**Supplementary Table S1:** Clinicopathological characteristics of Nottingham Tenovus series

|  |  |  |
| --- | --- | --- |
| **Variable** | **n\*** | **Cases (%)** |
| **Menopausal status** | 1650 |  |
| Pre-menopausal |  | 612 (37.0) |
| postmenopausal |  | 1038 (63.0) |
| **Tumour Grade (NGS)** | 1650 |  |
| G1 |  |  306 (18.5) |
| G2 |  | 531 (32.2) |
| G3 |  |  813 (49.3) |
| **Lymph node stage** | 1650 |  |
| Negative |  |  1056 (64.0) |
| Positive (1-3 nodes) |  | 486 (29.5) |
| Positive (>3 nodes) |  | 108 (6.5) |
| **Tumour size (cm)** | 1650 |  |
| T1 a + b (≤1.0) |  | 187 (11.0) |
| T1 c (>1.0 -2.0) |  | 868 (53.0) |
| T2 (>2.0-5) |  | 579 (35.0) |
| T3 (>5) |  | 16 (1.0) |
| **Tumour type** | 1650 |  |
| IDC-NST |  | 941 (57) |
| Tubular  |  | 349 (21) |
| ILC |  | 160 (10) |
| Medullary (typical/atypical) |  | 41 (2.5) |
| Others |  | 159 (9.5) |
| **NPI subgroups** | 1650 |  |
| Excellent PG(2.08-2.40) | Low risk | 207 (12.5) |
| Good PG(2.42-3.40) | 331 (20.1) |
| Moderate I PG(3.42 to 4.4) | High risk | 488 (29.6) |
| Moderate II PG(4.42 to 5.4) | 395 (23.9) |
| Poor PG(5.42 to 6.4) | 170 (10.3) |
| Very poor PG(6.5–6.8) | 59 (3.6) |
| **Survival at 20 years** | 1650 |  |
| Alive and well |  | 1055 (64.0) |
| Dead from disease |  | 468 (28.4) |
| Dead from other causes |  | 127 (7.6) |
| **Adjuvant systemic therapy (AT**) |  |  |
| No AT  |  | 665 (42.0) |
| Hormone therapy (HT) |  | 642 (41.0) |
| Chemotherapy (CMF) |  | 307 (20.0) |
| Hormone + chemotherapy |  | 46 (3.0) |

\* Number of cases for which data were available.

NPI; Nottingham prognostic index, PG; prognostic group

**Supplemental Table S2:** Clinicopathological characteristics of ER- cohort

|  |  |  |
| --- | --- | --- |
| **Variable** |  | **Cases (%)** |
| **Menopausal status** | 279 |  |
| Pre-menopausal |  | 119 (43.6) |
| postmenopausal |  | 154 (56.4) |
| **Tumour Grade (NGS)** | 279 |  |
| G1 |  |  1 (0.4) |
| G2 |  |  26 (9.5) |
| G3 |  | 248 (90.2) |
| **Tumour size (cm)** | 279 |  |
| ≤2.0 |  |  140 (52.6) |
| >2.0 |  | 126 (47.4) |
| **Mitotic index** | 279 |  |
| M1 |  | 21 (7.5) |
| M2 |  | 47(16.8) |
| M3 |  | 274 (98.9) |
| **Tubule formation** | 279 |  |
| 1 |  | 1 (0.4) |
| 2 |  | 36 (15.0) |
| 3 |  | 240 (86.6) |
| **Pleomorphism** | 279 |  |
| 1 |  | 0 (0) |
| 2 |  | 3 (1.1) |
| 3 |  | 274(98.9) |
| **Her-2 status** | 279 |  |
| Positive |  | 28 (10) |
| Negative |  | 251 (90) |
| **NPI** | 279 |  |
| Good (≤ 3.4) |  | 15 (5.5) |
| Moderate (3.41-5.4) |  | 194 (71.1) |
| Poor (>5.4) |  | 64 (23.4) |

NPI; Nottingham prognostic index, PG; prognostic group

**Supplementary Table S3:** Antigens, primary antibodies, clone, source, optimal dilution and scoring system used for each immunohistochemical marker

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Antigen** | **Antibody** | **Clone** | **Source** | **Antigen Retrieval** | **Dilution / Incubation Time** | **Distribution** | **Scoring****system** | **Cut-offs** |
| BRCA1 | BRCA1 | MS110 | Calbiochem | Citrate pH6 | 1:10060 min | Nuclear | % of positive cells | <25% (negative) |
| ATM | Rabbit MAb anti-ATM | Y170 | Abcam | Citrate pH6 | 1:10018 hours | Nuclear | % of positive cells | <25% (negative) |
| XRCC1 | Mouse MAb Anti-XRCC1 | 33-2-5 | Thermo-scientific | Citrate pH6 | 1:20020 min | Nuclear | % of positive cells | ≥10% (positive) |
| Pol β | Rabbit anti-polβ | Ab26343 | Abcam | Citrate pH6 | 1:20060 min | Nuclear | H- Score | ≥100(Median H-score, positive) |
| BLM | Rabbit anti BLM | Polyclonal | Novus-Biologicals | Citrate pH6 | 1:10018 Hours | Nuclear | H- Score | ≥50(Median H-score, positive) |
| WRN | Rabbit Anti-WRN | Polyclonal | NovusBiologicals | Citrate pH6 | 1:100Overnight (18h) | Nuclear | H-score | Nuclear ≥116(Median H-score High) |
| RECQL4 | Rabbit AntiRECQL4 | Polyclonal | Novus Biologicals | Citrate pH6 | 1:100060 min | Nuclear | H-score | Nuclear ≥215 (Median H-score High) |
| Ku70/Ku80 | Mouse Anti-Ku70/Ku80 | Monoclonal | Abcam | Citrate pH6 | 1:250060 min | Nuclear | H- Score | >90(X-tile cut-off, positive) |
| CHK2 | Rabbit AntiCHK2 | Polyclonal | Abcam | Citrate pH6 | 1:10060 min | Nuclear | H- Score | ≥100(Median H-score, positive) |
| PARP1 | Mouse MAb Anti-PARP1 | 7D3-6 | BD pharmingen | Citrate pH6 | 1:1000 | Nuclear | % of positive cells | ≥10% (positive) |
| TOP2A | Mouse MAb | KiS1 | Dako-Cytomation | Citrate pH6 | 1:15060 min | Nuclear | % of positive cells | >25% (positive) |
| FEN1 | Rabbit anti-FEN1 | polyclonal | Novus Biologicals | Citrate pH6 | 1:20060 min | Nuclear  | H-score | >100 (positive) |
| DNA-PKcs | Mouse MAb Anti- | 3H6 | Abcam | Citrate pH6 | 1:100020 min | Nuclear | H-score | >260 ((Mean H-score, positive) |
| ER | Mouse MAb anti-ER-α | SP1 | Dako-Cytomation | Citrate pH6 | 1:15030 min | Nuclear | Allred score | ≥3 (positive) |
| ER | Mouse MAb anti-ER-α | EP1 | Dako-Cytomation | Citrate pH6 | 1:8030 min | Nuclear | % positive cells | ≥1% positive |
| PR | Mouse MAb anti-PR | PgR636 | Dako-Cytomation | Citrate pH6 | 1:12530 min | Nuclear | % positive cells | ≥1% positive |
| HER2 | Rabbit antihuman c-erbB2 | polyclonal | Dako-Cytomation | None | 1:40060 min | Membrane | See text | See text |
| CD8 | Mouse MAb Anti-CD8 | 1A5 | Vector Laboratories | Citrate pH6 | 1:5020 min | Membrane | See text | See text |
| FOXP3 | Mouse MAb Anti-FOXP3 | 236A/E7 | Abcam | Citrate pH6 | 1:10060 min | Stroma | positive cell counts | ≥3 positive |
| PD-1 | Mouse MAb Anti-PD-1 | EH33 | Cell Signalling Technology | Citrate pH6 | 1:7524 hours | Stroma | % positive cells | ≥5% positive |
| PD-L1 | Rabbit MAb Anti-PD-L1 | E1L3N | Cell Signalling Technology | Epitope retrieval solution 2, pH9, 95°C, 45 min | 1:2524 hours | MembraneCytoplasmStroma | % positive in tumour% positive cells in stroma | ≥1% positive |

All sections were pre-treated with microwave antigen retrieval using 0.1% citrate buffer (pH 6) except for HER2 (no pre-treatment).

**Supplementary Table S4:** Clinicopathological significance of ATM expression in CD8+ TILs positive and CD8+ TILs negative breast cancer

|  |  |  |  |
| --- | --- | --- | --- |
|  | **CD8 and ATM expression** | **P- value** | **\*P -Value**(Adjusted) |
| ATM+/CD8+ | ATM+/CD8- | ATM-/CD8+ | ATM-/CD8- |
| **A) Pathological Parameters** |
| **Tumour Size**  <1cm >1-2cm >2-5cm>5cm | 30 (34.9%)165(38.3%)91(32.6%)3 (21.4%) | 5 (5.8%)51(11.8%)27(9.7%)2(14.3%) | 41 (47.7%)176(40.8)141(50.5)8 (57.1%) | 10 (11.6)39(9.0%)20 (1.2%)1 (7.1%) | 0.268 | 0.2924 |
| **Tumour Stage** 123 | 191(37.3%)77 (32.8%)21(33.3%) | 59(11.5%)25(10.6%)2 (3.2%) | 214(41.8%)114(48.5%)38 (60.3%) | 48 (9.4%)19(8.1%)2 (3.2%) | 0.054 | 0.0810 |
| **Tumour Grade**  G1 G2 G3 | 57 (46.0%)100(38.3%)132(31.0%) | 20(16.1%)26(10.0%)40(9.4%) | 40 (32.3)110(42.1)216(50.7) | 7 (5.6%)25(9.6%)38(8.9%) | 0.002 | **0.0080** |
| **NPI**  ≤ 3.4 >3.4 | 100(41.7%)178(33.1%) | 30(12.5%)53(9.9%) | 90(37.5%)258(48.0%) | 20(8.3%)49(9.1%) | 0.034 | 0.0680 |
| **Mitotic Index** M1 (low; mitoses < 10)M2 (medium; mitoses 10-18)M3 (high; mitosis >18) | 116(43.8%)54 (36.5%)116(30.2%) | 28(10.6%)16(10.8%)37(9.6%) | 104(39.2%)62 (41.9%)195(50.8%) | 17(6.4%)16(10.8%)36(9.4%) | 0.014 | **0.0336** |
| **Tubule Formation** 1 (>75% definite tubule)2 (10%-75% definite tubule)3 (<10% definite tubule) | 12(27.3%)111(43.5%)163(32.7%) | 8(18.2%)31(12.2%)42(8.4%) | 19(43.2%)88(34.5%)254(51.0%) | 5(11.4%)25(9.8%)39(7.8%) | 0.001 | **0.0120** |
| **Pleomorphism** 1 (small-regular uniform)2 (Moderate variation)3 (Marked variation) | 6 (35.3%)112(38.2%)167(34.5%) | 3 (17.6%)39(13.3%)38(7.9%) | 6 (35.3%)116(39.6%)238(49.2%) | 2(11.8%)26(8.9%)41(8.5%) | 0.077 | 0.1027 |
| **Tumour Type** IDC-NSTTubular MedullaryILCOthersMixed NST &lobular/ special type  | 165 (33.8%)70 (42.9%)10 (34.5%)23 (33.8%)2 (22.2%)16 (37.2%) | 48 (9.8%)24 (14.7%)1 (3.4%)4 (5.9%)1 (11.1%)6 (14.0%) | 236 (48.4%)56 (34.4%)17 (58.6%)35 (51.5%)5 (55.6%)13 (30.2%) | 39 (8.0%)13 (8.0)1 (3.4%)6 (8.8%)1 (11.1%)8 (18.6%) | 0.045 | 0.0836 |
| **HER-2 overexpression** NoYes | 243(35.8%)41 (34.2%) | 76 (11.2%)9 (7.5%) | 300(44.2%)61 (50.8%) | 60(8.8%)9 (7.5%) | 0.459 | 0.9670 |
| **ER** NegativePositive | 6.6 (29.6%)220 (38.0%) | 15 (6.7%)71 (12.3%) | 121(54.3%)242(41.8%) | 21(9.4%)46(7.9%) | 0.003 | **0.0098** |
| **PR** NegativePositive | 104(31.4%)175(38.5%) | 23(6.9%)62(13.6%) | 172(52.0%)180(39.6%) | 32(9.7%)38(8.4%) | 0.001 | **0.0130** |

**Supplementary Table S5:** Clinicopathological significance of BRCA1 expression in CD8 positive and CD8 negative breast cancer

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **P- value** | **\*P -Value**(Adjusted) |
| BRCA1+/CD8+ | BRCA1+/CD8- | BRCA1-/CD8+ | BRCA1-/CD8- |
| **A) Pathological Parameters** |
| **Tumour Size**  <1cm >1-2cm >2-5cm>5cm | 79 (77.5%)363(68.6%)278(68.3%)10 (50%) | 15 (14.7%)86(16.3%)51 (12.5%)3 (15%) | 6 (5.9%)64 (12.1%)70(17.2%)6 (30%) | 2 (2.0%)16(3.0%)8 (2.0%)1 (5.0%) | 0.26 | 0.624 |
| **Tumour Stage** 123 | 418(65.3%)245(74.7%)67 (73.6%) | 107(16.7%)41 (12.5%)8 (8.8%) | 95(14.8%)36(11.0%)15(16.5%) | 20(3.1%)6 (1.85%)1 (1.1%) | 0.40 | 0.8 |
| **Tumour Grade**  G1 G2 G3 | 112(68.7%)263(78.0%)355(63.5%) | 33 (20.2%)53 (15.7%)70 (12.5%) | 10 (6.1%)18 (5.3%)118(21.1%) | 8 (4.9%)3 (0.9%)16(2.9%) | 3.5x10-12 | **p<0.0001** |
| **NPI**  ≤ 3.4 >3.4 | 218(72.7%)474(66.9%) | 58 (18.7%)94 (13.3%) | 18 (6.0%)121 (17.1%) | 8 (2.7%)19 (2.7%) | 0.000026 | **0.0003** |
| **Mitotic Index** M1 (low; mitoses < 10)M2 (medium; mitoses 10-18)M3 (high; mitosis >18) | 260 (76.9%)142 (73.2%)317 (63.4%) | 56 (16.6%)29 (14.9%)62 (12.4%) | 17 (5.0%)19 (9.8%)106(21.2%) | 5 (1.5%)4 (2.1%)15(3.0%) | 2.4x10-9 | **p<0.0001** |
| **Tubule Formation** 1 (>75% definite tubule)2 (10%-75% definite tubule)3 (<10% definite tubule) | 36 (64.3%)231(70.6%)452(69.2%) | 14(25.0%)56(17.1%)77(11.9%) | 2 (3.6%)33 (10.1%)107(16.5%) | 56 (100%)327(100%)649(100%) | 0.000207 | **0.0012** |
| **Pleomorphism** 1 (small-regular uniform)2 (Moderate variation)3 (Marked variation) | 13 (86.7%)282(73.2%)421(67.0%) | 0 (0%)74(19.2%)72(11.5%) | 0 (0%)22 (5.7%)120(19.1%) | 2 (13.3%)7 (1.8%)15 (2.4%) | 3.5x10-10 | **p<0.0001** |
| **Tumour Type** IDC-NSTTubular Medullary ILCOthersMixed NST& Lobular special type | 418 (66.5%)144(70.6%)18 (56.3%)96 (85.7%)9 (75%)38 (65.5%) | 82 (13%)40 (19.6%)1 (3.1%)13 (11.6%)3 (25%)16 (27.6%) | 113 (18%)11 (5.4%)12 (37.5%)3 (2.7%)0 (0%)3 (5.2%) | 16 (2.5%)9 (4.4%)1 (3.1%)0 (0 %)1 (1.7%)27 (2.6%) | 6.4x10-10 | **p <0.0001** |
| **HER-2**NegativePositive | 626(69.0)95 (66.4) | 140 (15.4)16 (11.2) | 116 (12.8)30 (21.0) | 25 (2.8)2 (1.4) | 0.037 | 0.1418 |
| **ER** NegativePositive | 150 (55.8%)574 (74.1%) | 28 (10.4%)124 (16.0%) | 76 (28.3%)66 (8.5%) | 15 (5.6%)11 (1.4%) | 2.6x10-18 | **p<0.0001** |
| **PR** NegativePositive | 260 (61.2%)464 (74.1%) | 47 (11.1%)108(17.3%) | 101 (23.8%)44 (7.0%) | 17 (4.0%)10 (1.6%) | 4.6x10-15 | **p<0.0001** |

**Supplementary Table S6**: Clinicopathological significance of XRCC1 expression in CD8 positive and CD8 negative breast cancers

|  |  |  |  |
| --- | --- | --- | --- |
|  | **CD8 and XRCC1 expression** | **P- value** | **\*P -Value**(Adjusted) |
| XRCC1+/CD8+ | XRCC1+/CD8- | XRCC1-/CD8+ | XRCC1-/CD8- |
| **A) Pathological Parameters** |
| **Tumour Size**  <1cm >1-2cm >2-5cm>5cm | 61 (71.8%)346 (76.8%)254(67.6%)12 (63.2%) | 11(12.9%)90(17.6%)52(13.8%)3 (15.8%) | 11(12.9%)52(10.2%)62(16.5%)3 (15.8%) | 2 (2.4%)22(4.3%)8 (2.1%)1 (5.3%) | 0.161 | 0.1756 |
| **Tumour Stage** 123 | 393(66.3%)209(67.9%)71 (78.0%) | 106(17.9%)45 (14.6%)7 (7.7%) | 67(11.3%)49(15.9%)11(12.1%) | 27(4.6%)5 (1.6%)2 (2.2%) | 0.013 | **0.0173** |
| **Tumour Grade**  G1 G2 G3 | 97 (66%)238(75.8%)71 (78%) | 33(22.4%)51 (16.2%)73 (13.8%) | 12(8.2%)17(5.4%)99(18.7%) | 5 (3.4%)8 (2.5%)20(3.8%) | 3.5x10-7 | **p<0.0001** |
| **NPI**  ≤ 3.4 >3.4 | 196(71.3%)442(65.7%) | 54(19.6%)99(14.7%) | 16(5.8%)108(16%) | 9 (3.3%)24(3.6%) | 0.000214 | **0.0004** |
| **Mitotic Index** M1 (low; mitoses < 10)M2 (medium; mitoses 10-18)M3 (high; mitosis >18) | 231(74.3%)128(70.3%)301 (64%) | 53 (17%)28(15.4%)64(13.6%) | 20 (6.4%)18 (9.9%)89 (18.9%) | 7(2.3%)8(4.4%)16(3.4%) | 0.000036 | **0.0001** |
| **Tubule Formation** 1 (>75% definite tubule)2 (10%-75% definite tubule)3 (<10% definite tubule) | 26(56.5%)211(68.7%)423(69.3%) | 16 (34.8%)53(17.3%)76 (12.5%) | 3 (6.5%)31(10.1%)93 (15.2%) | 1(2.2%)12(3.9%)18(3.0%) | 0.001 | **0.0015** |
| **Pleomorphism** 1 (small-regular uniform)2 (Moderate variation)3 (Marked variation) | 14 (87.5%)254(71.1%)389(66.5%) | 2 (12.5%)70 (19.6%)143(14.9%) | 0 (0)23(6.4%)104(17.8) | 0 (0)10(2.8%)21(3.6%) | 0.000005 | **p <0.0001** |
| **Tumour Type** IDC-NSTTubular Medullary ILCOthersMixed NST & Lobular/special type | 408(67.4%)120(64.5%)18(64.3%)81(82.7%)6 (54.5%)31(62%) | 86(14.2%)42(22.6%)0 (0)10(10.2%)3 (27.3%)12(24%) | 93(15.4%)17(9.1%)8 (28.6%)5 (5.1%)1 (9.1%)4 (8%) | 18(3.0%)7 (3.8%)2 (7.1%)2 (2.0%)1 (9.1%)3 (6%) | 0.000485 | **0.0008** |
| **Her2 overexpression** NoYes | 571(67.6%)92 (67.2%) | 139(16.4%)19 (13.9%) | 107(12.7)22 (16.1%) | 28(3.3%)4 (2.9%) | 0.663 | 7.9560 |
| **ER** NegativePositive | 148(59.0%)512(71.2%) | 29(11.6%)124(17.2%) | 60(23.9%)66(9.2%) | 14(5.6%)17(2.4%) | 9.3x10-7 | **p <0.0001** |
| **PR** NegativePositive | 240(60.8%)401(71.7%) | 56(14.2%)100(17.9%) | 80(20.3%)45(8.1%) | 19(4.8%)13(2.3%) | 5.4x10-8 | **p <0.0001** |

**Supplementary Table S7:** Clinicopathological significance of ATM expression in FOXP3 positive and FOXP3negative breast cancer

|  |  |  |  |
| --- | --- | --- | --- |
|  | **FOXP3 and ATM expression** | **P- value** | **\*P -Value**(Adjusted) |
| ATM+/ FOXP3+ | ATM+/ FOXP3- | ATM-/ FOXP3+ | ATM-/ FOXP3- |
| **A) Pathological Parameters** |
| **Tumour Size**  <1cm >1-2cm >2-5cm>5cm | 19 (20%)145 (30.7%)81 (27.7%)2 (15.4%) | 25 (26.3%)103 (21.8%)41 (14%)2 (15.4%) | 31 (32.6154( 32.6113 (38.76 (46.2 | 20 (21.171 (1557(19.53 (23.1 | 0.036 | 0.3960 |
| **Tumour Stage** 123 | 157 (28.4%)71 (28.2%)19 (27.9%) | 122 (22.1%)42 (16.7%)8 (11.8%) | 185 (33.5%)87 (34.5%)32 (47.1%) | 89 (16.1%)52 (20.6%)9 (13.2%) | 0.092 | 0.5060 |
| **Tumour Grade**  G1 G2 G3 | 40 (28%)66 (23.1%)141(31.7%) | 56 (39.2%)73 (25.5%)43 (9.7%) | 26 (18.2%)74 (25.9%)204 (45.8%) | 21 (14.7%)73 (25.5%)57 (12.8%) | 1.7X 10-21 | **<0.0001** |
| **NPI**  ≤ 3.4 >3.4 | 69 (25.9%)170(29.6%) | 84 (31.6%)82 (14.3%) | 64 (24.1%)226 (39.3%) | 49 (18.4%)97 (16.9%) | 6.5 X10-9 | **<0.0001** |
| **Mitotic Index** M1 (low; mitoses < 10)M2 (medium; mitoses 10-18)M3 (high; mitosis >18) | 72 (24.2%)44 (27.2%)126 (31.4%) | 99 (33.3%)32 (19.8%)39 (9.7%) | 66 (22.2%)53 (32.7%)183(45.6%) | 60 (20.2%)33 (20.4%)53 (13.2%) | 4.1x10-16 | **<0.0001** |
| **Tubule Formation** 1 (>75% definite tubule)2 (10%-75% definite tubule)3 (<10% definite tubule) | 10 (20.4%)82 (29.3%)150 (28.2%) | 16 (32.7%)80 (28.6%)74 (13.9%) | 14 (28.6%)70 (25%)218(41.1%) | 9 (18.4%)48(17.1%)89(16.8%) | 5.5x10-7 | **<0.0001** |
| **Pleomorphism** 1 (small-regular uniform)2 (Moderate variation)3 (Marked variation) | 6 (30%)83 (25.2%)151(29.7%) | 7 (35%)97(29.5%)66 (13%) | 6 (30%)74 (22.5%)222 (43.7%) | 1 (5%)75 (22.8%)69 (13.6%) | 7.8x10-3 | **<0.0001** |
| **Tumour Type** IDC-NSTTubular MedullaryILCOthersMixed NST &lobular/ special type  | 158 (30.6%)51 (28%)11 (36.7%)10 (13%)1 (12.5%)12 (24.5%) | 72 (13.9%)59 (32.4%)1 (3.3%)24 (31.4%)2 (25%)14 (28.6%) | 212 (41%)41 (22.5%)18 (60%)17 (22.1%)2 (25%)11 (22.4%) | 75(14.5%)31(17%)0 (0%)26(33.8%)3 (37.5%)12 (24.5%) | 4.4x10-13 | **<0.0001** |
| **HER-2 overexpression** NoYes | 198 (26.8%)48 (39.8%) | 165(22.2%)4 (3.3%) | 244 (32.9%)57 (46.7%) | 135(18.2%)13 (10.7%) | 1.6x10-7 | **<0.0001** |
| **ER** NegativePositive | 76 (32.2%)168(26.8%) | 18 (7.6%)153(24.4%) | 117 (49.6%)181 (28.9%) | 25 (10.6%)124(19.8%) | 4.7x10-12 | **<0.0001** |
| **PR** NegativePositive | 99 (28.7%)140(27.9%) | 41 (11.9%)123(24.6%) | 156 (45.2%)141 (28.1%) | 49 (14.2%)97 (19.4%) | 4.4x10-8 | **<0.0001** |

**Supplementary Table S8:** Clinicopathological significance of BRCA1 expression in FOXP3 positive and FOXP3negative breast cancer

|  |  |  |  |
| --- | --- | --- | --- |
|  | **FOXP3 and ATM expression** | **P- value** | **\*P -Value**(Adjusted) |
| BRCA1+/ FOXP3+ | BRCA1+/ FOXP3- | BRCA1-/ FOXP3+ | BRCA1-/ FOXP3- |
| **A) Pathological Parameters** |
| **Tumour Size**  <1cm >1-2cm >2-5cm>5cm | 60 (51.3%)308(54.4%)230(54.1%)8 (38.1%) | 48 (41%)177(31.3%)118 (27.8%)6 (28.6%) | 5 (4.3%)58(10.2%)60(14.1%)6 (28.6%) | 4 (3.4%)23(4.1%)17(4%)1 (4.8%) | 0.015 | **0.0165** |
| **Tumour Stage** 123 | 354 (51.5%)196 (56.5%)56 (58.3%) | 217 (31.6%)109 (109%)24 (25%) | 86 (12.5%)31 (8.9%)12 (12.5%) | 30 (4.4%)11 (3.2%)4 (4.2%) | 0.397 | 4.3670 |
| **Tumour Grade**  G1 G2 G3 | 81 (44.3%)176 (47.4%)349 (60.6%) | 83 (45.4%)170(45.8%)97 (16.8%) | 5 (2.7%)15 (4%)109 (18.9%) | 14 (7.7%)10 (2.7%)21 (3.6%) | 2.0X10-30 | **<0.0001** |
| **NPI**  ≤ 3.4 >3.4 | 161 (48.3%)416 (55.7%) | 143 (42.9%)192 (25.7%) | 13 (3.9%)112 (15%) | 16 (4.8%)27 (3.6%) | 9.3 X10-11 | **<0.0001** |
| **Mitotic Index** M1 (low; mitoses < 10)M2 (medium; mitoses 10-18)M3 (high; mitosis >18) | 171 (45.1%)108 (51.9%)312 (60.7%) | 183(48.3%)76 (36.5%)84 (16.3%) | 11 (2.9%)17 (8.2%)97 (18.9%) | 14 (3.7%)7 (3.4%)21 (4.1%) | 9.5X10-27 | **<0.0001** |
| **Tubule Formation** 1 (>75% definite tubule)2 (10%-75% definite tubule)3 (<10% definite tubule) | 26 (44.1%)178(49.7%)387(56.6%) | 26 (44.1%)139(38.8%)178(26%) | 0 (0%)25 (7%)100(14.6%) | 7 (11.9%)16(4.5%)19(2.8%) | 4.0x10-9 | **<0.0001** |
| **Pleomorphism** 1 (small-regular uniform)2 (Moderate variation)3 (Marked variation) | 8 (42.1%)204(47.8%)376(57.8%) | 9 (47.4%)191(44.7%)142(21.8%) | 1 (5.3%)12 (2.8%)112(17.2%) | 1 (5.3%)20(4.7%)21(3.2%) | 3.3x10-19 | **<0.0001** |
| **Tumour Type** IDC-NSTTubular MedullaryILCOthersMixed NST &lobular/ special type  | 383(58.4%)107(47.6%)19 (59.4%)56 (44.4%)6 (54.5%)29 (43.3%) | 145 (22.1%096 (42.7%)0 (0%)68 (54%)5 (45.5%)33 (49.3%) | 102 (15.5%)9 (4%)13 (40.6%)1 (0.8%)0 (0%)1 (1.5%) | 26 (4%)13 (5.8%)0 (0%)1 (0.8%)0 (0%)4 (6%) | 1.5x10-23 | **<0.0001** |
| **HER-2 overexpression** NoYes | 511(52.3%)93 (64.1%) | 323(33.1%)21 (14.5%) | 101(10.3%)28 (19.3%) | 42 (4.3%)3 (2.1%) | 0.000004 | **<0.0001** |
| **ER** NegativePositive | 163 (58%)431 (52%) | 29 (10.3%)318(38.4%) | 72 (25.6%)53 (6.4%) | 17 (6%)27 (3.3%) | 2.1x10-27 | **<0.0001** |
| **PR** NegativePositive | 239 (54.7%)363 (53.5%) | 85 (19.5%)256(37.8%) | 90 (20.6%)37 (5.5%) | 23 (5.3%)22 (3.2%) | 2.2x10-18 | **<0.0001** |

**Supplementary Table S9:** Clinicopathological significance of XRCC1 expression in FOXP3 positive and FOXP3negative breast cancer.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **FOXP3 and ATM expression** | **P- value** | **\*P -Value**(Adjusted) |
| XRCC1+/ FOXP3+ | XRCC1+/ FOXP3- | XRCC1-/ FOXP3+ | XRCC1-/ FOXP3- |
| **A) Pathological Parameters** |
| **Tumour Size**  <1cm >1-2cm >2-5cm>5cm | 45 (45.5%)293(53.5%)206(52.3%)10 (52.6%) | 39 (39.4%)176(32.1%)111(28.2%)5 (26.3%) | 9 (9.1%)52 (9.5%)55 (14%)4 (21.1%) | 6 (6.1%)28(5.1%)22 (5.6%)0 (0%) | 0.219 | 2.4090 |
| **Tumour Stage** 123 | 340 (52.5%)158 (49.1%)57 (60.6%) | 204 (31.5%)107 (33.2%)22 (23.4%) | 63 (9.7%)43 (13.4%)14 (14.9%) | 41 (6.3%)14 (4.3%)1 (1.1%) | 0.044 | 0.0484 |
| **Tumour Grade**  G1 G2 G3 | 74 (41.8%)157(45.8%)323 (59.6%) | 81 (45.8%)158(46.1%)93 (17.2%) | 8 (4.5%)9 (2.6%)103 (19%) | 14 (7.9%)19 (5.5%)23 (4.2%) | 1.1 X10-28 | **<0.0001** |
| **NPI**  ≤ 3.4 >3.4 | 150 (47.8%)379 (53.7%) | 134 (42.7%)187 (26.5%) | 10 (3.2%)104(14.7%) | 20 (6.4%)36 (5.1%) | 5.3X10-10 | **<0.0001** |
| **Mitotic Index** M1 (low; mitoses < 10)M2 (medium; mitoses 10-18)M3 (high; mitosis >18) | 154 (43.1%)101(52.3%)282(58.8%) | 170(47.6%)63 (32.6%)87 (18.1%) | 14 (3.9%)14 (7.3%)92 (19.2%) | 19 (5.3%)15 (7.8%)19 (4%) | 1.2x10-22 | **0.0001** |
| **Tubule Formation** 1 (>75% definite tubule)2 (10%-75% definite tubule)3 (<10% definite tubule) | 22 (43.1%)168(48.3%)347(55%) | 22 (43.1%)136(39.1%)162(25.7%) | 2 (3.9%)19(5.5%)99(15.7%) | 5 (9.8%)25(7.2%)23(3.6%) | 7.8x10-9 | **<0.0001** |
| **Pleomorphism** 1 (small-regular uniform)2 (Moderate variation)3 (Marked variation) | 10 (41.7%)177(44.5%)346(57.4%) | 11 (45.8%)183(46%)125(20.7%) | 1 (4.2%)15(3.8%)104(17.2%) | 2 (8.3%)23(5.8%)28(4.6%) | 5.2x10-19 | **<0.0001** |
| **Tumour Type** IDC-NSTTubular MedullaryILCOthersMixed NST &lobular/ special type  | 370 (59.2%)92 (43.2%)17 (60.7%)38 (34.2%)3 (23.1%)26 (42.6%) | 137 (21.9%)92 (43.2%)1 (3.6%)64 (57.7%)8 (61.5%)26 (42.6%) | 92 (14.7%)11 (5.2%)10 (35.7%)4 (3.6%)0 (0%)3 (4.9%) | 26 (4.2%)17 (8%)0 (0%)5 (4.5%)2 (15.4%)6 (9.8%) | 5.1x10-21 | **<0.0001** |
| **HER-2 overexpression** NoYes | 458 (50.2%)93 (66.9%) | 308 (33.7%)18 (12.9%) | 100 (11%)21 (15.1%) | 47 (5.1%)7 (5%) | 0.000015 | **<0.0001** |
| **ER** NegativePositive | 151 (58.8%)390 (50.1%) | 27 (10.5%)298 (38.3%) | 61 (23.7%)55 (7.1%) | 18 (7%)35 (4.5%) | 1.19x10-21 | **<0.0001** |
| **PR** NegativePositive | 216 (53.5%)316 (52%) | 83 (20.5%)229(37.7%) | 80 (19.8%)35 (5.8%) | 25 (6.2%)28 (4.6%) | 2.4x10-14 | **<0.0001** |