

**Help fund cutting-edge research into breast cancer imaging**  
**Research theme: Early and effective diagnosis**  
**'Three-line summary'**

Dr Sarah Vinnicombe is developing a new imaging method using a technique called 'X-ray diffraction', which could help reveal more about breast tumours. This could mean treatments can be planned more effectively, ensuring that people with breast cancer receive the most appropriate treatments for them.

**'The challenge'**

Breast cancers can be detected using mammograms, a low-dose x-ray of the breast, but these are not always effective, particularly for women with dense breasts. In addition, as we understand more about the development of breast cancer, we need new non-invasive imaging techniques which can tell us much more about the tissues around a breast tumour, in order to plan future treatments more effectively.

**Aim:** Using X-ray diffraction imaging to understand more about breast tumours

**Researcher:** Dr Sarah Vinnicombe

**Where:** University of Dundee

**Cost:** £12,700 (lab supplies, cost of X-ray diffraction imaging, tumour collection and data analysis)

**Grant type:** Pilot

**Grant ref:** 2014NovSP459

**Duration:** 12 months – start date 2<sup>nd</sup> June 2015

**'The science behind the project'**

Most tissues in the body, including the breast, contain a molecule called collagen, which is normally organised into a mesh-like pattern. However, the collagen that surrounds some breast tumours is organised in a different way, and it is believed that this might affect how these breast tumours develop, progress, and respond to treatments.

Dr Sarah Vinnicombe wishes to develop an imaging technique which could tell the difference between normal and abnormal collagen in the breast.

Mammograms are not able to distinguish between the two, but Dr Vinnicombe believes it could be possible to do this using a different x-ray technique, called 'X-ray diffraction'.

With colleagues from UCL, she will test this X-ray diffraction technique on 20 tumours that have been donated by women after surgery, and see whether X-ray diffraction can identify areas of abnormal collagen on these tumours.

**'What difference will this project make?'**

Dr Vinnicombe hopes to develop an imaging technique to identify areas of abnormal collagen around tumours, which she will eventually test in women with breast cancer. Ultimately, this could help identify women at high risk of breast cancer before they develop it, or could help doctors to plan the most appropriate treatments for patients.