Sheep MMP-1 Immunoassay

Catalog Number: EA800190

For the quantitative determination of Sheep MMP-1 concentrations in cell culture supernates, serum, and plasma.

For research use only. Not for use in diagnostic procedures.

MANUFACTURED AND DISTRIBUTED BY:

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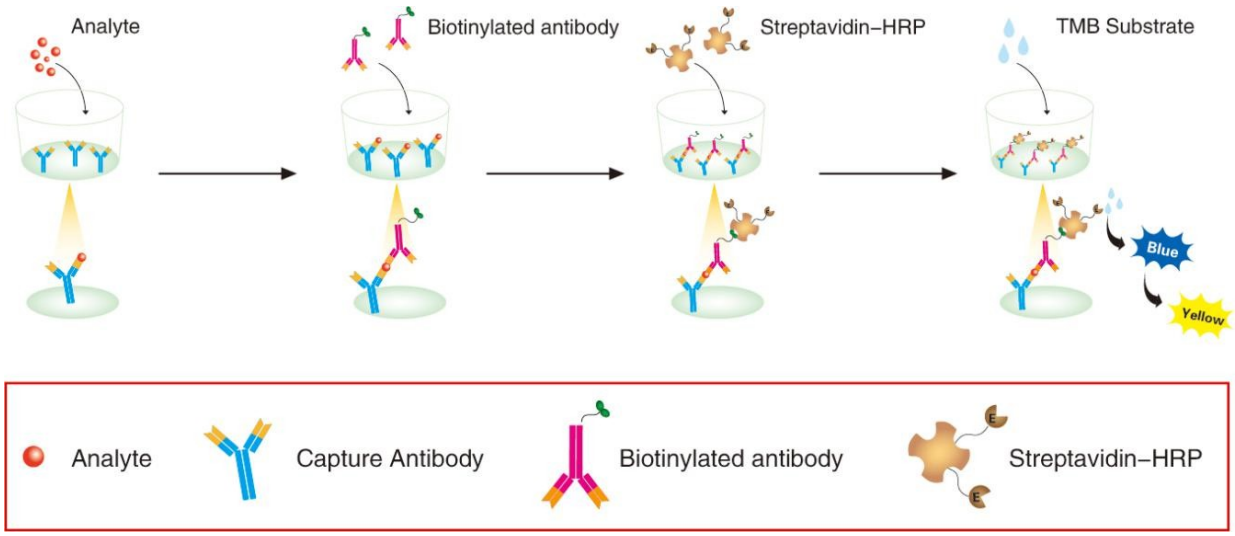
BACKGROUND

Matrix metalloproteinase-1 (MMP-1) also known as interstitial collagenase and fibroblast collagenase is an enzyme that in Sheeps is encoded by the MMP1 gene. MMP-1 has an archetypal structure consisting of a pre-domain, a pro-domain, a catalytic domain, a linker region and a hemopexinlike domain. The Catalytic Domains of MMPs share very similar characteristics, having a general shape of oblate ellipsoid with a diameter of ~40 Å. The Catalytic Domain of MMP-1 is composed of five highly twisted β-strands (sI-sV), three α-helix (hA-hC) and a total of eight loops, enclosing a total of five metal ions, three Ca2+ and two Zn2+, one of which with catalytic role. The Catalytic Domain (CAT) of MMP-1 starts with the F100 (non-truncated CAT) as the first amino-acid of the N-terminal loop of the CAT domain. A specific region (183)RWTNNFREY(191) has been identified as a critical segment of matrix metalloproteinase 1 for the expression of collagenolytic activity. On C-terminal part of the CAT Domain the hB α-helix, known as the "active-site helix" encompasses part of the "zinc-binding consensus sequence" HEXXHXXGXXH that is characteristic of the Metzincin superfamily. The α-helix hB finishes abruptly at Gly225 where the last loop of the domain starts. This last loop contains the "specificity loop" which is the shortest in the MMPs family. The Catalytic Domain ends at Gly261 with α-helix hC. MMPs are involved in the breakdown of extracellular matrix in normal physiological processes, such as embryonic development, reproduction, and tissue remodeling, as well as in disease processes, such as arthritis and metastasis. Specifically, MMP-1 breaks down the interstitial collagens, types I, II, and III. Mechanical force may increase the expression of MMP1 in Sheep periodontal ligament cells. MMP1 has been shown to interact with CD49b.

PRINCIPLE OF THE ASSAY

This assay employs the quantitative sandwich enzyme immunoassay technique. A monoclonal βantibody specific forMMP-1 has been pre-coated onto a microplate. Standards and samples are pipetted into the wells and anyMMP-1 present is captured by the coated antibody after incubation. Following extensive washing, a biotin-conjugate antibody specific forMMP-1 is added to detect the capturedMMP-1 protein in sample. For signal development, horseradish peroxidase (HRP)-conjugated Streptavidin is added, followed by tetramethyl-benzidine (TMB) reagent. Following a wash to remove any unbound combination, and enzyme conjugate is added to the wells. Solution containing sulfuric acid is used to stop color development and the color intensity which is proportional to the quantity of bound protein is measurable at 450nm.

Schematic diagram:



TECHNICAL HINTS AND LIMITATIONS

1. This ELISA should not be used beyond the expiration data on the kit label.
2. To avoid cross-contamination, use a fresh reagent reservoir and pipette tips for each step.
3. To ensure accurate results, some details, such as technique, plasticware and water sources should be emphasized.
4. A thorough and consistent wash technique is essential for proper assay performance.
5. A standard curve should be generated for each set of samples assayed.
6. It is recommended that all standards and samples be assayed in duplicate.
7. Avoid microbial contamination of reagents and buffers. Buffers containing protein should be made under aseptic conditions and be prepared fresh daily.
8. In order to ensure the accuracy of the results, the standard curve should be made every time.

PRECAUTIONS

The Stop Solution suggested for use with this kit is an acid solution. Wear protective gloves, clothing, eye, and face protection. Wash hands thoroughly after handling.

KIT COMPONENTS& STORAGE CONDITIONS

PART	SIZE	STORAGE OF OPENED/ RECONSTITUTED MATERIAL
Microwell Plate - antibody coated 96-well Microplate (8 wells ×12 strips)	1 plate	Return unused wells to the foil pouch containing the desiccant pack. Reseal along entire edge of the zip-seal. May be stored for up to 1 month at 2 – 8℃**
Standard - lyophilized,8000pg/ml upon reconstitution	2 vials	Aliquot and Store at -20°C** for six months
Concentrated Biotin-Conjugated antibody	2 vials	Store at 2-8°C **for six months
Concentrated Streptavidin-HRP	1 vial	Store at 2-8°C** for six months
Standard /sample Diluent	1 bottle	Store at 2-8°C** for six months
Biotin-Conjugate antibody Diluent	1 bottle	Store at 2-8°C** for six months
Streptavidin-HRP Diluent	1 bottle	Store at 2-8°C** for six months
20 x Wash Buffer Concentrate	1 bottle	Store at 2-8°C** for six months
Substrate Solution	1 bottle	Store at 2-8°C** for six months
Stop Solution	1 bottle	Store at 2-8°C** for six months
Plate Cover Seals	4 pieces	

**Provided this is within the expiration date of the kit.

OTHER SUPPLIES REQUIRED BUT NOT SUPPLIED

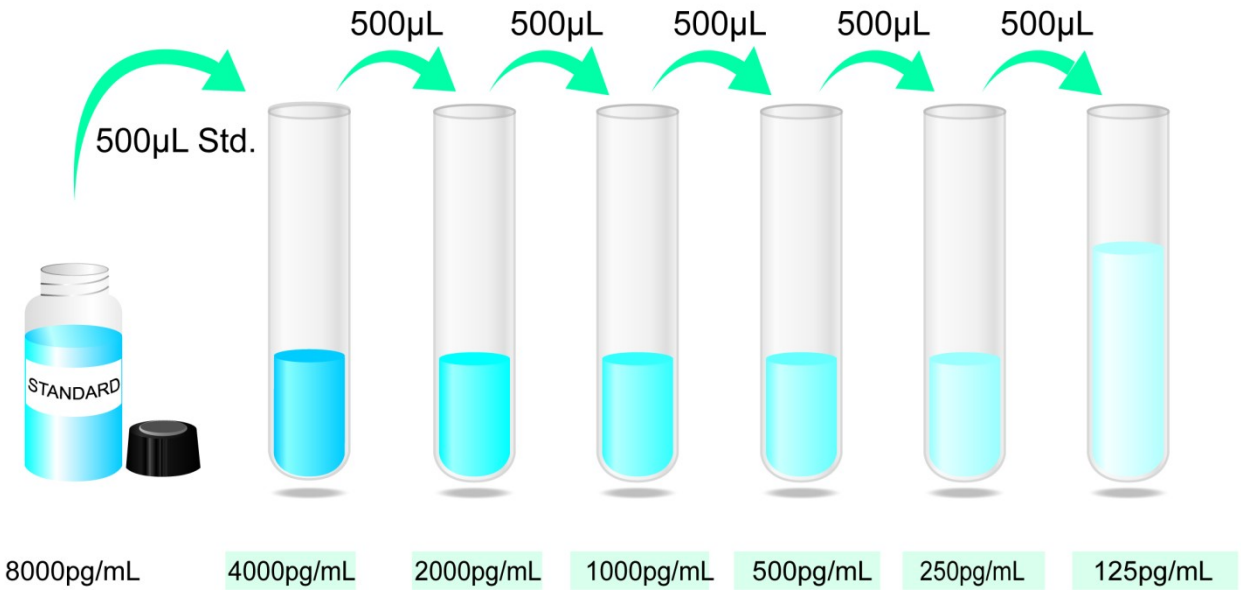
1. Microplate reader capable of measuring absorbance at 450 nm.
2. Pipettes and pipette tips.
3. Deionized or distilled water.
4. Squirt bottle, manifold dispenser, or automated microplate washer.
5. 500 mL graduated cylinder.

SPECIMEN COLLECTION & STORAGE

Cell Culture Supernates - Centrifuge cell culture media at 1000×g to remove debris. Assay immediately or aliquot and store samples at ≤ -20 °C. Avoid repeated freeze-thaw cycles.
Serum - Use a serum separator tube (SST) and allow samples to clot for 2 hours at room temperature or overnight at 2-8℃. Centrifuge approximately for 15 minutes at 1000×g. Assay immediately or aliquot and store samples at ≤ -20 °C. Avoid repeated freeze-thaw cycles.
Plasma - Collect plasma using EDTA, heparin, or citrate as an anticoagulant. Centrifuge for 15 minutes at 1000×g within 30 minutes of collection. Assay immediately or aliquot and store samples at ≤ -20 °C. Avoid repeated freeze-thaw cycles.
Note: The normal Sheep serum or plasma samples are suggested to make a 1:2 dilution.

REAGENTS PREPARATION

1. **Temperature returning** - Bring all kit components and specimen to room temperature (20-25℃) before use.
2. **Wash Buffer** - Dilute 30mL of 20x Wash Buffer Concentrate with 570mL of deionized or distilled water to prepare 600mL of Wash Buffer. If crystals have formed in the concentrate Wash Buffer, warm to room temperature and mix gently until the crystals have completely dissolved.
3. **Standard\Specimen (2 vials)** – Sheep MMP-1 Standard has a total of 2 vials. Each vial contains the standard sufficient for generating a standard curve. Reconstitute the Standard with 1.0mL of deionized or distilled water. This reconstitution produces a stock solution of 8000 pg/mL. Allow the standard to sit for a minimum of 15 minutes with gentle agitation prior to making dilutions. Pipette 500µL of Standard/Specimen Diluent into 4000pg/ml tube and the remaining tubes. Use the stock solution of 8000pg/mL to produce a 2-fold dilution series (below). Mix each tube thoroughly (vortex 20 sec for each of dilution step) and change pipette tips between each transfer. The 8000 pg/mL standard serves as the high standard. The Standard/specimen Diluent serves as the zero standard (0 pg/mL).



Preparation of Sheep MMP-1 standard dilutions

***If you do not run out of re-melting standard, store it at -20℃. Diluted standard shall not be reused.**

4. **Working solution of Biotin-Conjugate anti-Sheep MMP-1 antibody(2 vials)** - The lyophilized Detection Antibody should be stored at 4℃ to -20℃ in a manual defrost freezer for up to 6 months, if not used immediately. Centrifuge for 1 min at 6000 x g to bring down the material prior to open the vial. The vial contains sufficient Detection Antibody for a 96-well plate. Add 55 µL of sterile Biotin-Conjugate antibody Diluent to each vial and vortex 30 sec to obtain the stock solution. If the entire 96-well plate is used, take 100µL of detection antibody stock solution into 10 mL of Biotin-Conjugate antibody Diluent to make working dilution of Detection Antibody and mix thoroughly prior to the assay. If the partial antibody is used. make a 1:100 dilution of the concentrated Biotin-Conjugate solution with the Biotin-Conjugate antibody Diluent in a clean plastic tube.

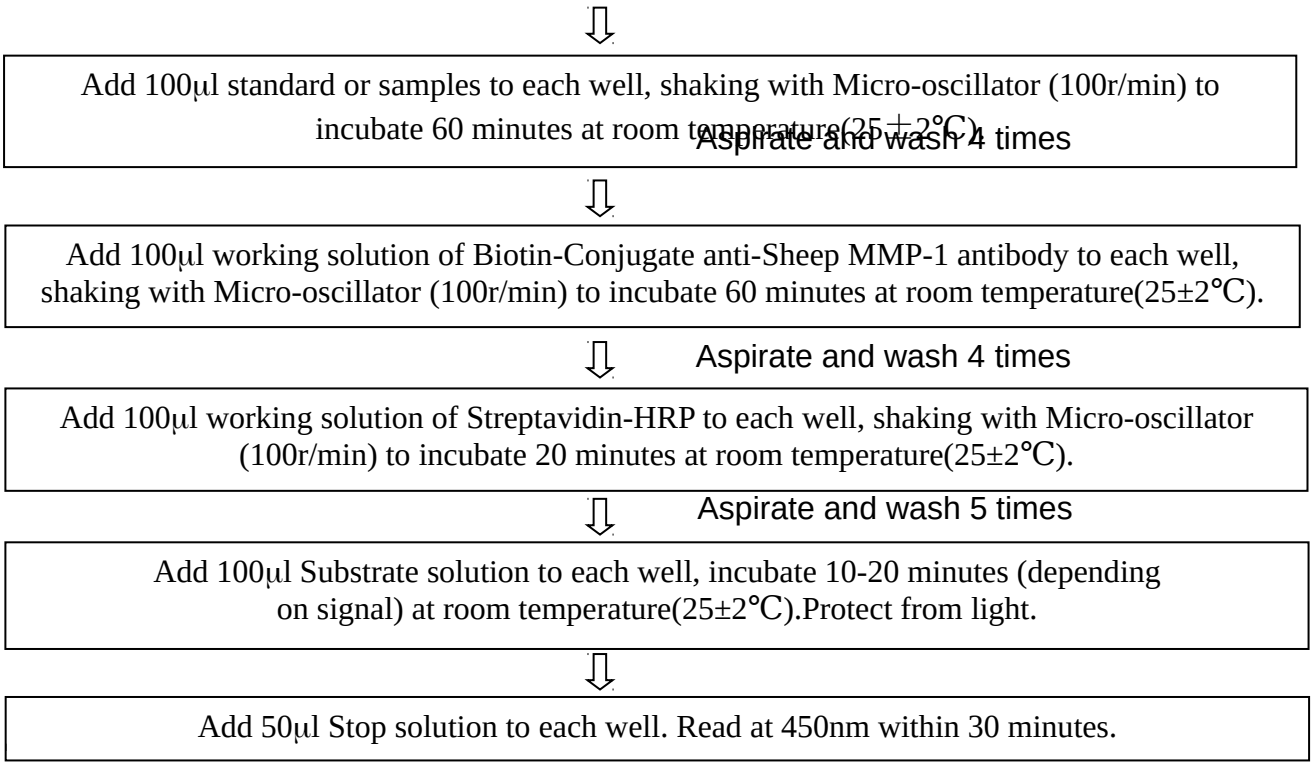
   ***The working solution should be used within one day after dilution.**

5. **Working solution of Streptavidin-HRP(120µL)** - Centrifuge for 1 min at 6000 x g to bring down the material prior to open the vial. The vial contains 120 µL HRP Conjugate sufficient for a 96-well plate.Make 1:100 dilutions in Reagent Diluent. If the entire 96-well plate is used, add 100 ul of HRP Conjugate to 10 mL of Streptavidin-HRP Diluent to make working dilution of HRP Conjugate and mix thoroughly prior to the assay. The rest of undiluted HRP Conjugate can be stored at 4°C for up to 6 months. DO NOT FREEZE.

   ***The working solution should be used within one day after dilution.**

ASSAY PROCEDURE

Prepare all reagents and standards as directed. Wash the plate 3 times before assay.



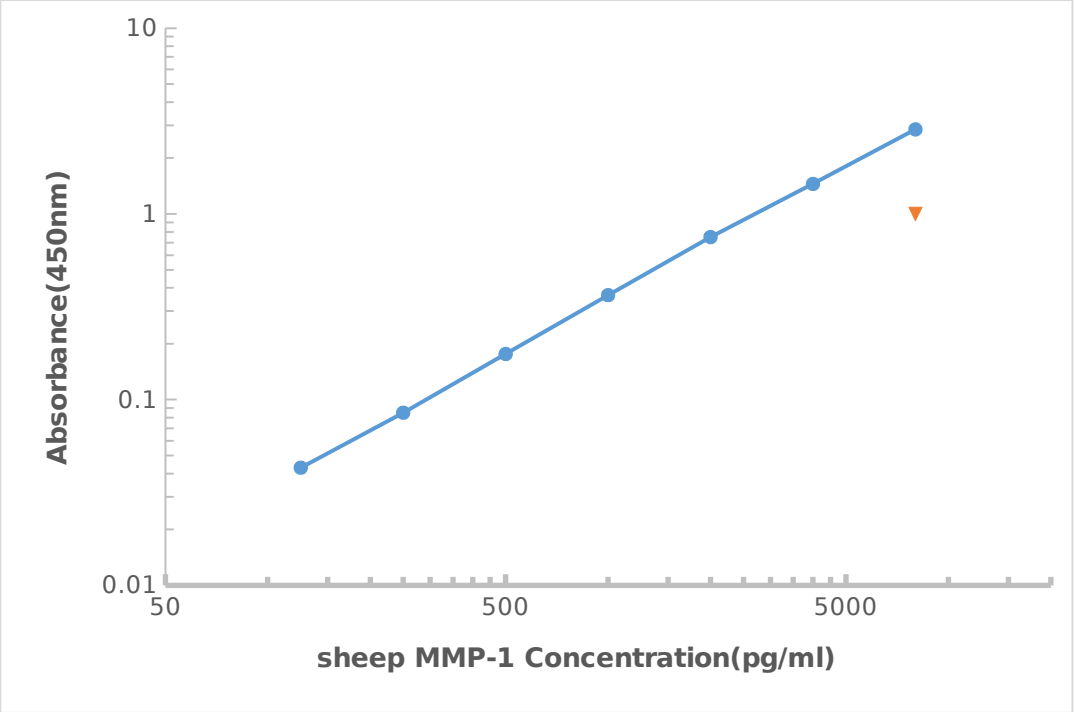
CALCULATION OF RESULTS

1. The standard curve is used to determine the amount of specimens.
2. First, average the duplicate readings for each standard, control, and sample. All O.D. values are subtracted by the mean value of blank control before result interpretation.
3. Construct a standard curve by reducing the data using computer software capable of generating a four parameter logistic (4-PL) curve-fit. As an alternative, construct a standard curve by plotting the mean absorbance for each standard on the y-axis against the concentration on the x-axis and draw a best fit curve through the points on the graph.
4. The data may be linearized by plotting the log of the MMP-1 concentrations versus the log of the O.D. and the best fit line can be determined by regression analysis. This procedure will produce an adequate but less precise fit of the data. If samples have been diluted, the concentration read from the standard curve must be multiplied by the dilution factor.
5. This standard curve is provided for demonstration only. A standard curve should be generated for each set of samples assayed.

Typical data using theMMP-1 ELISA

Std (pg/mL)	O.D.1	O.D.2	Averag	Correct

0	0.076	0.078	0.077	---
125	0.113	0.115	0.114	0.037
250	0.215	0.221	0.218	0.141
500	0.321	0.350	0.335	0.258
1000	0.534	0.516	0.525	0.448
2000	0.963	0.931	0.947	0.870
4000	1.469	1.442	1.455	1.378
8000	2.035	2.072	2.053	1.976



Representative standard curve for MMP-1 ELISA.

Performance Characteristics

SENSITIVITY: The minimum detectable dose was 65 pg/mL.

SPECIFICITY: This assay recognizes both natural and recombinant Sheep MMP-1. The factors listed below were prepared at 10ng/ml in Standard /sample Diluent and assayed for cross-reactivity and no significant cross-reactivity or interference was observed.

Factors assayed for cross-reactivity

Recombinant Sheep	Recombinant mouse	Recombinant porcine
MMP-2	MMP-1	MMP-1
MMP-3		
MMP-9		
MMP-11		
MMP-13		
TGF-β1		
TGF-β2		
TGF-β3		

REPEATABILITY: The coefficient of variation of both intra-assay and inter-assay were less than 10%.

RECOVERY： The recovery of MMP-1 spiked to three different levels in four samples throughout the range of the assay in various matrices was evaluated.

Recovery ofMMP-1 in two matrices

Sample Type	Average % of Expected Range (%)	Range (%)
Citrate plasma	96	86-104
Cell culture supernatants	102	95-109

LINEARITY: To assess the linearity of the assay, three samples were spiked with high concentrations ofMMP-1 in various matrices and diluted with the appropriate Sample Diluent to

produce samples with values within the dynamic range of the assay. (The plasma samples were initially diluted 1:1)

Dilution ratio	Recovery (%)	Citrate plasma	Cell culture supernatants
1:2	Average% of Expected	95	103
	Range (%)	88-102	92-113
1:4	Average% of Expected	97	104
	Range (%)	89-105	94-112

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