

# Organelle Marker Panel

## Organelle Markers in subcellular localization studies

Subcellular localization studies are important for mapping and characterizing proteins and thus for better understanding of the cellular functions of the proteins. The spatial and temporal protein expression patterns can be visualized, on a fine cellular and subcellular level, using confocal microscopy analysis on human cell lines.

In order to facilitate interpretation of the subcellular distribution of the protein targeted by a specific antibody, the cells may be stained with reference markers for different subcellular structures, organelles, within the cells. For example, in the Human Protein Atlas (HPA) project, an antibody towards calreticulin was chosen as a reference marker for the Endoplasmic Reticulum (ER), as illustrated in **Figure 1**.

Moreover, for automated annotation of co-localization analysis, organelle specific markers are needed for every subcellular compartment.

## Atlas Antibodies' Organelle Marker Panel

In collaboration with the Human Protein Atlas project, we have developed a number of reference markers for different organelles.

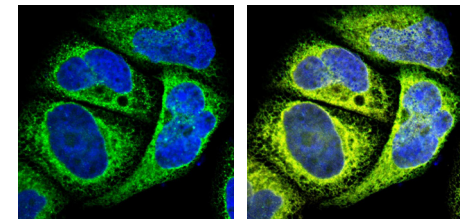
Our organelle marker panel includes 27 PrecisA Monoclonals™ antibodies targeting 15 different subcellular structures within the cell. These are presented in **Figure 3** and **Table 1**.

The organelle markers have been selected based primarily on the specific target recognition over a number of commonly used human cell lines, such as A-431, U-251 MG, U-2 OS, HeLa and MCF-7.

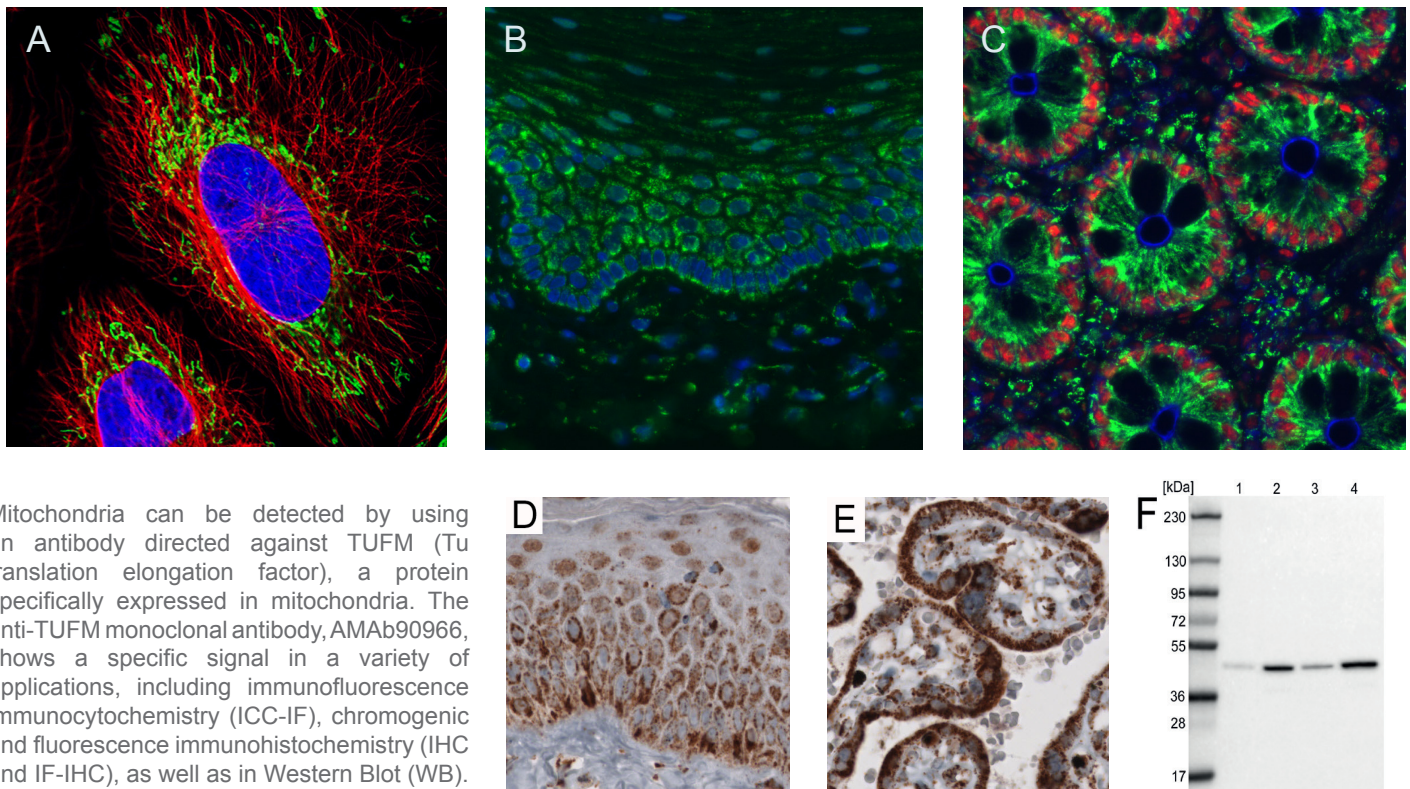
Other selection criteria included high signal to noise ratio, agreement of protein-RNA expression according to RNA Seq data, detection of band of expected target size in WB, as well as correlation of positivity compared to other antibodies towards the same protein target.

The 27 organelle markers have been combined as a panel and developed under the stringent conditions of the PrecisA Monoclonals antibodies, which guarantees a secured continuity and stable supply.

The majority of the organelle markers in this panel are recommended for Western Blot (WB), immunofluorescence (ICC-IF) and immunohistochemistry (IHC) applications, as exemplified with the anti-TUFM in **Figure 2**.



**Figure 1.** Immunofluorescence staining using the anti-HSP90B1 (HPA003901) is shown in green. Nuclei are shown in blue (DAPI). The endoplasmic reticulum (ER) reference marker detecting calreticulin is shown in yellow. The yellow signal overlaps with the green antibody signal, confirming ER-specificity.



Mitochondria can be detected by using an antibody directed against TUFM (Tu translation elongation factor), a protein specifically expressed in mitochondria. The anti-TUFM monoclonal antibody, AMAb90966, shows a specific signal in a variety of applications, including immunofluorescence immunocytochemistry (ICC-IF), chromogenic and fluorescence immunohistochemistry (IHC and IF-IHC), as well as in Western Blot (WB).

## Figure 2.

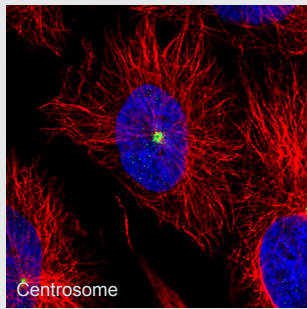
(A) ICC-IF staining of HeLa cell line with anti-TUFM (AMAb90966) shows distinct immunoreactivity in mitochondria (in green). Nuclei are displayed in blue (DAPI) and microtubules in red. (B) IHC-IF staining of human skin with Anti-TUFM immunoreactivity shown in green and nuclei in blue. (C) Multiplexed IHC-IF staining of human colon tissue with mitochondrial anti-TUFM. Immunoreactivity is shown in green, plasma membranes in blue (Anti-EZR, AMAb90979, IgG2b) and nuclei in red (Anti-HNRNPC, AMAb91010, IgG2a). (D) IHC staining of human skin and (E) placenta. (F) WB analysis of human cell lines U251 MG (1), A-431 (2), U-2 OS (3) and MCF-7 (4).





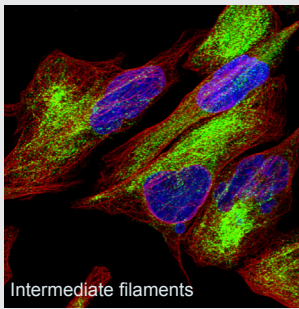
**Cell junctions**

IF staining with Anti-GJB6 (AMAb91305) shows positivity in cell junctions.



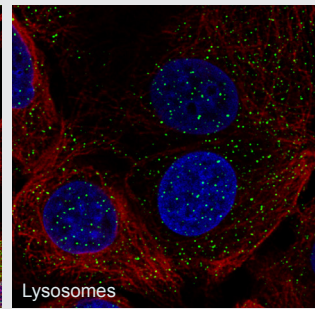
**Centrosome**

IF staining with Anti-CDK5RAP2 (AMAb91163) shows positivity in centrosome.



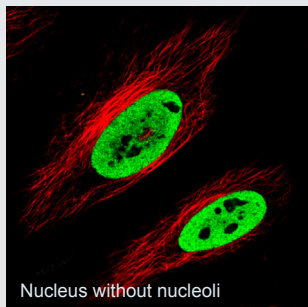
**Intermediate filaments**

IF staining with Anti-DES (AMAb91303) shows positivity in intermediate filaments.



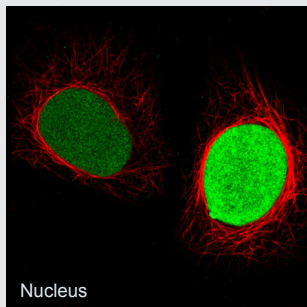
**Lysosomes**

IF staining with Anti-LAMP1 (AMAb91170) shows positivity in lysosomes.



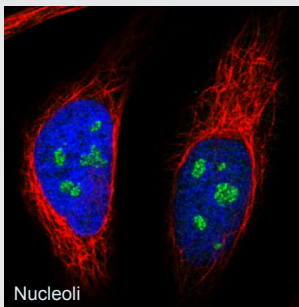
**Nucleus without nucleoli**

IF staining with Anti-FUS (AMAb90549) shows nuclear (without nucleoli) positivity.



**Nucleus**

IF staining with Anti-PARP1 (AMAb90959) shows a cell cycle dependent nuclear (without nucleoli) pattern.



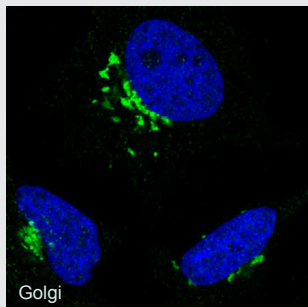
**Nucleoli**

IF staining with Anti-NOP56 (AMAb91013) shows nucleoli-specific positivity.



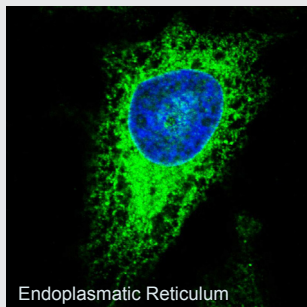
**Nuclear membrane**

IF staining with Anti-EMD (AMAb90562) shows strong positivity in nuclear membrane, as well as weaker positivity in ER.



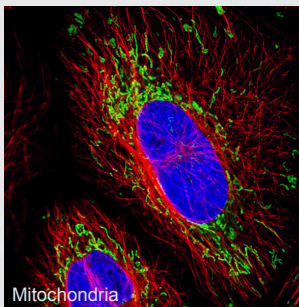
**Golgi**

IF staining with Anti-GORASP2 (AMAb91016) shows positivity in Golgi apparatus.



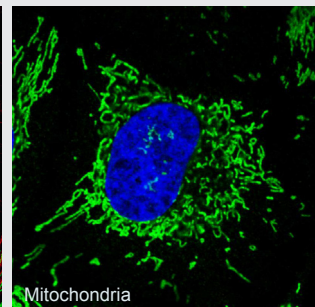
**Endoplasmic Reticulum**

IF staining with Anti-PDIA3 (AMAb90988) shows distinct positivity of endoplasmic reticulum (ER).



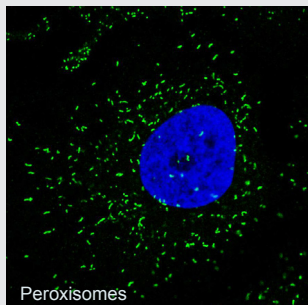
**Mitochondria**

IF staining with Anti-TUFM (AMAb90966) shows specific mitochondrial staining.



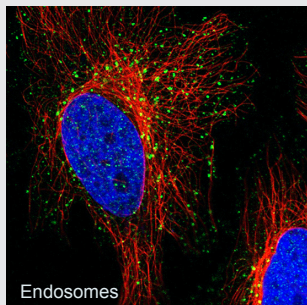
**Mitochondria**

IF staining with Anti-CS (AMAb91005) shows distinct positivity in mitochondria.



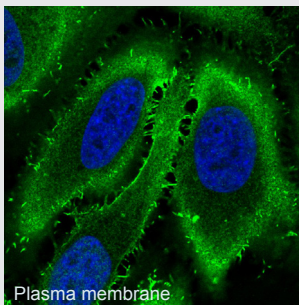
**Peroxisomes**

IF staining with Anti-ABCD3 (AMAb90995) shows positivity in peroxisomes.



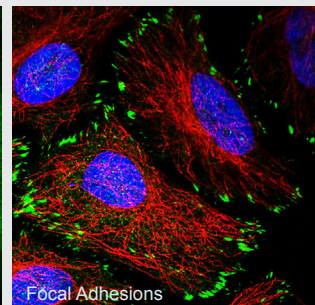
**Endosomes**

IF staining with Anti-VPS26A (AMAb90967) shows distinct staining of endosomes.



**Plasma membrane**

IF staining with Anti-EZR (AMAb90976) shows positivity in plasma membrane.



**Focal Adhesions**

IF staining with Anti-ZYX (AMAb90992) shows distinct staining of focal adhesions.

**Figure 3**

Immunofluorescence images showing 15 different subcellular organelles using the PrecisA Monoclonals as markers with antibody staining shown in green. Microtubule- and nuclear probes are visualized in red and blue respectively (where available).

**Table 1.**

PrecisA Monoclonals included in the Organelle Marker panel.

Organelle	Target gene description	Product Name	Product Number	Validated Applications	Iso-type
Cell junctions	Gap junction protein, beta 6, 30kda	Anti-GJB6	AMAb91305	ICC-IF	IgG2a
Centrosome	Cdk5 regulatory subunit associated protein 2	Anti-CDK5RAP2	AMAb91163	ICC-IF, IHC	IgG1
	Centrosomal protein 350kda	Anti-CEP350	AMAb91164	ICC-IF, IHC	IgG1
Intermediate filaments	Desmin	Anti-DES	AMAb91303	ICC-IF, WB	IgG2a
Lysosomes	Lysosomal-associated membrane protein 1	Anti-LAMP1	AMAb91170	IHC, WB	IgG2a
Nucleus (no nucleoli)	Fused in sarcoma	Anti-FUS	AMAb90549	ICC-IF, IHC*, WB*	IgG1
	Heterogeneous nuclear ribonucleoprotein C (C1/C2)	Anti-HNRNPC	AMAb91010	ICC-IF, IHC, WB*	IgG2a
	Heterogeneous nuclear ribonucleoprotein C (C1/C2)	Anti-HNRNPC	AMAb91012	ICC-IF, IHC, WB*	IgG1
	Anillin, actin binding protein	Anti-ANLN	AMAb90662	ICC-IF, IHC*, WB*	IgG1
Nucleus	Poly (ADP-ribose) polymerase 1	Anti-PARP1	AMAb90959	ICC-IF, IHC, WB*	IgG1
Nucleoli	MKI67 (FHA domain) interacting nucleolar phosphoprotein	Anti-MKI67IP	AMAb90961	ICC-IF, IHC	IgG2a
	NOP56 ribonucleoprotein homolog	Anti-NOP56	AMAb91013	ICC-IF, IHC, WB*	IgG1
Nuclear membrane	Emerin	Anti-EMD	AMAb90562	ICC-IF, IHC, WB*	IgG1
	Lamin b1	Anti-LMNB1	AMAb91251	ICC-IF, IHC, WB	IgG1
Golgi apparatus	Golgi reassembly stacking protein 2	Anti-GORASP2	AMAb91016	ICC-IF, IHC*, WB*	IgG2b
Endoplasmic reticulum	Protein disulfide isomerase family A	Anti-PDIA3	AMAb90988	ICC-IF, IHC*, WB*	IgG1
	Heat shock protein 90kda beta (grp94), member 1	Anti-HSP90B1	AMAb91019	ICC-IF, IHC*, WB*	IgG2b
Mitochondria	Tu translation elongation factor, mitochondrial	Anti-TUFM	AMAb90964	ICC-IF, IHC, WB*	IgG1
	Tu translation elongation factor, mitochondrial	Anti-TUFM	AMAb90965	ICC-IF, IHC, WB	IgG2a
	Tu translation elongation factor, mitochondrial	Anti-TUFM	AMAb90966	ICC-IF, IHC, WB	IgG1λ
	Citrate synthase	Anti-CS	AMAb91005	ICC-IF, IHC, WB	IgG1
	Citrate synthase	Anti-CS	AMAb91007	ICC-IF, IHC, WB	IgG1
	Citrate synthase	Anti-CS	AMAb91009	ICC-IF, IHC, WB	IgG1
Peroxisomes	ATP-binding cassette, sub-family D (ALD), member 3	Anti-ABCD3	AMAb90995	ICC-IF, IHC*	IgG1
Endosomes	Vacuolar protein sorting 26 homolog A	Anti-VPS26A	AMAb90967	ICC-IF, IHC*, WB*	IgG1
Plasma membrane	Ezrin	Anti-EZR	AMAb90976	ICC-IF, IHC*, WB*	IgG1
Focal adhesions	Zyxin	Anti-ZYX	AMAb90992	ICC-IF, IHC	IgG2b

\* Products with enhanced validation for indicated application



In addition to the extensive validation and characterization always performed for our antibodies, we conduct application-specific Enhanced Validation to secure the antibody specificity in a defined context. [Learn more about enhanced validation.](#)

## ABOUT ATLAS ANTIBODIES

Atlas Antibodies is a Swedish biotechnology company that facilitates leading research worldwide through manufacturing and providing primary antibodies and protein standards for targeted proteomics using mass spectrometry.

## VERY RELIABLE ANTIBODIES

Atlas Antibodies is the original manufacturer of over 21,000 primary antibodies targeting the majority of human proteins. Building on our heritage with the Human Protein Atlas project, we provide highly validated reagents that enable leading research in biology, diagnostics, and medicine. All our products are rigorously evaluated for specificity, reproducibility and performance and characterized in multiple applications. Our team of researchers develops the next generation of innovative and reliable tools, fundamental to advancing research in neuroscience, oncology, cell biology, stem cells and development.

## CREATED BY THE HUMAN PROTEIN ATLAS

With our roots in the Human Protein Atlas project, an integration of antibody-based imaging, proteomics, and transcriptomics, our antibodies are affinity-purified, reproducible, selective, and specific for their target proteins through our enhanced validation process. Our Triple A Polyclonals™ are developed within the Human Protein Atlas project.

## VALIDATED BY ENHANCED VALIDATION

We take great care to validate our antibodies in IHC, WB, and ICC-IF. Our antibodies are validated in all major human tissues and organs and 20 cancer tissues. Each antibody is supported by over 500 staining images. As an additional layer of security, we perform Enhanced Validation. By using 5 different enhanced validation methods we validate our antibodies for each combination of protein, sample, and application. Discover our Triple A Polyclonals™ and PrecisA Monoclonals™ antibodies targeting the majority of human proteins in cells, tissues, and organs.

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### Atlas Antibodies Advanced Polyclonals.

Triple A Polyclonals™ are rabbit polyclonal primary antibodies developed within the Human Protein Atlas project. IHC characterization data from 44 normal and 20 cancer tissues is available on the Human Protein Atlas portal. Available as **25 µL** and **100 µL** unit size.



### Precise. Accurate. Targeted.

PrecisA Monoclonals™ are mouse monoclonal primary antibodies developed against a number of carefully selected targets. Clones are selected to recognize only unique non-overlapping epitopes and isotypes. Available as **25 µL** and **100 µL** unit size.



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