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A liquid chromatography-tandem mass spectrometry (LC-MS-MS) assay for the determination of tamoxifen and its metabolites in human serum

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Tamoxifen, a selective estrogen receptor modulator used for adjuvant treatment of breast cancer (BC) in patients with estrogen receptor positive tumors, is the most prescribed endocrine BC drug. We recently published a highly selective LC-MS-MS method for the quantification of tamoxifen and its metabolites in human serum. This method has now been modified to reduce sample volume requirements and improve sensitivity. Sample processing was robotized (Hamilton STAR), 20 µL serum was used for the analysis, and serum proteins were precipitated using acetonitrile containing deuterated internal standards. 85 µL of the supernatant was evaporated and reconstituted in 500 µL water:methanol (20:80, v:v). Samples were then injected onto a phenyl column, and analyzed on an ACQUITY UPLC-Xevo TQ-S tandem mass spectrometer with an atmospheric pressure photoionization (APPI) source from Waters. Water and methanol with 0.01% formic acid were used as mobile phases. The method included tamoxifen, Z-endoxifen and (Z)-4-hydroxytamoxifen (LOQ 12.5, 3.5 and 1.2 nM, respectively) and seven other metabolites; it was linear for all compounds. Total CVs were less or equal to 11.4% for medium concentration of all metabolites, and accuracies were in the range 99–110%. The method has been used to determine tamoxifen metabolites in 650 BC patients treated with tamoxifen. In conclusion, a simple, rapid, and selective LC-MS-MS method for the determination of tamoxifen and nine metabolites in human serum was developed and validated. Advantages of the method are low sample volume and high sensitivity. It is well suited for biobank studies.

Biography

Ersilia Bifulco did her PhD in Food and Environmental Toxicology (University of Cagliari, Italy) with the thesis, "Nutritional and toxicological aspects of unifloral honeys" where she develops analytical methods for the identification of biological active molecules. In particular, she used techniques of extraction, purification (TLC, SPE), characterization and determination (HPLC-DAD, -MS, -MS/MS, Q-ToF and GC-MS). In the last six years, she has been working at the University of Bergen (Norway), establishing and using quantitative methods for a variety of biological matrices, mainly in connection with biobank studies.

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