

## p40 (M)

Concentrated and Prediluted Monoclonal Antibody  
902-3066-030921

**BIOCARE**  
M E D I C A L

Available Product Formats				
Format	Catalog Number	Description	Dilution	Diluent
Concentrate	ACR 3066 A, C	0.1, 1.0 mL	1:100	Van Gogh Yellow
Predilute	APR 3066 AA, H	6.0, 25 mL	Ready-to-use	N/A
UltraLine – For BenchMark	AVR 3066 KG, KG25	6.0, 25 mL	Ready-to-use	N/A
Q Series – For Leica BOND-III	ALR 3066 G7	7.0 mL	Ready-to-use	N/A

### Intended Use:

For Research Use Only. Not for use in diagnostic procedures.

### Summary and Explanation:

The mouse monoclonal antibody p40 [clone BC28] recognizes an epitope unique to the p40 protein. p40 is selectively expressed in lung SCC, offering an opportunity for improved specificity (1), resulting in diminished reactivity in lung ADC and increased specificity.

The mouse monoclonal anti-p40 [BC28] demonstrated high sensitivity and specificity, staining 97% (65/67) of cases of lung SCC and 0% (0/71) of cases of lung ADC (see Performance Characteristics). p40 has also been reported in combination with TTF-1 in a method to improve specificity for SCC vs. ADC, while preserving limited tissue specimens (2,3).

Changes in expression of p40 have been implicated in other neoplastic tissues, including bladder, prostate, and head and neck cancers (1,2,3). p40 (M) [BC28] was found to be a sensitive marker in each of these tissues (see Performance Characteristics). Studies have supported the routine use of p40 as an alternative for p63 (1-4).

U.S. Patent 9,428,576 and Patents Pending.

### Principle of Procedure:

Principle of Procedure: Antigen detection in tissues and cells is a multi-step immunohistochemical process. The initial step binds the primary antibody to its specific epitope. After labeling the antigen with a primary antibody, a one-, two- or three-step detection procedure can be employed. The one-step procedure will feature an enzyme-labeled polymer that binds to the primary antibody. A two-step procedure will feature a secondary antibody added to bind to the primary antibody. An enzyme-labeled polymer is then added to bind to the secondary antibody. The three-step detection procedure will feature a secondary antibody added to bind to the primary antibody followed by a linker antibody step for maximum binding. An enzyme-labeled polymer is then added to bind to the linker antibody. These detections of the bound antibodies are evidenced by a colorimetric reaction.

**Source:** Mouse monoclonal

**Species Reactivity:** Human; others not tested

**Immunogen:** a synthetic peptide corresponding to amino acids 5-17 of human p40

**Clone:** BC28

**Isotype:** IgG1

**Protein Concentration:** Call for lot specific Ig concentration

**Epitope/Antigen:** amino acids 5-17 of p40

**Cellular Localization:** Nuclear

**Positive Tissue Control:** Lung squamous cell carcinoma

**Known Applications:**

Immunohistochemistry (formalin-fixed paraffin-embedded tissues)

**Supplied As:** Buffer with protein carrier and preservative

**For AVR3066K:**

p40 (M) (AVR3066)

V-Blocker (BRR4001)

### Storage and Stability:

Store at 2°C to 8°C. The product is stable to the expiration date printed on the label, when stored under these conditions. Do not use after expiration date. Diluted reagents should be used promptly; any remaining reagent should be stored at 2°C to 8°C.

### Staining Protocol Recommendations (intelliPATH FLX® and manual use):

**Peroxide Block:** Block for 5 minutes with Peroxidized 1.

**Pretreatment:** Perform heat retrieval using Diva Decloaker. Refer to the Diva Decloaker data sheet for specific instructions.

**Protein Block (Optional):** Incubate for 5-10 minutes at RT with Background Punisher.

**Primary Antibody:** Incubate for 30 minutes at RT.

**Probe:** Incubate for 10 minutes at RT with a secondary probe.

**Polymer:** Incubate for 10-20 minutes at RT with a tertiary polymer.

**Chromogen:** Incubate for 5 minutes at RT with Biocare's DAB – OR – Incubate for 5-7 minutes at RT with Warp Red.

### Counterstain:

Counterstain with hematoxylin. Rinse with deionized water. Apply Tacha's Bluing Solution for 1 minute. Rinse with deionized water.

### Technical Note:

This antibody, for intelliPATH FLX and manual use, has been standardized with MACH 4 detection system. Use TBS buffer for washing steps.

### Staining Protocol Recommendations (Ventana BenchMark XT / ULTRA Slide Staining Systems):

AVR3066 is intended for use with the Ventana BenchMark XT / ULTRA Slide Staining Systems. Refer to the User Manual for specific instructions for use. Recommended protocol parameters are as follows:

- Using **ultraView on XT / ULTRA:**

**Template/Detection:** ultraView DAB

**Pretreatment Protocol:** CC1 Mild

**Primary Antibody:** 32 minutes, 37°C

**ultraBlock (V-Blocker BRR4001):** Incubate for 4 minutes (with appropriate Option # registered by user)

V-Blocker is recommended to be applied prior to any detection system.

- Using **OptiView on ULTRA:**

**Template/Detection:** OptiView DAB IHC

**Pretreatment Protocol:** CC1 64 minutes

**Peroxidase:** Pre Primary Peroxidase Inhibitor

**Primary Antibody:** 32 minutes, 36°C

### Staining Protocol Recommendations (Q Series – For Leica BOND-III):

ALR3066 is intended for use with the Leica BOND-III. Refer to the User Manual for specific instructions for use. Recommended protocol parameters are as follows:

**Protocol Name:** IHC Protocol F

**Detection:** Bond Polymer Refine

**HIER:** 30 min with ER1

**Peroxide Block:** 5 min

**Marker (Primary Antibody):** 15 min

**Post Primary:** 8 min

**Polymer:** 8 min

**Mixed DAB Refine:** 10 min

**Hematoxylin:** 5 min

### Performance Characteristics:

Nuclear staining of p40 (M) [BC28] was observed in 97% (65/67) of cases of lung squamous cell carcinoma, with no staining observed in lung adenocarcinoma cases (n=71). Staining of p40 (M) was also observed in 85.5% (41/48) of cases of urothelial carcinoma and 78% (46/59) of cases of



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### Performance Characteristics Cont'd:

head and neck squamous cell carcinomas. In breast cancers, only myoepithelial cells in ductal carcinoma *in situ* (DCIS) stained with p40 (M). No cases of prostate cancer were found to be positive with p40 (M). p40 (M) [BC28] nuclear staining was observed in the expected normal tissues: basal cells in prostate, myoepithelial cells in breast, urothelial cells in bladder (but not umbrella cells), stratified epithelial cells in skin, tonsil, esophagus and cervical mucosa, occasional cytotrophoblasts in placenta. (Table 2).

### Limitations:

This product is provided for Research Use Only (RUO) and is not for use in diagnostic procedures. Suitability for specific applications may vary and it is the responsibility of the end user to determine the appropriate application for its use.

### Precautions:

1. This antibody contains less than 0.1% sodium azide. Concentrations less than 0.1% are not reportable hazardous materials according to U.S. 29 CFR 1910.1200, OSHA Hazard communication and EC Directive 91/155/EC. Sodium azide (NaN<sub>3</sub>) used as a preservative is toxic if ingested. Sodium azide may react with lead and copper plumbing to form highly explosive metal azides. Upon disposal, flush with large volumes of water to prevent azide build-up in plumbing. (Center for Disease Control, 1976, National Institute of Occupational Safety and Health, 1976) (5)
2. Specimens, before and after fixation, and all materials exposed to them should be handled as if capable of transmitting infection and disposed of with proper precautions. Never pipette reagents by mouth and avoid contacting the skin and mucous membranes with reagents and specimens. If reagents or specimens come in contact with sensitive areas, wash with copious amounts of water. (6)
3. Microbial contamination of reagents may result in an increase in nonspecific staining.
4. Incubation times or temperatures other than those specified may give erroneous results. The user must validate any such change.
5. Do not use reagent after the expiration date printed on the vial.
6. The SDS is available upon request and is located at <http://biocare.net>.

### Technical Support:

Contact Biocare's Technical Support at 1-800-542-2002 for questions regarding this product.

### References:

1. Hibi K, *et al.* AIS is an oncogene amplified in squamous cell carcinoma. Proc Natl Acad Sci U S A. 2000 May 9; 97(10):5462-7.
2. Pelosi G, *et al.* p40 and thyroid transcription factor-1 immunoreactivity on small biopsies or cellblocks for typing non-small cell lung cancer: a novel two-hit, sparing-material approach. J Thorac Oncol. 2012 Feb; 7(2):281-90.
3. Brown AF, *et al.* Tissue-preserving antibody cocktails to differentiate primary squamous cell carcinoma, adenocarcinoma, and small cell carcinoma of lung. Arch Pathol Lab Med. 2013 Sep; 137(9):1274-81.
4. Sailer V, *et al.* Comparison of p40 and p63 expression in prostate tissues - which one is the superior diagnostic marker for basal cells? Histopathology. 2013 Jul; 63(1):50-6.
5. Center for Disease Control Manual. Guide: Safety Management, NO. CDC-22, Atlanta, GA. April 30, 1976 "Decontamination of Laboratory Sink Drains to Remove Azide Salts."
6. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014.

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**Table 1:** Sensitivity and specificity of mouse monoclonal antibody p40 (M) [BC28] were determined by testing formalin-fixed, paraffin-embedded neoplastic tissues.

Pathology	Number of Specimens	Number of Positive Specimens	% Positive
Lung squamous cell carcinoma	67	65	97.0%
Lung adenocarcinoma	71	0	0%
Urothelial carcinoma	48	41	85.5%
Head and neck squamous cell carcinoma	59	46	78.0%
Breast cancer	65	18	27.6%
Prostate cancer	12	0	0%

**Table 2:** Tissue cross-reactivity of mouse monoclonal antibody p40 (M) [BC28] was determined by testing formalin-fixed, paraffin-embedded normal tissues.

Tissue	# positive/ total tissues	Tissue	# positive/ total tissues
Adrenal gland	0/3	Ovary	0/3
Bladder, urinary	2/3	Pancreas	0/3
Bone marrow	0/1	Parathyroid	0/3
Eye	0/1	Pituitary gland	0/2
Breast	3/3	Placenta	1/3
Brain, cerebellum	0/3	Prostate	3/3
Brain, cerebral cortex	0/3	Skin	1/1
Fallopian tube	0/3	Spinal cord	0/2
Esophagus	3/3	Spleen	0/2
Stomach	0/3	Skeletal muscle	0/3
Intestine, small intestine	0/3	Testis	0/3
Intestine, colon	0/3	Thymus	3/3
Intestine, rectum	0/3	Thyroid	0/3
Heart	0/3	Inflammatory tonsillitis*	3/3
Kidney	0/6	Ureter	3/3
Liver	0/3	Uterus cervix	3/3
Lung	0/3	Uterus (endometrium)	0/3

\*B and T cells are negative. Only normal squamous epithelium is positive.



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