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Gastrin-releasing peptide receptor as a promising prognostic biomarker in breast cancer

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Objective: Previous studies indicated a positive correlation between gastrin-releasing peptide receptor (GRPR) and estrogen receptor (ER) levels, suggesting a potential association between these receptors and tumor progression. This study aimed to verify the expression and prognostic implications of GRP and GRPR in breast cancer by analyzing multiple cancer-related databases. **Methodology:** The expression and prognosis of GRP and GRPR in breast cancer were assessed using different databases, including ONCOBD, Gent2, and Gene Expression Profiling Interactive Analysis (GEPIA). **Results:** Bioinformatics analysis revealed overexpression of GRPR in breast cancer compared with healthy tissue, while GRP level was similar in both samples. The expression of GRP and GRPR was positively correlated with estrogen receptor and grade 1 tumors ($p<0.001$). Among the breast cancer subtypes, Luminal A showed the highest levels of GRP and GPR, followed by Luminal B, HER2+, TNBC, and basal. Prognosis analysis using Gent2 indicated better outcomes for breast cancer patients with higher expression of GRP and GRPR, showing improved overall survival (OS) compared with those with low expression ($p=0.004$). However, in GEPIA, no difference was observed in OS in patients with high and low expression of the biomarkers. Additional studies are needed to elucidate these relationships. **Conclusion:** Our findings suggest that GRP and GRPR expression correlates with estrogen receptor positivity in breast cancer and may be associated with a good prognosis for breast cancer patients. Furthermore, the overexpression of GRPR in breast cancer suggests its potential as a novel prognostic biomarker and might be useful as a therapeutic target in cancer treatment.

Keywords: breast neoplasm; gastrin-releasing peptide; computational biology; estrogen receptor.