

Mouse Lipocalin-2/NGAL

96-Well Plate Assay

Cat. # EZMNGAL-39K

Mouse Lipocalin-2/NGAL ELISA KIT
96-Well Plate

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INTRODUCTION

Lipocalin-2 is also known as NGAL, Siderocalin and 24P3. It plays an important role in innate immune response, differentiation, tumorigenesis, and cell survival. It is synthesized and secreted from macrophages, glial cells, epithelial cells and adipose tissue. Lipocalin-2 is a 25 kDa glycoprotein and exists in monomeric and homodimeric forms. The secretion of Lipocalin-2 is induced in non-bacterial inflammation, obesity, anemia, hypoxia, acute renal injury and in some cancers. Lipocalin-2 can induce insulin resistance and plays an important role in several diseased states such as obesity, diabetes, metabolism, CVD, acute infection, renal injury, inflammation and certain types of cancers.

INTENDED USE

This Mouse Lipocalin-2/NGAL ELISA kit is used for the non-radioactive quantification of Mouse Lipocalin-2/NGAL in serum, plasma, and cell culture. One kit is sufficient to measure 40 unknown samples in duplicate.

This kit is for Research Use Only. Not for Use in Diagnostic Procedures.

PRINCIPLES OF ASSAY

This assay is a Sandwich ELISA based, sequentially, on: 1) capture of Mouse Lipocalin-2/NGAL molecules from samples to the wells of a microtiter plate coated with a monoclonal Rat anti-Lipocalin-2/NGAL antibody, 2) washing of unbound materials from samples, 3) binding of a second biotinylated polyclonal goat anti-Lipocalin-2/NGAL antibody to the captured molecules, 4) washing of unbound materials from samples, 5) binding of streptavidin-horseradish peroxidase conjugate to the immobilized biotinylated antibodies, 6) washing of excess free enzyme conjugates, and 7) quantification of immobilized antibody-enzyme conjugates by monitoring horseradish peroxidase activities in the presence of the substrate 3,3',5,5'-tetramethylbenzidine. The enzyme activity is measured spectrophotometrically by the increased absorbance at 450 nm – 590 nm after acidification of formed products. Since the increase in absorbance is directly proportional to the amount of captured Mouse Lipocalin-2/NGAL in the unknown sample, the latter can be derived by interpolation from a reference curve generated in the same assay with reference standards of known concentrations of Mouse Lipocalin-2/NGAL.

REAGENTS SUPPLIED

Each kit is sufficient to run one 96-well plate and contains the following reagents:

Note: Store all reagents at 2-8°C

Reagents Supplied	Catalog Number	Volume	Quantity
Microtiter Plate with 2 plate sealers	EP39	-----	1 plate 2 sealers
Mouse Lipocalin-2/NGAL Standard	E8039-K	Lyophilized	1 vial
Mouse Lipocalin-2/NGAL Quality Controls 1 and 2	E6039-K	Lyophilized	2 vials
Assay Buffer	AB-PTR	40 mL	1 bottle
10X Wash Buffer	EWB-HRP	50 mL	2 bottles
Mouse Lipocalin-2/NGAL Detection Antibody	E1039	11 mL	1 bottle
Enzyme Solution	EHRP	12 mL	1 bottle
Substrate Solution	ESS-TMB3	12 mL	1 bottle
Stop Solution	ET-TMB	12 mL	1 bottle

STORAGE AND STABILITY

Recommended storage for kit components is 2-8°C.

All components are shipped and stored at 2-8°C. Reconstituted standards and controls can be frozen for future use but repeated freeze/thaw cycles should be avoided. Refer to expiration dates on all reagents prior to use. Do not mix reagents from different kits unless they have the same lot numbers.

REAGENT PRECAUTIONS

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. Dispose of unused contents and waste in accordance with international, federal, state, and local regulations.

Note: See Full Labels of Hazardous components on next page.

Full Labels of Hazardous components:

Ingredient, Cat #		Full Label	
Mouse Lipocalin-2/NGAL ELISA Detection Antibody	E1039		Warning. Causes serious eye irritation. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Mouse Lipocalin-2/NGAL ELISA Quality Control 1 & 2	E6039-K	 	Danger. Harmful if swallowed. Causes serious eye damage. Harmful to aquatic life with long lasting effects. Avoid release to the environment. Wear eye protection. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention.
Mouse Lipocalin-2/NGAL ELISA Standard	E8039-K	 	Danger. Harmful if swallowed. Causes serious eye damage. Harmful to aquatic life with long lasting effects. Avoid release to the environment. Wear eye protection. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention.
Stop Solution	ET-TMB		Warning. May be corrosive to metals.
10X HRP 10X Wash Buffer Concentrate	EWB-HRP		Warning. May cause an allergic skin reaction. Wear protective gloves. IF ON SKIN: Wash with plenty of soap and water.

MATERIALS REQUIRED BUT NOT PROVIDED

1. Multi-channel Pipettes and pipette tips: 5-50 μL and 50-300 μL
2. Pipettes and pipette tips: 10 μL -20 μL or 20 μL -100 μL
3. Reagent Reservoirs
4. Polypropylene Microfuge Tubes
5. Vortex Mixer
6. De-ionized water
7. Microtiter Plate Reader capable of reading absorbency at 450 nm
8. Orbital Microtiter Plate Shaker
9. Absorbent Paper or Cloth

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 $\leq -20^{\circ}\text{C}$.
- 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.
- Serum samples should be diluted 1/10 in the Assay Buffer provided in the kit. For example, in a tube, 5 μL of serum may be combined with 45 μL of Assay Buffer. When further dilution beyond 1/10 is required, use Assay Buffer as the diluent.

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 $\leq -20^{\circ}\text{C}$.
- 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.
- Plasma samples should be diluted 1/10 in the Assay Buffer provided in the kit. For example, in a tube, 5 μL of serum may be combined with 45 μL of Assay Buffer. When further dilution beyond 1/10 is required, use Assay Buffer as the diluent.

C. Preparation of Tissue Culture Supernatant:

- Centrifuge the sample to remove debris and assay immediately or aliquot and store samples at $\leq -20^{\circ}\text{C}$.
- Avoid multiple (>2) freeze/thaw cycles.
- Tissue culture supernatant may require a dilution with an appropriate control medium prior to assay. Tissue/cell extracts should be done in neutral buffers containing reagents and conditions that do not interfere with assay performance. Excess concentrations of detergent, salt, denaturants, high or low pH, etc. will negatively affect the assay. Organic solvents should be avoided. The tissue/cell extract samples should be free of particles such as cells or tissue debris.

NOTE:

- A maximum of 20 μL per well of diluted serum or plasma 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 anti-coagulant since an excess of heparin will provide falsely high values. Use no more than 10 IU heparin per mL of blood collected.

REAGENT PREPARATION

A. Mouse Lipocalin-2/NGAL Standard Preparation

1. Use care in opening the lyophilized Standard vial. Using a pipette, reconstitute the Mouse Lipocalin-2 Standard with 250 μ L distilled or de-ionized water. Invert and mix gently, let sit for 5 minutes then mix well.
2. Label 6 polypropylene microfuge tubes as Tubes 1-6. Add 100 μ L of Assay Buffer to each of the 6 tubes. Prepare serial dilutions by adding 100 μ L of the reconstituted standard to the # 6 tube, mix well and transfer 100 μ L of the #6 standard to the #5 tube, mix well and transfer 100 μ L of the #5 standard to the #4 tube, mix well and transfer 100 μ L of the # 4 standard to the #3 tube, mix well and transfer 100 μ L of the #3 standard to the #2 tube, mix well and transfer 100 μ L of the #2 standard to the #1 tube and mix well. The 0 ng/mL standard (Background) will be Assay Buffer.

Note: Change tip for every dilution. Wet tip with standard before dispensing. Unused portions of reconstituted standard should be stored in small aliquots at $\leq -20^{\circ}\text{C}$. Avoid multiple freeze/thaw cycles.

Tube #	Volume of Deionized Water to Add	Volume of Standard to Add	Standard Stock Concentration
Reconstituted standard	250 μ L	0	X (refer to analysis sheet for exact concentration)

Tube #	Volume of Assay Buffer to Add	Volume of Standard to Add	dilution factor (ng/ml)
Tube 6	100 μ L	100 μ L of reconstituted standard	X/2
Tube 5	100 μ L	100 μ L of Tube 6	X/4
Tube 4	100 μ L	100 μ L of Tube 5	X/8
Tube 3	100 μ L	100 μ L of Tube 4	X/16
Tube 2	100 μ L	100 μ L of Tube 3	X/32
Tube 1	100 μ L	100 μ L of Tube 2	X/64

REAGENT PREPARATION (continued)

B. Mouse Lipocalin-2/NGAL Quality Control 1 and 2 Preparation

Use care in opening the lyophilized Quality Control vials. Reconstitute each Mouse Lipocalin-2/NGAL Quality Control 1 and Quality Control 2 with 250 μ L distilled or de-ionized water and gently invert to ensure complete hydration. Unused portions of the reconstituted Quality Controls should be stored in small aliquots at $\leq -20^{\circ}\text{C}$. Avoid further freeze/thaw cycles.

C. Preparation of Wash Buffer

Bring the 10X Wash Buffer to room temperature and mix to bring all salts into solution. Dilute 100 mL of 10X Wash Buffer (two bottles) with 900 mL deionized water. Store unused portion at 2-8 $^{\circ}\text{C}$ for up to one month.

Mouse Lipocalin-2/NGAL ELISA ASSAY PROCEDURE

Warm all reagents to room temperature before setting up the assay.

1. Remove the required number of strips from the Microtiter Assay Plate. Unused strips should be resealed in the foil pouch and stored at 2-8°C. Assemble the strips in an empty plate holder. Add 300 µL diluted Wash Buffer to each well of the plate. Decant Wash Buffer and remove the residual volume by inverting the plate and tapping it smartly onto absorbent towels several times. **Do not let wells dry before proceeding to the next step.** If an automated machine is used for the assay, follow the manufacturer's instructions for all washing steps described in this protocol.
2. Add 80 µL of Assay Buffer provided in the kit to all wells. (refer to Microtiter Plate Arrangement section for suggested sample order placement)
3. Add 20 µL Assay Buffer to the Blank wells.
4. Add 20 µL Standards or Controls to the appropriate wells.
5. Add 20 µL of sample to the appropriate wells.
6. Cover the plate with plate sealer and incubate at room temperature for 2 hours on an orbital microtiter plate shaker set to rotate at moderate speed, about 400 to 500 rpm.
7. Remove plate sealer and decant reagents from the plate. Tap as before to remove residual volume in well. Wash wells 3 times with diluted Wash Buffer, 300 µL per well per wash. Decant and tap after each wash to remove residual buffer.
8. Add 100 µL Detection Antibody to each well. Re-cover plate with sealer and incubate at room temperature for 1 hour on an orbital microtiter plate shaker set to rotate at moderate speed, approximately 400-500 rpm.
9. Remove plate sealer and decant reagents from the plate. Tap as before to remove residual volume in well. Wash wells 3 times with diluted Wash Buffer, 300 µL per well per wash. Decant and tap after each wash to remove residual buffer.
10. Add 100 µL Enzyme Solution to each well. Cover plate with sealer and incubate with moderate shaking at room temperature for 30 minutes on the microtiter plate shaker.

Mouse Lipocalin-2/NGAL ELISA ASSAY PROCEDURE (continued)

11. Remove sealer, decant reagents from the plate and tap plate to remove the residual volume. Wash wells 3 times with diluted Wash Buffer, 300 μ L per well per wash. Decant and tap after each wash to remove residual buffer.
12. Add 100 μ L of Substrate Solution to each well, cover plate with sealer and shake on the plate shaker for **approximately** 5 to 20 minutes. Blue color should be formed in wells with the Mouse Lipocalin-2/NGAL standards with intensity proportional to increasing concentrations of Mouse Lipocalin-2/NGAL.

Note: Please be aware that the color may develop more quickly or more slowly than the recommended incubation time depending on the localized room temperature. Please visually monitor the color development to optimize the incubation time.

13. Remove sealer and add 100 μ L Stop Solution [**CAUTION: CORROSIVE SOLUTION**] and gently shake plate by hand to ensure complete mixing of solution in all wells. The blue color should turn to yellow after acidification. Read absorbance at 450 nm and 590nm in a plate reader within 5 minutes and ensure that there are no air bubbles in any well. Record the difference of absorbance units. The absorbance of the highest Mouse Lipocalin-2/NGAL standard should be approximately 2.0 - 3.0, or not to exceed the capability of the plate reader used.

(Note: For diluted samples, multiply the calculated concentration by the dilution factor.)

Assay Procedure for Mouse Lipocalin-2/NGAL ELISA Kit (Cat. # EZMNGAL-39K)

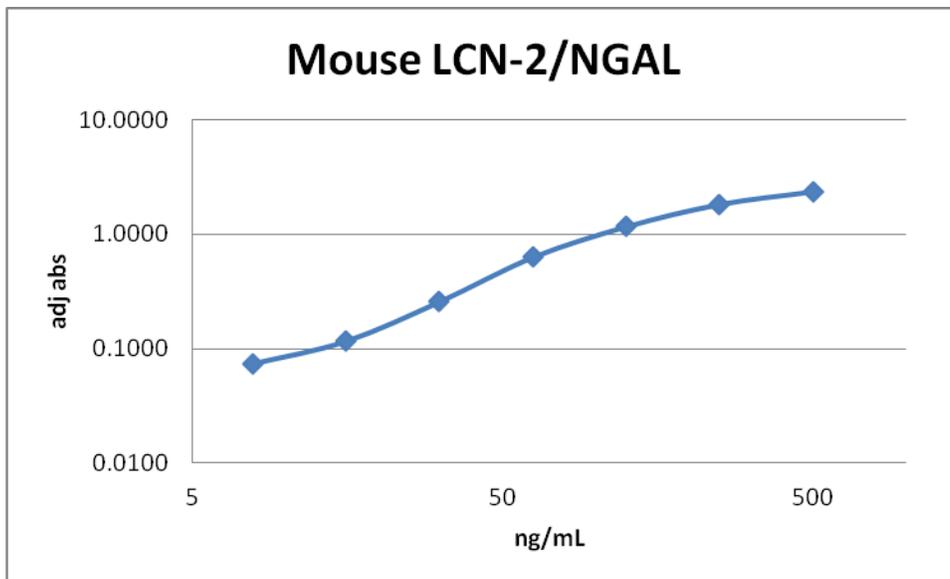
	Step 1	Step 2	Step 3	Step 4-5	Step 6-7	Step 8	Step 9	Step 10	Step 11	Step 12-13			
Well #	Wash plate 1X with 300 μ L 1X Wash Buffer. Remove residual buffer by tapping smartly on absorbent towels.	Assay Buffer	Assay Buffer	Standards/ QCs/ Samples	Seal, Agitate, Incubate 2 hrs at Room Temperature. Wash 3X with 300 μ L Wash Buffer.	Detection Antibody	Seal, Agitate, Incubate 1 hour at Room Temperature. Wash 3X with 300 μ L Wash Buffer.	Enzyme Solution	Seal, Agitate, Incubate 30 minutes at Room Temperature. Wash 3X with 300 μ L Wash Buffer.	Substrate Solution	Seal, Agitate, Incubate 5 – 20 minutes at Room Temperature.	Stop Solution	Read Absorbance at 450 nm and 590 nm.
A1, B1		80 μ L	20 μ L	--		100 μ L		100 μ L		100 μ L			
C1, D1		80 μ L	--	20 μ L of Tube 1		↓		↓		↓			
E1, F1		80 μ L	--	20 μ L of Tube 2									
G1, H1		80 μ L	--	20 μ L of Tube 3									
A2, B2		80 μ L	--	20 μ L of Tube 4									
C2, D2		80 μ L	--	20 μ L of Tube 5									
E2, F2		80 μ L	--	20 μ L of Tube 6									
G2, H2		80 μ L	--	20 μ L of Reconstituted standard									
A3, B3		80 μ L	--	20 μ L of QC 1									
C3, D3		80 μ L	--	20 μ L of QC 2									
E3, F3		80 μ L	--	20 μ L of Sample									
G3, H3 Etc.		80 μ L	--	20 μ L of Sample									

MICROTITER PLATE ARRANGEMENT

Mouse Lipocalin-2/NGAL ELISA

	1	2	3	4	5	6	7	8	9	10	11	12
A	Blank	Tube 4	QC1									
B	Blank	Tube 4	QC1									
C	Tube 1	Tube 5	QC2									
D	Tube 1	Tube 5	QC2									
E	Tube 2	Tube 6	Sample 1									
F	Tube 2	Tube 6	Sample 1									
G	Tube 3	Reconstituted Standard	Sample 2									
H	Tube 3	Reconstituted Standard	Sample 2									

GRAPH OF TYPICAL REFERENCE CURVE



Typical Standard Curve, not to be used to calculate data.

ASSAY CHARACTERISTICS

A. Sensitivity

The Minimum Detectable Concentration (MinDC) of Mouse Lipocalin-2/NGAL is 5.8 ng/mL . It is calculated by using MILLIPLEX® Analyst 5.1. 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. This reported value is the mean plus 2 standard deviations of the MinDC of multiple assays (n= 8 assays)

B. Specificity

The antibody pair used in this assay is specific to Mouse Lipocalin-2 and does not significantly cross-react to the following molecules/hormones tested:

MMP-2	< 0.1 % cross reactivity
MMP-3	< 0.1 % cross reactivity
MMP-7	< 0.1 % cross reactivity
MMP-8	< 0.1 % cross reactivity
MMP-9	< 0.1 % cross reactivity
MMP-12	< 0.1 % cross reactivity

ASSAY CHARACTERISTICS (continued)

C. Precision

Intra-Assay Variation

	Mean Lipocalin-2/NGAL Levels (ng/mL)	Intra-Assay %CV
1	31.3	3.47 %
2	167.3	5.19 %

Inter-Assay Variation

	Mean Lipocalin-2/NGAL Levels (ng/mL)	Inter-Assay %CV
1	33.8	7.31 %
2	164.6	6.29 %

The assay variations of EMD Millipore's Mouse Lipocalin-2/NGAL ELISA kit was studied on two samples at two levels on the Mouse Lipocalin-2/NGAL standard curve. The mean intra-assay variation was calculated from results of eight determinations of the indicated samples. The mean inter-assay variations of each sample were calculated from results of 8 separate assays with duplicate samples in each assay.

ASSAY CHARACTERISTICS (continued)

C. Spike Recovery of Mouse Lipocalin-2/NGAL in Assay Samples

Sample	Lipocalin-2/NGAL Added (ng/mL)	Expected (ng/mL)	Observed (ng/mL)	Recovery
1	31.25	57.3	48.08	84%
	62.5	88.5	72.77	82%
	125	151.0	120.05	80%
2	31.25	31.3	27.95	89%
	62.5	62.5	57.54	92%
	125	125.0	115.74	93%
3	31.25	35.4	33.06	93%
	62.5	66.7	60.85	91%
	125	129.2	102.37	79%
4	31.25	35.7	32.82	92%
	62.5	66.9	56.06	84%
	125	129.4	116.2	90%
5	31.25	35.9	33.56	94%
	62.5	67.1	60.79	91%
	125	129.6	124.18	96%
6	31.25	35.1	33.87	97%
	62.5	66.3	59.06	89%
	125	128.8	128.56	100%
7	31.25	31.3	29.24	94%
	62.5	62.5	55.7	89%
	125	125.0	106.96	86%
8	31.25	46.1	42.38	92%
	62.5	77.3	71.37	92%
	125	139.8	124.39	89%
9	31.25	31.3	29.21	93%
	62.5	62.5	57.3	92%
	125	125.0	119.2	95%
Average				90%

Varying amounts of Mouse Lipocalin-2/NGAL were added to individual mouse serum and plasma samples and the resulting Lipocalin-2/NGAL content of each sample was assayed by Mouse Lipocalin-2/NGAL ELISA. The recovery = $[(\text{observed Lipocalin-2/NGAL} / (\text{spiked Lipocalin-2/NGAL concentration} + \text{basal Lipocalin-2/NGAL level})) \times 100\%$.

ASSAY CHARACTERISTICS (continued)

D. Linearity of Sample Dilution

Sample	Volume (µL)	Expected (ng/mL)	Observed (ng/mL)	Expected
1	10		212	
	5	106	117	110%
	2.5	53	66	123%
	1.25	27	37	139%
2	10		172	
	5	86	99	115%
	2.5	43	57	133%
	1.25	21	33	153%
3	10		185	
	5	93	100	108%
	2.5	46	58	124%
	1.25	23	33	141%
4	10		157	
	5	78	85	108%
	2.5	39	48	123%
	1.25	20	28	144%
5	10		165	
	5	82	88	107%
	2.5	41	46	112%
	1.25	21	27	131%
6	10		74	
	5	37	37	101%
	2.5	18	19	102%
	1.25	9	11	120%
7	10		17	
	5	8	6	77%
	2.5	4	3	63%
	1.25	2		
8	10		33	
	5	16	15	92%
	2.5	8	7	87%
	1.25	4	4	89%
Average				109%

ASSAY CHARACTERISTICS (continued)

E. Linearity of Sample Dilution

8 Mouse LPS plasma samples with the indicated sample volumes were assayed. Required amounts of assay buffer were added to compensate for lost volumes below 10 μL . The resulting dilution factors of 1/10, 1/20, 1/40 and 1/80 representing 10 μL , 5 μL , 2.5 μL and 1.25 μL sample volumes assayed, respectively, were applied in the calculation of observed Mouse Lipocalin-2/NGAL concentrations. % expected = (observed/expected) x 100%

QUALITY CONTROLS

The ranges for Quality Control 1 and 2 are provided on the card insert or can be located at the EMD MILLIPORE website www.emdmillipore.com using the catalog number as the keyword.

TROUBLESHOOTING GUIDE

1. To obtain reliable and reproducible results the operator should carefully read this manual and fully understand all aspects of each assay step before attempting to run the assay.
2. Throughout the assay the operator should adhere strictly to the procedures with good laboratory practice.
3. Have all necessary reagents and equipment ready on hand before starting. Once the assay has been started all steps should be completed with precise timing and without interruption.
4. Avoid cross contamination of any reagents or samples to be used in the assay.
5. Make sure all reagents and samples are added to the bottom of each well.
6. Careful and complete mixing of solutions in the well is critical. Poor assay precision will result from incomplete mixing or cross well contamination due to inappropriate mixing.
7. Remove any air bubbles formed in the well after acidification of substrate solution because bubbles interfere with spectrophotometric readings.
8. High signal in background or blank wells could be due to 1.) cross well contamination by standard solution or sample or 2.) inadequate washing of wells with Wash Buffer or 3.) overexposure to light after substrate has been added.

REPLACEMENT REAGENTS

Reagents

Mouse Lipocalin-2/NGAL ELISA Plate

10X HRP Wash Buffer Concentrate

Mouse Lipocalin-2/NGAL ELISA Standard

Mouse Lipocalin-2/NGAL Quality Controls 1 and 2

Assay Buffer

Mouse Lipocalin-2/NGAL ELISA Detection Antibody

Enzyme Solution

Substrate Solution

Stop Solution

Cat.

EP39

EWB-HRP

E8039-K

E6039-K

AB-PTR

E1039

EHRP

ESS-TMB3

ET-TMB

ORDERING INFORMATION

To place an order:

To assure the clarity of your kit order, please FAX the following information to our customer service department:

Include:

- 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

FAX: (636) 441-8050

Toll-Free US: (866) 441-8400
(636) 441-8400

Mail Orders: EMD Millipore Corporation
6 Research Park Drive
St. Charles, Missouri 63304 U.S.A.

For European Customers:

To best serve our European customers in placing an order or obtaining additional information about ELISA products, please contact your technical specialist or sales representative or email our European Customer Service at:

Austria	AUCustomerService@merckgroup.com
Belgium	BENLCustomerService@merckgroup.com
Denmark	denmark@merckgroup.com
France	FRCustomerService@merckgroup.com
Finland	Asiakaspalvelu@merckgroup.com
Germany	GECustomerService@merckgroup.com
Ireland	IECustomerService@merckgroup.com
Italy	CSR-IT@merckgroup.com
Netherlands	BENLCustomerService@merckgroup.com
Norway	Norway@merckgroup.com
Spain	pedidos@merckgroup.com
Sweden	Kundservice@merckgroup.com
Switzerland	SZCustomerService@merckgroup.com
UK	UKCustomerService@merckgroup.com

ORDERING INFORMATION (continued)

Conditions of Sale

For Research Use Only. Not for Use in Diagnostic Procedures.

Material Safety Data Sheets (MSDS)

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

Technical Services

<http://www.emdmillipore.com/techservices>

To contact by phone

For North America: Toll-Free US: 1-(800) 221-1975 or 1-(781) 533-8045

Outside North America, contact your local office

<http://www.emdmillipore.com/offices>