



AssayMax™
Mouse Complement C1q
ELISA Kit

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For any questions regarding troubleshooting or performing the assay, please contact our support team at support@assaypro.com.

Thank you for choosing Assaypro.

Assay Summary

Step 1. Add 50 μ l of Standard or Sample per well.
Incubate 2 hours.

Step 2. Wash, then add 50 μ l of Biotinylated Antibody per well.
Incubate 1 hour.

Step 3. Wash, then add 50 μ l of SP Conjugate per well.
Incubate 30 minutes.

Step 4. Wash, then add 50 μ l of Chromogen Substrate per well.
Incubate 10 minutes.

Step 5. Add 50 μ l of Stop Solution per well.
Read at 450 nm immediately.

Symbol Key



Consult instructions for use.

Assay Template

[illegible]

AssayMax™ Mouse Complement C1q ELISA Kit

Catalog No. EMC1101-1

Sample insert for reference use only

Introduction

Complement C1q is the recognition subunit of C1 complex of the complement classical pathway (1). Mouse C1q is a 439.5 kDa protein with the overall shape of a bouquet of flowers, comprising six heterotrimeric collagen-like triple helices (2). The globular heads of C1q bind to the Fc-fragment of IgM or IgG on the surface of a pathogen, playing an important role in host defense and apoptotic cell clearance. It is a functional ligand for leukocyte-associated Ig-like receptor 1, restricting immune cell differentiation and activation (3). In mouse models, C1q is increased and associated with synapses before overt plaque deposition in Alzheimer's disease. C1q is necessary for the toxic effects of soluble β -amyloid oligomers on synapses and hippocampal long-term potentiation (4). C1q deficiency is associated with the development of systemic lupus erythematosus. C1q deficiency also triggers an exuberant effector CD8⁺ T-cell response to chronic viral infection leading to lethal immunopathology (5). Upregulation of C1q reflects Wnt signaling activity and mucosal regeneration in a mouse model of colitis (6).

Principle of the Assay

The AssayMax™ Mouse Complement C1q ELISA (Enzyme-Linked Immunosorbent Assay) Kit is designed for detection of complement C1q in mouse **plasma, serum, and urine samples**. This assay employs a quantitative **sandwich enzyme immunoassay** technique that measures mouse complement C1q in less than 4 hours. A polyclonal antibody specific for mouse complement C1q has been pre-coated onto a 96-well microplate with removable strips. Complement C1q in standards and samples is sandwiched by the immobilized antibody and a biotinylated polyclonal antibody specific for mouse complement C1q, which is recognized by a streptavidin-peroxidase (SP) conjugate. All unbound material is washed away and a peroxidase enzyme substrate is added. The color development is stopped and the intensity of the color is measured.

Caution and Warning

- This product is for **Research Use Only** and is not intended for use in diagnostic procedures.

- Prepare all reagents (diluent buffer, wash buffer, standard, biotinylated antibody, and SP conjugate), as instructed, prior to running the assay.
- Prepare all samples prior to running the assay. The dilution factors for the samples are suggested in this insert. However, the user should determine the optimal dilution factor.
- Spin down the SP conjugate vial and the biotinylated antibody vial before opening and using contents.
- The Stop Solution is an acidic solution.
- The kit should not be used beyond the expiration date.

Reagents

- **Mouse Complement C1q Microplate:** A 96-well polystyrene microplate (12 strips of 8 wells) coated with a polyclonal antibody against mouse complement C1q.
- **Sealing Tapes:** Each kit contains 3 precut, pressure sensitive sealing tapes that can be cut to fit the format of the individual assay.
- **Mouse Complement C1q Standard:** Mouse complement C1q in a buffered protein base (3.2 ng, lyophilized).
- **Biotinylated Mouse Complement C1q Antibody (50x):** A 50-fold concentrated biotinylated polyclonal antibody against mouse complement C1q (120 µl).
- **MIX Diluent Concentrate (10x):** A 10-fold concentrated buffered protein base (30 ml).
- **Wash Buffer Concentrate (20x):** A 20-fold concentrated buffered surfactant (30 ml, 2 bottles).
- **SP Conjugate (100x):** A 100-fold concentrate (80 µl).
- **Chromogen Substrate (1x):** A stabilized peroxidase chromogen substrate tetramethylbenzidine (7 ml).
- **Stop Solution (1x):** A 0.5 N hydrochloric acid solution to stop the chromogen substrate reaction (11 ml).

Storage Condition

- Upon arrival, immediately store components of the kit at recommended temperatures up to the expiration date.
- Store SP Conjugate and Biotinylated Antibody at -20°C.
- Store Microplate, Diluent Concentrate (10x), Wash Buffer, Stop Solution, and Chromogen Substrate at 2-8°C.
- Unused microplate wells may be returned to the foil pouch with the desiccant packs and resealed. May be stored for up to 30 days in a vacuum desiccator.
- Store Standard at 2-8°C before reconstituting with Diluent and at -20°C after reconstituting with Diluent.

Other Supplies Required

- Microplate reader capable of measuring absorbance at 450 nm
- Pipettes (1-20 μ l, 20-200 μ l, 200-1000 μ l, and multiple channel)
- Deionized or distilled reagent grade water

Sample Collection, Preparation, and Storage

- **Plasma:** Collect plasma using one-tenth volume of 0.1 M sodium citrate as an anticoagulant. Centrifuge samples at 3000 x *g* for 10 minutes and collect plasma. A 100000-fold sample dilution is suggested into MIX Diluent or within the range of 50000x – 500000x; however, user should determine optimal dilution factor depending on application needs. The undiluted samples can be stored at -20°C or below for up to 3 months. Avoid repeated freeze-thaw cycles.
- **Serum:** Samples should be collected into a serum separator tube. After clot formation, centrifuge samples at 3000 x *g* for 10 minutes and remove serum. A 100000-fold sample dilution is suggested into MIX Diluent or within the range of 50000x – 500000x; however, user should determine optimal dilution factor depending on application needs. The undiluted samples should be aliquoted to limit repeated freeze-thaw cycles and stored at -80°C for up to 3 months. When needed, the frozen sample should be thawed rapidly in a water bath at 37°C and immediately placed on ice until use to prevent complement activation.
- **Urine:** Collect urine using sample pot. Centrifuge samples at 800 x *g* for 10 minutes. A 2-fold sample dilution is suggested into MIX Diluent or within the range of 1x – 10x; however, user should determine optimal dilution factor depending on application needs. The undiluted samples can be stored at -20°C or below for up to 3 months. Avoid repeated freeze-thaw cycles.

Applicable samples may also include biofluids, cell culture, and tissue homogenates. If necessary, user should determine optimal dilution factor depending on application needs.

Refer to Dilution Guidelines for further instruction.

Guidelines for Dilutions of 100-fold or Greater <i>(for reference only; please follow the insert for specific dilution suggested)</i>	
100x	10000x
A) 4 µl sample : 396 µl buffer (100x) = 100-fold dilution <i>Assuming the needed volume is less than or equal to 400 µl.</i>	A) 4 µl sample : 396 µl buffer (100x) B) 4 µl of A : 396 µl buffer (100x) = 10000-fold dilution <i>Assuming the needed volume is less than or equal to 400 µl.</i>
1000x	100000x
A) 4 µl sample : 396 µl buffer (100x) B) 24 µl of A : 216 µl buffer (10x) = 1000-fold dilution <i>Assuming the needed volume is less than or equal to 240 µl.</i>	A) 4 µl sample : 396 µl buffer (100x) B) 4 µl of A : 396 µl buffer (100x) C) 24 µl of B : 216 µl buffer (10x) = 100000-fold dilution <i>Assuming the needed volume is less than or equal to 240 µl.</i>

Reagent Preparation

- Freshly dilute all reagents and bring all reagents to room temperature before use.
- MIX Diluent Concentrate (10x):** Dilute the MIX Diluent Concentrate 10-fold with reagent grade water to produce a 1x solution. When diluting the concentrate, make sure to rinse the bottle thoroughly to extract any precipitates left in the bottle. Mix the 1x solution gently until the crystals have completely dissolved. Store for up to 30 days at 2-8°C.
- Mouse Complement C1q Standard:** Reconstitute the Mouse Complement C1q Standard (3.2 ng) with 0.8 ml of MIX Diluent to generate a 4 ng/ml standard stock solution. Allow the vial to sit for 10 minutes with gentle agitation prior to making dilutions. Prepare duplicate or triplicate standard points by serially diluting from the standard stock solution (4 ng/ml) 2-fold with equal volume of MIX Diluent to produce 2, 1, 0.5, 0.25, 0.125, and 0.063 ng/ml solutions. MIX Diluent serves as the zero standard (0 ng/ml). Any remaining stock solution should be stored at -20°C and used within 30 days. Avoid repeated freeze-thaw cycles.

Standard Point	Dilution	[C1q] (ng/ml)
P1	1 part Standard (4 ng/ml)	4.0
P2	1 part P1 + 1 part MIX Diluent	2.0
P3	1 part P2 + 1 part MIX Diluent	1.0
P4	1 part P3 + 1 part MIX Diluent	0.5
P5	1 part P4 + 1 part MIX Diluent	0.25
P6	1 part P5 + 1 part MIX Diluent	0.125
P7	1 part P6 + 1 part MIX Diluent	0.063
P8	MIX Diluent	0.0

- **Biotinylated Mouse Complement C1q Antibody (50x):** Spin down the antibody briefly and dilute the desired amount of the antibody 50-fold with MIX Diluent to produce a 1x solution. The undiluted antibody should be stored at -20°C.
- **Wash Buffer Concentrate (20x):** Dilute the Wash Buffer Concentrate 20-fold with reagent grade water to produce a 1x solution. When diluting the concentrate, make sure to rinse the bottle thoroughly to extract any precipitates left in the bottle. Mix the 1x solution gently until the crystals have completely dissolved.
- **SP Conjugate (100x):** Spin down the SP Conjugate briefly and dilute the desired amount of the conjugate 100-fold with MIX Diluent to produce a 1x solution. The undiluted conjugate should be stored at -20°C.

Assay Procedure

- Prepare all reagents, standard solutions, and samples as instructed. Bring all reagents to room temperature before use. The assay is performed at room temperature (20-25°C).
- Remove excess microplate strips from the plate frame and return them immediately to the foil pouch with desiccants inside. Reseal the pouch securely to minimize exposure to water vapor and store in a vacuum desiccator.
- Add 50 µl of Mouse Complement C1q Standard or sample to each well. Gently tap plate to thoroughly coat the wells. Break any bubbles that may have formed. Cover wells with a sealing tape and incubate for 2 hours. Start the timer after the last addition.
- Wash the microplate manually or automatically using a microplate washer. Invert the plate and decant the contents; hit 4-5 times on absorbent material to completely remove the liquid. If washing manually, wash five times with 200 µl of Wash Buffer per well. Invert the plate each time and decant the contents; hit 4-5 times on absorbent material to completely remove the liquid. If using a microplate washer,

wash six times with 300 μ l of Wash Buffer per well; invert the plate and hit 4-5 times on absorbent material to completely remove the liquid.

- Add 50 μ l of Biotinylated Mouse Complement C1q Antibody to each well. Gently tap plate to thoroughly coat the wells. Break any bubbles that may have formed. Cover wells with a sealing tape and incubate for 1 hour.
- Wash the microplate as described above.
- Add 50 μ l of SP Conjugate to each well. Gently tap plate to thoroughly coat the wells. Break any bubbles that may have formed. Cover wells with a sealing tape and incubate for 30 minutes. Turn on the microplate reader and set up the program in advance.
- Wash the microplate as described above.
- Add 50 μ l of Chromogen Substrate to each well. Gently tap plate to thoroughly coat the wells. Break any bubbles that may have formed. Incubate in ambient light for 10 minutes or until the optimal blue color density develops.
- Add 50 μ l of Stop Solution to each well. The color will change from blue to yellow. Gently tap plate to ensure thorough mixing. Break any bubbles that may have formed.
- Read the absorbance on a microplate reader at a wavelength of 450 nm **immediately**. If wavelength correction is available, subtract readings at 570 nm from those at 450 nm to correct optical imperfections. Otherwise, read the plate at 450 nm only. Please note that some unstable black particles may be generated at high concentration points after stopping the reaction for about 10 minutes, which will reduce the readings.

Data Analysis

- Calculate the mean value of the duplicate or triplicate readings for each standard and sample.
- To generate a standard curve, plot the graph using the standard concentrations on the x-axis and the corresponding mean 450 nm absorbance (OD) on the y-axis. The best fit line can be determined by regression analysis using log-log or four-parameter logistic curve fit.
- Determine the unknown sample concentration from the Standard Curve and multiply the value by the dilution factor.

Typical Data

- The typical data is provided for reference only. Individual laboratory means may vary from the values listed. Variations between laboratories may be caused by technique differences.

Standard Point	ng/ml	OD	Average OD
P1	4.0	2.477 2.331	2.404
P2	2.0	1.625 1.715	1.670
P3	1.0	0.928 0.990	0.959
P4	0.5	0.516 0.480	0.498
P5	0.25	0.276 0.258	0.267
P6	0.125	0.142 0.156	0.149
P7	0.063	0.087 0.081	0.084
P8	0.0	0.034 0.032	0.033

Standard Curve

- The curve is provided for illustration only. A standard curve should be generated each time the assay is performed.

Performance Characteristics

- The minimum detectable dose of mouse complement C1q as calculated by 2SD from the mean of a zero standard was established to be 25 pg/ml.

- Intra-assay precision was determined by testing three plasma samples twenty times in one assay.
- Inter-assay precision was determined by testing three plasma samples in twenty assays.

	Intra-Assay Precision			Inter-Assay Precision		
Sample	1	2	3	1	2	3
n	20	20	20	20	20	20
CV (%)	5.3%	6.6%	5.8%	8.5%	11.0%	9.4%
Average CV (%)	5.9%			9.6%		

Spiking Recovery

- Recovery was determined by spiking one plasma and one serum sample with different C1q concentrations.

Sample	Unspiked Sample (ng/ml)	Spiking Value (ng/ml)	Expected	Observed	Recovery (%)
Plasma	0.202	0.553	0.755	0.692	92%
		0.280	0.482	0.438	91%
		0.122	0.324	0.294	91%
Serum	0.311	0.553	0.864	0.791	92%
		0.280	0.591	0.523	88%
		0.122	0.433	0.391	90%
Average Recovery (%)					91%

Linearity

- Plasma and serum samples were serially diluted to test for linearity.

Average Percentage of Expected Value (%)		
Sample Dilution	Plasma	Serum
50000x	108%	110%
100000x	99%	102%
200000x	92%	90%

Cross-Reactivity

Species	Cross-Reactivity (%)
Canine	10%
Bovine	None
Equine	1%
Monkey	8%
Human	10%
Rat	100%
Swine	20%
Rabbit	None
Protein	Cross-Reactivity (%)
Mouse Complement C3	None

Troubleshooting

Issue	Causes	Course of Action
Low Precision	Use of improper components	- Check the expiration date listed before use. - Do not interchange components from different lots.
	Improper wash step	- Check that the correct wash buffer is being used. - Check that all wells are empty after aspiration. - Check that the microplate washer is dispensing properly. - If washing by pipette, check for proper pipetting technique.
	Splashing of reagents while loading wells	Pipette properly in a controlled and careful manner.
	Inconsistent volumes loaded into wells	- Pipette properly in a controlled and careful manner. - Check pipette calibration. - Check pipette for proper performance.
	Insufficient mixing of reagent dilutions	- Thoroughly agitate the lyophilized components after reconstitution. - Thoroughly mix dilutions.
	Improperly sealed microplate	- Check the microplate pouch for proper sealing. - Check that the microplate pouch has no punctures. - Check that three desiccants are inside the microplate pouch prior to sealing.
Unexpectedly Low or High Signal Intensity	Microplate was left unattended between steps	Each step of the procedure should be performed uninterrupted.
	Omission of step	Consult the provided procedure for complete list of steps.
	Steps performed in incorrect order	Consult the provided procedure for the correct order.
	Insufficient amount of reagents added to wells	- Check pipette calibration. - Check pipette for proper performance.
	Wash step was skipped	Consult the provided procedure for all wash steps.
	Improper wash buffer	Check that the correct wash buffer is being used.
	Improper reagent preparation	Consult reagent preparation section for the correct dilutions of all reagents.

	Insufficient or prolonged incubation periods	Consult the provided procedure for correct incubation time.
Deficient Standard Curve Fit	Non-optimal sample dilution	- Sandwich ELISA: If samples generate OD values higher than the highest standard point (P1), dilute samples further and repeat the assay. - Competitive ELISA: If samples generate OD values lower than the highest standard point (P1), dilute samples further and repeat the assay. - User should determine the optimal dilution factor for samples.
	Contamination of reagents	A new tip must be used for each addition of different samples or reagents during the assay procedure.
	Contents of wells evaporate	Verify that the sealing film is firmly in place before placing the assay in the incubator or at room temperature.
	Improper pipetting	- Pipette properly in a controlled and careful manner. - Check pipette calibration. - Check pipette for proper performance.
	Insufficient mixing of reagent dilutions	- Thoroughly agitate the lyophilized components after reconstitution. - Thoroughly mix dilutions.

References

- (1) Kishore U and Reid KB. (2000) *Immunopharmacology*. 49(1-2):159-170.
- (2) Yonemasu K and Sasaki T. (1981) *Biochem J*. 193(2):621-629.
- (3) Son M *et al.* (2012) *Proc Natl Acad Sci USA*. 109(46):E3160-E3167.
- (4) Hong S *et al.* (2016) *Science*. 352(6286):712-716.
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- (6) Gunji N *et al.* (2021) *Med Mol Morphol*. 54(2):87-94.

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