Introduction
Male breast cancer (MBC) is rare, occurring in ~1% of all breast cancers. While classified as a hormonal disease, MBC is less characterized molecularly than female BC.

Methods
Within the MBC cohort, approximately 10% were negative for ER, PR, and HER2 (TNBC); of those 65% were also negative for AR; 80% were ER+; 51% were both ER+ and PR+. The incidence of high ER and PR protein expression was greater (72% vs. 56%, 54% vs. 40%) but incidence of HER2 overexpression (HC, 3+) and amplification (HER2/CEP17 ratio higher than 2) was lower (8.8% vs. 11%, 5% vs. 14%) when compared to FBC overall. The rate of EGFR amplification (measured as ≥ 4 copies in 40% or more tumor cells by FISH) was not different from FBC (11%), while the percentage of MBC with AR protein expression (74%) was more similar to ER, PR positive FBC patients. Other biomarkers: the rate of ERCC1 overexpression was lower in MBC when compared to FBC (25% vs. 50% overexpression), TLE3 (25% vs. 83% overexpression), and ERCC1 gene mutations (10% vs. 100%).

Results
Conclusions
In 17% of cases treatment options were identified based on changes in protein expression or copy number. In 98% of cases treatment options were identified based on gene mutations.

Table 1. Comparison of subtypes found in Caris cohort, compared to FBC and MBC reported in the literature. MBC most often presents like ER+/HER2-; however, our cohort had fewer ER+/HER2- cases and higher number of cases with AR+. AR+; 6 of 7 tested had PTEN loss. In contrast, of 37 cases tested had somatic BRCA2 mutations, which is similar to previous findings. A single ERBB2 mutation was found in a triple negative MBC (L869R; previously reported in NSCLC).

Table 2. Changes in gene copy number as measured by FISH or CISH were identified (percent ‘positive’ of total cases tested).

Table 3. Levels of protein expression, reported as percent ‘positive’ of total cases tested. A. Comparison of MBC to FBC subtypes, and B. Comparison of subtypes within MBC. While MBC has been reported to have more aggressive biology, the overall Ki67 profile was similar in MBC to all FBC profiled at Caris.

Table 4. Frequency of specific PIK3CA mutations in MBC by exon. Mutations were seen in 50% of cases tested; 100% of cases with a PIK3CA mutation were also AR+; 6 of 7 were ER/PR+ (86%), and 3 of 9 tested had PTEN loss. In contrast, the cases with wild type PIK3CA, 5 were AR+/ER+, 5 were AR+/ER+, and only 1 of 10 tested had PTEN loss.

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Results, Gene Copy Number
Table 2. Changes in gene copy number as measured by FISH or CISH were identified in approximately 20% of cases and were more prevalent in the ER positive, HER2 negative subtype.

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Results, Hormone Receptor (HR) Status
Figure 3. Co-incidence of AR, ER, and PR. 5 cases were negative for AR, PR, and HER2. Of the 37 cases with all 3 HR’s tested, 18 (50%) overexpressed all 3 HR’s. We identified overexpression of at least one HR in the 20 other cases where at least one HR was not tested.

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