A new indicator for breast cancer relapse identified

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Researchers at the IMIM (Institut de Recerca Hospital del Mar) have proven that the absence of the 14-3-3 protein sigma in breast cancer cells is directly associated with these cells' capacity to activate the signalling of a protein complex called NF-kB, which is related to tumour progression. The activation of NF-kB in tumours was also identified as the best indicator for relapse in breast cancer patients, compared to other parameters currently used, such as the presence of affected ganglions or the tumour's size and degree. The investigators have also described a group of genes that are activated in breast cancer cells and that are also associated with a poor prognosis in other types of tumours.

Previous studies had detected that the 14-3-3 protein sigma was not present in the tumours of many breast cancer patients. They have now discovered that 'the lack of this protein does not in itself establish a prognosis factor for these types of cancer, although the NF-kB complex is an essential requirement for it to remain active chronically, as it is associated with tumour invasion and metastasis or, stated differently, the progression of the tumour', comments Lluís Espinosa, study coordinator and researcher in the IMIM stem cells and cancer research group.

Breast cancer is most common among women in Western countries and relapse and metastasis are the fatal consequences of this disease. Identifying the mechanisms involved in the survival of breast cancer cells and their ability to colonise other tissues are crucial issues for improving treatment. With the participation of some 100 patients, this study analysed the possible usefulness of determining the lack of the

14-3-3 sigma and/or the activation of NF-kB in tumour cells as a factor in prognosis and diagnosis, as well as for future clinical and therapeutic applications.

The results obtained from this project have opened up new roads of investigation that will have to centre on identifying the pharmaceuticals that induce the expression of the 14-3-3 protein sigma in breast tumours and characterise their effect on tumour cells. They also hope to define which genes activated by the NF-kB complex are important for tumour progression in this group of patients and to study their potential as possible therapeutic targets.

According to Espinosa 'This opens up the possibility of researching and employing specific therapeutic strategies for this concrete group of patients who, in principle, have bad prognoses and an especially high risk of relapse'.

The study was initially led and developed at the IMIM by Dr Lluís Espinosa's and Anna Bigas' group and collaboration from researchers and doctors from the Hospital del Mar, the Jimenez Díaz Foundation, the Barcelona Institute of Biomedical Research (IRB) and Pompeu Fabra University.

More information: "Inhibition of Specific NF-κB Activity Contributes to the Tumor Suppressor Function of 14-3-3σ in Breast" Cancer.Julia Inglés-Esteve, Mònica Morales, Alba Dalmases, Ricard Garcia-Carbonell, Alba Jené-Sanz, Núria López-Bigas, Mar Iglesias, Cristina Ruiz-Herguido, Ana Rovira, Federico Rojo, Joan Albanell, Roger R. Gomis, Anna Bigas, and Lluís Espinosa. *PLoS ONE* 7(5): e38347. doi:10.1371/journal.pone.0038347

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