Speedy™ Human IgM One-Step ELISA Kit Datasheet

Please read it entirely before use

Catalogue Number: SE50316

Size: 96T

Sensitivity: 0.20 ng/mL

Range: 1.25-80 ng/mL

Usage: For the quantitative detection of human IgM concentrations in serum, plasma, urine, saliva, human milk and human cerebrospinal fluid.

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

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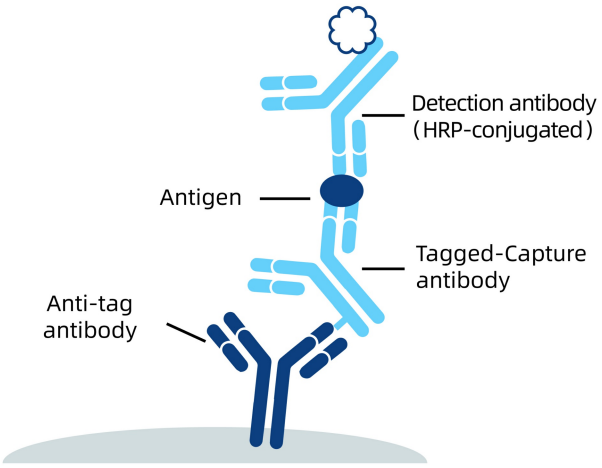
1. Background

IgM is one of the five major classes of antibodies (immunoglobulins) produced by the immune system. High levels of IgM may indicate an active or recent infection, or certain autoimmune diseases. Deficiency in IgM can lead to increased susceptibility to infections, particularly from bacteria and viruses.

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 - 160 ng/bottle; lyophilized	2 bottles	
Capture Antibody (100×) - 60 uL/vial*	1 vial	
Detection antibody, HRP-Conjugated (100×) - 60 uL/vial*	1 vial	
Sample Diluent PT 1 - 30 mL/bottle; For human serum, plasma, saliva, human milk and CSF samples.	2 bottles	
Sample Diluent PT 3 - 30 mL/bottle; For urine samples.	1 bottle	
Detection Diluent PT PB1 - 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 Urine: Collect urine samples and centrifuge for 20 minutes at 1000xg. Collect the aqueous layer, assay immediately or aliquot and store samples at ≤ -20°C. Avoid repeated freeze-thaw cycles.

6.4 Saliva: Collect saliva samples and centrifuge for 5 minutes at 10,000xg. Collect the aqueous layer, assay immediately or aliquot and store samples at ≤ -20°C. Avoid repeated freeze-thaw cycles.

6.5 Human Milk: Collect milk samples and Centrifuge for 15 minutes at 1000xg at 2-8°C. Collect the aqueous fraction and repeat this process a total of 3 times. Assay immediately.

6.6 Human Cerebrospinal Fluid (CSF): Collect CSF samples in a tube and centrifuge for 15 minutes at 1000xg. Collect the aqueous layer, 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 uL 100X capture antibody + 50 uL 100X Detection Antibody, HRP-conjugated + 4,900 uL Detection Diluent. Mix gently but thoroughly.

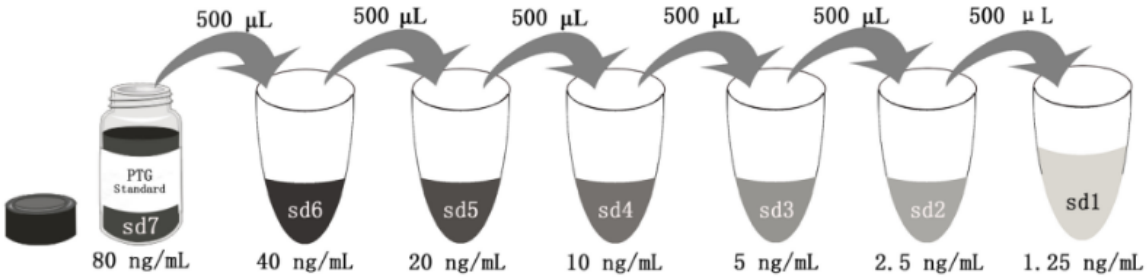
7.3 Sample Dilution: Different samples should be diluted with corresponding Sample Diluent. The minimum required dilution factor was 1:2; consequently, no more than 25 uL of undiluted sample was added per well.

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: 1:32,000 or 1:64,000 is recommended for human serum and plasma. 1:2 or 1:4 is recommended for urine. 1:400 or 1:800 is recommended for saliva. 1:200 or 1:400 is recommended for saliva. 1:80 or 1:160 is recommended for CSF.

7.4 Standard Serial Dilution:

For human serum, plasma, saliva, human milk and CSF, add 2 mL Sample Diluent PT 1 in protein standard. For urine, add 2 mL Sample Diluent PT 3 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 1 or PT 3	**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 1× 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 1× 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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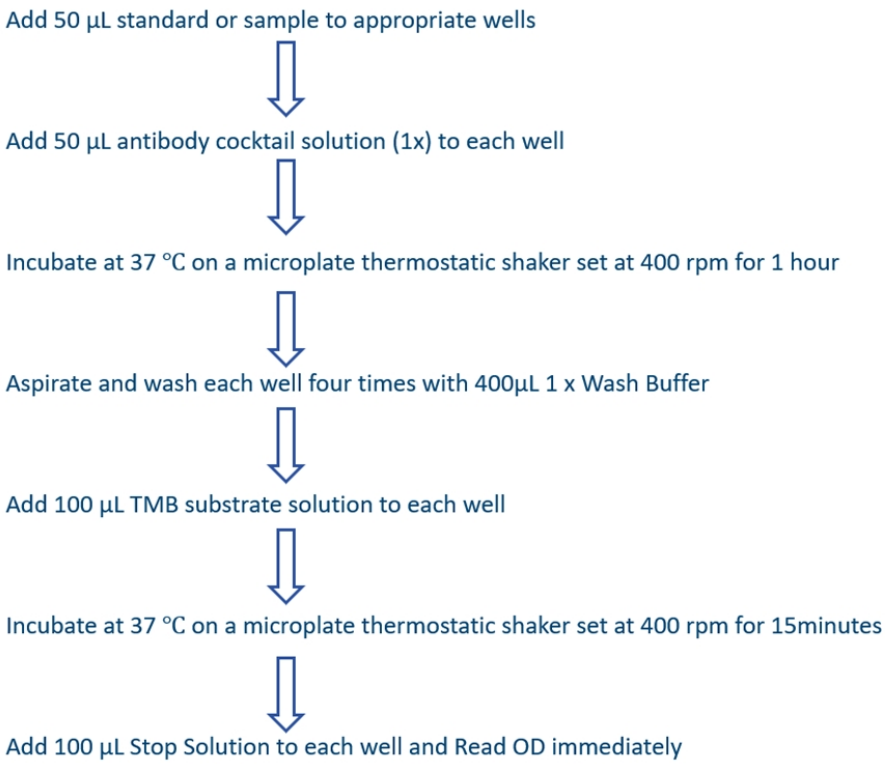

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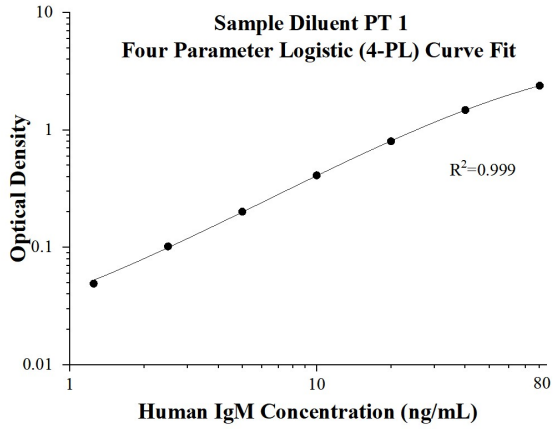
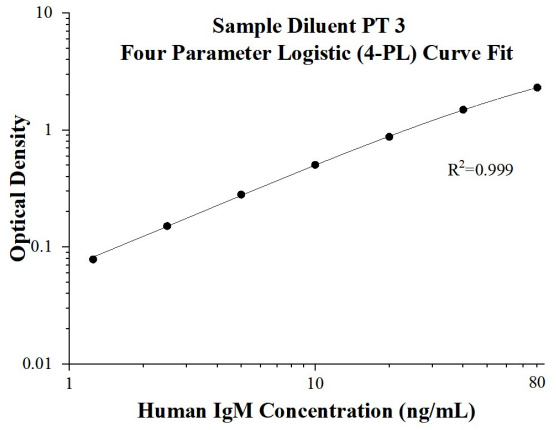
9. Validation Data

9.1 Standard curve

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



(ng/mL)	O.D	Average	Corrected
0	0.0292 0.029	0.0291	-
1.25	0.0783 0.078	0.0782	0.0491
2.5	0.1297 0.1325	0.1311	0.1020
5	0.2337 0.2274	0.2306	0.2015
10	0.4303 0.4508	0.4406	0.4115
20	0.8921 0.7705	0.8313	0.8022
40	1.5047 1.5212	1.5130	1.4839
80	2.429 2.4062	2.4176	2.3885



(ng/mL)	O.D	Average	Corrected
0	0.0279 0.0299	0.0289	-
1.25	0.1069 0.1078	0.1074	0.0785
2.5	0.1818 0.1787	0.1803	0.1514
5	0.3123 0.3084	0.3104	0.2815
10	0.5364 0.5319	0.5342	0.5053
20	0.906 0.9044	0.9052	0.8763
40	1.5351 1.5125	1.5238	1.4949
80	2.3512 2.3274	2.3393	2.3104

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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 (ng/mL)	SD	CV%
1	8	41.70	1.75	4.20
2	8	8.15	0.34	4.17
3	8	3.94	0.12	3.05

Inter-assay Precision				
Sample	n	Mean (ng/mL)	SD	CV%
1	16	41.67	2.16	5.18
2	16	8.18	0.29	3.55
3	16	3.97	0.12	3.02

9.3 Recovery

The recovery of human IgM spiked to three different levels throughout the range of the assay was evaluated.

Sample Type		Average% of Expected	Range (%)
Human plasma	1:128,000	106	101-111
	1:256,000	105	104-106
Urine	1:8	101	95-108
Saliva	1:800	111	105-114
	1:1,600	107	99-112
Human milk	1:800	109	105-115
	1:1,600	105	100-109
CSF	1:160	110	106-116
	1:320	108	107-110

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9.4 Sample values

Human plasma/Urine/Saliva/Human milk - Human plasma, urine, saliva and human milk samples were evaluated for the presence of human IgM in this assay.

Sample Type	Mean (**µg/mL**)	Range (**µg/mL**)
Human plasma (n=16)	585.02	222.34-1,240.44

Sample Type	Mean (ng/mL)	Range (ng/mL)
Urine (n=8)	28.99	6.57-69.37
Saliva (n=8)	5,163.04	1,161.17-9,878.50
Human milk (n=8)	4,965.26	2,238.45-8,827.27

Human cerebrospinal fluid (CSF) - Human cerebrospinal fluid (CSF) samples were evaluated for the presence of IgM in this assay, and measured 1,141.05 ng/mL.

9.5 Sensitivity

The minimum detectable dose of human IgM is 0.20 ng/mL. This was determined by adding two standard deviations to the concentration corresponding to the mean O.D. of 20 zero standard replicates.

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 plasma was initially diluted 1:16,000. The saliva was initially diluted 1:200. The human milk was initially diluted 1:100. The CSF was initially diluted 1:40.)

		Human plasma (Sample diluent PT 1)	Urine (Sample diluent PT 3)	Saliva (Sample diluent PT 1)	Human milk (Sample diluent PT 1)	CSF (Sample diluent PT 1)
1:2	Average% of Expected	100	100	100	100	100
	Range (%)	-	-	-	-	-
1:4	Average% of Expected	107	85	103	98	106
	Range (%)	98-116	76-93	98-108	93-103	103-109
1:8	Average% of Expected	101	85	106	102	108
	Range (%)	99-104	84-85	99-113	94-109	105-111
1:16	Average% of Expected	105	86	110	105	112
	Range (%)	102-108	83-90	97-123	98-111	105-119

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9.7 Specificity

This assay recognizes natural and recombinant human IgM.

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

Recombinant human:

IgG1

IgG2

IgG3

IgG4

IgA1

IgA2

IGHE

IGHD

A sample containing 50 ng/mL of the recombinant rat IgM reads as 0.80 ng/mL (1.60% cross-reactivity).

A sample containing 50 ng/mL of the recombinant mouse IgM reads as 6.66 ng/mL (13.32% cross-reactivity).

10. References

1. Sogn, J A, and T J Kindt. *Current opinion in immunology* vol. 1,1 (1988): 73-6.

2. Wilson, Bridget E, and Catherine M Freeman. *Allergy and asthma proceedings* vol. 45,5 (2024): 364-370.

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