The clinical actionability of PTEN protein and gene expression analysis in HR- and HER2+ breast cancers

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**BACKGROUND**
- Phosphatase and tensin homolog (PTEN) is a tumor suppressor with a key role in breast cancer tumorigenesis, tumor progression, and resistance to therapy.
- The clinical value and reliability of PTEN testing in breast cancer is still unclear.

**AIM OF THE STUDY**
Proof-of-principle study to identify high-risk breast cancers based on the relationship between PTEN and other biomarkers.

**METHODS**
- 608 breast cancers were subjected to PTEN expression analysis by IHC, scored using a three-tiered system, and clustered in PTEN-low (PTEN-L) - scores 0/1 - and PTEN-retained (PTEN-WT) - score 2.
- Clinical and genomic data of 4,265 breast cancers were extracted from cBioPortal (METABRIC & MSK).
- Fisher’s and Chi-squared tests, Odds ration and 95% CI were calculated for each variable; multinomial logistic regression models and survival analyses were performed.

**RESULTS**
- Decreased or null expression of PTEN protein was found in 280 (46.1%) breast cancers.
- 3. Higher death rates in PTEN-L HER2+ breast cancers

**CONCLUSIONS**
- The analysis of PTEN status may provide additional data to perform a tailored risk assessment of patients with HR- and HER2+ breast cancers.
- Future studies on the post-transcriptional mechanisms of PTEN may explain the diverse frequency between PTEN protein and gene alterations.