BREAST CANCER

Tracking ctDNA to evaluate relapse risk

Identifying the patients who are most at risk of relapse after treatment of primary breast cancer is a major challenge. Circulating tumour DNA (ctDNA) present in the blood of patients with breast cancer can be used to determine whether minimal residual disease (MRD) persists after treatment, according to findings of a recent study led by Nicholas Turner.

The 55 patients involved in this study received neoadjuvant chemotherapy. DNA samples obtained before any treatment was initiated were screened for breast-cancer-related somatic mutations. These mutations were subsequently tracked in postsurgical blood samples using digital PCR, to enable discrimination of ctDNA from other circulating cell-free DNA.

ctDNA was analyzed at different time points after surgery. For 80% of the patients who had a disease relapse, ctDNA was detected in serial samples; for 50% of them, ctDNA was detected in a single postsurgical sample. The prediction of

relapse based on ctDNA detection was possible at a median of 7.9 months earlier than clinical detection by radiographic imaging. It is important to note that the follow-up duration was short (~2 years).

This study is the first to demonstrate that the detection of ctDNA in plasma, a minimally invasive procedure, can be used to identify which patients have MRD after completing primary therapy. “If we can identify which women are at risk of relapse, we can then focus on treatments to prevent it,” explains Turner. The question that his research group is now tackling is “whether we can identify MRD early enough using ctDNA blood tests, and does further use of adjuvant therapy have the potential to increase the chances of cure.”

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Original article Garcia-Murillas, I. *et al.* Mutation tracking in circulating tumor DNA predicts relapse in early breast cancer. *Sci. Transl. Med.* 7, 302ra133 (2015)