MILLIPLEX™ MAP

HUMAN NEURODEGENERATIVE DISEASE PANEL 1 KIT
96 Well Plate Assay

#HNDG1-36K

FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC PROCEDURES.

By purchasing this product, which contains fluorescently labeled microsphere beads authorized by Luminex Corporation ("Luminex"), you, the customer, acquire the right under Luminex's patent rights, if any, to use this product or any portion of this product, including without limitation the microsphere beads contained herein, only with Luminex's laser based fluorescent analytical test instrumentation marketed under the name of Luminex 100™ IS, 200™, HTS.

INTRODUCTION

Neurodegenerative disease is a condition characterized by the deterioration of neurons or their myelin sheath over time in the brain and/or spinal cord. These neurons are responsible for such everyday activities as processing sensory information, making decisions, and controlling movement. Because these cells are not easily regenerated, excessive cumulative damage can lead to age-related diseases such as Alzheimer's and Parkinson's disease, as well as other conditions such as amyotrophic lateral sclerosis (ALS) and epilepsy. These disorders are devastating and expensive, both on a personal and global level, and as population demographics continue to change, a therapeutic solution is critical. Consequently, research is underway to identify biomarkers that will help scientists not only understand the pathogenesis of neurodegenerative disease, but also identify people with these disorders before the onset of symptoms and potentially provide new therapeutic tools.

Therefore, understanding neurobiology is fundamental to determining the pathogenesis of these devastating neurodegenerative diseases. Identification of key biomarkers and their accurate measurement is crucial. However, conventional methods, including RIAs and ELISAs, are not able to measure simultaneously multiple biomarkers with small sample volume. Millipore is the first to provide you with multiplex panels for the study of neurodegenerative disease. The Luminex®-based MILLIPLEX™ MAP Human Neurodegenerative Panels will allow you to explore complexities of the nervous system and the pathobiology of disease.

Millipore's MILLIPLEX™ Human Neurodegenerative Panel 1 is a versatile system for neurobiology research.

- MILLIPLEX™ MAP offers you the ability to:
  - Choose any combination of analytes from our panel of 7 analytes to design a custom kit that better meets your needs.
- A convenient "all-in-one" box format gives you the assurance that you will have all the necessary reagents you need to run your assay.

Millipore's MILLIPLEX™ Human Neurodegenerative Panel 1 kit is to be used for the simultaneous quantification of the following 7 analytes: Apo AI, Apo CIII, Apo E, Prealbumin, Complement Factor H, Complement Factor C3 and α-2 Macroglobulin. This kit may be used for the analysis of all above analytes in human serum, plasma, and cerebrospinal fluid samples.

This kit is for research purposes only.

Please read entire protocol before use.

It is important to use same assay incubation conditions throughout your study.

PRINCIPLE

MILLIPLEX™ MAP is based on the Luminex® xMAP® technology — one of the fastest growing and most respected multiplex technologies offering applications throughout the life sciences and capable of performing a variety of bioassays including immunoassays on the surface of fluorescent-coded beads known as microspheres.

- Luminex® uses proprietary techniques to internally color-code microspheres with two fluorescent dyes. Through precise concentrations of these dyes, 100 distinctly colored bead sets can be created, each of which is coated with a specific capture antibody.
- After an analyte from a test sample is captured by the bead, a biotinylated detection antibody is introduced.
- The reaction mixture is then incubated with Streptavidin-PE conjugate, the reporter molecule, to complete the reaction on the surface of each microsphere.
- The microspheres are allowed to pass rapidly through a laser which excites the internal dyes marking the microsphere set. A second laser excites PE, the fluorescent dye on the reporter molecule.
- Finally, high-speed digital-signal processors identify each individual microsphere and quantify the result of its bioassay based on fluorescent reporter signals.

The capability of adding multiple conjugated beads to each sample results in the ability to obtain multiple results from each sample. Open-architecture xMAP® technology enables multiplexing of many types of bioassays reducing time, labor and costs over traditional methods.

STORAGE CONDITIONS UPON RECEIPT

- Recommended storage for kit components is 2 - 8°C.
- Once the standards and controls have been reconstituted, immediately transfer contents into polypropylene vials. **DO NOT STORE RECONSTITUTED STANDARDS OR CONTROLS IN GLASS VIALS**. For long-term storage, freeze reconstituted standards and controls at ≤ -20°C. Avoid multiple (>2) freeze/thaw cycles.
- **DO NOT FREEZE Antibody-Immobilized Beads, Detection Antibody, and Streptavidin-Phycoerythrin**.

REAGENTS SUPPLIED

Note: Store all reagents at 2 – 8°C

REAGENTS SUPPLIED	CATALOG NUMBER	VOLUME	QUANTITY
Human Neurodegenerative Disease Panel 1 Standard	HNDG1-8036-1	lyophilized	1 vial
Human Neurodegenerative Disease Panel 1 Quality Controls 1 and 2	HNDG1-6036-1	lyophilized	2 vials
Set of one 96-Well Filter Plate with 2 Sealers	MX-PLATE		1 plate 2 sealers
Assay Buffer	L-AB	30 mL	3 bottles
10X Wash Buffer Note: Contains 0.05% Proclin	L-WB	30 mL	1 bottle
Human Neurodegenerative Disease Panel 1 Detection Antibodies	HNDG-1036-1	3.2 mL	1 bottle
Streptavidin-Phycoerythrin	L-SAPE6	3.2 mL	1 bottle
Bead Diluent	LA-BD	4.0 mL	1 bottle
Mixing Bottle	----------	----------	1 bottle

Human Neurodegenerative Disease Panel 1 Antibody-Immobilized Beads:

Bead/Analyte Name	Luminex Bead Region	Customizable 7 Analytes (20X concentration, 200µL) Available	Cat. #
Anti-Human Apolipoprotein AI Bead	08	□	APOA-1
Anti-Human Apolipoprotein CIII Bead	11	□	APOC-3
Anti-Human Apolipoprotein E Bead	14	□	APOE
Anti-Human Prealbumin Bead	56	□	HPALBN
Anti-Human Complement Factor H Bead	90	□	HCFH
Anti-Human Complement C3 Bead	92	□	HCC3
Anti-Human α2-Macroglobulin Bead	96	□	HA2MG

MATERIALS REQUIRED BUT NOT PROVIDED

Reagents

1. Luminex Sheath Fluid (Luminex Catalog # 40-50000)

Instrumentation / Materials

1. Adjustable Pipettes with Tips capable of delivering 25 µL to 1000 µL
2. Multichannel Pipettes capable of delivering 5 µL to 50 µL or 25 µL to 200 µL
3. Reagent Reservoirs
4. Polypropylene Microfuge Tubes
5. Rubber Bands
6. Absorbent Pads
7. Laboratory Vortex Mixer
8. Sonicator (Branson Ultrasonic Cleaner Model #B200 or equivalent)
9. Titer Plate Shaker (Lab-Line Instruments Model #4625 or equivalent)
10. Vacuum Filtration Unit (Millipore Vacuum Manifold Catalog #MSVMHTS00 or equivalent with Millipore Vacuum Pump Catalog #WP6111560 or equivalent)
11. Luminex 100™ IS, 200™, or HTS by Luminex Corporation
12. Plate Stand (Millipore Catalog # MX-STAND)

SAFETY PRECAUTIONS

- All blood components and biological materials should be handled as potentially hazardous. Follow universal precautions as established by the Centers for Disease Control and Prevention and by the Occupational Safety and Health Administration when handling and disposing of infectious agents.
- Sodium azide or Proclin has been added to some reagents as a preservative. Although the concentrations are low, sodium azide and Proclin may react with lead and copper plumbing to form highly explosive metal azides. On disposal, flush with a large volume of water to prevent azide build up.

TECHNICAL GUIDELINES

To obtain reliable and reproducible results, the operator should carefully read this entire manual and fully understand all aspects of each assay step before running the assay. The following notes should be reviewed and understood before the assay is set up.

- FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC PROCEDURES.
- Do not use beyond the expiration date on the label.
- Do not mix or substitute reagents with those from other lots or sources.
- The Antibody-Immobilized Beads are light sensitive and must be protected from light at all times. Cover the assay plate containing beads with opaque plate lid or aluminum foil during all incubation steps.
- It is important to allow all reagents to warm to room temperature (20-25°C) before use in the assay.

- The bottom of the Microtiter Filter Plate should not be in direct contact with any surface during assay set-up or incubation times. The plate can be set on a plate stand or on the non-flat side of the plate cover or any other plate holder to raise the plate from the surface. A plate stand can be purchased separately from Millipore (Millipore Catalog #MX-STAND).
- Incomplete washing can adversely affect the assay outcome. All washing must be performed with the Wash Buffer provided.
- After the wash steps, keep the bottom of the Microtiter Filter Plate clean by blotting on paper towels or absorbent pads to prevent any leakage due to capillary action.
- Keep the vacuum suction on the plate as low as possible. It is recommended to have a vacuum setting that will remove 200 µL of buffer in $\geq$ 5 seconds (equivalent to < 100 mmHg).
- After hydration, all Standards and Controls must be transferred to polypropylene tubes.
- The Standards prepared by serial dilution must be used within 1 hour of preparation. Discard any unused standards except the standard stock which may be stored at ≤ -20°C for 1 month and at ≤ -80°C for greater than one month.
- If samples fall outside the dynamic range of the assay, further dilute the samples with the appropriate diluent and repeat the assay.
- Any unused mixed Antibody-Immobilized Beads may be stored in the Mixing Bottle at 2-8°C for up to one month.
- During the preparation of the standard curve, make certain to mix the higher concentration well before making the next dilution. Use a new tip with each dilution.
- The plate should be read immediately after the assay is finished. If, however, the plate cannot be read immediately, seal the plate, cover with aluminum foil or an opaque lid, and store the plate at 2-8°C for up to 24 hours. Prior to reading, agitate the plate on the plate shaker at room temperature for 10 minutes. Delay in reading a plate may result in decreased sensitivity for some Neurodegenerative Disease biomarkers.
- The titer plate shaker should be set at a speed to provide maximum orbital mixing without splashing of liquid outside the wells. For the recommended plate shaker, this would be a setting of 5-7 which is approximately 500-800 rpm.
- Ensure that the needle probe is clean. This may be achieved by sonication and/or alcohol flushes. Adjust probe height according to the protocols recommended by Luminex to the kit filter plate using 3 alignment discs prior to reading an assay.
- For cell culture supernatants or tissue extraction, use the culture or extraction medium as the matrix solution in background, standard curve and control wells. If samples are diluted in Assay Buffer, use the Assay Buffer as the matrix.
- For diluted serum/plasma samples (1:40,000) and diluted cerebrospinal fluid samples (1:400), use the Assay Buffer provided in the kit as the matrix.
- For cell/tissue homogenate, the final cell or tissue homogenate should be prepared in a buffer that has a neutral pH, contains minimal detergents or strong denaturing detergents, and has an ionic strength close to physiological concentration. Avoid debris, lipids, and cell/tissue aggregates. Centrifuge samples before use.
- Vortex all reagents well before adding to plate.

SAMPLE COLLECTION AND STORAGE

A. Preparation of Serum Samples:

- Allow the blood to clot for at least 30 minutes before centrifugation for 10 minutes at 1000xg. Remove serum and assay immediately or aliquot and store samples at ≤ -20°C.
- Avoid multiple (>2) freeze/thaw cycles.
- When using frozen samples, it is recommended to thaw the samples completely, mix well by vortexing and centrifuge prior to use in the assay to remove particulates.
- ***Prior to the assay,*** serum samples should be diluted 1:40,000 in the Assay Buffer. **Samples can be diluted using a two-step protocol. Step 1, add 5 µl serum to 995 µl Assay Buffer (i.e. 200-fold). Step 2, add 5 µl of the 200-fold diluted sample from Step 1 to another microfuge tube containing 995 µl Assay Buffer (i.e. 40,000-fold). Users may make similar dilutions using less sample volume to conserve Assay Buffer.** If serum samples require further dilution beyond 1:40,000, continue to use Assay Buffer as the sample diluent. Additional Assay Buffer can be purchased from Millipore (Millipore Catalog #L-AB). For diluted samples, multiply the final concentration of each analyte by the dilution factor.

B. Preparation of Plasma Samples:

- Plasma collection using EDTA as an anti-coagulant is recommended. Centrifuge for 10 minutes at 1000xg within 30 minutes of blood collection. Remove plasma and assay immediately or aliquot and store samples at ≤ -20°C.
- Avoid multiple (>2) freeze/thaw cycles.
- When using frozen samples, it is recommended to thaw the samples completely, mix well by vortexing and centrifuge prior to use in the assay to remove particulates.
- ***Prior to the assay,*** plasma samples should be diluted 1:40,000 in the Assay Buffer. **Samples can be diluted using a two-step protocol. Step 1, add 5 µl plasma to 995 µl Assay Buffer (i.e. 200-fold). Step 2, add 5 µl of the 200-fold diluted sample from Step 1 to another microfuge tube containing 995 µl Assay Buffer (i.e. 40,000-fold). Users may make similar dilutions using less sample volume to conserve Assay Buffer.** If plasma samples require further dilution beyond 1:40,000, continue to use Assay Buffer as the sample diluent. Additional Assay Buffer can be purchased from Millipore (Millipore Catalog #L-AB). For diluted samples, multiply the final concentration of each analyte by the dilution factor.

C. Preparation of CSF (cerebrospinal fluid):

- Centrifuge the sample to remove debris and assay immediately or aliquot and store samples at ≤ -20°C.
- Avoid multiple (>2) freeze/thaw cycles.
- ***Prior to the assay,*** CSF samples should be diluted 1:400 in the Assay Buffer. **Samples can be diluted by adding 5 µl CSF to 1995 µl Assay Buffer (i.e. 400-fold). Users may make similar dilutions using less sample volume to conserve Assay Buffer.** If CSF samples require further dilution beyond 1:400, continue to use Assay Buffer as the sample diluent. Additional Assay Buffer can be purchased from Millipore (Millipore Catalog #L-AB). For diluted samples, multiply the final concentration of each analyte by the dilution factor.

D. Preparation of Tissue Culture Supernatant:

- Centrifuge the sample to remove debris and assay immediately or aliquot and store samples at ≤ -20°C.
- Avoid multiple (>2) freeze/thaw cycles.
- Tissue culture supernatant may require a dilution with an appropriate matrix, control medium or Assay Buffer, prior to assay.

NOTE:

- A maximum of 25 µL per well of diluted serum, plasma, or CSF can be used. Tissue culture or other media may also be used.
- All samples must be stored in polypropylene tubes. **DO NOT STORE SAMPLES IN GLASS.**
- Avoid debris, lipids and cells when using samples with gross hemolysis or lipemia.
- Care must be taken when using heparin as an anticoagulant since an excess of heparin will provide falsely high values. Use no more than 10 IU heparin per mL of blood collected.

PREPARATION OF REAGENTS FOR IMMUNOASSAY

A. Preparation of Antibody-Immobilized Beads

Sonicate each individual antibody-bead vial for 30 seconds; vortex for 1 minute. Add 150 µL from each antibody bead vial to the Mixing Bottle and bring final volume to 3.0 mL with Bead Diluent. Vortex the mixed beads well. Unused portion may be stored at 2-8°C for up to one month.

Example 1: When using 7 Neurodegenerative Disease antibody-immobilized beads, add 150 µL from each of the 7 bead sets to the Mixing Bottle. Then add 1.95 mL Bead Diluent.

Example 2: When using 5 Neurodegenerative Disease antibody-immobilized beads, add 150 µL from each of the 5 bead sets to the Mixing Bottle. Then add 2.25 mL Bead Diluent.

B. Preparation of Quality Controls

Before use, reconstitute Quality Control 1 and Quality Control 2 with 250 µL deionized water. Invert the vial several times to mix and vortex. Allow the vial to sit for 5-10 minutes and then transfer the controls to appropriately labeled polypropylene microfuge tubes. Unused portion may be stored at ≤ -20°C for up to one month.

C. Preparation of Wash Buffer

Bring the 10X Wash Buffer to room temperature and mix to bring all salts into solution. Dilute 30 mL of 10X Wash Buffer with 270 mL deionized water. Store unused portion at 2-8°C for up to one month.

D. Preparation of Human Neurodegenerative Disease Panel 1 Standard

1.) Prior to use, reconstitute the Human Neurodegenerative Disease Panel 1 Standard with 250 µL deionized water to give a 2,000 ng/mL concentration for α2-Macroglobulin, 1000 ng/mL for Complement Factor H, Prealbumin, and Apolipoprotein AI, 200 ng/mL for Complement C3 and Apolipoprotein E, and 40 ng/mL for Apolipoprotein CIII. Invert the vial several times to mix. Vortex the vial for 10 seconds. Allow the vial to sit for 5-10 minutes and then transfer the standard to an appropriately labeled polypropylene microfuge tube. This will be used as standard 7 (the highest concentration standard). The unused portion may be stored at ≤ -20°C for up to one month.

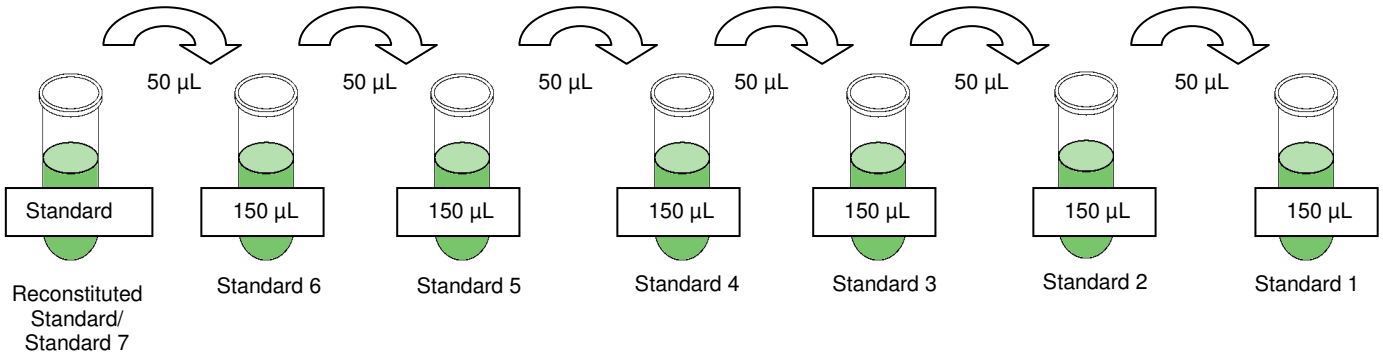
2.) Preparation of Working Standards

Label six polypropylene microfuge tubes as Standard 1, Standard 2, Standard 3, Standard 4, Standard 5, and Standard 6. Add 150 µL of Assay Buffer to each of the six tubes. Prepare 1:4 serial dilutions by adding 50 µL of the reconstituted Standard 7 to the Standard 6 tube, mix well and transfer 50 µL of the Standard 6 to the Standard 5 tube, mix well and transfer 50 µL of the Standard 5 to the Standard 4 tube, mix well and transfer 50 µL of the Standard 4 to Standard 3 tube, mix well and transfer 50 µL of the Standard 3 to the Standard 2 tube, mix well and transfer 50 µL of the Standard 2 to the Standard 1 tube and mix well. The 0 pg/mL standard (Background) will be the Assay Buffer.

Preparation of Human Neurodegenerative Disease Panel 1 Standard

Tube Number	Standard Dilution	Volume of Deionized Water to Add	Volume of Standard to Add
7	Original	250 µL	0

Tube Number	Standard Dilution	Volume of Assay Buffer to Add	Volume of Standard to Add
6	1:4	150 µL	50 µL of Standard Tube 7 (Original Standard)
5	1:16	150 µL	50 µL of Standard Tube 6 (1:4 Standard)
4	1:64	150 µL	50 µL of Standard Tube 5 (1:16 Standard)
3	1:256	150 µL	50 µL of Standard Tube 4 (1:64 Standard)
2	1:1024	150 µL	50 µL of Standard Tube 3 (1:256 Standard)
1	1:4096	150 µL	50 µL of Standard Tube 2 (1:1024 Standard)



After dilution, each tube has the following concentrations for each analyte.

Tube Number	Standard Dilution	Apo CIII (ng/mL)	Apo E, Complement C3 (ng/mL)	Apo AI, Prealbumin, Complement Factor H (ng/mL)	α2-Macroglobulin (ng/mL)
	Background	0	0	0	0
1	1:4096	0.010	0.049	0.244	0.488
2	1:1024	0.039	0.195	0.977	1.953
3	1:256	0.156	0.781	3.906	7.813
4	1:64	0.625	3.125	15.625	31.25
5	1:16	2.5	12.5	62.5	125
6	1:4	10	50	250	500
7	Original	40	200	1,000	2,000

IMMUNOASSAY PROCEDURE

- Prior to beginning this assay, it is imperative to read this protocol completely and to thoroughly understand the Technical Guidelines.
- Allow all reagents to warm to room temperature (20-25°C) before use in the assay.
- Diagram the placement of Standards [Std 0 (Background), Std 1, Std 2, Std 3, Std 4, Std 5, Std 6, and Std 7], Controls 1 and 2, and Samples on Well Map Worksheet in a vertical configuration. (Note: Most instruments will only read the 96-well plate vertically by default.) It is recommended to run the assay in duplicate.
- Set the filter plate on a plate holder at all times during reagent dispensing and incubation steps so that the bottom of the plate does not touch any surface.

1. Prewet the filter plate by pipetting 200 µL of 1X Wash Buffer into each well of the Microtiter Filter Plate. Seal and mix on a plate shaker for 10 minutes at room temperature (20-25°C).
2. Remove Wash Buffer by vacuum. **(NOTE: DO NOT INVERT PLATE.)** Blot excess Wash Buffer from the bottom of the plate with an absorbent pad or paper towels.
3. Add 25 µL of each Standard or Control into the appropriate wells.
4. Add 25 µL of Assay Buffer to the Background and sample wells.
5. Add 25 µL of appropriate matrix solution to the background, standards, and control wells.

   A. When assaying 1:40,000 serum/ plasma or 1:400 diluted CSF, use the Assay Buffer provided in the kit as the matrix solution.

   B. When assaying tissue culture or other supernatant, use proper control culture medium as the matrix solution.
6. Add 25 µL of Sample (tissue culture supernatant or diluted serum/plasma/CSF)into the appropriate wells.
7. Vortex Mixing Bottle and add 25 µL of the Mixed Beads to each well. (Note: During addition of Beads, shake bead bottle intermittently to avoid settling.)
8. Seal the plate with a plate sealer, cover it with the lid. Wrap a rubber band around the plate holder, plate and lid and incubate with agitation on a plate shaker 2 hours at room temperature (20-25°C).

Add 200 µL 1X Wash Buffer per well

Shake 10 min, RT

Vacuum

- Add 25 µL Standard or Control to appropriate wells
- Add 25 µL Assay Buffer to background and sample wells
- Add 25 µL Samples to sample wells
- Add 25 µL Matrix Solution to background, standards and control wells
- Add 25 µL Beads to each well

Incubate 2 hours at RT with shaking

9. Gently remove fluid by vacuum. **(NOTE: DO NOT INVERT PLATE.)**
10. Wash plate 3 times with 200 µL/well of Wash Buffer, removing Wash Buffer by vacuum filtration between each wash. Blot excess Wash Buffer from the bottom the plate by with an absorbent pad or paper towels.
11. Add 25 µL of Detection Antibodies into each well. (Note: Allow the Detection Antibodies to warm to room temperature prior to addition.)
12. Seal, cover with lid, and incubate with agitation on a plate shaker for 1 hour at room temperature (20-25°C). **DO NOT VACUUM AFTER INCUBATION.**
13. Add 25 µL Streptavidin-Phycoerythrin to each well containing the 25 µL of Detection Antibodies.
14. Seal, cover with lid and incubate with agitation on a plate shaker for 30 minutes at room temperature (20-25°C).
15. Gently remove all contents by vacuum. **(NOTE: DO NOT INVERT PLATE.)**
16. Wash plate 3 times with 200 µL/well Wash Buffer, removing Wash Buffer by vacuum filtration between each wash. Wipe any excess buffer on the bottom of the plate with a tissue.
17. Add 100 µL of Sheath Fluid to all wells. Resuspend the beads on a plate shaker for 5 minutes.
18. Run plate on Luminex 100™ IS, 200™, or HTS.
19. Save and analyze the Median Fluorescent Intensity (MFI) data using a weighted 5-parameter logistic or spline curve-fitting method for calculating Neurodegenerative Disease Panel 1 analyte concentrations in samples.

Vacuum and wash 3X with 200 µL Wash Buffer

Add 25 µL Detection Antibodies per well

Incubate 1 hour at RT

Do Not Vacuum

Add 25 µL Streptavidin-Phycoerythrin per well

Incubate for 30 minutes at RT

Vacuum and wash 3X with 200 µL Wash Buffer

Add 100 µL Sheath Fluid per well

Read on Luminex (50 µL, 50 beads per bead set)

EQUIPMENT SETTINGS

These specifications are for the Luminex 100™ IS v.1.7 or Luminex 100™ IS v2.1/2.2, Luminex 200™ v2.3, xPONENT, and Luminex HTS. Luminex instruments with other software (e.g. MasterPlex, StarStation, LiquiChip, Bio-Plex, LABScan100) would need to follow instrument instructions for gate settings and additional specifications from the vendors.

Events:	50, per bead	
Sample Size:	50 µL	
Gate Settings	8,000 to 15,000	
Time Out	60 seconds	
Bead Set:	7-plex Bead Regions	
	Apolipoprotein AI	8
	Apolipoprotein CIII	11
	Apolipoprotein E	14
	Prealbumin	56
	Complement Factor H	90
	Complement C3	92
	α2-Macroglobulin	96

QUALITY CONTROLS

The ranges for each analyte in Quality Control 1 and 2 are provided on the card insert or can be located at the MILLIPORE website www.millipore.com/techlibrary/index.do using the catalog number as the keyword.

ASSAY CHARACTERISTICS

Assay Sensitivities (minimum detectable concentrations, ng/mL)

MinDC: Minimum Detectable Concentration is calculated by the StatLIA® Immunoassay Analysis Software from Brendan Technologies. It measures the true limits of detection for an assay by mathematically determining what the empirical MinDC would be if an infinite number of standard concentrations were run for the assay under the same conditions.

Analyte	**N = 8 assays**	
	MinDC (ng/mL)	**MinDC + 2SD (ng/mL)**
Apolipoprotein AI	0.046	0.072
Apolipoprotein CIII	0.003	0.006
Apolipoprotein E	0.010	0.012
Prealbumin	0.053	0.076
Complement Factor H	0.195	0.223
Complement C3	0.036	0.050
α2-Macroglobulin	0.109	0.163

Precision

Intra-assay precision is generated from the mean of the %CV's from 16 reportable results across two different concentration of Neurodegenerative Diseases Panel 1 analytes in one experiment. Inter-assay precision is generated from the mean of the %CV's from two reportable results each for two different concentrations of Neurodegenerative Disease Panel 1 analytes across 6 different experiments.

Analyte	Intra-Assay %CV	Inter-Assay %CV
Apolipoprotein AI	5	18
Apolipoprotein CIII	5	16
Apolipoprotein E	3	15
Prealbumin	5	8
Complement Factor H	3	7
Complement C3	3	8
α2-Macroglobulin	3	8

Accuracy

Accuracy, defined as the percentage of measured analyte in samples spiked with known concentration of analyte, was determined by taking the average of 3 levels of analyte in 6 independent 1:40,000 Assay buffer diluted serum samples.

Analyte	Spike Recovery (% Recovery)
Apolipoprotein AI	92
Apolipoprotein CIII	94
Apolipoprotein E	92
Prealbumin	92
Complement Factor H	98
Complement C3	92
α2-Macroglobulin	97

Cross-Reactivity

There was no or negligible cross-reactivity between the antibodies and any of the other analytes in this panel.

TROUBLESHOOTING GUIDE

Problem	Probable Cause	Solution
Filter plate will not vacuum	Vacuum pressure is insufficient	Increase vacuum pressure such that 0.2mL buffer can be suctioned in 3-5 seconds.
	Samples have insoluble particles	Centrifuge samples just prior to assay set-up and use supernatant. If high lipid concentration, after centrifugation, remove lipid layer and use supernatant.
	Sample too viscous	May need to dilute sample.
Insufficient bead count	Vacuum pressure too high	Adjust vacuum pressure such that 0.2mL buffer can be suctioned in 3-5 seconds.
	Bead mix prepared incorrectly	Sonicate bead vials and vortex just prior to adding to bead mix bottle according to protocol. Agitate bead mix intermittently in reservoir while pipetting into the plate.
	Samples cause interference due to particulate matter or viscosity	See above. Also sample probe may need to be cleaned with alcohol flush, backflush and washes; or, if needed, probe should be removed and sonicated.
	Probe height not adjusted correctly	Adjust probe to 3 alignment discs in well H6.
Plate leaked	Vacuum pressure too high	Adjust vacuum pressure such that 0.2mL buffer can be suctioned in 3-5 seconds. May need to transfer contents to a new (prewetted) plate and continue.
	Plate set directly on table or absorbent towels during incubations or reagent additions	Set plate on plate stand or raised edge so bottom of filter is not touching any surface.
	Insufficient blotting of filter plate bottom causing wicking	Blot the bottom of the filter plate well with absorbent towels after each wash step.
	Pipette touching plate filter during additions	Pipette to the side of well.
	Probe height not adjusted correctly	Adjust probe to 3 alignment discs in well H6.
Background is too high	Background wells were contaminated	Avoid cross-well contamination by using sealer appropriately and by pipeting with multichannel pipets without touching reagent in plate.
	Matrix used has endogenous analyte or interference	Check matrix ingredients for crossreacting components (e.g. interleukin modified tissue culture medium).
	Insufficient washes	Increase number of washes.

Beads not in region or gate	Luminex not calibrated correctly or recently	Calibrate Luminex based on instrument manufacturer's instructions at least once a week or if temperature has changed by >3°C.
	Gate settings not adjusted correctly	Some Luminex instruments (e.g. Bio-Plex) require different gate settings than those described in the kit protocol. Use instrument default settings.
	Wrong bead regions in protocol template	Check kit protocol for correct bead regions or analyte selection.
	Incorrect sample type used	Samples containing organic solvents or if highly viscous should be diluted or dialyzed as required.
	Instrument not washed or primed	Prime the Luminex 4 times to eliminate air bubbles. Wash 4 times with sheath fluid or water if there is any remnant alcohol or sanitizing liquid.
	Beads were exposed to light	Keep plate and bead mix covered with dark lid or aluminum foil during all incubation steps.
Signal for whole plate is same as background	Incorrect or no Detection Antibody was added	Add appropriate Detection Antibody and continue.
	Streptavidin-Phycoerythrin was not added	Add Streptavidin-Phycoerythrin according to protocol. If Detection Antibody has already been vacuumed out, sensitivity may be low.
Low signal for standard curve	Detection Antibody may have been vacuumed out prior to adding Streptavidin Phycoerythrin	May need to repeat assay if desired sensitivity not achieved.
	Incubations done at incorrect temperatures, timings or agitation	Assay conditions need to be checked.
Signals too high, standard curves are saturated	Calibration target value set too high	With some Luminex instruments (e.g. Bio-Plex) default target setting for RP1 calibrator is set at High PMT. Use low target value for calibration and reanalyze plate.
	Plate incubation was too long with standard curve and samples	Use shorter incubation time.
Sample readings are out of range	Samples contain no or below detectable levels of analyte	If below detectable levels, it may be possible to use higher sample volume. Check with tech support for appropriate protocol modifications.
	Samples contain analyte concentrations higher than highest standard point	Samples may require dilution and reanalysis for that particular analyte.
	Standard curve was saturated at higher end of curve	See above.

High variation in samples and/or standards	Multichannel pipet may not be calibrated	Calibrate pipets.
	Plate washing was not uniform	Confirm all reagents are vacuumed out completely in all wash steps.
	Samples may have high particulate matter or other interfering substances	See above.
	Plate agitation was insufficient	Plate should be agitated during all incubation steps using a vertical plate shaker at a speed where beads are in constant motion without splashing.
	Cross-well contamination	Check when reusing plate sealer that no reagent has touched sealer. Care should be taken when using same pipet tips that are used for reagent additions and that pipet tip does not touch reagent in plate.

REPLACEMENT REAGENTS	**Catalog #**
Human Neurodegenerative Disease Panel 1 Standard	HNDG1-8036-1
Human Neurodegenerative Disease Panel 1 Quality Controls	HNDG1-6036-1
Human Neurodegenerative Disease Panel 1 Detection Antibodies	HNDG1-1036-1
Streptavidin-Phycoerythrin	L-SAPE6
Assay Buffer	L-AB
Bead Diluent	LA-BD
Set of two 96-Well Filter Plates with Sealers	MX-PLATE
10X Wash Buffer	L-WB

Antibody-Immobilized Beads

Analyte	Bead #	Catalog #
Apolipoprotein AI	8	APOA-1
Apolipoprotein CIII	11	APOC-3
Apolipoprotein E	14	APOE
Prealbumin	56	HPALBN
Complement Factor H	90	HCFH
Complement C3	92	HCC3
α2-Macroglobulin	96	HA2MG

ORDERING INFORMATION

To place an order:

To assure the clarity of your custom Neurodegenerative Disease Panel 1 kit order, please FAX the following information to our customer service department:

- Your name, telephone and/or fax number
- Customer account number
- Shipping and billing address
- Purchase order number
- Catalog number and description of product
- Quantity of kits
- Selection of MILLIPLEX™ Neurodegenerative Disease Panel 1 Analytes Requirements

FAX: (636) 441-8050
Toll-Free US: (866) 441-8400
(636) 441-8400
Mail Orders: Millipore Corp.
6 Research Park Drive
St. Charles, Missouri 63304 U.S.A.

For International Customers:

To best serve our international customers in placing an order or obtaining additional information about MILLIPLEX™ MAP products, please contact your multiplex specialist or sales representative or email our European Customer Service at customerserviceEU@Millipore.com.

Conditions of Sale

All products are for research use only. They are not intended for use in clinical diagnosis or for administration to humans or animals. All products are intended for *in vitro* use only.

Material Safety Data Sheets (MSDS)

Material Safety Data Sheets for Millipore products may be ordered by fax or phone or through our website at www.millipore.com/techlibrary/index.do

REFENERENCES

Soares H D, et al. Proteomic approaches in drug discovery and development. 2004. Int Rev Neurobio. 61:97-126.

Thal L J, et al. The role of biomarkers in clinical trials for Alzheimer disease. 2006. Alzheimer Dis Assoc Disord. 20:6-15

WELL MAP

	1	2	3	4	5	6	7	8	9	10	11	12
A	0 Standard (Background)	Standard #4	QC-1 Control	Sample #3								
B	0 Standard (Background)	Standard #4	QC-1 Control	Sample #3								
C	Standard #1	Standard #5	QC-2 Control	Etc.								
D	Standard #1	Standard #5	QC-2 Control									
E	Standard #2	Standard #6	Sample #1									
F	Standard #2	Standard #6	Sample #1									
G	Standard #3	Standard #7	Sample #2									
H	Standard #3	Standard #7	Sample #2									