abcam

ab283575

Anti-MMP9 antibody [RM1020]

Anti-MMP9 antibody [RM1020] (ab283575) is a rabbit recombinant multiclonal antibody detecting MMP9 in **Western Blot, Flow Cytometry (Intra), IP, IHC-P, IHC-Fr, ICC/IF, ELISA**. Suitable for **Human, Mouse, Rat**.

- KO validated for confirmed specificity
- Biophysical QC for unrivalled batch-batch consistency
- Over 30 publications

Recombinant | RabMAb | KO Validated | 20ul selling size

Key facts

Isotype	IgG
Host species	Rabbit
Storage buffer	pH: 7.2 - 7.4 Preservative: 0.01% Sodium azide Constituents: PBS, 40% Glycerol (glycerin, glycerine), 0.05% BSA
Form	Liquid
Clonality	Multiclonal
Immunogens	The exact immunogen used to generate this antibody is proprietary information.
Clone number	RM1020
Purification technique	Affinity purification Protein A
Concentration	0.536 mg/mL The concentration of this product may be batch-dependent Batch concentration finder →

Reactivity data

ICC/IF

Tested

Species	Mouse
Dilution info	1/50
Notes	-

Species	Human
Dilution info	1/50
Notes	-

Expected

Species	Rat
Dilution info	Use at an assay dependent concentration.
Notes	-

Not recommended

Species	Recombinant fragment - Mouse
Dilution info	-
Notes	-

IP

Tested

Species	Mouse
Dilution info	1/30
Notes	-

Expected

Species	Human, Rat
Dilution info	Use at an assay dependent concentration.
Notes	-

Not recommended

Species	Recombinant fragment - Mouse
Dilution info	-
Notes	-

Flow Cyt (Intra)

Tested

Species	Mouse
Dilution info	1/500
Notes	-

Species	Human
Dilution info	1/500
Notes	-

Expected

Species	Rat
Dilution info	Use at an assay dependent concentration.
Notes	-

Not recommended

Species	Recombinant fragment - Mouse
Dilution info	-
Notes	-

WB

Tested

Species	Mouse
Dilution info	1/1000
Notes	-

Species	Rat
Dilution info	1/1000
Notes	-

Species	Human
Dilution info	1/1000
Notes	-

Not recommended

Species	Recombinant fragment - Mouse
Dilution info	-
Notes	-

I-ELISA

Tested

Species	Recombinant fragment - Mouse
Dilution info	-
Notes	-

Expected

Species	Mouse, Human, Rat
Dilution info	Use at an assay dependent concentration.
Notes	-

IHC-Fr

Tested

Species	Mouse
Dilution info	1/100
Notes	-

Species	Rat
Dilution info	1/100
Notes	-

Expected

Species	Human
Dilution info	Use at an assay dependent concentration.
Notes	-

Not recommended

Species	Recombinant fragment - Mouse
Dilution info	-
Notes	-

IHC-P

Tested

Species	Mouse
Dilution info	1/5000
Notes	-

Species	Rat
Dilution info	1/5000
Notes	-

Species	Human
Dilution info	1/5000
Notes	-

Not recommended

Species	Recombinant fragment - Mouse
Dilution info	-

Notes	-

Target data

See full target information MMP9

Function	Matrix metalloproteinase that plays an essential role in local proteolysis of the extracellular matrix and in leukocyte migration (PubMed:12879005, PubMed:1480034, PubMed:2551898). Could play a role in bone osteoclastic resorption (By similarity). Cleaves KiSS1 at a Gly-|-Leu bond (PubMed:12879005). Cleaves NINJ1 to generate the Secreted ninjurin-1 form (PubMed:32883094). Cleaves type IV and type V collagen into large C-terminal three quarter fragments and shorter N-terminal one quarter fragments (PubMed:1480034). Degrades fibronectin but not laminin or Pz-peptide.

Storage

Shipped at conditions	Blue Ice
Appropriate short-term storage duration	1-2 weeks
Appropriate short-term storage conditions	+4°C
Appropriate long-term storage conditions	-20°C
Aliquoting information	Upon delivery aliquot
Storage information	Avoid freeze / thaw cycle

Notes

What is this antibody validated in?
Anti-MMP9 antibody [RM1020] (ab283575) is a rabbit recombinant recombinant multiclonal antibody and is validated for use in Western Blot (WB), Flow Cytometry (Intra), Immunoprecipitation (IP), Immunohistochemistry (IHC-P), Immunohistochemistry (IHC-Fr), Immunocytochemistry/immunofluorescence (ICC/IF), ELISA in Human, Mouse, Rat samples.

What is the molecular weight of MMP9?
Anti-MMP9 [RM1020] (ab283575) specifically detects a band for MMP9 (UniProt: P14780) at a molecular weight of 78kDa.

Trusted by the scientific community
Anti-MMP9 [RM1020] (ab283575) was first used in a scientific publication in 2021 and has been cited over 30 times in

peer-reviewed journals.

Specificity confirmed
The specificity of Anti-MMP9 antibody [RM1020] (ab283575) has been confirmed by Western blot testing in MMP9 Knockout A549 cell line.

Other related products
We have a range of other formats of antibody clone [RM1020] also available for your convenience: ab283575, Carrier free - ab283594

What are recombinant multiclonals?
Recombinant multiclonals are a mixture of recombinant antibodies co-expressed from a library of heavy and light chains. They offer several advantages including:

- The sensitivity of polyclonal antibodies by recognising multiple epitopes
- High batch-to-batch consistency and reproducibility
- Improved sensitivity and specificity
- Long-term security of supply
- Animal-free batch production

View our range of recombinant multiclonal antibodies.

Patented technology
Our RabMAb® technology is a patented hybridoma-based technology for making rabbit monoclonal antibodies. For details on our patents, please refer to RabMAb® patents.

Trial sizes available!
Test your antibody or perform pre-screening before committing to a larger quantity. Sold in 20µl. Discover our selection of trial-size antibodies.

Supplementary info

This supplementary information is collated from multiple sources and compiled automatically.

Activity summary	The MMP-9 protein also known as matrix metalloproteinase-9 or gelatinase B functions as an enzyme involved in the breakdown of extracellular matrix proteins. It consists of a zinc ion at its active site and facilitates the degradation of type IV and V collagens fibronectin and elastin. MMP-9 has a molecular weight of approximately 92 kDa and is expressed in a variety of tissues including the liver lungs and immune cells. This enzyme can exist in monomer and dimer forms with its activity regulated by tissue inhibitors of metalloproteinases (TIMPs).
Biological function summary	Matrix metalloproteinase-9 profoundly influences tissue remodeling inflammation and angiogenesis. It does not form part of a larger protein complex but interacts closely with substrates in the extracellular matrix. MMP-9 plays important roles in processes such as embryogenesis reproduction and wound healing through the remodeling of surrounding tissues. The MMP-9 protein is often measured using assays like ELISA or analyzed via techniques such as Western blotting to determine its expression levels and activity in different biological contexts.

Pathways

	MMP-9 participates in the matrix metalloproteinase pathway and the NF-kB signaling pathway. These pathways are essential in orchestrating processes such as tissue remodeling and inflammatory responses. MMP-9 acts alongside other matrix metalloproteinases including MMP-2 and is regulated by factors like cytokines growth factors and hormones ensuring the precision of extracellular matrix degradation during physiological processes.
Associated diseases and disorders	Matrix metalloproteinase-9 has associations with cancer invasion and metastasis as well as chronic inflammatory diseases like rheumatoid arthritis. In cancer upregulated MMP-9 expression aids tumor cells in breaching the basement membrane facilitating metastasis. The disorder-associated pathways often involve interactions with proteins like vascular endothelial growth factor (VEGF) and transforming growth factor-beta (TGF-beta). Understanding MMP-9's role in these conditions can contribute to developing targeted therapies that inhibit its activity potentially mitigating disease progression.

Product promise

Tested

We have tested this species and application combination and it works. It is covered by our product promise.

Expected

We have not tested this specific species and application combination in-house, but expect it will work. It is covered by our product promise.

Predicted

This species and application combination has not been tested, but we predict it will work based on strong homology. However, this combination is not covered by our product promise.

Not recommended

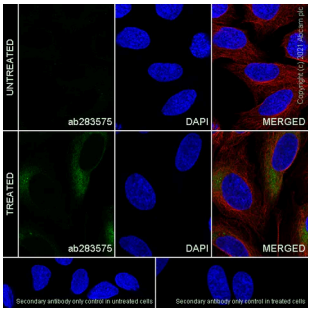
We do not recommend this combination. It is not covered by our product promise.

We are dedicated to supporting your work with high quality reagents and we are here for you every step of the way should you need us.

In the unlikely event of one of our products not working as expected, you are covered by our product promise.

Full details and terms and conditions can be found here:
Terms & Conditions.

16 product images

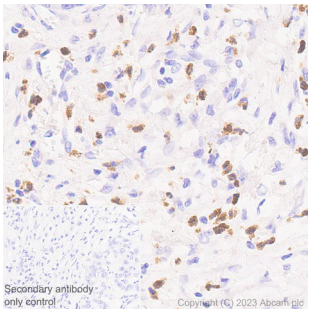


Immunocytochemistry/ Immunofluorescence - Anti-MMP9 antibody [RM1020] (ab283575)

MMP9 Immunocytochemistry/ Immunofluorescence staining using rabbit Anti-MMP9 antibody

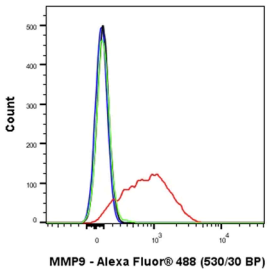
Immunofluorescent analysis of 4% Paraformaldehyde-fixed, 0.1% TritonX-100 permeabilized U-2 OS cells labelling MMP9 with ab283575 at 1/50 (12.26 ug/ml) dilution, followed by ab150081 Goat Anti-Rabbit IgG H&L (Alexa Fluor® 488) preadsorbed antibody at 1/1000 (2 ug/ml) dilution (Green). ab195889 Anti-alpha Tubulin mouse monoclonal antibody - Microtubule Marker (Alexa Fluor® 594) was used to counterstain tubulin at 1/200 (2.5 ug/ml) dilution (Red). The Nuclear counterstain was DAPI (Blue).
Confocal image showing increased cytoplasmic staining in U-2 OS cells treated with 12-O-Tetradecanoylphorbol-13-acetate (200nM) for 24hours.

Secondary antibody only control: Secondary antibody is ab150081 Goat Anti-Rabbit IgG H&L (Alexa Fluor® 488) preadsorbed at 1/1000 (2 ug/ml) dilution.



Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) - Anti-MMP9 antibody [RM1020] (ab283575)

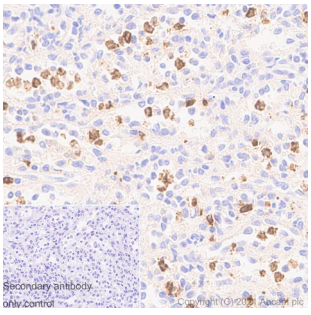
Immunohistochemical analysis of paraffin-embedded human gastric carcinoma tissue labelling MMP9 with ab283575 at 1:5000 dilution (0.123 µg/ml), followed by a ready to use LeicaDS9800 (Bond™ Polymer Refine Detection). Positive staining on immune cells of human gastric carcinoma is observed. The section was incubated with ab283575 for 10 mins at room temperature. The immunostaining was performed on a Leica Biosystems BOND® RX instrument. Counter stained with hematoxylin. Secondary antibody only control: Used PBS instead of primary antibody, secondary antibody is LeicaDS9800 (Bond™ Polymer Refine Detection). Heat mediated antigen retrieval was performed with Tris-EDTA buffer (pH 9.0, Epitope Retrieval Solution2) for 20 mins.



Flow Cytometry (Intracellular) - Anti-MMP9 antibody [RM1020] (ab283575)

MMP9 Flow Cytometry (Intracellular) staining using rabbit Anti-MMP9 antibody

Flow cytometric analysis of 4% paraformaldehyde fixed 90% methanol permeabilized U-2 OS (Human bone osteosarcoma epithelial cell) treated with TPA (200nM 24h) (Red) / Untreated control (Green) cells labelling MMP9 with ab283575 at 1/500 dilution (0.1ug) compared with a Rabbit monoclonal IgG (ab172730) (Black) isotype control and an unlabelled control (cells without incubation with primary antibody and secondary antibody) (Blue). A Goat F(ab')2 Anti-Rabbit IgG(DyLight® 488, ab98507) at 1/500 dilution was used as the secondary antibody.



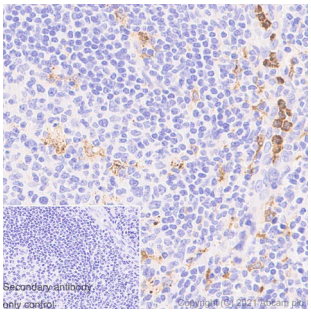
Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) - Anti-MMP9 antibody [RM1020] (ab283575)

MMP9 Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) staining using rabbit Anti-MMP9 antibody

Immunohistochemical analysis of paraffin-embedded Human spleen tissue labelling MMP9 with ab283575 at 1/5000 (0.123 ug/ml) followed by a ready to use LeicaDS9800 (Bond™ Polymer Refine Detection). Positive staining on the human spleen. The section was incubated with ab283575 for 10 mins at room temperature. The immunostaining was performed on a Leica Biosystems BOND® RX instrument Counterstained with Hematoxylin.

Secondary antibody only control: Secondary antibody is a ready to use LeicaDS9800 (Bond™ Polymer Refine Detection).

Heat mediated antigen retrieval with Tris-EDTA buffer (pH 9.0, epitope retrieval solution2) for 20 mins

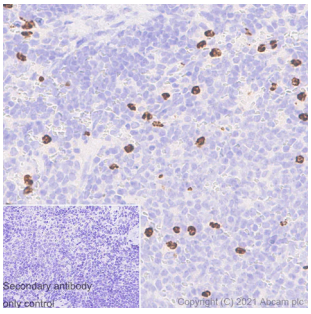


Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) - Anti-MMP9 antibody [RM1020] (ab283575)

MMP9 Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) staining using rabbit Anti-MMP9 antibody

Immunohistochemical analysis of paraffin-embedded Human tonsil tissue labelling MMP9 with ab283575 at 1/5000 (0.123 ug/ml) followed by a ready to use LeicaDS9800 (Bond™ Polymer Refine Detection). Positive staining on the human tonsil. The section was incubated with ab283575 for 10 mins at room temperature. The immunostaining was performed on a Leica Biosystems BOND® RX instrument Counterstained with Hematoxylin.
Secondary antibody only control: Secondary antibody is a ready to use LeicaDS9800 (Bond™ Polymer Refine Detection).

Heat mediated antigen retrieval with Tris-EDTA buffer (pH 9.0, epitope retrieval solution2) for 20 mins

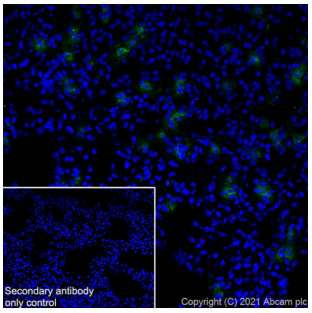


Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) - Anti-MMP9 antibody [RM1020] (ab283575)

MMP9 Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) staining using rabbit Anti-MMP9 antibody

Immunohistochemical analysis of paraffin-embedded Rat spleen tissue labelling MMP9 with ab283575 at 1/5000 (0.123 ug/ml) followed by a ready to use LeicaDS9800 (Bond™ Polymer Refine Detection). Positive staining on the rat spleen. The section was incubated with ab283575 for 10 mins at room temperature. The immunostaining was performed on a Leica Biosystems BOND® RX instrument Counterstained with Hematoxylin.
Secondary antibody only control: Secondary antibody is a ready to use LeicaDS9800 (Bond™ Polymer Refine Detection).

Heat mediated antigen retrieval with Tris-EDTA buffer (pH 9.0, epitope retrieval solution2) for 20 mins

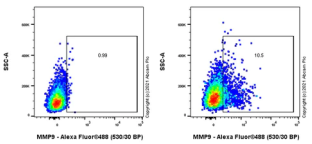


Immunohistochemistry (Frozen sections) - Anti-MMP9 antibody [RM1020] (ab283575)

MMP9 Immunohistochemistry (Frozen sections) staining using rabbit Anti-MMP9 antibody

Immunohistochemical analysis of 4% PFA-fixed, 0.2% Triton X-100 permeabilized frozen Mouse lung (fresh) tissue labeling MMP9 with ab283575 at 1/100 (6.13 ug/ml) dilution followed by ab150077 Goat Anti-Rabbit IgG H&L (Alexa Fluor® 488) at 1/1000 (2 ug/ml) dilution (Green). The nuclear counterstain was DAPI (Blue).
Positive staining on macrophages of mouse lung is observed.

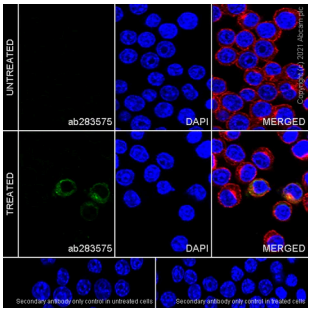
Secondary antibody control: Secondary antibody is ab150077 Goat Anti-Rabbit IgG H&L (Alexa Fluor® 488) at 1/1000 (2 ug/ml) dilution.



Flow Cytometry (Intracellular) - Anti-MMP9 antibody [RM1020] (ab283575)

MMP9 Flow Cytometry (Intracellular) staining using rabbit Anti-MMP9 antibody

Flow cytometric analysis of 4% paraformaldehyde fixed 90% methanol permeabilized RAW 264.7 (Mouse Abelson murine leukemia virus-induced tumor macrophage) treated with 100ng/ml LPS for 4h then together with 1ug/ml BFA for another 3h (Right) / Untreated control (Left) cells labelling MMP9 with ab283575 at 1/500 dilution (0.1ug). A Goat F(ab')2 Anti-Rabbit IgG(DyLight® 488, ab98507) at 1/500 dilution was used as the secondary antibody.

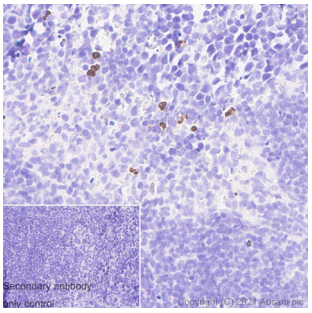


Immunocytochemistry/ Immunofluorescence - Anti-MMP9 antibody [RM1020] (ab283575)

MMP9 Immunocytochemistry/ Immunofluorescence staining using rabbit Anti-MMP9 antibody

Immunofluorescent analysis of 4% Paraformaldehyde-fixed, 0.1% TritonX-100 permeabilized RAW 264.7 cells labelling MMP9 with ab283575 at 1/50 (12.26 ug/ml) dilution, followed by ab150081 Goat Anti-Rabbit IgG H&L (Alexa Fluor® 488) preadsorbed antibody at 1/1000 (2 ug/ml) dilution (Green). ab195889 Anti-alpha Tubulin mouse monoclonal antibody - Microtubule Marker (Alexa Fluor® 594) was used to counterstain tubulin at 1/200 (2.5 ug/ml) dilution (Red). The Nuclear counterstain was DAPI (Blue).
Confocal image showing increased cytoplasmic staining in RAW 264.7 cells treated with lipopolysaccharide (100 ng/ml) for 4 hours then together with Brefeldin A (1 ug/ml) for 3 hours.

Secondary antibody only control: Secondary antibody is ab150081 Goat Anti-Rabbit IgG H&L (Alexa Fluor® 488) preadsorbed at 1/1000 (2ug/ml) dilution.



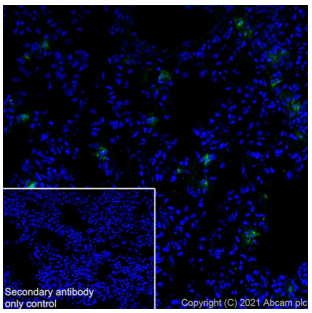
Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) - Anti-MMP9 antibody [RM1020] (ab283575)

MMP9 Immunohistochemistry (Formalin/PFA-fixed paraffin-embedded sections) staining using rabbit Anti-MMP9 antibody

Immunohistochemical analysis of paraffin-embedded Mouse spleen tissue labelling MMP9 with ab283575 at 1/5000 (0.123 ug/ml) followed by a ready to use LeicaDS9800 (Bond™ Polymer Refine Detection). Positive staining on the mouse spleen. The section was incubated with ab283575 for 10

mins at room temperature. The immunostaining was performed on a Leica Biosystems BOND® RX instrument Counterstained with Hematoxylin.
Secondary antibody only control: Secondary antibody is a ready to use LeicaDS9800 (Bond™ Polymer Refine Detection).

Heat mediated antigen retrieval with Tris-EDTA buffer (pH 9.0, epitope retrieval solution2) for 20 mins

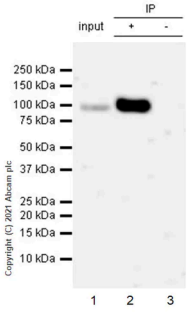


Immunohistochemistry (Frozen sections) - Anti-MMP9 antibody [RM1020] (ab283575)

MMP9 Immunohistochemistry (Frozen sections) staining using rabbit Anti-MMP9 antibody

Immunohistochemical analysis of 4% PFA-fixed, 0.2% Triton X-100 permeabilized frozen Rat lung (fresh) tissue labeling MMP9 with ab283575 at 1/100 (6.13 ug/ml) dilution followed by ab150077 Goat Anti-Rabbit IgG H&L (Alexa Fluor® 488) at 1/1000 (2 ug/ml) dilution (Green). The nuclear counterstain was DAPI (Blue).
Positive staining on macrophages of rat lung is observed.

Secondary antibody control: Secondary antibody is ab150077 Goat Anti-Rabbit IgG H&L (Alexa Fluor® 488) at 1/1000 (2 ug/ml) dilution.



Immunoprecipitation - Anti-MMP9 antibody [RM1020] (ab283575)

MMP9 was immunoprecipitated from 0.35 mg Mouse lung lysate 10 ug with ab283575 at 1/30 dilution (2ug in 0.35mg lysates). Western blot was performed on the immunoprecipitate using ab283575 at 1/1000 dilution. VeriBlot for IP secondary antibody(HRP)(ab131366) was used at 1/5000 dilution.
Lane 1: Mouse lung lysate 10 ug

Lane 2: ab283575 IP in Mouse lung lysate

Lane 3: Rabbit monoclonal IgG (ab172730) instead of ab283575 in Mouse lung lysate

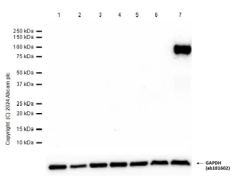
Blocking and dilution buffer and concentration: 5% NFDM/TBST.

Exposure time: 3 min

All lanes:
Immunoprecipitation - Anti-MMP9 antibody [RM1020] (ab283575)

Predicted band size: 78 kDa

Observed band size: 84-92 kDa



Western blot - Anti-MMP9 antibody [RM1020] (ab283575)

The expression of MMP-9 can be stimulated by various agents, such as inflammatory cytokine, growth factor, and 12-O-tetradecanoylphorbol-13-acetate (TPA) (PMID:21047770, 28969043).
Blocking and diluting buffer and concentration: 5% NFDM/TBST
All lanes:
Western blot - Anti-MMP9 antibody [RM1020] (ab283575) at 1/1000 dilution

Lane 1:
LoVo (Human colorectal adenocarcinoma epithelial cell) whole cell lysate at 20 µg

Lane 2:
Huh7 (Human hepatocellular carcinoma epithelial cell) whole cell lysate at 20 µg

Lane 3:
MCF7 (Human breast adenocarcinoma epithelial cell) whole cell lysate at 20 µg

Lane 4:
HeLa (Human cervix adenocarcinoma epithelial cell) whole cell lysate at 20 µg

Lane 5:
Caco-2 (Human colorectal adenocarcinoma epithelial cell) whole cell lysate at 20 µg

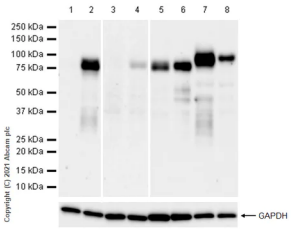
Lane 6:
A549 (Human lung carcinoma epithelial cell) serum starved overnight whole cell lysate at 20 µg

Lane 7:
A549 (Human lung carcinoma epithelial cell) serum starved overnight, then treated with 100ng/ml TPA for 24 hours, then together with 1ug/ml BFA for another 3h whole cell lysate at 20 µg

Secondary

All lanes:
Western blot - Goat Anti-Rabbit IgG H&L (HRP) (ab97051) at 1/20000 dilution

Exposure time: 60s



Western blot - Anti-MMP9 antibody [RM1020] (ab283575)

MMP9 Western blot staining using rabbit Anti-MMP9 antibody

Blocking and diluting buffer and concentration: 5% NFDM/TBST MMP9 is a glycoprotein (PMID: 29329315). The 92 kDa band likely represents the zymogen prior to activating cleavage of the pro-peptide (PMID: 7688350; PMID: 12901881). Exposure time: Lane 3-4: 3min ; Others: 37 seconds
All lanes:
Western blot - Anti-MMP9 antibody [RM1020] (ab283575) at 1/1000 dilution

Lane 1:
U-2 OS (Human bone osteosarcoma epithelial cell) whole cell lysate at 20 µg

Lane 2:
U-2 OS treated with 200nM TPA for 24h whole cell lysate at 20 µg

Lane 3:
RAW 264.7 (Mouse Abelson murine leukemia virus-induced tumor macrophage) whole cell lysate at 20 µg

Lane 4:
RAW 264.7 treated with 100ng/ml lipopolysaccharide (LPS) for 4h, then together with 1ug/ml BFA for another 3h whole cell lysate at 20 µg

Lane 5:
NR8383 (Rattus norvegicus lung macrophage (alveolar)) whole cell lysate at 20 µg

Lane 6:
NR8383 treated with 100ng/ml lipopolysaccharide (LPS) for 4h, then together with 1ug/ml BFA for another 3h whole cell lysate at 20 µg

Lane 7:
Human lung lysate at 20 µg

Lane 8:

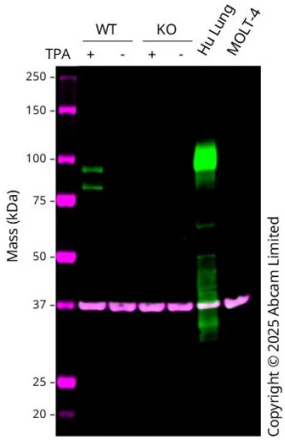
Mouse lung lysate at 20 µg

Secondary

All lanes:
Western blot - Goat Anti-Rabbit IgG H&L (HRP) (ab97051) at 1/100000 dilution

Predicted band size: 78 kDa

Observed band size: 84-92 kDa



Western blot - Anti-MMP9 antibody [RM1020] (ab283575)

MMP9 Western blot staining using rabbit Anti-MMP9 antibody

Western blot: Rabbit Recombinant Multiclonal[RM1020] to MMP9 283575 staining at 1/1000 dilution, shown in green; Mouse anti GAPDH (ab8245) loading control staining at 1/20,000 dilution, shown in magenta. A band was observed at 90 kDa in Wild-type A549 TPA-treated (80nM, 24h) cell lysates with no signal observed at this size in MMP9 knockout A549 TPA-treated (80nM, 24h) cell line. To generate this image, samples were run on an SDS-PAGE gel then transferred onto a nitrocellulose membrane. Membranes were blocked in 3pc Milk in TBS-0.1 % Tween® 20 (TBS-T) before incubation with primary antibodies overnight at 4°C. Blots were washed four times in TBS-T, incubated with secondary antibodies for 1 h at room temperature, washed again four times then imaged. Secondary antibodies used were Goat anti-Rabbit 800CW & Goat anti-Mouse 680RD at 1/20,000 dilution.
All lanes:
Western blot - Anti-MMP9 antibody [RM1020] (ab283575) at 1/1000 dilution

Lane 1:
Wild-type A549 TPA-treated (80nM, 24h) at 20 µg

Lane 2:
Wild-type A549 Vehicle Control TPA (0nM, 24h) at 20 µg

Lanes 3 - 4:
Western blot - Human MMP9 knockout A549 cell line (ab286527) at 20 µg

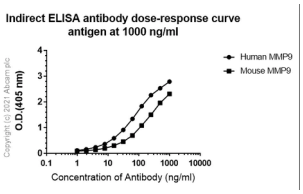
Lane 5:
Human Lung at 20 µg

Lane 6:
MOLT-4 at 20 µg

Secondary

All lanes:
Goat anti-Rabbit 800CW & Goat anti-Mouse 680RD at 1/20000 dilution

Performed under reducing conditions.



Indirect ELISA - Anti-MMP9 antibody [RM1020] (ab283575)

ELISA using ab283575 at varying antibody concentrations and antigen concentration at 1000 ng/ml. An Alkaline Phosphatase-conjugated AffiniPure Goat Anti-Rabbit IgG (H+L) (1/2500) was used as the secondary antibody.

Please note: All products are 'FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC OR THERAPEUTIC PROCEDURES'.