### **Contents**

Subjects	Page
List of abbreviations	II
List of Figures	III
List of Tables	IV
• Introduction	1
Aim of the Work	3
• Review of Literature	
♦ Chapter (1): Breast Cancer	4
◆ Chapter (2): Octamer-Binding T Factor 4	
Materials and Methods	89
Results and Cases	99
• Discussion	142
• Summary	151
Conclusion and Recommendations	154
• References	156
Arabic Summary	

### **List of Abbreviations**

Abbreviation	Refers to
ADH	Atypical Ductal Hyperplasia
AJCC	American Joint Committee on Cancer
ALH	Atypical Lobular Hyperplasia
AR	Androgen Receptor
ASCO	American Society of Clinical Oncology
BM	Bone marrow
CALLA	Common Acute Lymphoblastic Leukemia Antigen
cAMP	Cyclic Adenosine Monophosphate
CD	Cluster of Differentiation
CISH	Chromogenic in situ Hybridization
СК	Cytokeratin
CSCs	Cancer Stem Cells
СТН	Chemotherapy
DCIS	Ductal Carcinoma In situ
DIN	Ductal Intraepithelial neoplasia
EGFR	Epidermal Growth Factor Receptor
ELISA	Enzyme Linked Immunosorbent Assay
EMA	Epithelial Membrane Antigen
EMT	Epithelial Mesenchymal Transition
ER	Estrogen receptor
FDA	Food and Drug Administration
FFDM	Full Field Digital Mammography
FFTP	First Full Term Pregnancy
FISH	Fluorescence in situ Hybridization

HCG	Human Chorionic Gonadotrophin
HER-2	Human Epidermal growth factor Receptor-2
HR	Hormone Receptor
HRT	Hormone Replacement Therapy
Hx & E	Haematoxylin and Eosin
IBC	Inflammatory Breast Cancer
IDC	Invasive Duct Carcinoma
IGF-1	Insulin-like Growth Factor-1
IHC	Immunohistochemistry
IM	Internal mammary node
Ki-67 LI	Ki-67 Labelling Index
LCIS	Lobular Carcinoma Insitu
LIN	Lobular Intraepithelial Neoplasia
LIQ	Lower Inner Quadrant
LOQ	Lower Outer Quadrant
LVI	Lymphovascular Invasion
miRNA	Micro Ribodeoxy Nucleic Acid
MoAbs	Monoclonal Antibodies
Mol	Molecular
MRI	Magnetic Resonance Imaging
MSC	Mesenchymal Stem/ Stromal Cell
NCI	National Cancer Institute
NOS	Not Otherwise Specified
NPI	Nottingham Prognostic Index
OCT4	Octamer binding transcription factor 4
OGCs	Osteoclast-like Giant Cells
OS	Overall Survival
PAS	Periodic Acid Schiff

### 3 List of Abbreviations

PCNA	Proliferating Cell Nuclear Antigen
PCR	Polymerase Chain Reaction
PR	Progesterone Receptor
RR	Regional Relapse
RTH	Radiotherapy
RT-PCR	Reverse transcriptase polymerization chain reaction
SEER	Surveillance Epidemiology and End Results
SISH	Silver- enhanced in situ Hybridization
SSEA-4	Stage-Specific Embryonic Antigen-4
TAF/CAF	Tumor/ Cancer-Associated Fibroblasts
TDLU	Terminal Duct Lobular Unit
TNBC	Triple Negative Breast Carcinoma
UICC	International Union for Cancer Control
WHO	World Health Organization

## List of Figures

No.	<u>Figure</u>	<u>Page</u>
<u>1</u>	Molecular classification of breast cancer.	54
2	Histological special types and molecular subtypes.	61
<u>3</u>	A case of invasive duct carcinoma, grade II, H & E (x 200)	127
4	A case of invasive duct carcinoma, grade III, H & E (x 200)	127
<u>5</u>	A case of invasive lobular carcinoma, H&E (x200)	128
<u>6</u>	case of invasive duct carcinoma and adjacent in situ ductal component comedo type, H&E (x200)	128
<u>7</u>	A case of lobular carcinoma in situ, H&E (x100)	129
<u>8</u>	A case of higher power view of previous case, H&E (x 200)	129
9	A case of seminoma positive nuclear and occasional cytoplasmic staining for OCT4, control x 200	130
<u>10</u>	A case of normal breast tissue showing negative staining for OCT4 (x100)	130
<u>11</u>	A case of normal breast tissue showing negative staining for Oct4 (x200)	131
<u>12</u>	A case of hyperplastic epithelial changes showing negative immunostaining for Oct4 (x200)	131
<u>13</u>	A case of hyperplastic epithelial changes showing negative immunostaining for Oct4 (x400)	132

No.	<u>Figure</u>	Page
14	A case of hyperplastic epithelial changes showing negative immunostaining for Oct4 (x400)	132
<u>15</u>	A case of hyperplastic epithelial changes showing negative staining for Oct4 (x400)	133
<u>16</u>	A case of hyperplastic epithelial changes showing positive cytoplasmic Oct4 immunostaining, score (+1) (x400)	133
<u>17</u>	A case of hyperplastic epithelial changes showing positive cytoplasmic Oct4 immunostaining, score (+1) (x400)	134
<u>18</u>	A case of invasive duct carcinoma and adjacent in situ changes showing positive nuclear and cytoplasmic Oct4 immunostaining, score (+2) (x100)	134
<u>19</u>	A case of in situ ductal showing cytoplasmic positive Oct4 immunostaining, score (+2) (x200)	135
<u>20</u>	A case of invasive lobular carcinoma with lobular in situ component showing positive cytoplasmic immunostaining for Oct4, score (+2)( x 200)	135
<u>21</u>	A case of in situ lobular carcinoma showing cytoplasmic positive Oct4 immunostaining, score (+2) (x400)	136
22	A case of invasive duct carcinoma Grade II showing positive cytoplasmic Oct4 immunostaining (+2) (x100)	136
<u>23</u>	A case of invasive duct carcinoma showing positive cytoplasmic Oct4 immunostaining score (+2) (x100)	137

No.	<u>Figure</u>	Page
<u>24</u>	A case of higher power view of previous case showing positive cytoplasmic Oct4 immunostaining, score (+2) (x200)	137
<u>25</u>	A case of invasive duct carcinoma showing positive nuclear Oct4 immunostaining score (+1) (x200)	138
<u>26</u>	High power view of previous case (x200)	138
<u>27</u>	A case of invasive lobular carcinoma showing positive nuclear immunostaining for Oct4, score (+2) (x100)	139
<u>28</u>	A case of higher power view of previous case showing positive nuclear Oct4 immunostaining score (+2) (x200)	139
<u>29</u>	A case of invasive lobular carcinoma showing positive nuclear and cytoplasmic Oct4 immunostaining score (+2) (x400)	140
<u>30</u>	A case of triple negative invasive duct carcinoma showing positive cytoplasmic Oct4 immunostaining, score (+2) (x100)	140
31	A case of triple negative invasive duct carcinoma invading fat showing positive nuclear Oct4 immunostaining, score (+2) (x200)	141
<u>32</u>	A case of triple negative invasive duct carcinoma showing positive nuclear Oct4 immunostaining, score (+2) (x400)	141

### **List of Tables**

<u>No.</u>	<u>Table</u>	<u>Page</u>
<u>1</u>	WHO histological classification of malignant breast tumors (2012)	15
<u>2</u>	Criteria for the differential diagnosis of mucin producing carcinomas	28
<u>3</u>	Classification of metaplastic carcinomas	35
4	Proposed classification for ductal carcinoma in situ	48
<u>5</u>	Minimal criteria for low grade ductal carcinoma in situ	50
<u>6</u>	Summary of intraductal carcinoma grading	51
7	Scarff-Bloom-Richardson (SBR) grading system	68
8	pTNM Classification for Breast carcinoma	69
9	Distribution of studied cases according to age	100
<u>10</u>	Distribution of studied cases according to breast lesions	101
<u>11</u>	Distribution of studied cases according to tumor size	102
<u>12</u>	Distribution of studied cases according to tumor type	103

No.	<u>Table</u>	Page
<u>13</u>	Distribution of studied cases according to tumor grade	104
<u>14</u>	Distribution of studied cases according to presence of carcinoma in situ	105
<u>15</u>	Distribution of studied cases according to presence of vascular emboli	106
<u>16</u>	Distribution of studied cases according to lymph node status	107
<u>17</u>	Distribution of studied cases according to ER status	108
<u>18</u>	Distribution of studied cases according to PR status	109
<u>19</u>	Distribution of studied cases according to Her2/neu status	110
<u>20</u>	Distribution of studied cases according to Ki67 expression	111
<u>21</u>	Distribution of studied cases according to OCT4 expression	112
<u>22</u>	Correlation between OCT4 and age	114
<u>23</u>	Correlation between OCT4 and breast lesions	115
<u>24</u>	Correlation between OCT4 and tumor size	116
<u>25</u>	Correlation between OCT4 and tumor type	117

#### Suist of Tables

No.	<u>Table</u>	Page
<u>26</u>	Correlation between OCT4 and tumor grade	118
<u>27</u>	Correlation between OCT4 and presence of carcinoma in situ	119
<u>28</u>	Correlation between OCT4 and presence of vascular emboli	120
<u>29</u>	Correlation between OCT4 and lymph node status	121
30	Correlation between OCT4 and ER status	122
31	Correlation between OCT4 and PR status	123
32	Correlation between OCT4 and HER2/neu	124
33	Correlation between OCT4 and Ki67 proliferation index	125
<u>34</u>	Correlation between OCT4 and triple negative cases	126



# Introduction





# Aim of the Work





## **Review of Literature**





## **Materials and Methods**





## **Results and Cases**

