

A lower serum antioxidant capacity as a distinctive feature for women with HER2+ breast cancer

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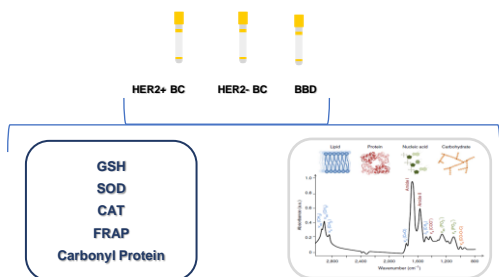
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Introduction

The overexpression of the human epidermal growth factor receptor 2 (HER2) or the amplification of its gene in breast cancer (BC) can contribute to redox imbalance in the pro-oxidative sense, also known as oxidative stress. This is the first study that investigate IR spectrum wavenumbers obtained by ATR-FTIR and their relationship to redox status among women with HER2+ BC, HER2- BC and benign breast diseases (BBD).

Objective and Methods

The aim of this study was to investigate the IR spectrum wavenumbers obtained by ATR-FTIR and their relationship to the levels of redox status markers reduced glutathione (GSH), superoxide desmutase (SOD), catalase (CAT), Ferric Reducing Antioxidant Power (FRAP) and protein carbonyl among women with HER2+ BC, HER2- BC and (BBD).



Results

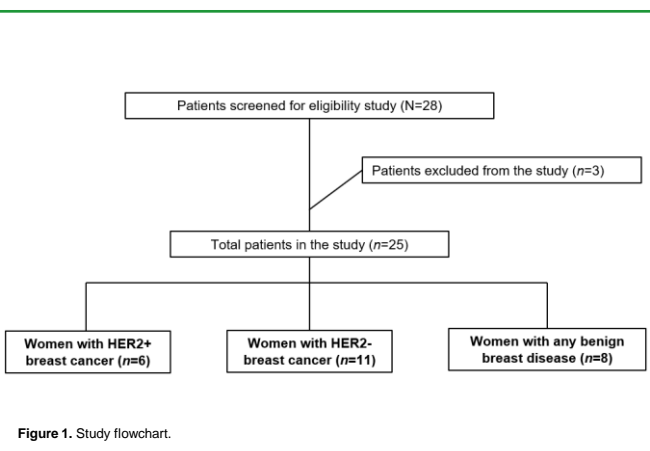


Figure 1. Study flowchart.

Conclusions

Our results indicate a distinctive feature of these HER2+ molecular subtypes. Data regarding the serum's antioxidant capacity and the IR spectrum by ATR-FTIR will allow us to assess biochemical changes that occur before clinical signs, monitoring whether changes in therapy or interventions are necessary throughout cancer treatment.

Keywords: breast cancer; HER2; antioxidant capacity.

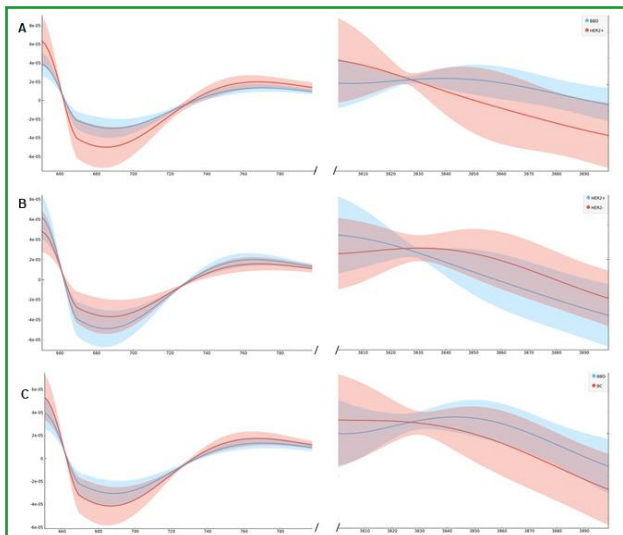


Figure 2. Graph of the second derivative ATR-FTIR. (A) Infrared spectrum HER2+xBBD; (B) Infrared spectrum HER2+XHER2-; (C) Infrared spectrum BBDXBC.

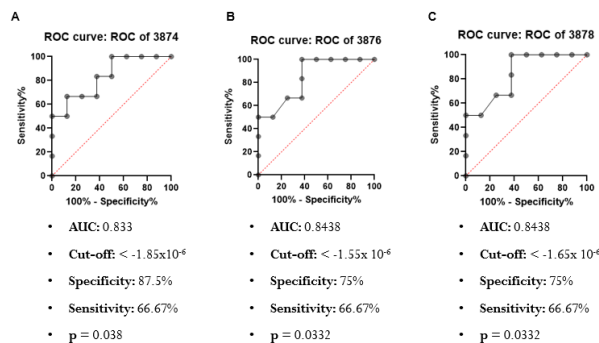


Figure 3. ROC Curve for HER2+xBBD. (A) 3874 cm⁻¹; (B) 3876 cm⁻¹; (C) 3878 cm⁻¹.

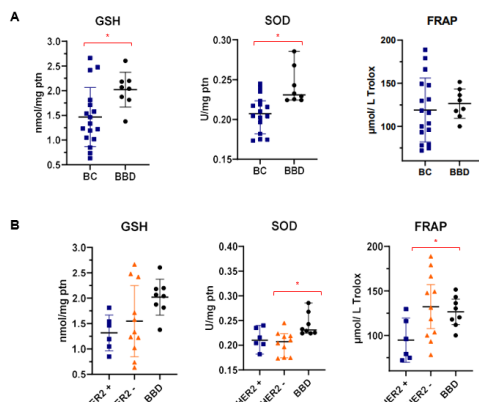


Figure 4. Redox status biomarkers levels in BC, HER2+, HER2- and BBD women. (A) GSH, SOD and FRAP levels in BC and BBD women; (B) GSH, SOD and FRAP levels in HER2+, HER2- and BBD women.

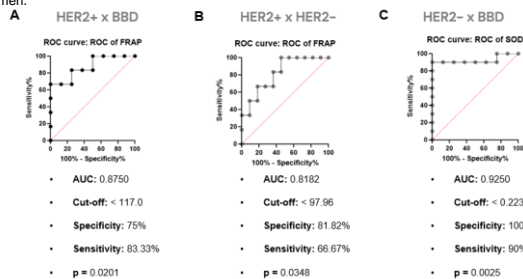


Figure 5. ROC Curve for HER2+xBBD, HER2+XHER2- and HER2-XBBD. (A) FRAP differentiates the groups HER2+ and BBD; (B) FRAP differentiates the groups HER2+ and HER2-; (C) SOD differentiates the groups HER2- and BBD.

Contact