

Abstract #2066

Title: Quantitative gene expression analysis using Oncotype DX in ductal carcinoma *in situ* that is adjacent to invasive ductal carcinoma.

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Background: It is common for ductal carcinoma *in situ* (DCIS) and invasive ductal carcinoma (IDC) to be observed adjacent to each other in the same tissue section. To explore the quantitative biology of DCIS, we measured ER, PR, HER2, proliferation gene expression and Recurrence Score (RS) using *Oncotype DX* in DCIS adjacent to IDC. **Material and Methods:** Thirty cases of ER positive tumors were identified with adjacent DCIS and IDC of similar nuclear grade. Manual microdissection was performed to separate DCIS and IDC tissues from each case. Using the *Oncotype DX* assay, standardized quantitative expression of 16 individual cancer related genes including ER, PR and HER2 and the proliferation index (the average of the 5 proliferations genes) was measured on a scale from 0 to 15 (relative to reference genes), where a one unit increment is associated with a 2-fold change in expression. The RS was also calculated. Descriptive statistics and Pearson's R correlation coefficients were determined to compare DCIS to IDC.

Results: 27 of the 30 samples had sufficient RNA for analyses of the DCIS component (8 with low grade, 10 with intermediate grade, and 9 with high grade DCIS). The correlation coefficients for the comparison of DCIS and adjacent IDC for quantitative ER, PR, HER2, and the proliferation index was 0.78, 0.73, 0.76, and 0.83, respectively. For ER, IDC and DCIS measures were within 2 units for all 27 cases and within 1 unit for 22/27 (81%). For PR, IDC and DCIS measures were within 2 units for 25 of 27 cases and within 1 unit for 19/27 (70%). For HER2, IDC and DCIS measures were within 2 units for 26 of 27 cases and within 1 unit for 24/27 (89%). For proliferation index, IDC and DCIS measures were within 2 units for all 27 cases and within 1 unit for 26/27 (96%). There was a wide range of RS in DCIS (mean 13.9; range 0 to 56). Although for RS there was a significant correlation between DCIS and IDC ($R=0.84$), on average the RS was 4 units lower for DCIS.

Discussion: Quantitative RT-PCR analysis of DCIS is technically feasible and sufficient RNA for *Oncotype DX* analysis is obtained in 90% of cases. As has been described previously for invasive breast cancer, there is considerable expression heterogeneity in DCIS between patients. DCIS adjacent to invasive breast cancer demonstrates very similar, but not identical, quantitative biology for the genes in the assay. Further DCIS studies to evaluate *Oncotype DX* and recurrence rates would be of great interest.