



## Investigating intra-tumour genetic heterogeneity of lymphocyte enriched triple-negative breast cancers

Increased levels of immune cells within breast cancer tissue have been linked to improved patient survival. Dr Natrajan will find out whether specific genes encourage immune cells to infiltrate cancer tissue and whether this can be used to predict a patient's outlook.

### The challenge

Triple negative breast cancer is associated with a worse prognosis than other types of the disease. One of the challenges of treating triple negative breast cancer is that there is variation in the DNA of different cells within the same tumour as well as variation in the DNA between different tumours. We need to understand what causes specific cells in a tumour to promote cancer, and others to have an anti-cancer effect.

<b>Aim:</b>	To find out whether a patient's prognosis can be predicted by analysing the number of immune cells in triple negative breast cancer
<b>Researcher:</b>	Dr Rachael Natrajan, Institute of Cancer Research
<b>Funding:</b>	Breast Cancer Now funded grant (2011MaySF01)
<b>Tissue:</b>	Frozen triple negative breast cancer samples from 10 patients

### The science behind the project

The immune system has the ability to detect and destroy cancer cells, and is being studied by researchers worldwide as a means to develop new treatments for cancer. Previous research has found that patients with triple negative breast cancer have a better outlook when a greater number of immune cells, such as white blood cells, are found within their tumour.

Using 50 triple negative breast cancer samples from 10 different patients from the Breast Cancer Now Tissue Bank, Dr Natrajan will look for 'hotspots' in the tissue where cancer cells are surrounded by a high number of immune cells. The tissue samples will then be analysed to look for differences in the DNA sequence between cancer tissue that is rich in immune cells and tissue that is not.

The cancer cells that make up a triple negative tumour often show variation in their DNA sequences, meaning that different cells within the tumour have different behaviours and may vary in their response to treatments. Dr Natrajan aims to identify whether certain cancer cells contain specific genes that instruct immune cells to infiltrate the cancer tissue, which is associated with better survival outcomes.

### What difference will this project make?

A greater understanding of the genes that influence the role of immune cells in breast cancer will aid the development of new treatments that harness the immune system to target and kill cancer cells. Finding a link between better chances of survival and a greater number of immune cells in the tumour may also allow doctors to analyse tissue samples for immune cell infiltration in order to more accurately predict a patient's outlook.