Biomarker family found for chemo resistant breast cancers

April 12 2012

Biomarkers which could help to predict resistance to chemotherapy in breast cancer patients have been identified by researchers from the University of Hull, UK.

The researchers found a family of proteins to be twice as prevalent in clinical samples obtained from breast cancer patients who were resistant to chemotherapy than those who were successfully treated.

Chemotherapy resistance is a major problem for some types of breast cancer and many patients undergo treatment that does not work, delaying other more suitable treatments and subjecting the patient to adverse side effects in the process.

Published online in the *Journal of Proteomics*, the Hull research identifies a number of potential biomarkers associated with resistance to common chemotherapy drugs, including epirubicin and docetaxel.

Lead researcher Dr Lynn Cawkwell, says: "A major goal in cancer research is to be able to predict the response of a patient to chemotherapy. Unfortunately, a reliable test has not yet been developed to achieve this. We hope our work can help to bring us a step closer.

"Most of my work uses clinical samples instead of cell lines, thanks to the links I have with oncologists and surgeons at Castle Hill Hospital in Hull. Studying clinical samples gives a more accurate representation of what is relevant in real-life diseases."

The project used two high-throughput processes to screen clinical samples of breast tumour tissue.

One screening method using antibodies identified 38 proteins that were twice as prevalent in samples from patients who were resistant to chemotherapy than those who were successfully treated. The other screening method used mass spectrometry and uncovered 57 potential biomarkers of which five belong to the 14-3-3 protein family.

The findings from both screening methods highlight the possible importance of proteins from the 14-3-3 family and their potential for development into a predictive test for clinical use. Dr Cawkwell's team hope to investigate the protein family's role more fully in chemotherapy resistance.

"If we're correct, we hope that by testing for these proteins, doctors will be able to anticipate a patient's response to different chemotherapies, and decide which course of treatment is most appropriate for them," she says.

Dr Cawkwell's team is continuing with this study, as well as investigating radiotherapy resistance in a number of different cancers.

More information: *J Proteomics* 2012 April 3 [epub ahead of print] Pilot and feasibility study: comparative proteomic analysis by 2-DE MALDI TOF/TOF MS reveals 14-3-3 proteins as putative biomarkers of response to neoadjuvant chemotherapy in ER-positive breast cancer

J Proteomics. 2012 Feb 2;75(4):1276-83 Proteomic identification of predictive biomarkers of resistance to neoadjuvant chemotherapy in luminal breast cancer: A possible role for 14-3-3 theta/tau and tBID? Hodgkinson VC, Elfadl D, Agarwal V, Garimella V, Russell C, Long ED, Fox JN, McManus PL, Mahapatra TK, Kneeshaw PJ, Drew PJ, Lind

MJ, Cawkwell L.

Provided by University of Hull