



MS

# Validated Antibodies

Large-scale validated antibodies for  
immunohistochemistry.

## Product Highlights













validated on more than  
**10,000** tumors









[www.ms-validatedantibodies.com](http://www.ms-validatedantibodies.com)

## Highlight antibodies with publications

Antibodies	Clone	Images
<b>CPA1</b>	MSVA-601M	
<b>GAD2</b>	MSVA-602M	
<b>Mesothelin</b>	MSVA-235M	
<b>PD-L1</b>	MSVA-711R	
<b>PLAP</b>	MSVA-350R	
<b>TROP-2</b>	MSVA-733R	
<b>TRPS1</b>	MSVA-512R	
<b>Uroplakin 1A</b>	MSVA-735M	
<b>Uroplakin 1B</b>	MSVA-734M	
<b>Uroplakin 3B</b>	MSVA-736M	

## Further product highlights

Antibodies	Clone	Images
<b>CD4</b>	MSVA-004R	
<b>CEA</b>	MSVA-465R	
<b>GLUT1</b>	MSVA-401R	
<b>MTAP</b>	MSVA-741R	
<b>PAX8</b>	MSVA-708R	
<b>Vimentin</b>	MSVA-458R	

# Complete MSVA Portfolio

## A

ACE2  
AIF1  
Androgen Receptor  
Arginase-1

## B

Brachyury  
BRG1 / SMARCA4

## C

Cadherin-16/CDH16  
Cadherin-17/CDH17  
Calbindin 1  
Caldesmon  
Calponin

Caspase-3

CBP

CD1a

CD3

CD4

CD5

CD7

CD8

CD20

CD22

CD23

CD27

CD31

CD32

CD34

CD38

CD44

CD45

CD45RA

CD56

CD141

CD163

CD171

CEA/CD66e/CEACAM5

CELA3B

Chromogranin A

Claudin 3

Collagen IV

CPA1/

Carboxypeptidase A1

C-Peptide

CTLA-4 /CD152

Cyclin E1

Cystatin A

Cytokeratin 5

Cytokeratin 6

Cytokeratin 7

Cytokeratin 10

Cytokeratin 13

Cytokeratin 14

Cytokeratin 15

Cytokeratin 17

Cytokeratin 18

Cytokeratin 19

Cytokeratin 20

Cytokeratin Pan

## D

Decorin

Desmin

Desmoglein 1

Desmoglein 3

DOG-1

## E

E-Cadherin

Elastin

EpCAM

Estrogen Receptor

## F

FABP1

Factor 13 alpha

## G

GAD2

GATA3

Glucocorticoid Receptor

Glutamine Synthetase

GLUT1

GP2

GPX2

## H

Helicobacter Pylori

Hepatocyte Specific

HER2 / CD340

Histone H3

HLA-DRa

HLA-DRB1

HMGA2

HMGB1

## I

IgA

IgD

Inhibin alpha

INSM1

Insulin

## K

KDM6A

Ki-67

KLK7

## M

Mammaglobin

MBP/Myelin Basic

Protein

MCM2

MCM3

MCM7

Melan A CR (cross reactive)

Melan A specific

Mesothelin

MPO/Myeloperoxidase

MSH2

MSH6

MTAP

MUC1

MUC2

MUC5AC

MUC6

MX1

Myosin Heavy Chain 7

Myosin Heavy Chain 11

## N

Napsin A

NSE gamma

Nucleolin

## O

Occludin

## P

p16

p53

p63

PAPP-A

PAX6

PAX8

PD-L1

Pepsinogen I

Periostin

PGP9.5

PLAP

PMEL17 / gp100

Progesterone Receptor

Prostein

PSA

PSAP /ACP3/ ACPP

PTH

## S

S100

S100A12

S100P

SATB2

SDHB

Somatostatin

STAR

STING1

Synaptophysin

## T

TACSTD2 / Trop2

TdT

TFE3 / Transcription

Factor E3

TFF-1 / pS2

Thyroglobulin

TH

TIGIT

TIM3

TLE1

TOP2A / TOPO2A

TRIM29

TRIM72

TRPS1

TTF-1/Thyroid

Transcription Factor 1

TYMS

## U

Uroplakin 1A

Uroplakin 1B

Uroplakin 3B

## V

Villin

Vimentin

Vwf

## X

XRCC5/Ku-p80

## Z

ZAP-70

# CPA1 MSVA-601M

## Protein expressed on normal and neoplastic pancreatic acinar cells.

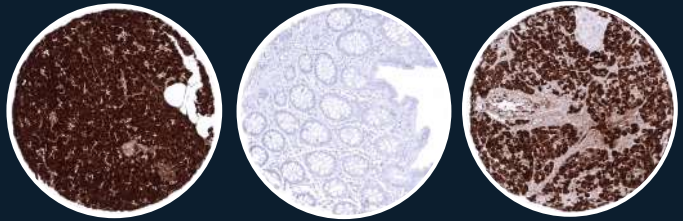
Antibody type = Mouse monoclonal / IgG1

Synonyms = Carboxypeptidase A1 (pancreatic)

Reactivity = Human

Dilution = 1:100 – 1:200

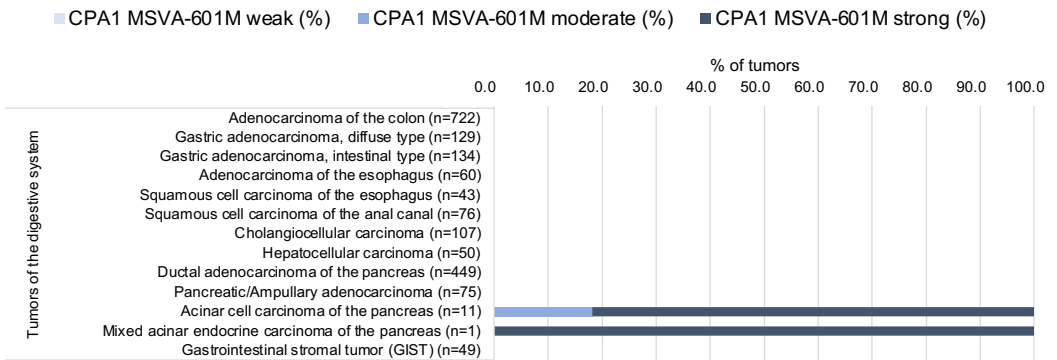
Intended Use = Research Use Only



CPA1 (clone MSVA-601M) is a new marker for immunohistochemistry with very high sensitivity and specificity (>99%) for acinar cell carcinoma of the pancreas. Acinar cell carcinoma of the pancreas makes up for only 1-2% of pancreatic tumors but is misdiagnosed in a considerable fraction of cases.

A study on 15,680 tumors of than 100 different tumor entities was recently published in the American Journal of Surgical Pathology by Uhlig et. al (1). In the study, a positive CPA1 immunostaining was seen in all 12 analyzed pancreatic acinar cell carcinomas but in none of the 12,263 tumors from the other 130 tumor categories.

The full graphic and further information about the study is shown on our website under compatibility of antibodies.



[1] "Carboxypeptidase A1 (CPA1) Immunohistochemistry Is Highly Sensitive and Specific for Acinar Cell Carcinoma (ACC) of the Pancreas." Published by Uhlig R et al. in Am J Surg Pathol. 2022 Jan 1;46(1):97-104.

# GAD2 MSVA-602M

Highly expressed in pancreatic islet cells

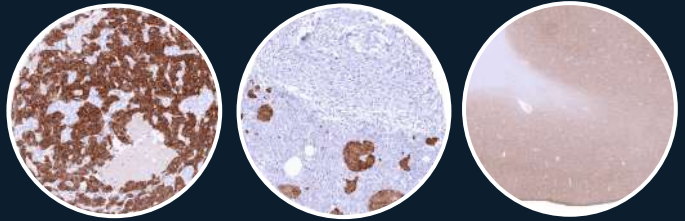
Antibody type = Mouse monoclonal  
IgG2b, kappa

Synonyms = GAD65

Reactivity = Human

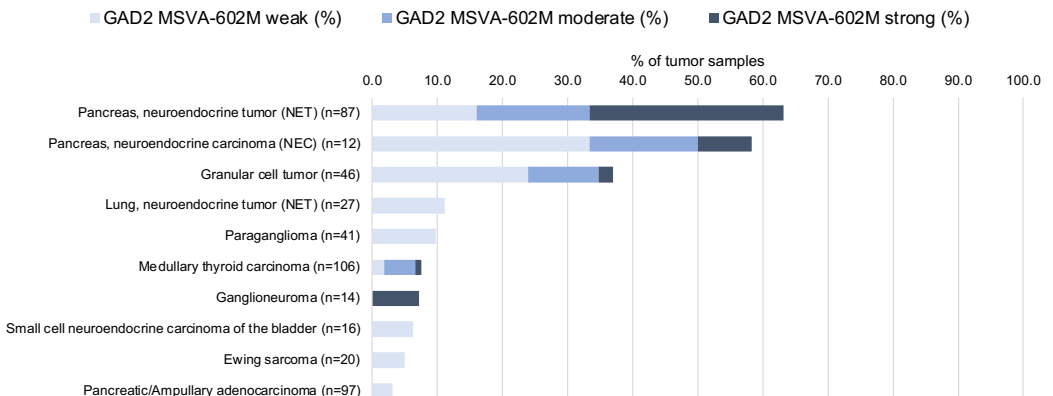
Dilution = 1:100 – 1:200

Intended Use = Research Use Only



Glutamate decarboxylase 2 (GAD2) is one out of two glutamate decarboxylases that catalyze the decarboxylation of glutamate to GABA (the most relevant inhibitory neurotransmitter in the central nervous system). In addition, GAD2 plays a less well-known role in insulin-producing  $\beta$ -cells of pancreatic islets.

Lennartz et al. analyzed formalin fixed archival tissues from 76 different types of normal tissues and 17,507 tumors from 152 different tumor categories. They found an unusually high tissue specificity of GAD2 expression among normal tissues and a restriction of GAD2 expression to only few tumor entities. In normal tissues, GAD2 expression was strictly limited to the brain and islet cells of the pancreas. Accordingly, GAD2 expression in (extracranial) tumors largely predominated in neuroendocrine neoplasms derived from the pancreatic islets. The expression of GAD2 in different tumor types is shown below. The graphic is based on the results of Lennartz et al. (2). The full graphic and further information about the study is shown on our website under compatibility of antibodies.



[2] Lennartz et al. GAD2 Is a Highly Specific Marker for Neuroendocrine Neoplasms of the Pancreas. Am J Surg Pathol. 2024 Jan 25. Epub ahead of print. PMID: 38271200.

# Mesothelin MSVA-235M

## Protein expressed in various epithelial and mesothelial tumor types

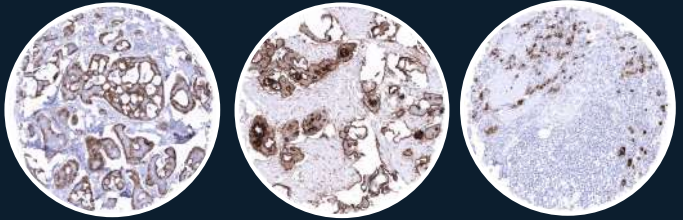
Antibody type = Mouse monoclonal / IgG2

Synonyms = CAK1; MSLN; SMR; SMRP  
Megakaryocyte potentiating factor

Reactivity = Human

Dilution = 1:100 – 1:200

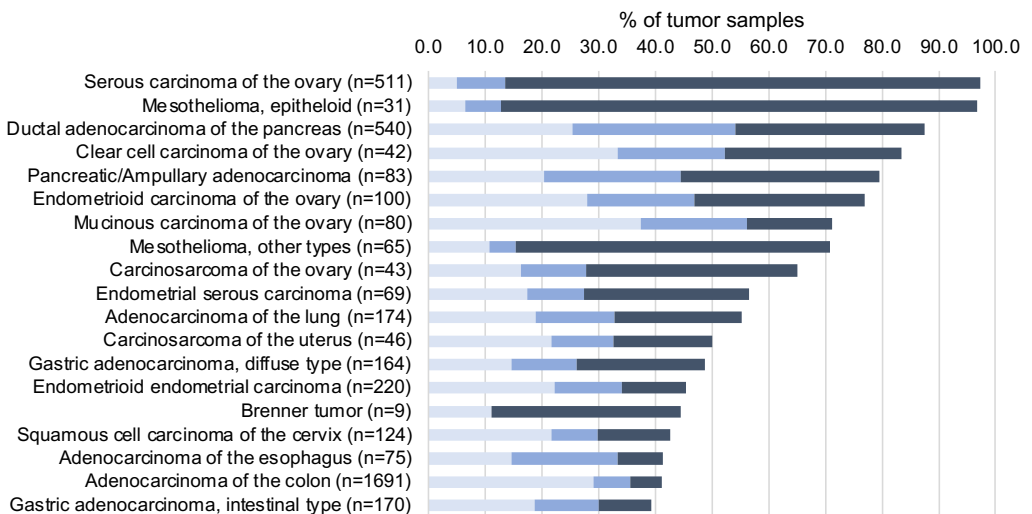
Intended Use = Research Use Only



A total of 13,218 tumors were analyzed from 122 different tumor categories (3). At least one case with a positive mesothelin immunostaining was seen in 66 and at least one case with a strong mesothelin immunostaining was seen in 50 of 122 tumor categories. The distribution of positive staining results is shown below and on our website.

Mesothelin is a promising therapeutic target. Accordingly, the authors see the main impact of their study in the ranking list of tumors that might most commonly benefit from anti-mesothelin drugs such as amatuximab, anetumab and others (3).

- Mesothelin MSVA-235M weak (%)
- Mesothelin MSVA-235M moderate (%)
- Mesothelin MSVA-235M strong (%)



[3] Weidemann et al. "Mesothelin Expression in Human Tumors: A Tissue Microarray Study on 12,679 Tumors" in *Biomedicines* 2021, 9, 397.

# PD-L1 MSVA-711R

## Pivotal protein in immune-oncology

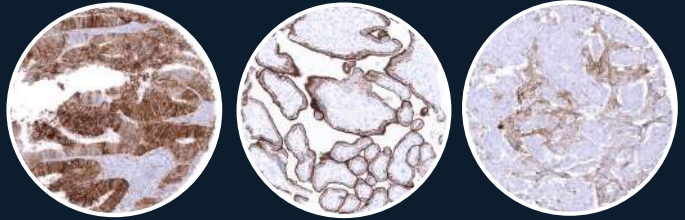
Antibody type = Recombinant Rabbit monoclonal / IgG

Synonyms = B7-H1; CD274; PDCD1 ligand 1

Reactivity = Human

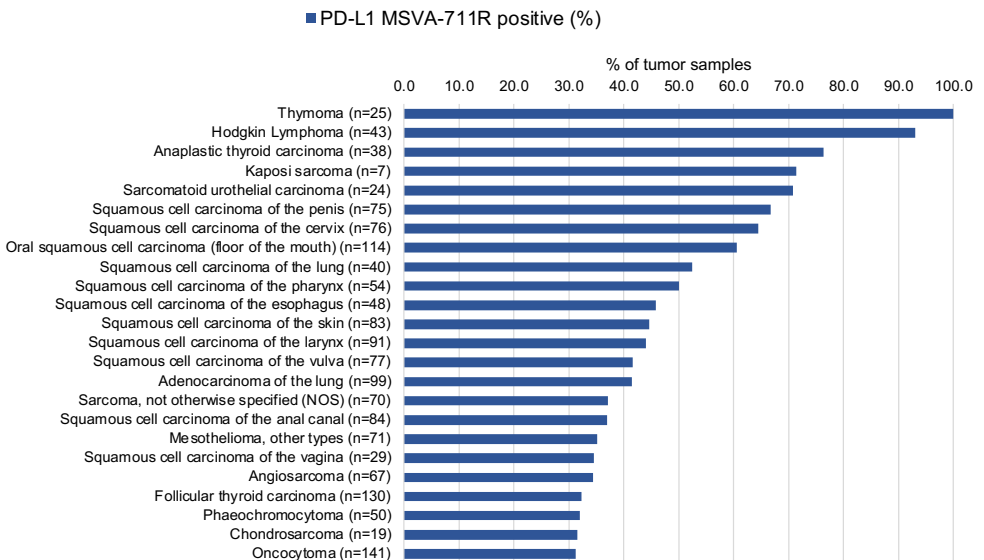
Dilution = 1:00 – 1:200

Intended Use = Research Use Only



In three studies by Möller et al. a total of 14,654 tumors from 118 different tumor types were analyzed. At a cut-off level of  $\geq 10\%$  PD-L1 positive tumor cells, a positive PD-L1 staining was seen in 85 of 118 tumor types. The distribution of positive staining results is shown in a "ranking order" figure below and on our website.

The importance of the data by Möller et al. comes from their ranking list of cancer types according to their frequency of PD-L1 positivity. It is the only study so far that analyzed most relevant cancer types under highly standardized conditions for PD-L1.



[4] 3 studies by Möller et al. **1.** "High density of cytotoxic T-lymphocytes is linked to tumoral PD-L1 expression regardless of the mismatch repair status in colorectal cancer". Published in *Acta Oncologica*. 2021;60(9):1210-1217. **2.** "Tumor cell PD-L1 expression is a strong predictor of unfavorable prognosis in immune checkpoint therapy-naive clear cell renal cell cancer". Published in *International Urology and Nephrology*. 2021;53(12):2493-2503. **3.** "PD-L1 expression and CD8 positive lymphocytes in human neoplasms: A tissue microarray study on 11,838 tumor samples". Published in *Cancer Biomarkers*. 2023;36(2):177-191.

# PLAP MSVA-350R

Antibody type = Recombinant Rabbit monoclonal / IgG

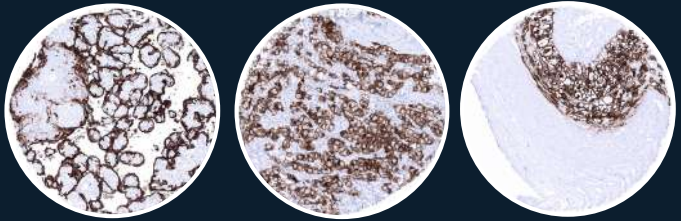
Synonyms = Alkaline phosphatase placental type; Alkaline

Reactivity = Human

Dilution = 1:100 – 1:200

Intended Use = Research Use Only

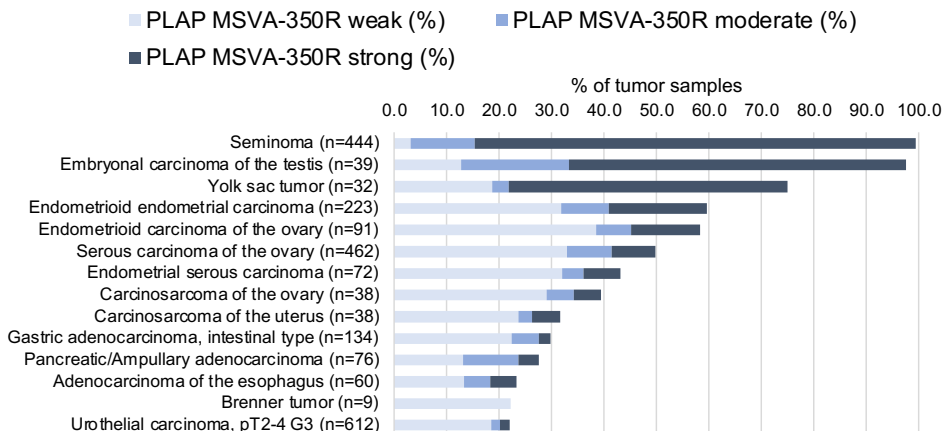
**Marker for germ cell tumors which can also be expressed in various types of adenocarcinomas**



The analysis of 12,381 tumors from 131 different tumor categories revealed at least one case with a positive PLAP staining in 48 and at least one case with a strong PLAP staining in 22 of 131 tumor categories. Of note, PLAP expression does not occur in leiomyomatous tumors (previous reports on this subject were driven by cross-reactivity of other PLAP antibodies). The main conclusion of Reiswich et al. with respect to utility of PLAP expression analysis was (5):

- **PLAP is frequently expressed in germ cell tumors and can be used for ascertaining this diagnosis as a part of a panel.**
- **PLAP can be expressed – even at high levels! – in various other cancers including gynecologic, urothelial, gastrointestinal and biliopancreatic carcinomas.**

The full graphic and further information about the study is shown on our website under compatibility of antibodies.



[5] "Pattern of placental alkaline phosphatase (PLAP) expression in human tumors: a tissue microarray study on 12,381 tumors." Reiswich et al. In the journal of Pathology: Clinical Research, 2021;7(6):577-589.



# TROP-2 MSVA-733R

Antibody type = Recombinant Rabbit monoclonal / IgG

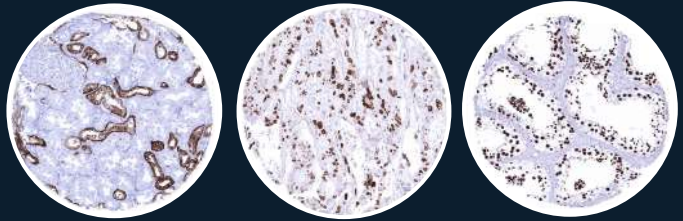
Synonyms = TACSTD2

Reactivity = Human

Dilution = 1:100 – 1:200

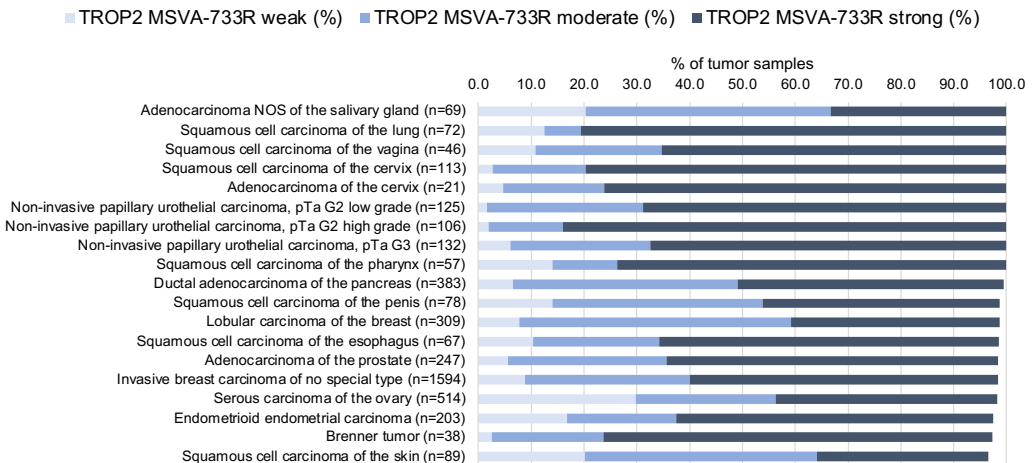
Intended Use = Research Use Only

## Therapeutic target protein



Trophoblast cell surface antigen 2 (TACSTD / Trop-2) is the target of sacituzumab govitecan, an antibody-drug conjugate approved for treatment of triple negative breast cancer and urothelial carcinoma. TROP2 is expressed in many more tumor entities. However, most currently available data on TROP2 expression in cancer tissues was based on RNA profiling.

To clarify the prevalence of TROP2 protein expression in cancer, Dum et al. successfully analyzed 16,024 tumor tissue samples from 150 different tumor types for TROP2 expression by IHC (6). Dum et al. used our novel rabbit recombinant antibody (MSVA-733R) which was thoroughly validated on 76 different normal tissue types by comparison with a second independent antibody and RNA expression data. The full graphic and further information about the study is shown on our website under compatibility of antibodies.



[6] Dum et al.: "Trophoblast cell surface antigen 2 (TROP2) expression in human tumors: A tissue microarray study on 18,563 tumors. Published in Pathobiology. 2022 Apr 27;1:1-14. PMID: 35477165.

# TRPS1 MSVA-741R

## Transcription factor highly expressed in breast epithelial tissues

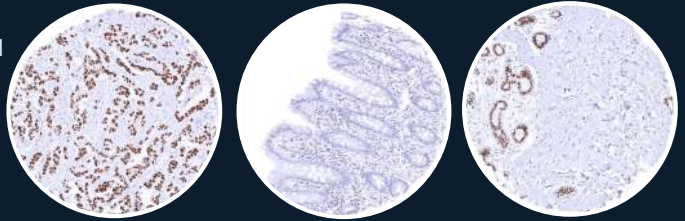
Antibody type = Rabbit monoclonal / IgG

Synonyms = GC79; LGCR; Transcriptional repressor GATA binding 1

Reactivity = Human

Dilution = 1:100 – 1:200

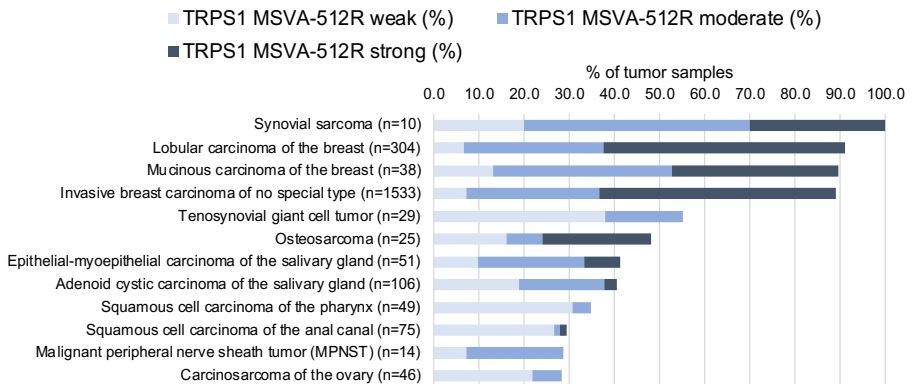
Intended Use = Research Use Only



In the study by Lennartz et al. 86 of 152 tumor categories showed detectable TRPS1 staining and 36 tumor categories showed at least one strongly positive case. The TRPS1 positivity rate was highest in various types of breast cancers (51.4%-100%), soft tissue tumors (up to 100%), salivary gland tumors (up to 46.2%), squamous cell carcinomas of various sites of origin (up to 34.7%), and in diverse gynecological cancers (up to 40.0%). The authors conclusions were (7):

- **TRPS1 immunostaining is a sensitive but not a fully specific marker for breast cancer.**
- **TRPS1 positivity is a suitable marker for synovial sarcoma (positive in 80-100%).**
- **The combined analysis of TRPS1 and GATA3 is highly useful: A combined GATA3 and TRPS1 positivity was almost exclusively seen in neoplasms of the breast and the salivary glands. Only 2.5% of 1,159 GATA3/TRPS1 dual positive tumors were of non-breast and non-salivary gland origin.**

The full graphic is shown on our website under compatibility of antibodies.



[7] Lennartz et al. "TRPS1 is a highly sensitive marker for breast cancer: A tissue microarray study evaluating more than 19,000 tumors from 152 different tumor entities" Published in Am J Surg Pathol. 2024 Apr 22. doi: 10.1097/PAS.0000000000002213. Epub ahead of print. PMID: 38647255

# Uroplakin 1a (MSVA-735M)

Antibody type = Mouse monoclonal IgG

**Marker for urothelium and urothelial tumors**

Synonyms = UP1A; UPIA; UPKA; TSPAN21

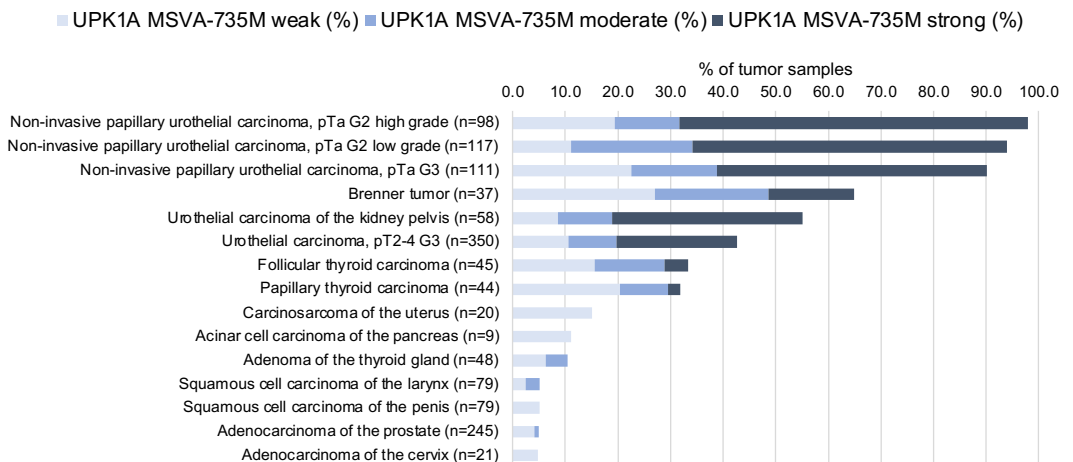
Reactivity = Human

Dilution = 1:100-1:200

Intended Use = Research Use Only



Urothelial carcinomas are solid tumors that lack characteristic histological features. Immunohistochemistry is therefore often needed to distinguish urothelial carcinomas from other solid cancers that can for example include poorly differentiated adenocarcinomas of the prostate invading the urinary bladder. However, none of the currently used "urothelium markers" is highly specific. In this study, Reiswich et al. introduce our MSVA-735M uroplakin 1a antibody as a novel tool for the distinction of urothelial neoplasms. In their study on more than 5,000 tumors they show Upk1a expression in 42% of muscle invasive urothelial cancers (often strong) but only in <5% of prostatic adenocarcinomas (usually weak) (8). The authors suggest that Upk1a may be useful for the distinction of urothelial neoplasms as a part of a panel. The full graphic and further information about the study is shown on our website under compatibility of antibodies.



[8] Reiswich et al. Large-scale human tissue analysis identifies Uroplakin 1a as a putative diagnostic marker for urothelial cancer. Published in Pathology Research and Practice 2022 Jul 18;237:154028.

# Uroplakin 1b MSVA-734M

## Marker for urothelial carcinomas

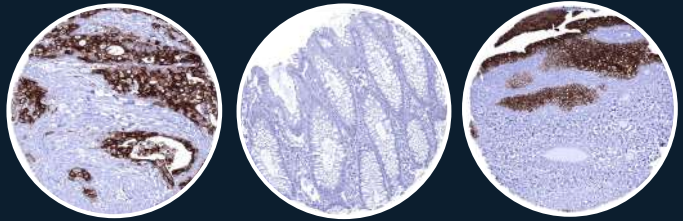
Antibody type = Mouse monoclonal IgG

Synonyms = TSPAN20, UPK1B

Reactivity = Human

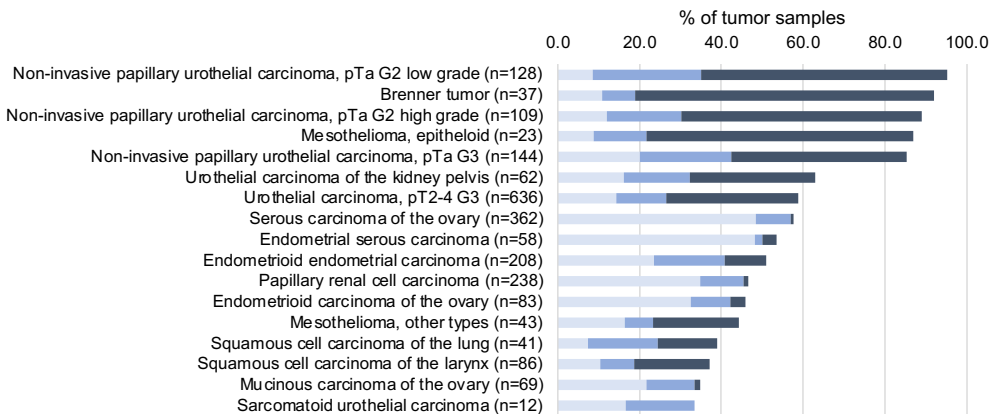
Dilution = 1:100 – 1:200

Intended Use = Research Use Only



In this study, Reiswich et al. introduce our MSVA-734M uroplakin 1b antibody as a potential new tool for diagnostic surgical pathology (9). By analyzing 608 samples of 76 different normal tissue types, the authors showed that Upk1b expression is limited to few normal tissues including mesothelial and urothelial cells. The subsequent analysis of 14,061 samples from 127 different tumor types showed that Upk1b expression in cancer was preferentially seen in tumors derived from these cell types including urothelial carcinoma and mesothelioma. The authors propose that immunohistochemical Upk1b analysis could be included into panels designed for the distinction of malignant mesothelioma from adenocarcinoma of the lung or urothelial carcinoma from prostatic adenocarcinoma in the bladder. The full graphic and further information about the study is shown on our website under compatibility of antibodies.

■ UPK1B MSVA-734M weak (%)     ■ UPK1B MSVA-734M moderate (%)  
■ UPK1B MSVA-734M strong (%)



[9] "Large-scale human tissue analysis identifies Uroplakin 1b as a putative diagnostic marker in surgical pathology." Published by Reiswich et al. in Human Pathology 2022 May 10;126:108-120. PMID: 35550834

# Uroplakin 3b MSVA-736M

Antibody type = Mouse monoclonal IgG

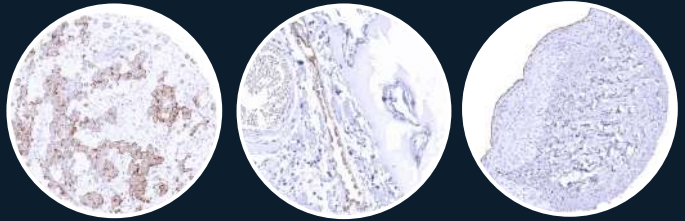
Synonyms = FLJ32198, MGC10902, p35, UP111b

Reactivity = Human

Dilution = 1:100 – 1:200

Intended Use = Research Use Only

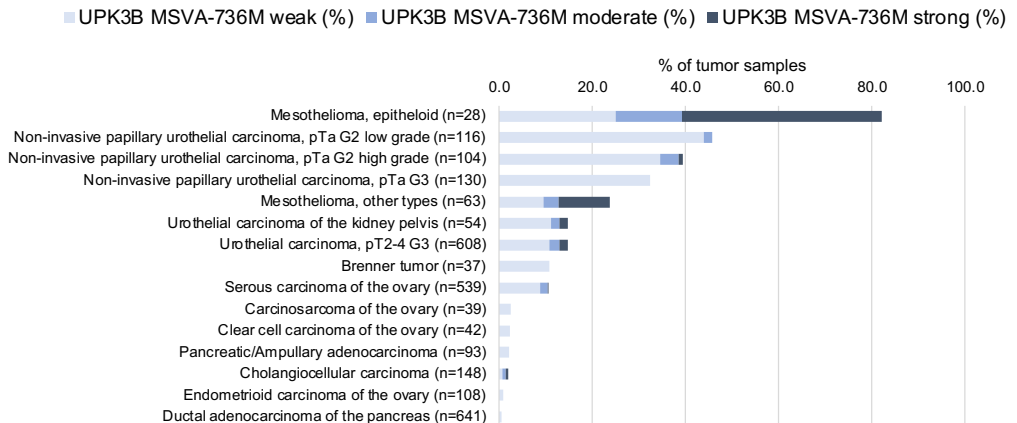
**Marker for mesothelial cells and umbrella cells**



The characterization of the Upk3b gene by Lennartz et al. revealed that Upk3b, a “surface stabilizer gene” only occurs in three normal cell types (amnion cells, surface membrane of umbrella cells of the urothelium, mesothelial cells) all of which periodically undergo massive distension. Accordingly, Upk3b expression was only found in few cancer types in their study on more than 16,000 tumors (10).

Because the most frequent and strongest Upk3b positivity was seen in mesotheliomas while Upk3b was absent in pulmonary adenocarcinomas and most other tumor entities that commonly metastasize to the lung, Lennartz et al. concluded from their data that Upk3b is a useful marker for the distinction of mesotheliomas from other thoracic tumors.

The full graphic and further information about the study is shown on our website under *compatibility of antibodies*.



[10] Lennartz et al.: “Analysis of More than 16,000 Human Tumor and Normal Tissues Identifies Uroplakin 3B as a Useful Diagnostic Marker for Mesothelioma and Normal Mesothelial Cells.” Published in Diagnostics (Basel). 2022 Oct 17;12(10):2516. PMID: 36292206

# Further product highlights

## CD4 MSVA-004R

Antibody type = Recombinant Rabbit  
monoclonal / IgG

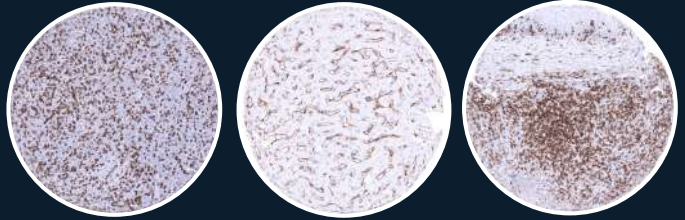
**Protein expressed on T helper lymphocytes**

Synonyms = L3T4; Leu3; Ly-4;  
Lymphocyte antigen CD4

Reactivity = Human

Dilution = 1:00 – 1:200

Intended Use = Research Use Only



## CEA / CD66e / CEACAM5 MSVA-465R

Antibody type = Recombinant Rabbit  
monoclonal / IgG

**Protein with variable expression in epithelial  
tumor types**

Synonyms = Carcinoembryonic Antigen-  
related Cell Adhesion Molecule 5

Reactivity = Human

Dilution = 1:00 – 1:200

Intended Use = Research Use Only



## GLUT1 MSVA-401R

Antibody type = Recombinant Rabbit  
monoclonal / IgG

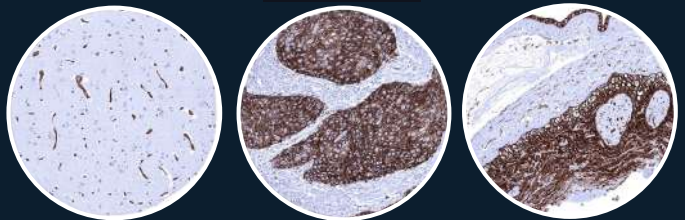
**Key protein for transporting glucose through cell  
membranes**

Synonyms = Glucose transporter  
type-1; PED; RATGTG1

Reactivity = Human

Dilution = 1:00 – 1:200

Intended Use = Research Use Only



## MTAP MSVA-741R

Antibody type = Recombinant Rabbit monoclonal / IgG

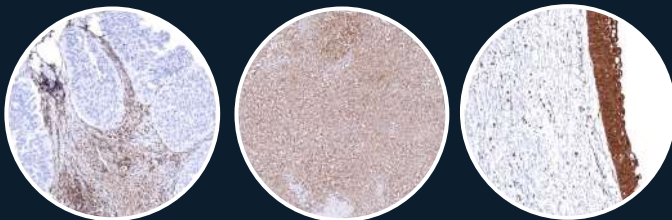
**Sensitive and specific marker for homozygous 9p21 deletions.**

Synonyms = BDMF, DMSFH

Reactivity = Human

Dilution = 1:00 – 1:200

Intended Use = Research Use Only



## PAX8 MSVA-708R

Antibody type = Recombinant Rabbit monoclonal / IgG

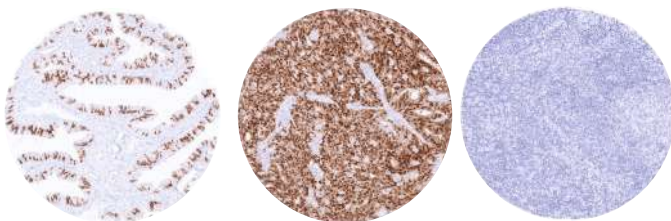
**Marker for kidney, thyroid and Mueller tract tissues**

Synonyms = Paired box gene 8

Reactivity = Human

Dilution = 1:00 – 1:200

Intended Use = Research Use Only



## Vimentin MSVA-458R

Antibody type = Recombinant Rabbit monoclonal / IgG

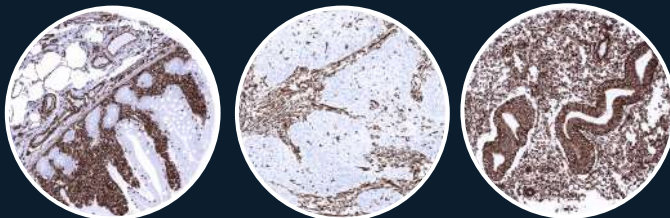
**Marker of mesenchymal cell origin and of epithelial-to-mesenchymal transition (EMT) during cancer progression.**

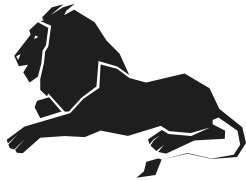
Synonyms = VIM

Reactivity = Human

Dilution = 1:00 – 1:200

Intended Use = Research Use Only





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# Validated Antibodies

[www.ms-validatedantibodies.com](http://www.ms-validatedantibodies.com)