

World Congress on Breast Cancer

August 03-05, 2015 Birmingham, UK

Circulating Tumour cells and Breast Cancer Heterogeneity

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Breast cancer kills by metastasizing beyond the breast. In order to reduce breast cancer deaths we need to reduce this process. Circulating tumour cells (CTCs) have been found to have prognostic value in many studies of breast cancer patients and CTCs represent one step in metastasis. Persistence of CTCs, and their phenotypic changes, after chemotherapy have been associated with therapeutic resistance. In addition, varying degrees of concordance have been reported between molecular markers in CTCs and their corresponding primary tumors leading to a clinical trial based on the profile of the CTCs rather than the primary tumour. It is plausible that there are certain properties that CTCs require in order to enter the blood stream, survive, and begin to grow at a remote site. In a recent study of circulating tumour cells from patients with advanced breast cancer we found two distinctive genomic signatures regardless of the molecular subtype of the primary tumour. Small numbers of CTCs were isolated from peripheral blood then analyzed by high-resolution copy number profiling using the Affymetrix Genome-Wide Human SNP 6.0 array. Our results suggest that there are certain key properties needed by CTCs to survive. Alterations on chromosome 19 were surprisingly frequent in comparison to large amounts of data in public repositories from crushed primary tumour samples. We believe that CTCs arise from a minor subpopulation of the primary breast cancer and are currently using fluorescence in situ hybridization to investigate this hypothesis. It is possible that, in the future, common alterations in CTCs could be targeted to block metastasis.

Biography

Susan J Done completed her medical training at Cambridge University and then moved to Canada where she is currently an Associate Professor in the Departments of Laboratory Medicine and Pathobiology, and Medical Biophysics, at the University of Toronto. She is a pathologist at the University Health Network (which includes Toronto General Hospital and the Princess Margaret Cancer Centre) and a member of the Campbell Family Institute for Breast Cancer Research. Her research is focussed on breast cancer intratumoural heterogeneity and early events in invasion and metastasis. She has published more than 60 peer reviewed papers.

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