



DCIS PRECISION News about Ductal Carcinoma In Situ (DCIS)

Ductal Carcinoma In Situ (DCIS) is a breast condition that is often found on mammograms. DCIS refers to abnormal cells found inside a milk duct. Research shows that at least 3 out of 4 women (75%) with DCIS will not get a future invasive breast cancer, but almost all still receive breast cancer treatment. There are types of DCIS that are considered low-risk or higher risk. This is why DCIS is sometimes called different names. PRECISION* is learning about DCIS risk to find women who may not need treatment. One of their published articles is explained here.

What is the science article about?

DCIS is often first seen as tiny white dots on mammograms. These white dots are spots of calcium salts called **calcifications**. Calcifications can be due to DCIS or they can exist for other reasons. Calcifications are made up of different types of crystals. The structure of the calcifications can vary according to their surrounding environment.

This study looked at what kind of crystals were in the calcifications of samples from women who were diagnosed with DCIS.

Why was this study done?

There are still many things that we don't know about DCIS. Past studies have shown that patterns of breast calcification on mammograms give clues into the type of DCIS in the breast tissue.

This study found out more about the chemistry inside each calcification and was the first study to link the chemistry to the cells around it. This may help find new ways to predict which calcifications have higher risk of developing into invasive breast cancer in the future.

How was this study done?

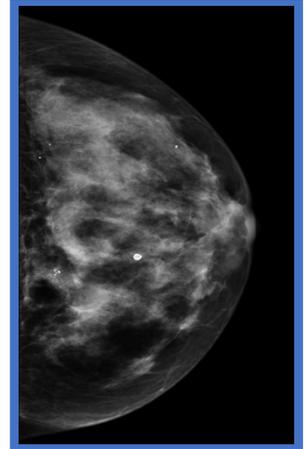
Fifteen DCIS samples were chosen from the Gloucestershire Hospitals NHS Foundation Trust tissue archive. These were from patients diagnosed with these different breast conditions:

- Benign breast condition (no cancer cells)
- DCIS
- Invasive breast cancer

Calcifications were measured for each type of these breast conditions to learn how they were different.

Each sample was placed in a high-energy beam of X-rays created in a synchrotron. A detector in the synchrotron measured how the x-rays were scattered by the calcification crystals.

Different structures show different patterns when they interact with X-rays and they can be measured. This process is called x-ray diffraction.



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A synchrotron is a large ring structure, half a kilometre around, which accelerates a beam of electrons to almost the speed of light. As the electron beam is bent by large magnets, it creates bursts of energy in the form of X-rays, which can be directed towards the tissue samples.

What are the results of this study?

This study showed that:

- The order and structure inside the crystals changed. They were less orderly in benign samples than they were in DCIS samples. DCIS samples were less orderly than invasive breast cancer samples.
- The size and strain of the crystals also changed. They were smaller in benign samples when compared to DCIS. They were biggest in the invasive breast cancer samples.

What does it mean for women with DCIS?

This study found out about calcifications that are formed inside the breast and how the surrounding structures may affect those calcifications as they form.

This means there were differences that may be able to be measured between the calcifications found in benign breast condition, DCIS and invasive breast cancer patients.

This could help in our search to learn how to tell differences between low-risk and higher risk DCIS. More studies will have to be done to see if these same results happen before this can be used in the clinic.

There were also some limits about this study that are important.

- This was a very small study. Larger studies are needed to learn more about some of the factors that affect the way calcification changes.

When was the study done?

The study was published in December 2019.

Official name of the article

Calcification Microstructure Reflects Breast Tissue Microenvironment.

By Gosling, S. et al. On behalf of PRECISION.*

It was published in J Mammary Gland Biol Neoplasia, DOI: 10.1007/s10911-019-09441-3.

The article can be found at:

<https://link.springer.com/article/10.1007%2Fs10911-019-09441-3> and
<https://www.dcisprecision.org/publications/>.