

## Hsa-miR-223 Probe

Catalog No. HM223-100E

**Description:** one vial of 0.650 ml of probe in hybridization buffer

### Intended Use:

This probe is intended for *in-vitro diagnostic use only*.

### Principle:

MicroRNA's (miRNA's) are endogenous, non-coding small RNA molecules that play important role in controlling gene expression. They are found to engage in multiple biological function and disease progression including cancer. miRNA either acts as tumor suppressor or oncogene depending on function of their target gene. Aberrant expression of miRNA has been reported in different cancer types hence *in situ* detection of miRNA provides important insight for diagnosis, prognosis and disease management. miR-223 is a hematopoietic specific microRNA with crucial functions in myeloid lineage development. It plays an essential role in promoting granulocytic differentiation. miR-223 is commonly repressed in hepatocellular carcinoma and leukemia. In some cancers the microRNA-223 down-regulation is correlated with higher tumor burden, disease aggressiveness, and poor prognostic factors. Higher expression levels of miRNA-223 are associated with extranodal marginal-zone lymphoma of mucosa-associated lymphoid tissue of the stomach.

Please visit the following link for more information about hsa-miR-223. <http://www.ncbi.nlm.nih.gov/gene/407008>

### Summary and Explanation

MiRNA's play an important role in many biological processes, including differentiation and development, cell signaling, and response to infection. Recent research have shown that human miRNA genes are frequently located in cancer-associated genomic regions, while perturbed miRNA expression patterns have been observed in many human cancers. A number of oncogene and tumor suppressor genes were found to be targets of miRNAs and global miRNA expression signatures were able to distinguish between cancerous and non-cancerous tissues. The microRNA profiles can serve as highly specific markers for diagnosis, prognosis, disease monitoring as well as prediction of therapeutic response. MiRNA's are remarkably stable molecule to be well preserved in FFPE as well as frozen specimens. Early diagnosis detection and assessment of the disease progression are essential for disease management, especially in tumor patients, where timely therapeutic interventions are extremely critical.

### Principles of the Procedure

*In Situ* hybridization (ISH) allows the detection and localization of definitive nucleic acid sequences directly within a cell or tissue. High specificity is ensured through the action of annealing of probe nucleic acid sequence to complementary target nucleic acid sequence. ISH techniques can be used to identify infectious agents in tissue sections, to localize gene expression within individual cells, or to detect specific nucleic acid sequences in cells.

In ISH, fixed tissue sections are treated with nucleic acid retrieval solution to expose target nucleic acid sequences. A hapten (fluorescein labeled probe) is hybridized to the exposed target nucleic acid sequences in the cells. Subsequent washing steps remove any probe that is not bound or that is non-specifically bound to the tissue section. An immunohistochemical (IHC) procedure is then used to detect the probe-target hybrid. (Downstream detection of hybridized hapten labeled probe is done by using specific anti-hapten antibody). This procedure includes incubating the slide with a mouse anti-fluorescein or digoxigenin antibody, followed by detection of this antibody with a secondary antibody enzyme conjugate. After addition of an appropriate substrate for the enzyme (such as DAB, diaminobenzidine solution), a brown colored reaction product is precipitated at the location of the probe-target hybrid. Microscopic examination of the slide provides visual interpretation of the staining results.

### Materials Required But Not Provided

EZ-DeWax™ (Cat # HK585), SuperSensitive™ wash buffer (Cat # HK583), and Super Sensitive one-step Polymer-HRP ISH detection kit (Cat # DF400) need to be ordered separately. Please refer to the package insert(s) of detection kit for detailed protocols and instructions on use of the reagents.

### Recommended detection system:

Super Sensitive One step Polymer-HRP ISH Detection Kit.

### Storage and Handling

Store the probe at 2-8° C. The probe is allowed to reach room temperature prior to use. This probe is suitable for use till expiry date when stored at 2-8°C. If reagents are stored under any conditions other than those specified in the package insert, they must be verified by the user.

Positive and negative controls should be run simultaneously for every experiment. 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.

### Specimen Collection and Slide Preparation

Tissues fixed in 10% (v/v) formalin are suitable for use prior to paraffin embedding and sectioning.

### Treatment of Tissues Prior to Staining

All formalin-fixed, paraffin-embedded tissue sections require pretreatment with Nucleic Acid Retrieval 1 solution (NAR-1) Cat. No. HK873.

### Staining procedure

- The BioGenex miRNA probes are supplied in hybridization buffer and used without further dilution.
- The probe solution is brought to room temperature just prior to use.

- (c) All testing is done at room temperature. The testing parameters and testing protocols are listed in Table 1 below.
- (d) The BioGenex Super Sensitive one-step Polymer-HRP ISH detection kit (Cat# DF400) is used to detect hybridized probes following the instructions in the package insert for the detection system.

The negative and positive control probe is run in parallel.

### Recommended protocol and parameters for Hsa-miR-223 probe

Table 1: Protocol for Manual Staining Procedure -FFPE tissue section

S.No	Reagents	Cat #	ITT	Cycle	No. of buffer wash
1	Baking	NA	20 min, 70°C		0
2	EZ-DeWax™	HK585	10 min, RT	3	0
3	100% Alcohol	NA	10 min, RT	2	2
4	NAR1 (Pretreatment)	HK601	2 min, 85 °C 20 min, 98 °C	1	3
5	Pre-hybridization buffer	HK881	20 min, 42 °C	1	0
6	Probe-Hybridization (Hsa-miR-223)	HM223-100E	2 hrs, 42 °C	1	3
7	Wash A	HK839	5 min, 47 °C	2	2
8	Wash B	HK880	5 min, 52 °C	2	2
9	Peroxide Block	HK026	10 min, RT	1	2
10	Power Block	HK083	10 min, RT	1	0
11	Anti-Fluorescence AB	HK818	30 min, RT	1	3
12	Poly-HRP	HK943	40 min, RT	1	2
13	DAB	HK124	10 min, RT	1	3
14	Hematoxylin	HK030	1-3 min	1	3+3*

3\*-DI WATER WASH

#### Note:

- Supersensitive ISH detection kit(DF-400) is recommended for miRNA detection.
- EZ-DeWax™ (Cat # HK585) and SuperSensitive™ wash buffer (Cat # HK583) are not part of kit component and need to be ordered separately.
- Heat pretreatment with NAR1 can either be done at manual staining platform Xmatrx mini with BioGenex proprietary technique of oil sealing and coverslip or in the EZ-Retraver with bulk NAR1 reagent.
- Coverslips should be used at NAR1, probe and antibody steps to achieve proper reagents spread and minimize the usage of reagent. This also ensures prevention of evaporation and drying during heating.

**Disclaimer:** The above information is provided for reference only. Each end-user is responsible for developing and validating optimal testing conditions for use with this product.

#### Quality Control

This product is quality control tested at BioGenex according to the suggested procedure. The recommended positive control tissue for this miRNA probe is NORMALBREAST (FB-HM223).

#### Troubleshooting

Contact BioGenex Technical Service Department at **1-800-421-4149** or your local distributor to report unusual staining.

#### Expected Results

Proper use of this probe will result in an intense stain at the specific site of the hybridized fluorescein-labeled probe in positive test tissue and positive controls. If staining is absent from any positive control slides, or present in any negative control slides, the test should be considered invalid.

Both nuclear and cytoplasmic staining pattern was observed when tested in Normal Breast tissues. It has been long assumed that mature miRNA can only be found in the cytoplasm but recent reports revealed the nuclear localization of mature miRNA. If tissue or cells are not processed optimally then you may see non-specific staining in connective tissue.

#### Limitations of the Procedure

Correct treatment of tissues prior to and during fixation, embedding, and sectioning is important for obtaining optimal results. Inconsistent results may be due to variations in tissue processing, as well as inherent variations in tissue. The results from *in-situ* hybridization must be correlated with other laboratory findings.






#### Performance Characteristics

BioGenex has conducted studies to evaluate the performance of the probe with BioGenex detection systems and accessories. The probes have been found to be sensitive and show specific binding to the target nucleic acid of interest with minimal to no binding to non-specific tissues or cells. BioGenex probes 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 standard quality control for all products released and through surveillance programs.

#### Bibliography

- Lorio MV and Croce CM. (2012). MicroRNA dysregulation in cancer: diagnostics, monitoring and therapeutics. A comprehensive review. *EMBO Mol Med* 4, 143–159.

2. Chen PS, Su JL, and Hung MC. (2012). Dysregulation of Micro RNAs in cancer. *J Biomed Sci*, 19, 90.
3. Nuovo GJ. (2008). In situ detection of precursor and mature microRNAs in paraffin embedded, formalin fixed tissues and cell preparations. *Methods* 44, 39–46.
4. Song R, Ro S, Yan W. (2010). In situ hybridization detection of microRNAs. *Methods Mol Biol.* 629, 287-94.
5. Liang H, Zhang J, Ke Zen, Zhang Chen-Yu, Chen Xi. (2013). Nuclear microRNAs and their unconventional role in regulating non-coding RNAs. *Protein Cell* 4(5), 325–330.
6. Jeffries CD, Fried HM and Perkins D. (2011). Nuclear and cytoplasmic localization of neural stem cell microRNAs. *RNA*, 17, 675–686.
7. Tang R and Zen Ke. (2011). Gold glitters everywhere: nucleus microRNAs and their functions. *Front Biol*, 6 (1), 69-75.
8. Sun W, Shen W, Yang S, Hu F, Li H, Zhu TH (2010). miR-223 and miR-142 attenuate hematopoietic cell proliferation, and miR-223 positively regulates miR-142 through LMO2 isoforms and CEBP-β. *Cell Res* 20 (10): 1158–69.
9. Johnnidis JB, Harris MH, Wheeler RT, Stehling-Sun S, Lam MH, Kirak O, Brummelkamp TR, Fleming MD, Camargo FD (2008). Regulation of progenitor cell proliferation and granulocyte function by microRNA-223. *Nature* 451 (7182): 1125–9.
10. Fazi F, Racanicchi S, Zardo G, Starnes LM, Mancini M, Travaglini L, Diverio D, Ammatuna E, Cimino G, Lo-Coco F, Grignani F, Nervi C (2007). Epigenetic silencing of the myelopoiesis regulator microRNA-223 by the AML1/ETO oncoprotein. *Cancer Cell* 12(5): 457–66.
11. Stamatopoulos B, Meuleman N, Haibe-Kains B, Saussoy P, Van Den Neste E, Michaux L, Heimann P, Martiat P, Bron D, Lagneaux L (2009). microRNA-29c and microRNA-223 down-regulation has in vivo significance in chronic lymphocytic leukemia and improves disease risk stratification. *Blood* 113 (21): 5237–45.
12. Liu TY, Chen SU, Kuo SH, Cheng AL, Lin CW (2010). E2A-positive gastric MALT lymphoma has weaker plasmacytoid infiltrates and stronger expression of the memory B-cell-associated miR-223: possible correlation with stage and treatment response. *Mod Pathol* 23 (11): 1507–17.

	Temperature Limitation	<b>IVD</b>	In Vitro Diagnostic Medical Device
	Use By Date	<b>LOT</b>	Batch Code
	Non-Sterile		Consult Instructions for Use
<b>REF</b>	Catalogue Number		<b>BioGenex</b>