

# NeoPATH Pro Universal AP Polymer Kit

Micro-polymer detection  
901-10027-050125

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Available Product Formats	
Catalog Number	Volume
NPRI10027KT135	135 tests

## Intended Use:

For *in vitro* Diagnostic Use

The NeoPATH Pro Universal AP Polymer Kit is intended for use in either manual or automated Immunohistochemistry (IHC) staining protocols using an alkaline phosphatase (AP) polymer one- or two-step application method. This micro-polymer detection kit is designed for the detection of mouse IgG and IgM, and/or rabbit IgG primary antibodies bound to target antigens in the formalin-fixed, paraffin-embedded (FFPE) tissues during the IHC staining process. The clinical interpretation of any staining or its absence should be complemented by morphological studies and proper controls and should be evaluated within the context of the patient's clinical history and other diagnostic tests by a qualified pathologist.

## Summary and Explanation:

The NeoPATH Pro Universal AP Polymer Kit is designed using a one-step or two-step method for detecting mouse and/or rabbit primary antibodies to form an antibody-enzyme complex. This complex is then visualized using an appropriate substrate/chromogen. In the one-step method a secondary antibody directly linked to the micro-polymer is applied while in the two-step method the secondary antibody is unlabeled, and an additional enzyme-linked polymer labeled reagent is sequentially applied. The two-step method is designed to amplify the detection in cases of low expressing antigens.

Fast red is a well-established chromogen used in IHC staining protocols that in the presence of an alkaline phosphatase (AP) enzyme produces a fuchsin red precipitate that is insoluble in organic solvents and can be cover slipped with a permanent mounting media

## Principle of Procedure:

This micro-polymer detection kit may be used in immunohistochemistry testing of formalin-fixed, paraffin-embedded tissue sections. In general, immunohistochemical (IHC) staining techniques allow for the visualization of antigens via the sequential application of a specific antibody to the antigen (primary antibody), a secondary antibody to the primary antibody (optional link antibody/probe), an enzyme complex and a chromogenic substrate with interposed washing steps. The enzymatic activation of the chromogen results in a visible reaction product at the antigen site. The specimen may then be counterstained, and cover slipped. Results are interpreted using a light microscope and aid in the differential diagnosis of pathophysiological processes, which may or may not be associated with a particular antigen.

## Materials and Methods:

### Reagents Provided:

Kit Catalog No.	Component Catalog No.	Component Description	Quantity x Volume
NPRI10027KT135	NPRI10025T135	NeoPATH Pro Universal AP Probe	1 x 45 mL
	NPRI10026T135	NeoPATH Pro MR AP Polymer	1 x 45 mL
	NPRI10022T45	NeoPATH Pro Fast Red Chromogen	3 x 10 mL
	NPRI10023T135	NeoPATH Pro Fast Red Buffer	1 x 30 mL

## Reconstitution, Mixing, Dilution, Titration:

The NeoPATH Pro Universal AP Polymer Kit reagent(s) are optimized and ready to use with Biocare antibodies and ancillary reagents. No reconstitution, mixing, dilution or titration is required.

## Known Applications:

Immunohistochemistry (formalin-fixed paraffin-embedded tissues)

## Species Reactivity:

Mouse and Rabbit IgG heavy and light chains

## Supplied As:

*NeoPATH Pro Universal AP Probe – NPRI10025*

Buffered saline solution, pH 7.2-7.4, containing a protein carrier and less than 0.1% sodium azide preservative. See Safety Data Sheet for additional details.

*NeoPATH Pro MR AP Polymer – NPRI10026*

Buffered saline solution, pH 7.6-7.8, containing a protein carrier and less than 0.01% ProClin 300 and/or less than 0.5% ProClin 950 as a preservative. See Safety Data Sheet for additional details.

*NeoPATH Pro Fast Red Chromogen – NPRI10022*

Acidic solution with 0.2N Hydrochloric Acid. See Safety Data Sheet for additional details.

*NeoPATH Pro Fast Red Buffer – NPRI10023*

Buffered solution, pH 8.7 – 8.9, 0.125% ProClin 950 preservative. See Safety Data Sheet for additional details.

## Materials and Reagents Needed but Not Provided:

Microscope slides, positively charged  
Positive and negative tissue controls  
Desert Chamber\* or similar Drying oven (optional)  
Xylene or xylene substitute  
Ethanol or reagent alcohol  
Decloaking Chamber\* or similar pressure cooker (optional)  
Deionized or distilled water  
Wash buffer\*  
Pretreatment reagents\* (optional)  
Enzyme digestion\* (optional)  
Protein block\* (optional)  
Primary antibody\*  
Negative control reagents\*  
Chromogens\*  
Hematoxylin\* (counterstain)  
Bluing reagent\*  
Mounting medium\*  
Coverglass  
Light Microscope (40-400X magnification)  
Automated Slide Stainer

\* Biocare Medical Products: Refer to the Biocare Medical website located at <http://biocare.net> for information regarding catalog numbers and ordering. Certain reagents listed above are based on specific applications and detection system used.

## Storage and Stability:

Store at 2°C to 8°C. The product is stable to the expiration date printed on the vial label when stored under these conditions. Do not use after expiration date. Storage under any condition other than those specified must be verified. The kit reagent(s) are ready-to-use and should not be diluted. The stability of user diluted reagents has not been established by Biocare.

# NeoPATH Pro Universal AP Polymer Kit

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

Positive and negative controls should be run simultaneously with all patient specimens. If unexpected staining is observed, which cannot be explained by variations in laboratory procedures and a problem with the antibody is suspected, contact Biocare's Technical Support at 1-800-542-2002 or via the technical support information provided on biocare.net.

## **Specimen Preparation:**

Tissues fixed in formalin are suitable for use prior to paraffin embedding. Osseous tissues should be decalcified prior to tissue processing to facilitate tissue cutting and prevent damage to microtome blades.<sup>1,2</sup>

Properly fixed and embedded tissues expressing the specified antigen target should be stored in a cool place. The Clinical Laboratory Improvement Act (CLIA) of 1988 requires in 42 CFR §493.1259(b) that "The laboratory must retain stained slides at least ten years from the date of examination and retain specimen blocks at least two years from the date of examination."<sup>3</sup>

## **Treatment of Tissues Prior to Staining:**



Perform Heat Induced Epitope Retrieval (HIER) per recommended protocol below. The routine use of HIER prior to IHC has been shown to minimize inconsistency and standardize staining.<sup>4,5</sup>

## **Warning and Precautions:**

1. NeoPATH Pro Fast Red Chromogen is mildly corrosive and may cause severe skin or eye damage. Avoid contact with skin and eyes. If contact occurs, flush the affected area with copious amounts of water. Seek medical attention if necessary.
2. Kit reagents contain less than 0.05% ProClin 300 and/or less than 1.125% ProClin 950. Wear gloves and protective clothing and take reasonable precautions when handling as ProClin is classified as an irritant and may cause skin contact sensitization. Avoid contact with eyes, skin, and mucous membranes.
3. Kit reagent(s) 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)<sup>6</sup>
4. Handle materials of human or animal origin as potentially biohazardous and dispose of such materials with proper precautions. In the event of exposure, follow the health directives of the responsible authorities where used.<sup>7,8</sup>
5. 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 into contact with sensitive areas, wash with copious amounts of water.<sup>9</sup>
6. Microbial contamination of reagents may result in an increase in nonspecific staining.
7. Incubation times or temperatures other than those specified may give erroneous results. The user must validate any such change.
8. Do not use reagent after the expiration date printed on the vial.
9. To prevent evaporation and ensure maximum test capacity, promptly cap and remove reagents from automated instruments after each run. Leaving reagents exposed can reduce their effectiveness and the number of tests they can provide. Always store reagents as directed to maintain their integrity.
10. The micro-polymer detection kit reagent(s) are optimized and ready to use with Biocare antibodies and ancillary reagents. Refer to the primary antibody and other ancillary reagent instructions for use for recommended protocols and conditions for use.

11. Follow local disposal regulations for your location along with recommendations in the Safety Data Sheet to determine the safe disposal of this product
12. The SDS is available upon request and is located at <http://biocare.net>.
13. Report any serious incidents related to this device by contacting the local Biocare representative and the applicable competent authority of the Member State or country where the user is located.

This micro-polymer detection kit contains components classified as indicated in the table below in accordance with Regulation (EC) No. 1272/2008

Hazard	Code	Hazard Statement
	H290 H314 H318 H335	May be corrosive to metals. Causes severe skin burns and eye damage. Causes serious eye damage. May cause respiratory irritation.
	H317	May cause an allergic skin reaction.
N/A	H401 H420 H412	Toxic to aquatic life. Harmful to aquatic life. Harmful to aquatic life with long lasting effects.

## **Instructions for Use:**

The NeoPATH Pro Universal AP Polymer Kit reagent(s) are optimized and ready to use with Biocare antibodies and ancillary reagents.

NeoPATH Pro Universal AP Polymer Kit is provided in vials ready for use on the NeoPATH Pro Automated Slide Stainer. Uncap the vial and place in the NeoPATH Pro reagent tray. The NeoPATH Pro Automated Slide Stainer will apply reagent as required in the selected protocol.

Refer to the appropriate antibody data sheet for the recommended staining protocol. Refer to the NeoPATH Pro Automated Slide Staining System User Manual for detailed instructions on instrument operation and additional protocol options.

## **Technical Notes:**

1. Do not use goat serum as a protein block.
2. Use TBS for washing steps. PBS wash buffers will inhibit alkaline phosphatase staining.

## **Quality Control:**

Refer to CLSI Quality Standards for Design and Implementation of Immunohistochemistry Assays; Approved Guideline-Second edition (I/LA28-A2) CLSI Wayne, PA USA ([www.clsi.org](http://www.clsi.org)). 2011<sup>10</sup>

## **Positive Tissue Control:**

External positive control materials should be fresh specimens fixed, processed, and embedded as soon as possible in the same manner as the patient sample(s). Positive tissue controls are indicative of correctly prepared tissues and proper staining techniques. One positive external tissue control for each set of test conditions should be included in each staining run.

The tissues used for the external positive control materials should be selected from patient specimens with well-characterized low levels of the positive target activity that gives weak positive staining. The low level of positivity for external positive controls is designed to ensure detection of subtle changes in the primary antibody sensitivity from instability or problems with the IHC

# NeoPATH Pro Universal AP Polymer Kit

Micro-polymer detection  
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**BIOCARE**  
M E D I C A L

methodology. Commercially available tissue control slides or specimens processed differently from the patient sample(s) validate reagent performance only and do not verify tissue preparation.

Known positive tissue controls should only be utilized for monitoring the correct performance of processed tissues and test reagents, rather than as an aid in formulating a specific diagnosis of patient samples. If the positive tissue controls fail to demonstrate positive staining, results with the test specimens should be considered invalid.

## Negative Tissue Control:

Use a negative tissue control fixed, processed, and embedded in a manner identical to the patient sample(s) with each staining run to verify the specificity of the IHC primary antibody for demonstration of the target antigen, and to provide an indication of specific background staining (false positive staining). Also, the variety of different cell types present in most tissue sections can be used by the laboratorian as internal negative control sites to verify the IHC's performance specifications. The types and sources of specimens that may be used for negative tissue controls are listed in the Performance Characteristics section.

If specific staining (false positive staining) occurs in the negative tissue control, results with the patient specimens should be considered invalid.

## Nonspecific Negative Reagent Control:

Use a nonspecific negative reagent control in place of the primary antibody with a section of each patient specimen to evaluate nonspecific staining and allow better interpretation of specific staining at the antigen site. Ideally, a negative reagent control contains an antibody produced and prepared (i.e. diluted to same concentration using same diluent) for use in the same way as the primary antibody but exhibits no specific reactivity with human tissues in the same matrix/solution as the Biocare antibody. Diluent alone may be used as a less desirable alternative to the previously described negative reagent controls. The incubation period for the negative reagent control should correspond to that of the primary antibody.

When panels of several antibodies are used on serial sections, the negative staining areas of one slide may serve as a negative/nonspecific binding background control for other antibodies. To differentiate endogenous enzyme activity or nonspecific binding of enzymes from specific immunoreactivity, additional patient tissues may be stained exclusively with substrate-chromogen or enzyme complexes (PAP, avidin-biotin, streptavidin) and substrate-chromogen, respectively.

## Assay Verification:

Prior to initial use of an antibody or staining system in a diagnostic procedure, the user should verify the antibody's specificity by testing it on a series of inhouse tissues with known immunohistochemical performance characteristics representing known positive and negative tissues. Refer to the quality control procedures previously outlined in this section of the product insert and to the quality control recommendations of the CAP Certification Program<sup>11</sup> for Immunohistochemistry and/or the NCCLS IHC guideline<sup>12</sup>. These quality control procedures should be repeated for each new antibody lot, or whenever there is a change in assay parameters. Tissues listed in the Performance Characteristics section are suitable for assay verification.

## **Troubleshooting:**

Follow the antibody specific protocol recommendations according to the data sheet provided. If atypical results occur, contact Biocare's Technical Support at 1-800-542-2002.

## Interpretation of Staining:

The NeoPATH Pro Universal AP Polymer Kit produces a red color reaction at the antigen sites localized by the primary antibody. Prior to interpretation of

patient results, the staining of controls must be evaluated by a qualified pathologist. Negative controls are evaluated and compared to stained slides to ensure any staining observed is not a result of nonspecific interactions.

## Positive Tissue Control:

The positive tissue control stained with indicated antibody should be examined first to ascertain that all reagents are functioning properly. The appropriate staining of target cells (as indicated above) is indicative of positive reactivity. If the positive tissue controls fail to demonstrate positive staining, any results with the test specimens should be considered invalid.

The color of the reaction product may vary depending on substrate chromogens used. Refer to substrate package inserts for expected color reactions. Further, metachromasia may be observed in variations of the method of staining.<sup>13</sup>

When a counterstain is used, depending on the incubation length and potency of the counterstain used, counterstaining will result in a coloration of the cell nuclei. Excessive or incomplete counterstaining may compromise proper interpretation of results. Refer to protocol(s) for recommended counterstain.

## Negative Tissue Control:

The negative tissue control should be examined after the positive tissue control to verify the specificity of the labeling of the target antigen by the primary antibody. The absence of specific staining in the negative tissue control confirms the lack of antibody cross reactivity to cells/cellular components. If specific staining (false positive staining) occurs in the negative external tissue control, results with the patient specimen should be considered invalid.

Nonspecific staining, if present, usually has a diffuse appearance. Sporadic staining of connective tissue may also be observed in sections from excessively formalin-fixed tissues. Use intact cells for interpretation of staining results. Necrotic or degenerated cells often stain nonspecifically.

## Patient Tissue:

Examine patient specimens stained with indicated antibody last. Positive staining intensity should be assessed within the context of any nonspecific background staining of the negative reagent control. As with any immunohistochemical test, a negative result means that the antigen was not detected, not that the antigen was absent in the cells/tissue assayed. If necessary, use a panel of antibodies to identify false-negative reactions.

Refer to Summary and Explanation, Limitations, and Performance Characteristics for specific information regarding indicated antibody immunoreactivity.

## **Limitations:**

### General Limitations:

1. For in vitro diagnostic (IVD) Use
2. This product is for professional use only: Immunohistochemistry is a multistep diagnostic process that consists of specialized training in the selection of the appropriate reagents; tissue selection, fixation, and processing; preparation of the IHC slide; and interpretation of the staining results.
3. For use by physician prescription only. (Rx Only)
4. Tissue staining is dependent on the handling and processing of the tissue prior to staining. Improper fixation, freezing, thawing, washing, drying, heating, sectioning or contamination with other tissues or fluids may produce artifacts, antibody trapping, or false negative results. Inconsistent results may be due to variations in fixation and embedding methods, or to inherent irregularities within the tissue.<sup>14</sup>
5. Excessive or incomplete counterstaining may compromise proper interpretation of results.

# NeoPATH Pro Universal AP Polymer Kit

Micro-polymer detection  
901-10027-050125

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

6. The clinical interpretation of any positive or negative staining should be evaluated within the context of clinical presentation, morphology, and other histopathological criteria. The clinical interpretation of any positive or negative staining should be complemented by morphological studies using proper positive and negative internal and external controls as well as other diagnostic tests. It is the responsibility of a qualified pathologist who is familiar with the proper use of IHC antibodies, reagents, and methods to interpret all the steps used to prepare and interpret the final IHC preparation.
7. The optimum protocols for a specific application can vary. These include, but are not limited to fixation, heat-retrieval method, incubation times, antibody dilution, tissue section thickness and detection kit used. Refer to the primary antibody and other ancillary reagent instructions for use for recommended protocols and conditions for use. The data sheet recommendations and protocols are based on exclusive use of Biocare products. Ultimately, it is the responsibility of the investigator to determine optimal conditions.
8. This product is not intended for use in flow cytometry. Performance characteristics have not been determined for flow cytometry.
9. Tissues from persons infected with hepatitis B virus and containing hepatitis B surface antigen (HBsAg) may exhibit nonspecific staining with horseradish peroxidase.<sup>15</sup>
10. Reagents may demonstrate unexpected reactions in previously untested tissues. The possibility of unexpected reactions even in tested tissue groups cannot be completely eliminated due to biological variability of antigen expression in neoplasms, or other pathological tissues.<sup>16</sup> Contact Biocare's Technical Support at 1-800-542-2002, or via the technical support information provided on biocare.net, with documented unexpected reaction(s).
11. Normal/nonimmune sera from the same animal source as secondary antisera used in blocking steps may cause false-negative or false-positive results due to autoantibodies or natural antibodies.
12. False-positive results may be seen due to non-immunological binding of proteins or substrate reaction products. They may also be caused by pseudo peroxidase activity (erythrocytes), endogenous peroxidase activity (cytochrome C), or endogenous biotin (e.g., liver, breast, brain, kidney) depending on the type of immunostain used.<sup>14</sup>
13. A negative result means that the antigen was not detected, not that the antigen was absent in the cells or tissue examined.

## Product Specific Limitations:

No additional product specific limitations

## Performance Characteristics:

Staining was performed using protocols provided in the antibody specific instructions for use or as specified. Sensitivity and specificity of staining was evaluated across a range of normal and neoplastic tissue types evaluated during development of primary antibodies.

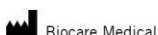
## Troubleshooting:

1. No staining of any slides – Check to determine appropriate positive control tissue, antibody, and detection products have been used. Check for incomplete or improper wax removal or pretreatment.
2. Weak staining of all slides – Check to determine appropriate positive control tissue, antibody, and detection products have been used.
3. Excessive background of all slides – There may be high levels of endogenous biotin (if using biotin-based detection products), endogenous HRP activity converting chromogen to colored end product (use peroxidase block), or excess non-specific protein interaction (use a protein block, such as serum- or casein-based blocking solution).
4. Tissue sections wash off slides during incubation – Check slides to ensure they are positively charged.
5. Specific staining too dark – Check protocol to determine if proper antibody titer was applied to slide, as well as proper incubation times for all

reagents. Additionally, ensure the protocol has enough washing steps to remove excess reagents after incubation steps are completed.

## References:

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7. Occupational Safety and Health Standards: Occupational exposure to hazardous chemicals in laboratories. (29 CFR Part 1910.1450). Fed. Register.
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11. College of American Pathologists (CAP) Certification Program for Immunohistochemistry. Northfield IL. [Http://www.cap.org](http://www.cap.org) (800) 3234040.
12. O'Leary TJ, Edmonds P, Floyd AD, Mesa-Tejada R, Robinowitz M, Takes PA, Taylor CR. Quality assurance for immunocytochemistry; Proposed guideline. MM4-P. National Committee for Clinical Laboratory Standards (NCCLS). Wayne, PA. 1997;1-46.
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16. Herman GE and Elfont EA. The taming of immunohistochemistry: the new era of quality control. Biotech & Histochem 1991; 66:194.



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TP v4 (01/02/2025)

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