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Improving understanding of cell behavior in breast cancer

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The invasion and spread of cancer cells to other parts of the body, known as metastasis, is a principal cause of death in patients diagnosed with breast cancer. Although patients with early stage, small, breast tumours have an excellent short term prognosis, more than 15 to 20 per cent of them will eventually develop distant metastases, and die from the disease. Vascular invasion — through lymphatic and blood vessels — is the major route for cancer spreading to regional lymph nodes and to the rest of the body.

Dr Stewart Martin, Professor Ian Ellis and their colleagues at The University of Nottingham, and worldwide, are combining a number of approaches in a dynamic effort to improve our understanding of cell behaviour in breast cancer. Discovering how these cells operate is vital in improving diagnosis and treatment for the cancer patient in the longer term, and in identifying therapeutic targets.

Already the results of their work have been excellent — with findings in relation to the spread of cancer through the lymphatic vessels prompting a much larger study funded by Cancer Research UK.

A research student within the Nottingham team, Rabab Mohammed, showed recently that specific factors that regulate the growth of blood and lymphatic vessels can identify a subset of tumours which have a high probability of recurring or spreading.

The team subsequently identified the crucial importance of assessing

both the level of blood and lymph vessel invasion by cancer cells at the earliest stages of detection. It has, until recently, been very difficult to distinguish between the two. With advances in immunohistochemical techniques, blood vessels can today be reliably identified and differentiated from lymphatics. Currently clinical approaches for the assessment of vascular invasion are insufficiently robust and can result in a failure to detect some lesions accurately, or fail to differentiate adequately between blood and lymph vessels. The Nottingham team has shown — using tumour sections from 177 patients — that 96 per cent of vascular invasion in primary invasive breast cancer is predominantly of the lymph vessels. This is significant.

It is important that this finding is verified in a larger cohort of patients. The researchers are now working to accomplish this, through funding recently obtained from Cancer Research UK, using specimens from more than a thousand women with early stage breast cancer. Results from this study will also allow them to determine whether Lymphatic Vascular Invasion can be incorporated into an improved prognostic index for early stage breast cancer.

This work is being combined with gene expression studies, with bioinformatic approaches and using in vitro (cells in culture) models to identify novel therapeutic targets. It is being conducted in collaboration with a number of groups, industrial and academic, from both the UK and overseas.

Source: University of Nottingham

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