Anti- PD-1
[IHC001]

Catalog No.	Description
AM922-5M	6 mL of Ready-to-Use Antibody for use with BioGenex Super Sensitive™ Detection Systems or other equivalent Detection Systems
AM922-10M	10 mL of Ready-to-Use Antibody in a barcode labeled vial for use with BioGenex Super Sensitive™ Detection Systems and BioGenex i6000™ Automated Staining Systems
MU922-UC	1 mL of Concentrated Antibody for use with BioGenex Super Sensitive™ Detection Systems or other equivalent Detection Systems
MU922-5UC	0.5 mL of Concentrated Antibody for use with BioGenex Super Sensitive™ Detection Systems or other Equivalent Detection Systems
AX922-YCD	Ready-to-Use Antibody in barcode labeled vial for use on the Xmatrx® Elite/Ultra Staining System, 200 tests
AX922-50D	Ready-to-Use Antibody in barcode labeled vial for use on the Xmatrx® Elite/Ultra Staining System, 50 tests

Immunogen	Clone	Species	Ig Class
PD-1	IHC001	Mouse	IgG

Intended Use
For In-Vitro Diagnostic Use.
This antibody is designed for the specific localization of PD-1 in formalin-fixed, paraffin-embedded tissue sections.
Evaluation must be performed by a qualified pathologist.

Summary and Explanation
PD-1, also known as programmed cell death protein 1 or CD279 (cluster of differentiation 279), is a cell surface receptor that belongs to the CD28 immunoglobulin super family and is expressed on T cells and pro-B cells. Studies have shown that PD-1/PD-L interaction function as an immune checkpoint for induction and maintenance of T-cells involved in peripheral tolerance and protects tissues from autoimmune attack. PD-1 down regulates the immune system which in turn reduces autoimmunity and promotes self-tolerance. PD-1 performs dual mechanism of promoting apoptosis (programmed cell death) in self antigen specific T-cells in lymph nodes at the same time inhibiting apoptosis in regulatory T cells (suppressor T cells).

Principles of the Procedure
Antigen detection by Immunohistochemistry (IHC) is a two-step process. In the first step, the primary antibody binds to the antigen of interest, and second, the antigen antibody binding is detected by a chromogen. The primary antibody may be used in IHC using manual techniques or BioGenex Automated Staining System. BioGenex offers a variety of Super Sensitive Detection Systems including Link-Label and Polymer-based technologies to detect the chromogenic signal from the stained tissues and cells.

Positive and negative controls should always 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 BioGenex Technical Support at 1.800.421.4149 or your local distributor.

Reagents Provided
Mouse Monoclonal Antibody PD-1 is affinity purified and diluted in PBS, pH 7.2, containing 1% BSA and 0.09% sodium azide

Dilution of Primary Antibody
BioGenex Ready-to-Use antibodies have been optimized for use with the recommended BioGenex Detection System and should not require further dilution. Further dilution may result in loss of sensitivity and must be validated by the user.

BioGenex concentrated antibodies must be diluted in accordance with the staining procedure when used with the recommended BioGenex Detection System (see staining procedure section below). Use of any detection methods other than the recommended systems and protocols, require validation by the user.

Materials Required But Not Provided
All the materials and reagents necessary for IHC are not provided. Pre-treatment reagents, Super Sensitive Detection Systems, control reagents and control slides, other ancillary reagents are available from BioGenex. Please refer to the product insert(s) of the BioGenex Super Sensitive IHC detection systems for detailed protocols and instructions.

The IHC procedure may need other lab equipment that is not provided including oven or incubator (capable of maintaining 56-60°C), BioGenex Automated Staining System, Humidity Chamber, Microwave oven, Staining Jars or baths, Timer (capable of 3-20 minute intervals), Wash Bottles, Absorbent Wipes, Microscope slides (Aptec coated), Coverslips, Lens paper and Light microscope with magnification of 200X.

Storage and Handling
Antibodies should be stored at 2-8°C without any further dilution. Fresh dilutions, if required, should be prepared prior to use and are stable and steady for up to one day at room temperature (20-26°C). Unused vial of antibody preparations should be discarded after one day to minimize microbial contamination and non-specific staining. Diluted antibody preparations can be refrigerated or frozen for extended shelf life.

This antibody is suitable for use until expiry date when stored at 2-8°C. Do not use product after the expiration date printed on vial. If reagents are stored under a condition other than those specified in the package insert, they must be verified by the user *(4)*.

The presence of precipitate or an unusual odor indicates that the antibody is deteriorating and should not be used.

Specimen Collection and Preparation
Tissues fixed in 10% (v/v) formalin, prior to paraffin embedding, are suitable for use. For further details on specimen preparation please refer Histological and Histochemical Methods: Theory and Practice *(5)*.

The user is advised to validate the use of the products with their tissue specimens prepared and handled in accordance with their laboratory practices.

Treatment of Tissues Prior to Staining
Pretreatment of tissues, if any, should be done as suggested in the staining procedure section below

Precautions
This antibody contains no hazardous material at a reportable concentration according to U.S. 29 CFR 1910.1200, OSHA Hazard Communication Standard and EC Directive 91/155/EC. However, this product contains sodium azide, at concentrations of less than 0.1%. Sodium azide is not classified as a hazardous chemical at the product concentrations. However, toxicity information regarding sodium azide at product concentrations has not been thoroughly investigated. Sodium azide may react with lead or copper plumbing to form highly explosive metal azides. Upon disposal, flush with large volumes of water to prevent azide build-up in plumbing *(6)*. For more information, a Safety Data Sheet (SDS) for

sodium azide in pure form is available upon request. Dispose unused reagents according to Local, State and Federal Regulations. Wear suitable Personal Protective Equipment, do not pipette reagents by mouth, and avoid contact of reagents and specimens with skin and mucous membranes. If reagents or specimens come in contact with sensitive area, wash with copious amounts of water *(7)*.

Refer to appropriate product inserts for instructions of use and safety information on detection reagents and other materials, which may be used with the antibody.

Recommended Protocol

Refer to the following table for conditions specifically recommended for this antibody. Refer to the detection system package insert for guidance on specific staining protocols or other requirements.

Parameter	BioGenex Recommendations
Control Tissue	Tonsil as available with Biogenex FB-918ME* & FG-918ME*
Recommended Dilution for Concentrated Ab	10-20 in HK156
Recommended Pretreatment (manual/i6000)**	EZ-AR2 (HK522-XAK)
Recommended Pretreatment(Xmatrx)	EZ-AR2 Elegance (HX032-YCD)
Antibody incubation(manual/i6000)	1 Hour at RT
Antibody incubation (Xmatrx)	1 Hour at RT
Detection System for manual, Xmatrx & i6000 -Open systems***	Use two-Step Super Sensitive™ Polymer-HRP IHC Detection System/DAB available from BioGenex (QD400 for Manual and QD410 for Automation). or For One-Step use Super SensitiveTM Polymer-HRP Detection Kit/DAB, available from BioGenex (QD620 or QD630)

*FB: positive control barrier slides, FG: positive control non barrier slides. Xmatrx requires barrier slides.
** Pretreatment times will vary based on individual microwave power
***For Closed system automation (Xmatrx-Elite, Xmatrx-Ultra & i6000 Diagnostics)
– Please refer to the factory protocols provided with the instrument.

Quality Control

The suggested positive control tissue for this particular antibody is tonsil. The user is always advised to use the control tissues available from BioGenex for your Quality Control purpose. Refer to the appropriate detection system package inserts for guidance on general quality control procedures.

Troubleshooting

Refer to the troubleshooting section in the package inserts of BioGenex Detection Systems (or other equivalent detection systems) for remedial actions on detection system related issues, or contact BioGenex Technical Support Department at 1-800-421-4149 or your local distributor to report unusual staining.

Expected Results

This antibody stains cell membrane in positive cells in formalin-fixed, paraffin embedded tissue sections. Interpretation of the staining result is solely the responsibility of the user. Any experimental result should be confirmed by a medically established diagnostic product or procedure.

Limitations of the Procedure

Immunohistochemistry is a complex procedure relating both histological and immunological detection. Improper Tissue handling and processing prior to immunostaining can lead to inconsistent results. Variations in embedding and fixation or the nature of the tissue may lead to variations in results. Endogenous peroxidase activity or pseudoperoxidase activity in erythrocytes and tissue biotin may result in non-specific staining based on the detection system employed. Tissues containing Hepatitis B Surface Antigen (HBsAg) may give false positive with horseradish peroxidase systems *(8)*. Improper counterstaining and mounting may compromise the interpretation of results.

Performance Characteristics

BioGenex has conducted studies to evaluate and determine the performance of the antibody with BioGenex detection systems and accessories. The antibodies have been found to be very specific and sensitive and they show specific binding to the antigen of interest with minimal to no binding to non-specific tissues or cells. BioGenex antibodies have shown reproducible and consistent results when used within a single run, between runs, between lots and wherever applicable between manual and automated runs. The products have been determined to be stable for the periods specified on the labels either by standard real time or accelerated methods. BioGenex ensures product quality through 100% quality control for all products released and through surveillance programs.

Bibliography

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7. 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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8°C 2°C	Temperature Limitation	IVD	In Vitro Diagnostic Medical Device
	Use By Date	LOT	Batch Code
NON STERILE	Non-Sterile		Consult Instructions for Use
EC REP	Representative in the European Community		Manufacturer