Gene signature can predict who will survive chemotherapy

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An eight gene 'signature' can predict length of relapse-free survival after chemotherapy, finds new research in Biomed Central's open access journal *BMC Medicine*.

Researchers from Academia Sinica and the National Taiwan University College of Medicine first identified genes that were involved in cellular invasion, a property of many cancer cells, using the National Cancer Institute's 60 human cancer cell line panel (NCI-60). Comparing the pattern of activation of each of these genes in different cell lines with how these cell lines responded to 99 different anti-cancer drugs, helped narrow down the list of genes to just those which could potentially influence the outcome of chemotherapy.

Testing this link, Prof Ker-Chau Li, from Academia Sinica and UCLA, commented, "Our study found eight genes which were involved in invasion, and the relative activation of these genes correlated to chemotherapy outcome, including the receptor for growth factor EGF. We also found that some invasion genes had unique patterns of expression that reflect the differential cell responses to each of the chemotherapy agents - five drugs (paclitaxel, docetaxel, erlotinib, everolimus and dasatinib) had the greatest effect."

When the researchers looked at gene expression data of these eight genes from cancer cell lines they found that there was an obvious difference between cells which responded to chemotherapy and those who did not (albeit with some overlap). In clinical studies, looking at lung and breast

cancer, the patients, whose gene signature put them in the low-risk group, had a longer relapse free survival than the high-risk group.

Prof Pan-Chyr Yang of National Taiwan University added, "The discovery of prognostic biomarkers for chemotherapy patients remains critical toward improving the efficacy of cancer treatment. The eight-gene signature obtained here may help choice of treatment as part of individualized cancer therapy and our method of gene discovery may be applicable in studying other cancers."

More information: Genome-wide analysis of three-way interplay among gene expression, cancer cell invasion and anti-cancer compound sensitivity, Yi-Chiung Hsu, Hsuan-Yu Chen, Shinsheng Yuan, Sung-Liang Yu, Chia-Hung Lin, Guani Wu, Pan-Chyr Yang and Ker-Chau Li, *BMC Medicine* 2013 , 11:106. doi:10.1186/1741-7015-11-106

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