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SOX-10, Nestin, and EGFR are Useful Immunohistochemical Markers for Identification of Triple Negative Breast Carcinoma

George Yang, MD, Mike Lacey, MD, Kelsea Cummings, BS, Ashot Minasyan, BS, Jeffrey Gordon, BS, Tony Knoll, MBA

Cell Marque Corp., Rocklin, CA 95677

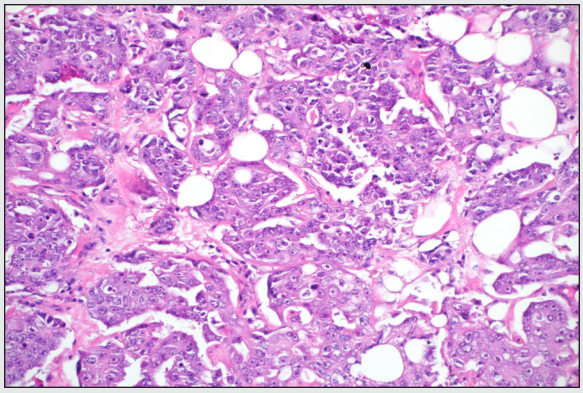

Fig 1. *Histology of triple negative breast carcinoma (400x).*

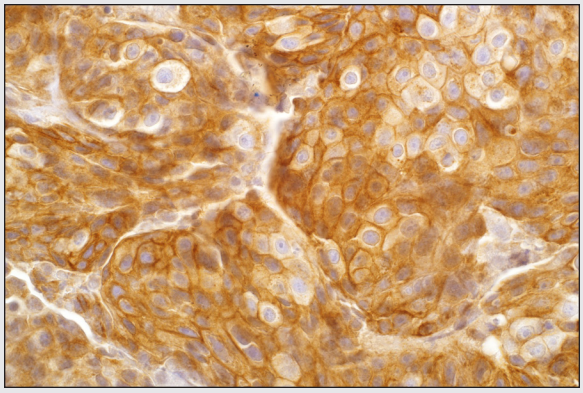

Fig 2. *Anti-EGFR strongly stains the membranes of tumor cells of triple negative breast carcinoma (400x).*

Introduction

Triple negative breast carcinoma (TNBC) is a subtype of breast carcinoma that constitutes approximately 20% of breast cancer incidence with a very aggressive clinical course and a lack of effective target therapy. Currently, basal markers, such as cytokeratin 5, cytokeratin 14, and cytokeratin 17 are the major immunohistochemical (IHC) markers to identify TNBC as basal-like breast carcinoma. However, recent studies have shown a lack of expression for basal cell markers in a high percentage of TNBC. Thus, there is a need for IHC markers that differentiate TNBC from non-TNBC. This study evaluated antibodies against SOX-10, nestin, EGFR, GATA3 and FOXA1 for their utility in the identification of TNBC.

Design

Whole slide surgical specimens of 30 cases of TNBC (negative for antibodies against ER, PR, and Her2/neu) and 30 cases of non-TNBC were evaluated by IHC. One full section from each case was stained with polyclonal anti-SOX-10, monoclonal anti-nestin, and monoclonal anti-EGFR. Monoclonal anti-GATA3 and anti-FOXA1 were also included in the study. Staining intensity was scored as 0 (negative), 1-2 (weak), 3 (moderate), 4 (strong); the labeling extent was tabulated as 0 (less than 5% positive cells), 1-2 (5-25% positive cells), 3 (26-75% positive cells), and 4 (greater than 75% positive cells). Nuclear staining of SOX-10, cytoplasmic staining of nestin, membranous staining of EGFR, nuclear staining of GATA3 and nuclear staining of FOXA1 are the patterns that are considered to be positive for these five antibodies.

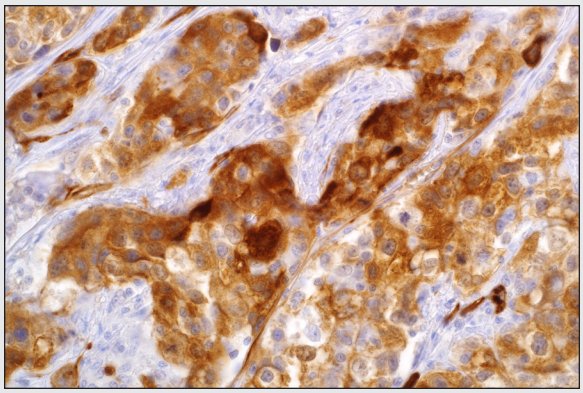

Fig 3. *Nestin expression is found in cytoplasm of tumor cells of triple negative breast carcinoma (400x).*

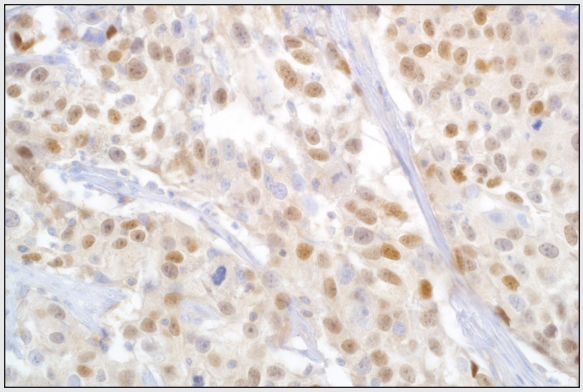

Fig 4. *SOX-10 is expressed in most of the tumor cell nuclei of triple negative breast carcinoma (400x).*

Results

As table 1 shows, of 30 TNBC cases, 20 cases (20/30, 66.7%) were positively stained by anti-SOX-10 with most tumors demonstrating moderate staining intensity and with 10-85% of tumor cells being positive. 20 of 30 TNBC cases (20/30, 66.7%) displayed positive staining for anti-nestin with the majority of tumor cells displaying moderate-to-strong staining intensity and with 10-100% of tumor cells being positive. 27 of 30 TNBC cases (27/30, 90%) expressed EGFR with most of the tumor cells showing moderate-to-strong staining intensity and with 50-100% of tumor cells being positive. Of 30 non-TNBC cases, only 1 case (1/30, 3.3%), 3 cases (3/30, 10%), and 8 cases (8/30, 26.6%) demonstrated staining for the antibodies against SOX-10, nestin, and EGFR, respectively. Anti-GATA3 was expressed in 15 TNBC cases (15/30, 50%) and in 29 non-TNBC cases (29/30, 96.7%). Anti-FOXA1 exhibited positive staining in 26 TNBCs (26/30, 86.7%) and 30 non-TNBC cases (30/30, 100%).

Table 1
New IHC Marker Expression in Triple Negative Breast Carcinoma and non-Triple Negative Breast Carcinoma

	SOX-10 Positive/ Total(%)	Nestin Positive/ Total(%)	EGFR Positive/ Total(%)	GATA3 Positive/ Total(%)	FOXA1 Positive/ Total(%)
TNBC	20/30 (66.7%)	20/30 (66.7%)	27/30 (90%)	15/30 (50%)	26/30 (86.7%)
Non-TNBC	1/30 (3.3%)	3/30 (10%)	8/30 (26.6%)	29/30 (96.7%)	30/30 (100%)

Conclusion

1) **Antibodies against SOX-10, nestin, and EGFR are useful and reliable biomarkers for identification of TNBC and should be included in a panel to separate TNBC from non-TNBC.**

2) **GATA3 and FOXA1 were not helpful for differentiation of TNBC from non-TNBC.**