Profiling signalling pathways in formalin-fixed and paraffin-embedded breast cancer tissues reveals cross-talk between EGFR, HER2, HER3 and uPAR.

Abstract:
In the last few years, new approaches and developments in patient-tailored cancer therapies have raised the need to select, more precisely, those patients who will respond to personalized treatments. Therefore, the most efficient way for optimal therapy and patient selection is to provide a tumour-specific protein network portrait prior to treatment. The aim of our study was to monitor protein networks in formalin-fixed and paraffin-embedded (FFPE) breast cancer tissues, with special emphasis on epidermal growth factor receptor 2 (HER2)-mediated signalling pathways, to identify and validate new disease markers. For this purpose we used a recently developed technology to extract full-length proteins from FFPE tissues and analysed 23 molecules involved in HER2-related signalling by reverse phase protein microarray (RPPA) in a series of 106 FFPE breast cancer tissue samples. We found a significant correlation of HER2 with human epidermal growth factor receptor 3 (HER3/erbB3), epidermal growth factor receptor 1 (EGFR/HER1/erbB1) and urokinase plasminogen receptor (uPAR) in routinely used FFPE breast cancer tissues. Thus, targeting HER2, EGFR, HER3 and uPAR together may offer a more efficient treatment option for patients with breast cancer.

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