2; consequently, no more than 25 µL of undiluted sample was added per well.

Samples may require further dilution if the readout values are higher than the highest standard OD reading. Variations in sample collection, processing and storage may affect the results of the measurement.

Recommended Dilution for different sample types: 1:2 or 1:4 is recommended for human serum and plasma. 1:2 to 1:400 is recommended for human and cynomolgus monkey cell culture supernatant.

7.4 Standard Serial Dilution:

Add 2 mL Sample Diluent PT 4B1 in protein standard.



Add # µL of Standard diluted in the previous step	—	500 µL	500 µL	500 µL	500 µL	500 µL	500 µL
# µL of Sample Diluent PT 4B1	**2000 µL**	500 µL	500 µL	500 µL	500 µL	500 µL	500 µL
	"sd7"	"sd6"	"sd5"	"sd4"	"sd3"	"sd2"	"sd1"

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8. Assay Procedure Summary

Bring all reagents to room temperature before use (Detection antibody, HRP-conjugated antibody can be used immediately). To avoid cross-contamination, change pipette tips between additions of each standard level, between sample additions, and between reagent additions. Also, use separate reservoirs for each reagent.

8.1 Preset the layout of the microplate, including control group,standard group and sample group,take out the required number of microplate strips and return excess strips to the foil pouch containing the drying reagent pack and reseal; store at 4°C immediately. Microplate strips should be used in one week.

8.2 Add 50 µL standard or sample to appropriate wells. To avoid high background always add samples or standards to the well before the addition of antibody cocktail.

8.3 Add 50 µL 1X Antibody Cocktail solution (refer to Reagent Preparation 7.2) to each well. Seal plate with cover seal and incubate at 37°C on a microplate thermostatic shaker set at 400 rpm for 1 hour (incubate at 37°C for 2 hours is recommended if thermostatic shaker is not available) .

8.4 Wash

1) Gently remove the cover seal. Discard the liquid from wells by aspirating or decanting. Remove any residual solution by tapping the plate a few times on fresh paper towels.

2) Wash 4 times with 1X Wash Buffer, using at least 350-400 µL per well. Following the last wash, firmly tap plates on fresh towels 10 times to remove residual Wash Buffer. Avoid getting any towel fibers in the wells or wells drying out completely.

8.5 Add 100 µL TMB substrate solution to each well, protected from light. Incubate at 37°C on a microplate thermostatic shaker set at 400 rpm for 15 to 20 minutes. (Substrate Solution should remain colorless until added to the plate.)

8.6 Add 100 µL Stop Solution to each well in the same order as addition of the TMB substrate . **Note: Avoid skin and eye contact with the Stop solution.**

8.7 Read results immediately on a microplate reader at a wavelength of 450 nm. If possible, perform a double wavelength readout (450 nm and 630 nm).

8.8 Data analysis: Calculate the average of the duplicate readings (OD value) for each standard and sample, and subtract the average of the zero standard absorbance. Construct a standard curve by plotting the mean absorbance for each standard on the y-axis against the concentration on the x-axis, four-parameter logistic curve- fit (4-PL) analysis is recommend. If the samples have been diluted, the fitting result must be multiplied by the dilution factor used.

Procedure summary

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Add 50 µL standard or sample to appropriate wells

↓

Add 50 µL antibody cocktail solution (1x) to each well

↓

Incubate at 37 °C on a microplate thermostatic shaker set at 400 rpm for 1 hour

↓

Aspirate and wash each well four times with 400µL 1 x Wash Buffer

↓

Add 100 µL TMB substrate solution to each well

↓

Incubate at 37 °C on a microplate thermostatic shaker set at 400 rpm for 15minutes

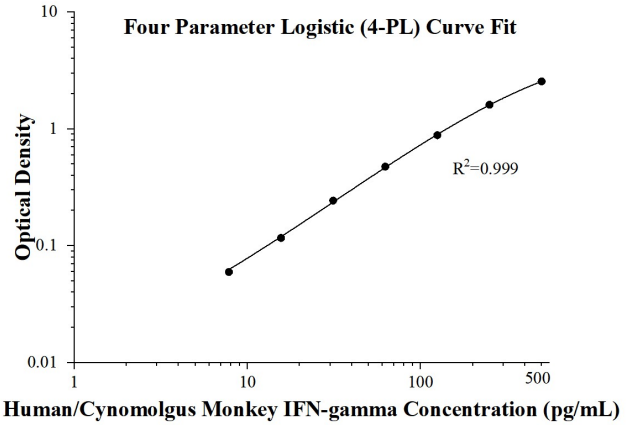
↓

Add 100 µL Stop Solution to each well and Read OD immediately

9. Validation Data

9.1 Standard curve

These standard curves are provided for demonstration only. A standard curve should be generated for each set of samples assayed.



(pg/mL)	O.D	Average	Corrected
0	0.0311 0.0321	0.0316	-
7.8	0.0888 0.0937	0.09125	0.05965
15.6	0.1483 0.1482	0.14825	0.11665
31.25	0.2741 0.2763	0.2752	0.2436
62.5	0.5049 0.5096	0.50725	0.47565
125	0.9159 0.9138	0.91485	0.88325
250	1.6432 1.6408	1.642	1.6104
500	2.5726 2.5999	2.58625	2.55465

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9.2 Precision

Intra-assay Precision (Precision within an assay) Three samples of known concentration were tested 8 times on one plate to assess intra-assay precision.

Inter-assay Precision (Precision between assays) Three samples of known concentration were tested in 16 separate assays to assess inter-assay precision.

Intra-assay Precision				
Sample	n	Mean (pg/mL)	SD	CV%
1	8	249.3	6.0	2.4
2	8	63.0	3.8	6.0
3	8	32.8	1.4	4.2

Inter-assay Precision				
Sample	n	Mean (pg/mL)	SD	CV%
1	16	245.0	10.2	4.2
2	16	62.9	3.4	5.5
3	16	32.6	1.3	4.0

9.3 Recovery

The recovery of human/cynomolgus monkey IFN-gamma spiked to three different levels throughout the range of the assay was evaluated.

Sample Type		Average% of Expected	Range (%)
Human plasma	1:8	100	98-102
	1:16	111	110-113
Cell culture supernatant	1:400	102	96-105
	1:800	101	98-105

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9.4 Sample values

Human plasma - Human plasma samples were evaluated for the presence of human IFN-gamma in this assay.

Sample Type	Mean (pg/mL)	Detection rate	Range (pg/mL)
Human Plasma (n=15)	65.2	66%	ND-220.9

ND*=Non-detectable

Cell culture supernatant - Human peripheral blood mononuclear cells (1 x 10^6 cells/mL) were cultured in DMEM supplemented 10% fetal bovine serum, 50 µM β-mercaptoethanol, 2 mM L-glutamine, 100 U/mL penicillin and 100 µg/mL streptomycin sulfate. Cells were stimulated with 10 µg/mL PHA. Aliquots were removed on day 1 and assayed for levels of IFN-gamma.

Condition	Day 1 (pg/mL)
Unstimulated	ND
Stimulated	18,158.2

ND*=Non-detectable

Cynomolgus monkey peripheral blood mononuclear cells (1 x 10^6 cells/mL) were cultured in DMEM supplemented 10% fetal bovine serum, 50 µM β-mercaptoethanol, 2 mM L-glutamine, 100 U/mL penicillin and 100 µg/mL streptomycin sulfate. Cells were stimulated with 50 ng/mL PMA and 1 µg/mL calcium Ionomycin. Aliquots were removed on day 1 and assayed for levels of IFN-gamma.

Condition	Day 1 (**ng/mL**)
Unstimulated	0.1
Stimulated	185.22

9.5 Sensitivity

The minimum detectable dose of human/cynomolgus monkey IFN-gamma is 1.1 pg/mL. This was determined by adding two standard deviations to the concentration corresponding to the mean O.D. of 20 zero standard replicates.

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9.6 Linearity

To assess the linearity of the assay, samples were diluted with the appropriate **Sample Diluent** to produce samples with values within the dynamic range of the assay.

(The human cell culture supernatant lysate was initially diluted 1:100. The cynomolgus monkey cell culture supernatant lysate was initially diluted 1:100.)

		Human plasma	Human cell culture supernatant	Cynomolgus monkey cell culture supernatant
1:2	(%)	100	100	100
	(%)	-	-	-
1:4	(%)	108	107	105
	(%)	107-109	106-108	103-106
1:8	(%)	100	109	109
	(%)	93-107	108-109	107-111
1:16	(%)	106	108	106
	(%)	98-114	104-111	99-113

9.7 Calibration

The NIBSC/WHO Human IFN-gamma Reference Reagent (82/587), which was intended as a potency standard, was evaluated in this kit. The dose response curve of this Reference Reagent parallels the Proteintech standard curve. To convert sample values obtained with the Speedy^{TM} Human IFN-gamma One-Step ELISA Kit to approximate NIBSC/WHO (82/587) values, use the equation below.

NIBSC (82/587) approximate value (IU/mL)=0.0223 × Proteintech Human IFN-gamma value (pg/mL)

9.8 Specificity

This assay recognizes natural and recombinant human/cynomolgus monkey IFN-gamma.

The following factors prepared at 50 ng/mL were assayed and exhibited no cross-reactivity or interference.

Recombinant human:	Recombinant mouse:	Recombinant rat:
IFN-γ R1	IFN-γ	IFN-γ
IFN-β		

10. References

1. Gray, P W, and D V Goeddel. Nature vol. 298,5877 (1982): 859-63.
2. Schoenborn, Jamie R, and Christopher B Wilson. Advances in immunology vol. 96 (2007): 41-101.
3. Denkinger, Claudia M et al. PloS one vol. 8,12 (2013): e85447.
4. Schroder, Kate et al. Journal of leukocyte biology vol. 75,2 (2004): 163-89.

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