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Analysis advances the individual response to treatment of breast cancer with tamoxifen

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Tamoxifen is a prodrug widely used in the treatment of breast cancer, but the patient response to it depends on their ability to metabolize it into endoxifen. Researchers have developed a new method that allows, through a simple blood test, to reveal the way each patient metabolizes the drug, information that is useful to learn the possible response to treatment, and depending on the results, adjusting the drug dose.

The success of the treatment based on tamoxifen depends fundamentally on the ability of one of the enzymes of the cytochrome P450 family to metabolize the drug and transform it into its most active metabolite, endoxifen, which has antitumor activity far superior to tamoxifen. Researchers of the research group Bioanalytical Chemistry at the UJI and the Laboratory of Molecular Pathobiology of the Provincial Hospital of Castellón, Josep Esteve, Juan Vicente Peris and Enrique Ochoa, says, "The family of cytochrome P450 consists of many genes, one of which contains many CYP2D6 genetic variations (polymorphisms), some more active than others for the metabolism of many drugs, among which tamoxifen stands out.

"Doctors do not normally have genetic information and, therefore, do not know the responsiveness of the patient. It is important to keep in mind that there are also other factors influencing responsiveness as diet or drug interactions."

A possible way to evaluate individual response to tamoxifen is to measure the levels of the prodrug and its derivatives in peripheral blood

of the patient. The method developed applies the so-called micellar liquid chromatography with fluorescence detection for quantifying endoxifen and tamoxifen in plasma samples taken from breast cancer patients at least one month after the treatment.

"The analysis demonstrated the metabolic capacity of tamoxifen in patients when testing the variations in the levels of tamoxifen and endoxifen, which in turn were correlated with the genetic analysis of polymorphisms of the CYP2D6 gene, which classified the patients in ultrafast, extended, intermediate and poor metabolizers. This analysis enabled such association, and using a simple MLC analysis, suggested a better adjustment of the drug, increasing the chances of successful treatment", the researchers explain.

The researcher of the Universitat Jaume I, Josep Esteve, notes that "compared to other existing methods, the approach developed allows assessing the ability of metabolization of tamoxifen in a clinical laboratory within a reasonable time and without the high costs that other tests involve."

More information: "Development of a methodology to quantify tamoxifen and endoxifen in breast cancer patients by micellar liquid chromatography and validation according to the ICH guidelines," *Talanta*, Volume 84, Issue 2, 15 April 2011, Pages 314-318, ISSN 0039-9140, dx.doi.org/10.1016/j.talanta.2011.01.022

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