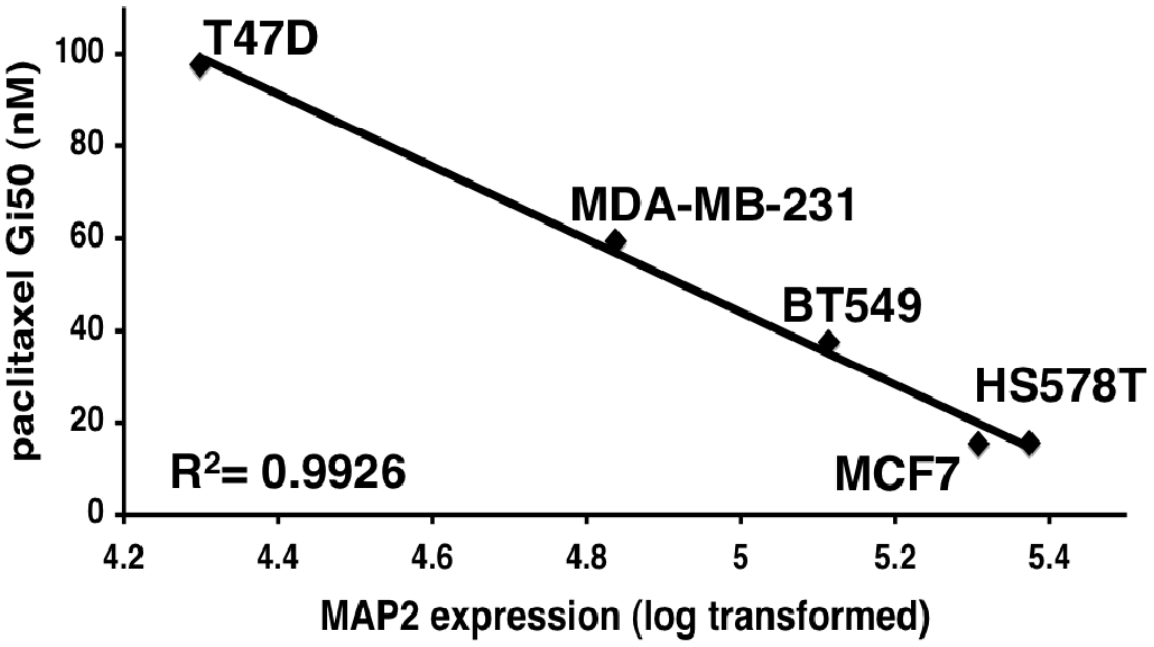
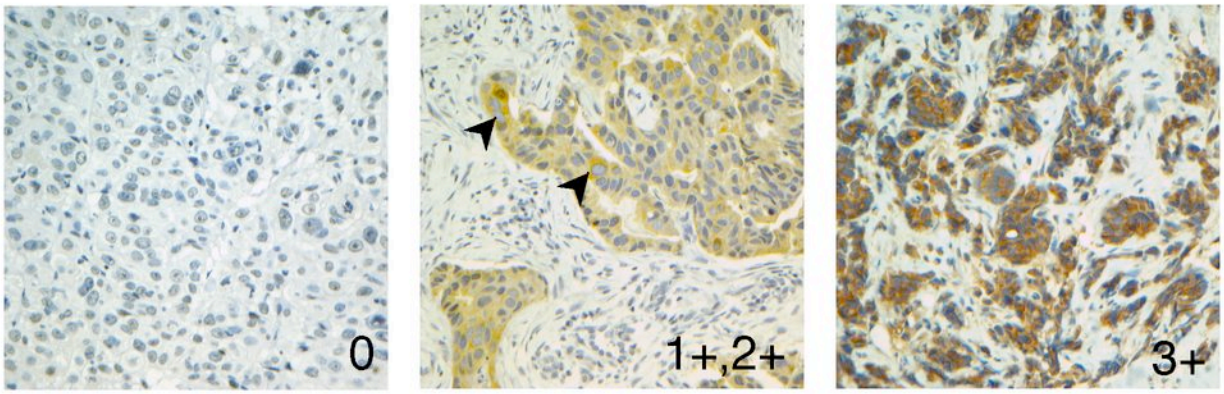
# Supplemental Figure 1



# Supplemental Figure 2

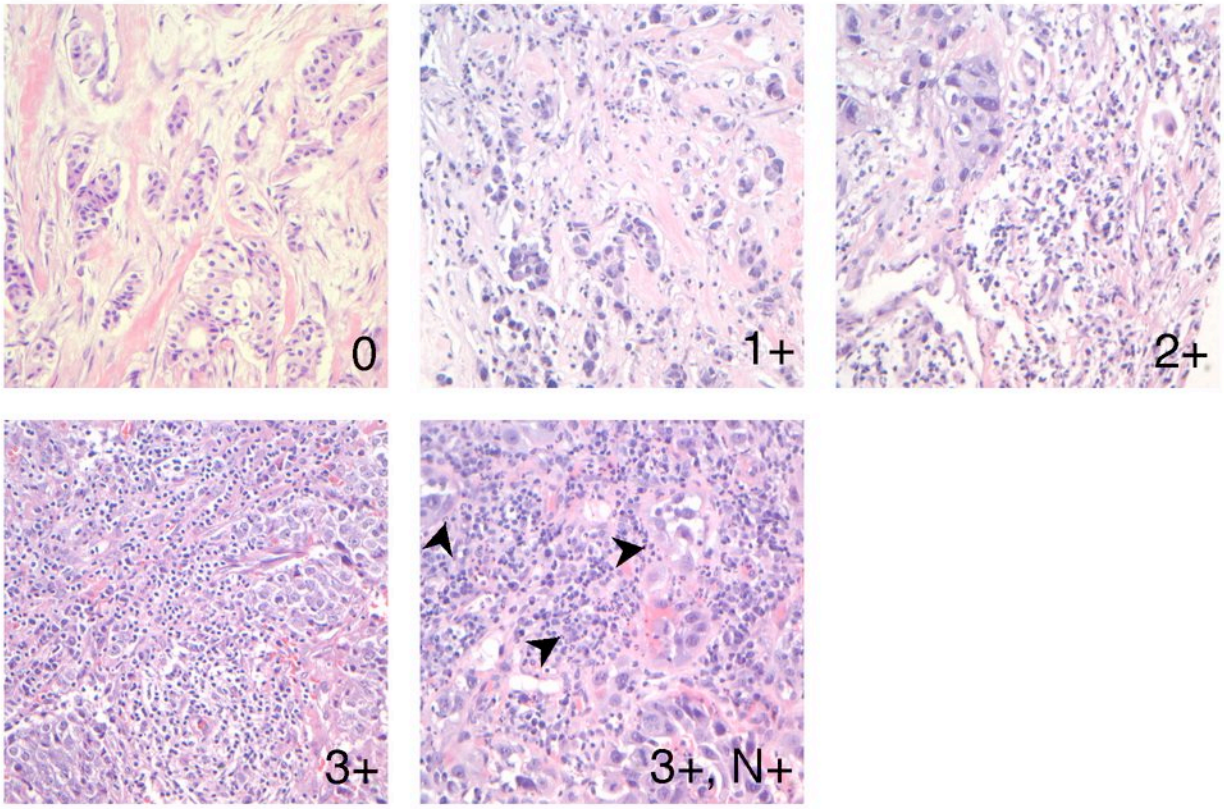
A

MAP2




B

Inflammation



Supplemental Information

## Supplemental Material and Methods

### Basal MAP2 expression and paclitaxel sensitivity

Gene expression data generated from breast cancer cell lines for analysis of MAP2 expression were obtained from Neve *et al.* (http://cancer.lbl.gov/breastcancer/data.php) (1). Drug sensitivity values ($Gi_{50}$) were extracted from publically available datasets provided by the NCI Genomics and Bioinformatics Group (http://discover.nci.nih.gov/datasetsNature2000.jsp) (2). The $Gi_{50}$values (nM) were plotted versus the relative mRNA expression after log transformation for the five breast cancer cell lines. Linear regression was used to determine $R^2$ value.

### IHC and scoring of inflammation and neutrophil

IHC was performed as described in Materials and Methods. MAP2 antibody (Thermo Fisher Scientific, Fremont, CA) was diluted at 1:400 and incubated for 1 h at 25°C. MAP2 staining was scored by percent of cells stained at each intensity, 0 to 3+. DEFA staining was performed as described in Materials and Methods and scored as percent of cells stained; 0= no staining, 1+ = < 1% moderate staining, 2+ = 1-50% moderate staining, 3+ = > 50% moderate/strong staining. Inflammation was characterized by the degree of immune cell infiltrate in areas of invasive tumor; 0 = no inflammation (or scattered isolated mononuclear cells), 1+ = minimal inflammation, 2+ = moderate inflammation, 3+ = severe inflammation. The predominant type of inflammatory

cells is mononuclear (lymphocytes and plasma cells). Neutrophils were scored in all samples by counting ten consecutive high-power fields (hpf) at 400X magnification, around invasive tumors. Tumors with high neutrophil infiltrate are defined as those with > 10 neutrophils/hpf. Scoring for inflammation and neutriphils was done by the study pathologist (M.G.O) using H&E stained slides. All slides were graded by the study pathologist (M.G.O) who was blinded to the clinical data.

**References**

1. Neve RM, Chin K, Fridlyand J, et al. A collection of breast cancer cell lines for the study of functionally distinct cancer subtypes. Cancer Cell 2006;10: 515-27.
2. Scherf U, Ross DT, Waltham M, et al. A gene expression database for the molecular pharmacology of cancer. Nat Genet 2000;24: 236-44.
3. Barbieri CE, Perez CA, Johnson KN, Ely KA, Billheimer D, Pietenpol JA. IGFBP-3 is a direct target of transcriptional regulation by DeltaNp63alpha in squamous epithelium. Cancer Res 2005;65: 2314-20.

## Legends for Supplemental Figures

### Supplemental Figure 1

Expression of MAP2 mRNA and paclitaxel growth inhibitory ($Gi_{50}$) concentration values for five breast cancer cell lines were obtained from two publicly available datasets (see Materials and Methods) and plotted for correlation. Linear regression was used to obtain an $R^2$ value.

### Supplemental Figure 2

A. Representative examples of IHC analysis of MAP2 expression in pretreatment biopsies. MAP2 staining was scored by percent of cells stained and intensity of staining from 0 to 3+ (highest percentage and intensity of stain); with 1+, 2+ representing a mixture of cells that stained either 1+ or 2+ (arrows). B. Inflammation was characterized by the degree of immune cell infiltrate in areas of invasive tumor; 0 = no inflammation (or scattered isolated mononuclear cells); 1+ = minimal inflammation; 2+ = moderate inflammation; 3+ = severe inflammation; and 3+, N+ represents a tumor with high neutrophil infiltrate (> 10 neutrophils/hpf, arrows).

**Supplemental Table 1.** Paclitaxel/radiation and taxane-based neoadjuvant patients

**Vanderbilt- BRE9936 paclitaxel/radiation neoadjuvant**

| pat. no. | age | race | pos LN | size | pCR | ER | PR | Her2 | stage | taxane |
|---|---|---|---|---|---|---|---|---|---|---|
| 9936-2 | 54 | C | y | 4 | n | + | - | - | 2B | paclitaxel* |
| 9936-3 | 66 | C | y | 4 | n | + | + | + | 2B | paclitaxel* |
| 9936-4 | 65 | C | y | 5 | n | + | + | - | 3B | paclitaxel* |
| 9936-5 | 46 | AA | n | 8 | n | - | - | - | 3A | paclitaxel* |
| 9936-6 | 45 | C | y | 10 | n | - | - | - | 3A | paclitaxel* |
| 9936-8 | 28 | C | y | 7 | n | + | - | - | 2B | paclitaxel* |
| 9936-9 | 36 | C | y | 4 | n | - | - | + | 2B | paclitaxel* |
| 9936-10 | 37 | C | y | 7 | n | + | + | - | 2B | paclitaxel* |
| 9936-11 | 36 | C | y | 8.5 | n | - | - | + | 3A | paclitaxel* |
| 9936-12 | 41 | C | n | 9 | n | - | - | - | 2B | paclitaxel* |
| 9936-13 | 60 | C | n | 6 | n | - | - | + | 2B | paclitaxel* |
| 9936-14 | 55 | C | n | 8 | y | - | - | + | 3A | paclitaxel* |
| 9936-15 | 48 | AA | n | 4 | y | - | - | - | 2B | paclitaxel* |
| 9936-16 | 36 | AS | y | 4.5 | y | - | - | - | 2B | paclitaxel* |
| 9936-17 | 48 | AA | n | 6 | y | - | - | - | 2B | paclitaxel* |
| 9936-18 | 28 | C | n | 7 | y | - | - | - | 2B | paclitaxel* |
| 9936-19 | 49 | C | n | 7 | y | - | - | - | 2B | paclitaxel* |

**Vanderbilt/NYU- taxane-based neoadjuvant**

| pat. no. | age | race | pos LN | size | pCR | ER | PR | Her2 | stage | taxane | AC | herceptin |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 03103-1 | 59 | C | n | 4 | n | - | - | - | 2B | paclitaxel | AC | |
| 03103-2 | 52 | AA | y | 2 | n | + | + | - | 2A | paclitaxel | AC | |
| 03103-3 | 60 | AA | y | 5 | n | + | - | - | 3A | paclitaxel | AC | |
| 03103-4 | 60 | AA | n | 4 | n | + | + | + | 3B | paclitaxel | AC | herceptin |
| 03103-5 | 47 | C | y | 6 | n | + | + | - | 2B | paclitaxel | AC | |
| 03103-6 | 33 | C | n | 6.5 | n | - | - | - | 2B | paclitaxel | AC | |
| 03103-7 | 66 | C | NA | 4 | n | - | - | - | 3A | paclitaxel | AC | |
| 03103-8 | 60 | C | n | 7 | n | + | + | - | 2B | paclitaxel | AC | |
| 03103-9 | 49 | C | NA | 3 | n | + | + | - | 2A | paclitaxel | AC | |
| 03103-10 | 51 | C | y | 10 | n | + | + | - | 3C | paclitaxel | AC | |
| 03103-11 | 64 | C | NA | 3.5 | n | + | + | - | 2A | paclitaxel | AC | |
| NYU1 | 50 | AS | y | 8 | n | + | - | - | 2B | paclitaxel* | | |
| NYU2 | 46 | AS | y | 6 | n | + | + | - | 2B | paclitaxel* | | |
| NYU3 | 55 | AA | y | 5.5 | n | + | + | - | 3A | paclitaxel* | | |
| NYU4 | 46 | C | y | 10 | n | + | - | + | 3A | paclitaxel* | | herceptin |
| NYU5 | 49 | C | NA | 5 | n | + | + | - | 2B | paclitaxel* | | |
| NYU6 | 58 | C | y | 5 | n | NA | NA | - | 2B | paclitaxel* | | |
| NYU7 | 55 | AA | y | 5.5 | n | + | + | + | 2B | paclitaxel* | | herceptin |
| NYU8 | 28 | AS | n | 12 | n | + | - | + | 3A | paclitaxel* | | |
| 0368-1 | 66 | C | y | 6 | n | + | - | + | 3B | docetaxel | | |
| 0368-2 | 46 | C | y | 4.5 | n | - | - | - | 2B | docetaxel | | |
| 0368-3 | 53 | C | n | 4 | n | + | - | + | 2B | docetaxel | | |
| 0368-4 | 45 | C | n | 11 | n | + | + | - | 3A | docetaxel | | |
| 0368-5 | 40 | C | n | 12 | n | + | + | - | 3A | docetaxel | | |
| 0368-6 | 44 | C | y | 5 | n | + | + | - | 3A | docetaxel | | |
| 0368-7 | 60 | AA | y | 3 | n | + | + | - | 2B | docetaxel | | |
| 0368-8 | 41 | C | NA | 4 | n | - | - | - | 2A | docetaxel | | |
| 0368-9 | 45 | C | y | 7 | n | - | - | + | 3A | docetaxel | | |
| 0368-10 | 48 | C | y | 2 | n | - | - | + | 3B | docetaxel | | |
| 0368-11 | 57 | C | y | 3 | n | - | - | + | 2A | docetaxel | | |
| 0368-12 | 56 | C | n | 8 | n | - | - | + | 3A | docetaxel | | |
| 0368-13 | 45 | AA | NA | 8 | n | - | - | - | 2B | docetaxel | | |
| 0368-14 | 45 | C | y | 5 | n | + | + | - | 2B | docetaxel | | |
| 0368-15 | 47 | C | n | 4 | n | - | - | + | 3A | docetaxel | | |
| 03103-12 | 40 | C | NA | 2 | n | + | - | + | 2B | paclitaxel | AC | herceptin |
| 03103-13 | 54 | C | n | NA | n | - | - | + | 2B | paclitaxel | AC | |
| 03103-14 | 53 | AA | NA | 4 | y | + | + | + | 2A | paclitaxel | AC | herceptin |
| 03103-15 | 46 | AA | n | 4 | y | - | - | - | 2B | paclitaxel | AC | |
| 03103-16 | 53 | C | n | 4 | y | + | + | - | 2B | paclitaxel | AC | |
| 03103-17 | 27 | AA | n | 8 | y | + | + | - | 2A | paclitaxel | AC | |
| NYU-9 | 51 | C | n | 7 | y | - | - | + | 3A | paclitaxel* | | |
| NYU-10 | 46 | AS | n | 8 | y | - | - | + | 3A | paclitaxel* | | herceptin |
| 0368-16 | 65 | C | n | 5 | y | - | - | - | 3B | docetaxel | AC | |
| 0368-17 | 35 | C | NA | 3 | y | - | - | - | 2A | docetaxel | AC | |
| 0368-18 | 62 | C | NA | 5 | y | + | + | + | 2B | docetaxel | AC | |
| 0368-19 | 41 | C | n | 6.5 | y | - | - | - | 3A | docetaxel | | |
| 0368-20 | 47 | C | n | 5 | y | - | + | - | 2B | docetaxel | | |

C= Caucasian, AS= Asian, AA= African American
LN= lymph node status; y= yes, n= no, NA= not available
size= tumor size at diagnosis (cm2)
AC= adriamycin/cyclophosphamide
*paclitaxel/radiation

**Supplemental Table 2.** Differential Expression of Tumor Subtype Gene Signatures

| **Basal-like Markers**† | | **Fold-change pCR vs NR** |
|---|---|---|
| actin, gamma 2, smooth muscle, enteric | ACTG2 | 5.4 |
| annexin A8 | ANXA8 | 4.7 |
| chitinase 3-like 2 | CHI3L2 | 13.9 |
| forkhead box C1 | FOXC1 | 8.2 |
| gamma-aminobutyric acid A receptor, pi | GABRP | 14.6 |
| keratin 5 | KRT5 | 8.5 |
| keratin 17 | KRT17 | 12.3, 12.3* |
| secretory leukocyte peptidase inhibitor | SLPI | 19.5 |
| tripartite motif-containing 29 | TRIM29 | 7.7 |
| **Luminal Markers**† | | |
| acyl-Coenzyme A dehydrogenase | ACADSB | -3.3, -5.1* |
| estrogen receptor 1 | ESR1 | -6.5 |
| GATA binding protein 3 | GATA3 | -6.4, -7.7*, -11.7* |
| RAS-like, estrogen-regulated, growth inhibitor | RERG | -3.5, -5.9* |
| trefoil factor 3 (intestinal) | TFF3 | -8.6 |

*Indicates multiple probes

†As defined by Sorlie *et al*.

## **Supplemental Table 3.** Gene ontology of differentially expressed probes

| GO Term | no. of probes selected* | no. of probes in GO category | p-value |
|---|---|---|---|
| extracellular region | 180 | 4555 | 7.44E-25 |
| **defense response** | 117 | 2365 | 1.30E-23 |
| **immune response** | 111 | 2171 | 1.55E-23 |
| extracellular space | 138 | 3289 | 3.29E-21 |
| **response to biotic stimulus** | 123 | 2754 | 4.34E-21 |
| **antigen binding** | 33 | 220 | 6.31E-21 |
| development | 229 | 7070 | 1.80E-20 |
| morphogenesis | 174 | 4778 | 2.93E-20 |
| organ development | 155 | 4228 | 2.86E-18 |
| **immunological synapse** | 30 | 228 | 1.61E-17 |
| **MHC protein complex** | 27 | 190 | 9.12E-17 |
| organogenesis | 140 | 3830 | 2.09E-16 |
| **MHC class I protein complex** | 24 | 152 | 4.00E-16 |
| ectoderm development | 29 | 249 | 1.49E-15 |
| histogenesis | 46 | 659 | 4.64E-15 |
| behavior | 71 | 1517 | 1.74E-13 |
| **response to stimulus** | 168 | 5438 | 4.68E-13 |
| epidermis development | 24 | 212 | 7.61E-13 |
| locomotion | 58 | 1167 | 2.88E-12 |
| locomotory behavior | 61 | 1274 | 3.67E-12 |
| epidermal growth factor receptor activity | 12 | 41 | 4.17E-12 |
| cell motility | 57 | 1152 | 5.31E-12 |
| G-protein-coupled receptor binding | 16 | 96 | 1.37E-11 |
| **chemokine activity** | 14 | 83 | 2.19E-10 |
| **chemokine receptor binding** | 14 | 83 | 2.19E-10 |
| cell-cell adhesion | 36 | 603 | 3.43E-10 |
| transmembrane receptor protein tyrosine kinase activi | 23 | 268 | 6.27E-10 |
| calcium-mediated signaling | 14 | 92 | 9.02E-10 |
| MAP/ERK kinase kinase activity | 7 | 15 | 2.95E-09 |
| **immune cell activation** | 32 | 536 | 3.26E-09 |

*probes selected = probes > 3-fold change, $P < 0.05$ between pCR and NR versus total number of probes, n = 54,675