

Prevent Breast Cancer's Mammographic Breast Density and Gene Mutations Project



About Prevent Breast Cancer

Predict. Prevent. Protect. You could call it our mantra. As the only UK charity entirely dedicated to the prediction and prevention of breast cancer, we're committed to freeing the world from the disease altogether. Unlike many cancer charities, we're focused on preventing, rather than curing. Promoting early diagnosis, screening and lifestyle changes, we believe we can stop the problem before it starts. As we are situated at the only breast cancer prevention centre in the UK, we're right at the front line in the fight against the disease.

We **predict**, we **prevent**, we **protect**.

We predict – by identifying who is at risk of breast cancer

We prevent – by offering preventative interventions, to **stop** breast cancer before it starts

We protect – our goal is to **shield future generations** from breast cancer

Prevent Breast Cancer seeks to create a breast cancer free future for the next generation. We conduct ground-breaking research into the prediction and prevention of breast cancer. Our research falls under four different categories: gene research, early detection and screening, preventative drugs, and diet and lifestyle.

We are a registered with the Charity Commission in England with the Registered Charity Number 1109839.

About this project

This is a four year gene research study into mammographic breast density running from September 2018 – September 2022.

The Need

Breast cancer is the most common cancer in the UK, accounting for a staggering 15% of all cancer diagnoses. Across the UK, 150 individuals are diagnosed with breast cancer every day; tragically 32 of them will lose their fight against the disease. Unfortunately, these figures are rising. If trends continue, we can expect a 12% increase in diagnoses in just 10 years.

In order to prevent breast cancer, it is essential to understand how it begins. Unfortunately, many of the reasons why breast cancer develops in women are unknown. This study aims to better understand **one of the biggest risk factors** for the development of breast cancer and by doing so could lead to improvements in both screening procedures and prevention.

After age, the second highest risk factor for developing breast cancer is **mammographic breast density**, which is a stiffness of breast tissue and is measured by whiteness on a mammogram. However, little is known about why high breast density promotes cancer development.

The Methods

Our researchers have previously found that high-density breast tissue is physically different to lower density areas, with high density areas being significantly stiffer and high in collagen. However, it is not yet clear why this stiffer tissue makes cancer more likely to develop.

Recent work by researchers has shown that breast cells grown in a stiff environment are more likely to show DNA mutations than those in soft conditions. This project builds on this work by using a cell model to mimic the conditions of high- and low-density breast tissue in order to find out **how tissue stiffness increases the rate of DNA mutations in breast cells**. Next, the researchers will look for these particular changes in human breast cells collected from high-density tissue from patients undergoing surgery for breast cancer or for prevention. This will allow the team to determine which changes may have played a part in the increased risk seen in individuals with high breast density.

By doing this we hope to be able to identify new ways to reduce the risks associated with high breast density.

Dr Andrew Gilmore, Senior Lecturer at Manchester University, is the lead researcher in this ground-breaking study. He will supervise a PhD student in carrying out this project.



Gene Research

Investigating how changes and mutations in genes can affect someone's risk of developing breast cancer.



Early Detection and Screening

Identifying new and unique screening methods to ensure early and accurate diagnoses.



Preventative Drugs

Investigating drugs that can be used as a preventative measure to reduce an individual's risk of developing breast cancer.



Diet and Lifestyle

Research into lifestyle factors that contribute to risk and how diet and exercise can reduce an individual's risk.

Research Impact

The results of this study will be communicated widely with a variety of audiences of all ages. To do this we will collaborate with The Wellcome Trust for Cell Matrix Research and The Manchester Breast Centre.

Additionally, a portion of the funds requested for this project will allow for the writing of papers to be included in peer-reviewed journals and reported the media where applicable. Our researchers have also budgeted for the costs of attending relevant medical conferences in order to communicate the results of the project.

Monitoring and Evaluation

Our researchers are required to provide 6-month progress reports of their studies so that Prevent Breast Cancer can monitor the work. These progress reports will be shared with the Trust as a means of reporting. Additionally, any publications in peer-reviewed journals resulting from this research will also be shared with the Trust.

Contact Details

If you would like to speak to someone about this project, please contact **Vicki Wilkinson, Charity Manager** by emailing vicki@preventbreastcancer.org.uk or phoning 0161 291 4400.