

# Product Datasheet

## PIEZO1 Antibody - BSA Free NBP1-78446

Unit Size: 0.1 ml

Store at 4C short term. Aliquot and store at -20C long term. Avoid freeze-thaw cycles.

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**NBP1-78446**

PIEZO1 Antibody - BSA Free

Product Information	
Unit Size	0.1 ml
Concentration	1 mg/ml
Storage	Store at 4C short term. Aliquot and store at -20C long term. Avoid freeze-thaw cycles.
Clonality	Polyclonal
Preservative	0.02% Sodium Azide
Isotype	IgG
Purity	Immunogen affinity purified
Buffer	PBS

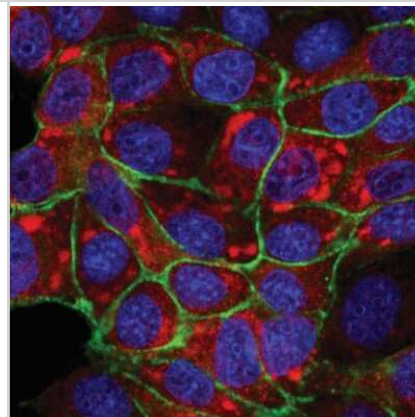
Product Description	
Description	Novus Biologicals Rabbit PIEZO1 Antibody - BSA Free (NBP1-78446) is a polyclonal antibody validated for use in IHC, WB, Flow and ICC/IF. Anti-PIEZO1 Antibody: Cited in 24 publications. All Novus Biologicals antibodies are covered by our 100% guarantee.
Host	Rabbit
Gene ID	9780
Gene Symbol	PIEZO1
Species	Human, Mouse, Guinea Pig
Reactivity Notes	Guinea Pig reactivity reported in scientific literature (PMID: 30324494).
Immunogen	A synthetic peptide made to an internal portion of the human PIEZO1 protein (between residues 950-1000) [UniProt Q92508]

Product Application Details	
Applications	Western Blot, Immunohistochemistry-Paraffin, Flow Cytometry, Flow (Intracellular), Immunocytochemistry/ Immunofluorescence, Immunohistochemistry
Recommended Dilutions	Western Blot 2 ug/ml, Flow Cytometry 1-5 ug/ml. Use reported in scientific literature (PMID 31685811), Immunohistochemistry 1:400, Immunocytochemistry/ Immunofluorescence 1:25, Immunohistochemistry-Paraffin 1:400, Flow (Intracellular) 1 - 5 ug/ml
Application Notes	According to Gudipaty et al "only this Piezo1 antibody reliably worked for Piezo1 immunostaining, as it vanishes in cells mosaically expressing a Piezo1-shRNA-mCherry construct" (PMID: 28199303). Prior to immunostaining paraffin tissues, antigen retrieval with sodium citrate buffer (pH 6.0) is recommended.



## Images

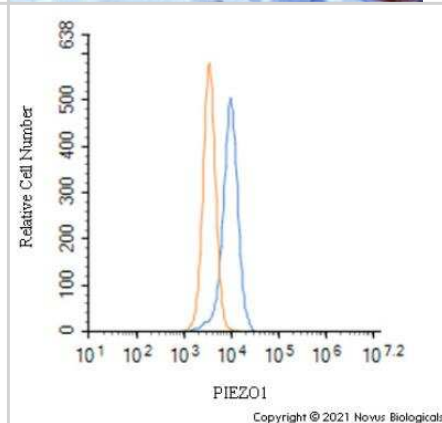
Immunocytochemistry/Immunofluorescence: PIEZO1 Antibody [NBP1-78446] - PIEZO1 antibody (Goat anti-rabbit 568) was tested in MDCK cells. Nuclei and B-actin were counterstained with DAPI (blue) and phalloidin (green). Image from verified customer review.



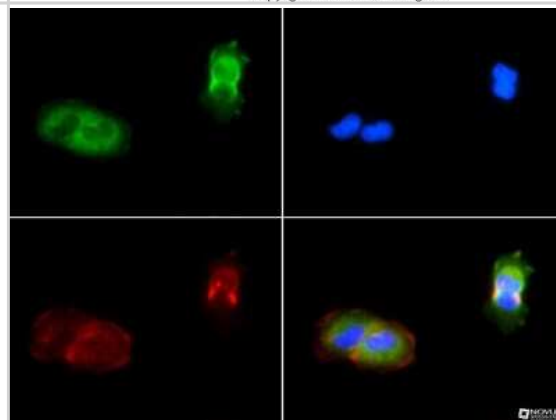
Immunohistochemistry: PIEZO1 Antibody [NBP1-78446] - Analysis of PIEZO1 in mouse epidermis using DAB with hematoxylin counterstain.



Flow Cytometry: PIEZO1 Antibody [NBP1-78446] - An intracellular stain was performed on MCF7 cells with PIEZO1 Antibody NBP1-78446 (blue) and a matched isotype control NBP2-24891 (orange). Cells were fixed with 4% PFA and then permeabilized with 0.1% saponin. Cells were incubated in an antibody dilution of 1.0 ug/mL for 30 minutes at room temperature, followed by Rabbit IgG (H+L) Cross-Adsorbed Secondary Antibody, Dylight 550 (SA5-10033, Thermo Fisher).



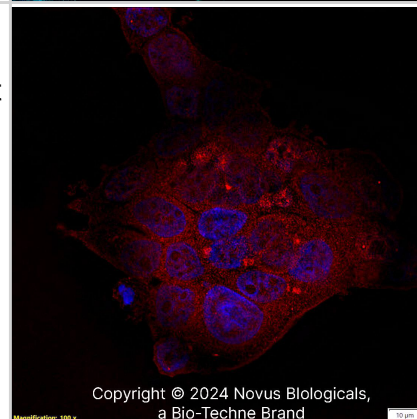
Immunocytochemistry/Immunofluorescence: PIEZO1 Antibody [NBP1-78446] - PIEZO1 antibody was tested in A431 cells with FITC (green). Nuclei and alpha-tubulin were counterstained with DAPI (blue) and Dylight 550 (red).



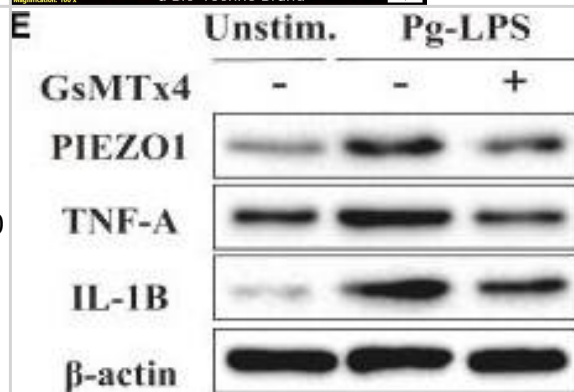
PIEZO1 was detected in immersion fixed MCF7 human breast cancer cell line using Rabbit anti-PIEZO1 Affinity Purified Polyclonal Antibody conjugated to DyLight 650 (Catalog # NBP1-78446C) (light blue) at 10 µg/mL overnight at 4C. Cells were stained counterstained with DAPI (blue). Cells were imaged using a 100X objective and digitally deconvolved.



PIEZO1 was detected in immersion fixed MCF7 human breast cancer cell line using Rabbit anti-PIEZO1 Affinity Purified Polyclonal Antibody conjugated to Janelia Fluor® 549 (Catalog # NBP1-78446JF549) (red) at 10 µg/mL overnight at 4C. Cells were stained counterstained with DAPI (blue). Cells were imaged using a 100X objective and digitally deconvolved.

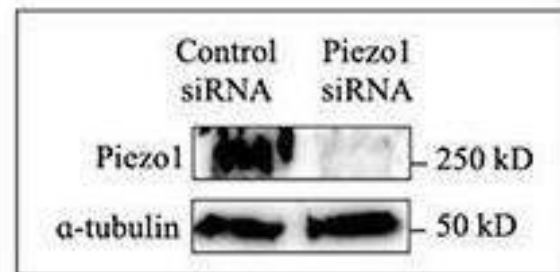


Immune response of macrophages after blocking Piezo1. (A) IF staining of CCR7 and CD206 in the Control, LPS and GsMTx4+LPS groups after 4-day-cultured. M1 macrophages were marked with CCR7 (red), M2 macrophages with CD206 (green), and nuclei with DAPI (blue). (B) Semi-quantitative analysis of CCR7 and CD163 in each group. (C) Flow cytometry analysis of RAW264. 7 cells in the Control, LPS and GsMTx4+LPS groups. Q6 represents M1 types (F4/80+/iNOS+) and Q10 represents M2 types (F4/80+/CD206+). (D) Expressions of Piezo1 and inflammation-related genes (Tnfa and Il1b) in macrophages cultured for 4 days. (E) Western blotting analysis of PIEZO1, IL-1B and TNF-A in RAW264. 7 cultured for 4 days. (F) Intracellular ROS levels of RAW264. 7 cultured for 4 days. (G) Concentration of inflammatory cytokines in macrophage medium detected by ELISA. \*P < 0. 05; \*\*P < 0. 01; \*\*\*P < 0. 001. Image collected and cropped by CiteAb from the following open publication (<https://pubmed.ncbi.nlm.nih.gov/37261355>), licensed under a CC-BY license. Not internally tested by Novus Biologicals.



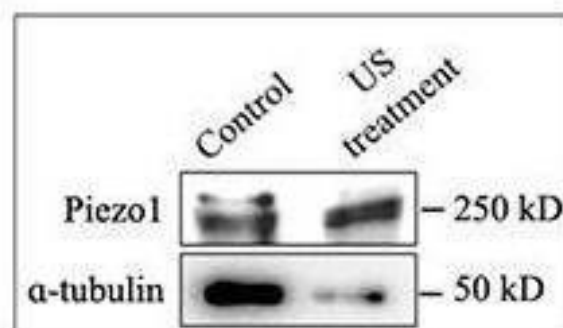
Ultrasound induces Piezo1 expression and localization to peripheral adhesion in MDA-MB-231 cancer cells. (a) Fluorescent images showing spatial distribution of microtubule, paxillin, and Piezo1 in the wild-type (control, ultrasound and nocodazole treated) and myosin IIA KD (control and ultrasound treated) cells. (b) Corresponding fluorescent intensity plot displaying paxillin and Piezo1 distribution in cells under different experimental condition described in panel a. (c) Western blot measuring the Piezo1 expression level in control and US treated cancer cells. (d) Western blot showing myosin IIA expression in control siRNA and myosin IIA KD cancer cells. (e) Western blot showing Piezo1 expression in control siRNA and Piezo1 KD cancer cells. (f) Fluorescent images showing microtubule network in myosin IIA KD cells and bar diagram demonstrating number of intact microtubules with and without US treatment.  $n = 15$  cells. (g) Fluorescent images showing microtubule network and bar diagram showing number of intact microtubules in Piezo1 KD cells with and without US treatment,  $n = 25$  cells. (h) Representative images illustrating microtubule network and Piezo1 localization in control and US treated cells and bar diagram estimating cell population with peripheral Piezo1 in control and US treated cells,  $n > 204$  cells. \*\*\*\* $p < 0.0001$ . In all image panels, scale bar: 10  $\mu\text{m}$  Image collected and cropped by CiteAb from the following open publication (<https://pubmed.ncbi.nlm.nih.gov/34589605>), licensed under a CC-BY license. Not internally tested by Novus Biologicals.

(e)

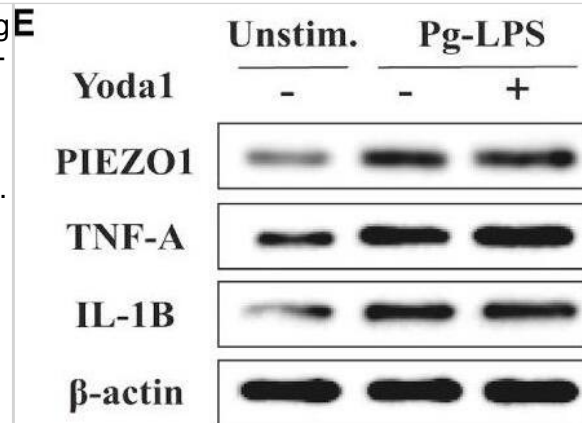


Ultrasound induces Piezo1 expression and localization to peripheral adhesion in MDA-MB-231 cancer cells. (a) Fluorescent images showing spatial distribution of microtubule, paxillin, and Piezo1 in the wild-type (control, ultrasound and nocodazole treated) and myosin IIA KD (control and ultrasound treated) cells. (b) Corresponding fluorescent intensity plot displaying paxillin and Piezo1 distribution in cells under different experimental condition described in panel a. (c) Western blot measuring the Piezo1 expression level in control and US treated cancer cells. (d) Western blot showing myosin IIA expression in control siRNA and myosin IIA KD cancer cells. (e) Western blot showing Piezo1 expression in control siRNA and Piezo1 KD cancer cells. (f) Fluorescent images showing microtubule network in myosin IIA KD cells and bar diagram demonstrating number of intact microtubules with and without US treatment.  $n = 15$  cells. (g) Fluorescent images showing microtubule network and bar diagram showing number of intact microtubules in Piezo1 KD cells with and without US treatment,  $n = 25$  cells. (h) Representative images illustrating microtubule network and Piezo1 localization in control and US treated cells and bar diagram estimating cell population with peripheral Piezo1 in control and US treated cells,  $n > 204$  cells. \*\*\*\* $p < 0.0001$ . In all image panels, scale bar: 10  $\mu\text{m}$  Image collected and cropped by CiteAb from the following open publication (<https://pubmed.ncbi.nlm.nih.gov/34589605>), licensed under a CC-BY license. Not internally tested by Novus Biologicals.

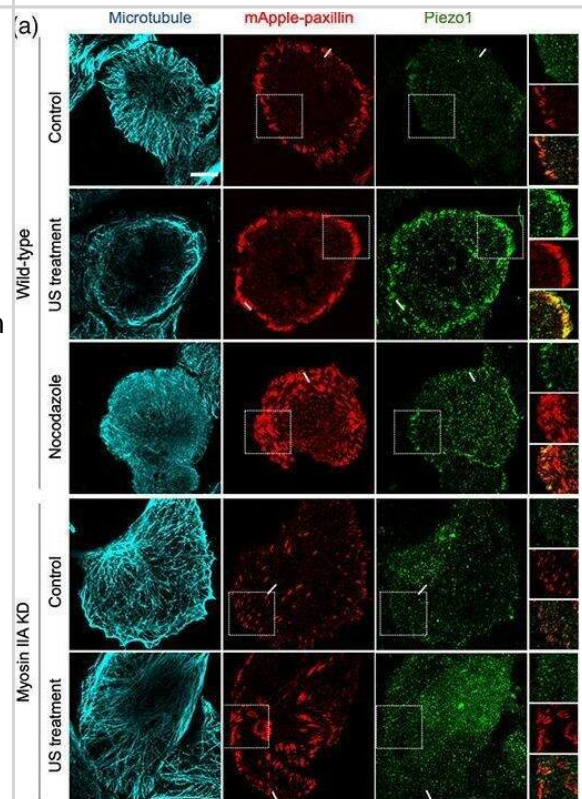
(c)



Immune response of macrophages after activating Piezo1. (A) IF staining of CCR7 and CD206 in the Control, LPS and Yoda1+LPS groups after 4-day-cultured. M1 macrophages were marked with CCR7 (red), M2 macrophages with CD206 (green), and nuclei with DAPI (blue). (B) Semi-quantitative analysis of CCR7 and CD206. (C) Flow cytometry analysis of RAW264.7 cells in the Control, LPS and Yoda1+LPS groups. Q6 represents M1 types (F4/80+/iNOS+) and Q10 represents M2 types (F4/80+/CD206+). (D) Piezo1, Tnfa and Il1b genes expressions in macrophages cultured for 4 days. (E) Western blotting analysis of PIEZO1, TNF-A and IL-1B in RAW264.7 cultured for 4 days. (F) Intracellular ROS levels of RAW264.7 cultured for 4 days. (G) Concentration of inflammatory cytokines in macrophages medium detected by ELISA. \*P < 0.05; \*\*P < 0.01; \*\*\*P < 0.001. Image collected and cropped by CiteAb from the following open publication (<https://pubmed.ncbi.nlm.nih.gov/37261355>), licensed under a CC-BY license. Not internally tested by Novus Biologicals.



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## Publications

Mitchell S, Pardo-Pastor C, Tchoumakova A et al. Energy deficiency selects crowded live epithelial cells for extrusion. *Nature* 2025-09-10 [PMID: 40931070]

Lim M, Park S, Joo Y et al. Piezo1-mediated mechanotransduction regulates the translational activity, function and lung pathogenicity of group 2 innate lymphoid cells. *Signal transduction and targeted therapy* 2025-08-21 [PMID: 40841361]

Verkest C, Roettger L, Zeitzschel N et al. Cluster nanoarchitecture and structural diversity of PIEZO1 at rest and during activation in intact cells *Science Advances* 2025-10-24 [PMID: 41124252]

Singh A, Tijore A, Margadant F et al. Enhanced tumor cell killing by ultrasound after microtubule depolymerization *Bioengineering & Translational Medicine* 2021-09-01 [PMID: 34589605] (Knockdown Validated, Immunocytochemistry/ Immunofluorescence, Canine)

Bosutti A, Giniatullin A, Odnoshivkina Y et al. "Time window" effect of Yoda1-evoked Piezo1 channel activity during mouse skeletal muscle differentiation *Acta Physiol (Oxf)* 2021-12-01 [PMID: 34097801] (Knockdown Validated, Immunocytochemistry/ Immunofluorescence, Canine)

Y Mitsuhashi, T Abe, K Misaki, Y Nakajima, K Kiriya, M Kawasaki, H Kiyonari, M Takeichi, M Toya, M Sato Cyst formation in proximal renal tubules caused by dysfunction of the microtubule minus-end regulator CAMSAP3 *Scientific Reports*, 2021-03-12;11(1):5857. 2021-03-12 [PMID: 33712686] (Knockdown Validated, Immunocytochemistry/ Immunofluorescence, Canine)

Mao C, Yu W, Li G et al. Effects of immediate loading directionality on the mechanical sensing protein PIEZO1 expression and early-stage healing process of peri-implant bone *Biomed Eng Online* 2024-03-19 [PMID: 38504231]

Austin Lai, Yung C Chen, Charles D Cox, Anthony Jaworowski, Karlheinz Peter, Sara Baratchi Analyzing the shear-induced sensitization of mechanosensitive ion channel Piezo-1 in human aortic endothelial cells. *Journal of cellular physiology* 2021-09-21 [PMID: 32959903]

Kotaro Hirano, Masaki Tsuchiya, Akifumi Shiomi, Seiji Takabayashi, Miki Suzuki, Yudai Ishikawa, Yuya Kawano, Yutaka Takabayashi, Kaori Nishikawa, Kohjiro Nagao, Eiji Umamoto, Yasuo Kitajima, Yusuke Ono, Keiko Nonomura, Hirofumi Shintaku, Yasuo Mori, Masato Umeda, Yuji Hara The mechanosensitive ion channel PIEZO1 promotes satellite cell function in muscle regeneration *Life Science Alliance* 2022-11-29 [PMID: 36446523]

Chang Liu, Yanan Xia, Shichen Fu, Fanyi Meng, Bingcheng Feng, Leiqi Xu, Lixiang Li, Xiuli Zuo Inhibition of Piezo1 Ameliorates Intestinal Inflammation and Limits the Activation of Group 3 Innate Lymphoid Cells in Experimental Colitis *Journal of Innate Immunity* 2023-09-19 [PMID: 37725937]

Mitchell SJ, Pardo-Pastor C, Zangle TA, Rosenblatt J Voltage-dependent volume regulation controls epithelial cell extrusion and morphology *bioRxiv : the preprint server for biology* 2023-03-14 [PMID: 36993671] (ICC/IF, Canine)

Zhao T, Chu Z, Chu C et al. Macrophages induce gingival destruction via Piezo1-mediated MMPs-degrading collagens in periodontitis *Frontiers in Immunology* 2023-05-16 [PMID: 37261355] (IHC-P, Human)

Details:

Dilution: 1:100

More publications at <http://www.novusbio.com/NBP1-78446>

## Procedures

### Immunohistochemistry-Paraffin protocol for PIEZO1 Antibody (NBP1-78446)

#### Immunohistochemistry-Paraffin Embedded Sections

##### Antigen Unmasking:

Bring slides to a boil in 10 mM sodium citrate buffer (pH 6.0) then maintain at a sub-boiling temperature for 10 minutes. Cool slides on bench-top for 30 minutes.

##### Staining:

1. Wash sections in deionized water three times for 5 minutes each.
2. Wash sections in wash buffer for 5 minutes.
3. Block each section with 100-400 ul blocking solution for 1 hour at room temperature.
4. Remove blocking solution and add 100-400 ul diluted primary antibody. Incubate overnight at 4C.
5. Remove antibody solution and wash sections in wash buffer three times for 5 minutes each.
6. Add 100-400 ul biotinylated diluted secondary antibody. Incubate 30 minutes at room temperature.
7. Remove secondary antibody solution and wash sections three times with wash buffer for 5 minutes each.
8. Add 100-400 ul Streptavidin-HRP reagent to each section and incubate for 30 minutes at room temperature.
9. Wash sections three times in wash buffer for 5 minutes each.
10. Add 100-400 ul DAB substrate to each section and monitor staining closely.
11. As soon as the sections develop, immerse slides in deionized water.
12. Counterstain sections in hematoxylin.
13. Wash sections in deionized water two times for 5 minutes each.
14. Dehydrate sections.
15. Mount coverslips.

\*The above information is only intended as a guide. The researcher should determine what protocol best meets their needs. Please follow safe laboratory procedures.

### Immunocytochemistry/ Immunofluorescence Protocol for PIEZO1 Antibody (NBP1-78446)

#### Immunocytochemistry Protocol

Culture cells to appropriate density in 35 mm culture dishes or 6-well plates.

1. Remove culture medium and wash the cells briefly in PBS. Add 10% formalin to the dish and fix at room temperature for 10 minutes.
2. Remove the formalin and wash the cells in PBS.
3. Permeablize the cells with 0.1% Triton X100 or other suitable detergent for 10 min.
4. Remove the permeablization buffer and wash three times for 10 minutes each in PBS. Be sure to not let the specimen dry out.
5. To block nonspecific antibody binding, incubate in 10% normal goat serum from 1 hour to overnight at room temperature.
6. Add primary antibody at appropriate dilution and incubate overnight at 4C.
7. Remove primary antibody and replace with PBS. Wash three times for 10 minutes each.
8. Add secondary antibody at appropriate dilution. Incubate for 1 hour at room temperature.
9. Remove secondary antibody and replace with PBS. Wash three times for 10 minutes each.
10. Counter stain DNA with DAPI if required.



**Western Blot Protocol for PIEZO1 Antibody (NBP1-78446)**

## Western Blot Protocol

1. Perform SDS-PAGE on samples to be analyzed, loading 10-25 ug of total protein per lane.
2. Transfer proteins to PVDF membrane according to the instructions provided by the manufacturer of the membrane and transfer apparatus.
3. Stain the membrane with Ponceau S (or similar product) to assess transfer success, and mark molecular weight standards where appropriate.
4. Rinse the blot TBS -0.05% Tween 20 (TBST).
5. Block the membrane in 5% Non-fat milk in TBST (blocking buffer) for at least 1 hour.
6. Wash the membrane in TBST three times for 10 minutes each.
7. Dilute primary antibody in blocking buffer and incubate overnight at 4C with gentle rocking.
8. Wash the membrane in TBST three times for 10 minutes each.
9. Incubate the membrane in diluted HRP conjugated secondary antibody in blocking buffer (as per manufacturer's instructions) for 1 hour at room temperature.
10. Wash the blot in TBST three times for 10 minutes each (this step can be repeated as required to reduce background).
11. Apply the detection reagent of choice in accordance with the manufacturer's instructions.



**Flow (Intracellular) Protocol for PIEZO1 Antibody (NBP1-78446)**

Protocol for Flow Cytometry Intracellular Staining (general dilution 1-5 ug/ml)

Sample Preparation.

1. Grow cells to 60-85% confluency. Flow cytometry requires between  $2 \times 10^5$  and  $1 \times 10^6$  cells for optimal performance.
2. If cells are adherent, harvest gently by washing once with staining buffer and then scraping. Avoid using trypsin as this can disrupt certain epitopes of interest. If enzymatic harvest is required, use Accutase, Collagenase, or TrypLE Express for a less damaging option.
3. Reserve 100 uL for counting, then transfer cell volume into a 50 mL conical tube and centrifuge for 8 minutes at 400 RCF.
  - a. Count cells using a hemocytometer and a 1:1 trypan blue exclusion stain to determine cell viability before starting the flow protocol. If cells appear blue, do not proceed.
4. Re-suspend cells to a concentration of  $1 \times 10^6$  cells/mL in staining buffer (NBP2-26247).
5. Aliquot out 1 mL samples in accordance with your experimental samples.

Tip: When cell surface and intracellular staining are required in the same sample, it is advisable that the cell surface staining be performed first since the fixation and permeabilization steps might reduce the availability of surface antigens.

Intracellular Staining.

Tip: When performing intracellular staining, it is important to use appropriate fixation and permeabilization reagents based upon the target and its subcellular location. Generally, our Intracellular Flow Assay Kit (NBP2-29450) is a good place to start as it contains an optimized combination of reagents for intracellular staining as well as an inhibitor of intracellular protein transport (necessary if staining secreted proteins). Certain targets may require more gentle or transient permeabilization protocols such as the commonly employed methanol or saponin-based methods.

Protocol for Cytoplasmic Targets:

Optional: Perform cell surface staining as described in the previous section.

1. Fix the cells by adding 100 uL fixation solution (such as 4% PFA) to each sample for 10-15 minutes.
2. Permeabilize cells by adding 100 uL of a permeabilization buffer to every  $1 \times 10^6$  cells present in the sample. Mix well and incubate at room temperature for 15 minutes.
  - a. For cytoplasmic targets, use a gentle permeabilization solution such as 1X PBS + 0.5% Saponin or 1X PBS + 0.5% Tween-20.
  - b. To maintain the permeabilized state throughout your experiment, use staining buffer + 0.1% of the permeabilization reagent (i.e. 0.1% Tween-20 or 0.1% Saponin).
3. Following the 15 minute incubation, add 2 mL of the staining buffer + 0.1% permeabilizer to each sample.
4. Centrifuge for 5 minutes at 400 RCF.
5. Discard supernatant and re-suspend in 1 mL of staining buffer + 0.1% permeabilizer.
6. Stain each sample at 1 uL/  $1 \times 10^6$  cells of primary antibody or 1-3 uL/  $1 \times 10^6$  cells for directly conjugated antibodies. Mix well and incubate at room temperature for 30 minutes- 1 hour. Gently mix samples every 10-15 minutes.
7. Following the primary/conjugate incubation, add 2 mL/sample of staining buffer +0.1% permeabilizer and centrifuge for 5 minutes at 400 RCF.
8. Remove supernatant and re-suspend each sample in 2 mL staining buffer + 0.1% permeabilizer, repeat wash for 5 minutes at 400 RCF.
9. If using a directly conjugated antibody, after the second wash, re-suspend cell pellet to a final volume of 500 uL per sample and proceed with flow analysis.





### **Novus Biologicals USA**

10730 E. Briarwood Avenue  
Centennial, CO 80112  
USA  
Phone: 303.730.1950  
Toll Free: 1.888.506.6887  
Fax: 303.730.1966  
nb-customerservice@bio-techne.com

### **Bio-Techne Canada**

21 Canmotor Ave  
Toronto, ON M8Z 4E6  
Canada  
Phone: 905.827.6400  
Toll Free: 855.668.8722  
Fax: 905.827.6402  
canada.inquires@bio-techne.com

### **Bio-Techne Ltd**

19 Barton Lane  
Abingdon Science Park  
Abingdon, OX14 3NB, United Kingdom  
Phone: (44) (0) 1235 529449  
Free Phone: 0800 37 34 15  
Fax: (44) (0) 1235 533420  
info.EMEA@bio-techne.com

### **General Contact Information**

www.novusbio.com  
Technical Support: nb-technical@bio-techne.com  
Orders: nb-customerservice@bio-techne.com  
General: novus@novusbio.com

### **Products Related to NBP1-78446**

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NBP1-78446PEP	PIEZO1 Antibody Blocking Peptide
NBP2-33376H	Blue Marker Antibody (6F4-F6) [HRP]
HAF008	Goat anti-Rabbit IgG Secondary Antibody [HRP]
NB7160	Goat anti-Rabbit IgG (H+L) Secondary Antibody [HRP]
NBP2-24891	Rabbit IgG Isotype Control

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### **Limitations**

This product is for research use only and is not approved for use in humans or in clinical diagnosis. Primary Antibodies are guaranteed for 1 year from date of receipt.

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