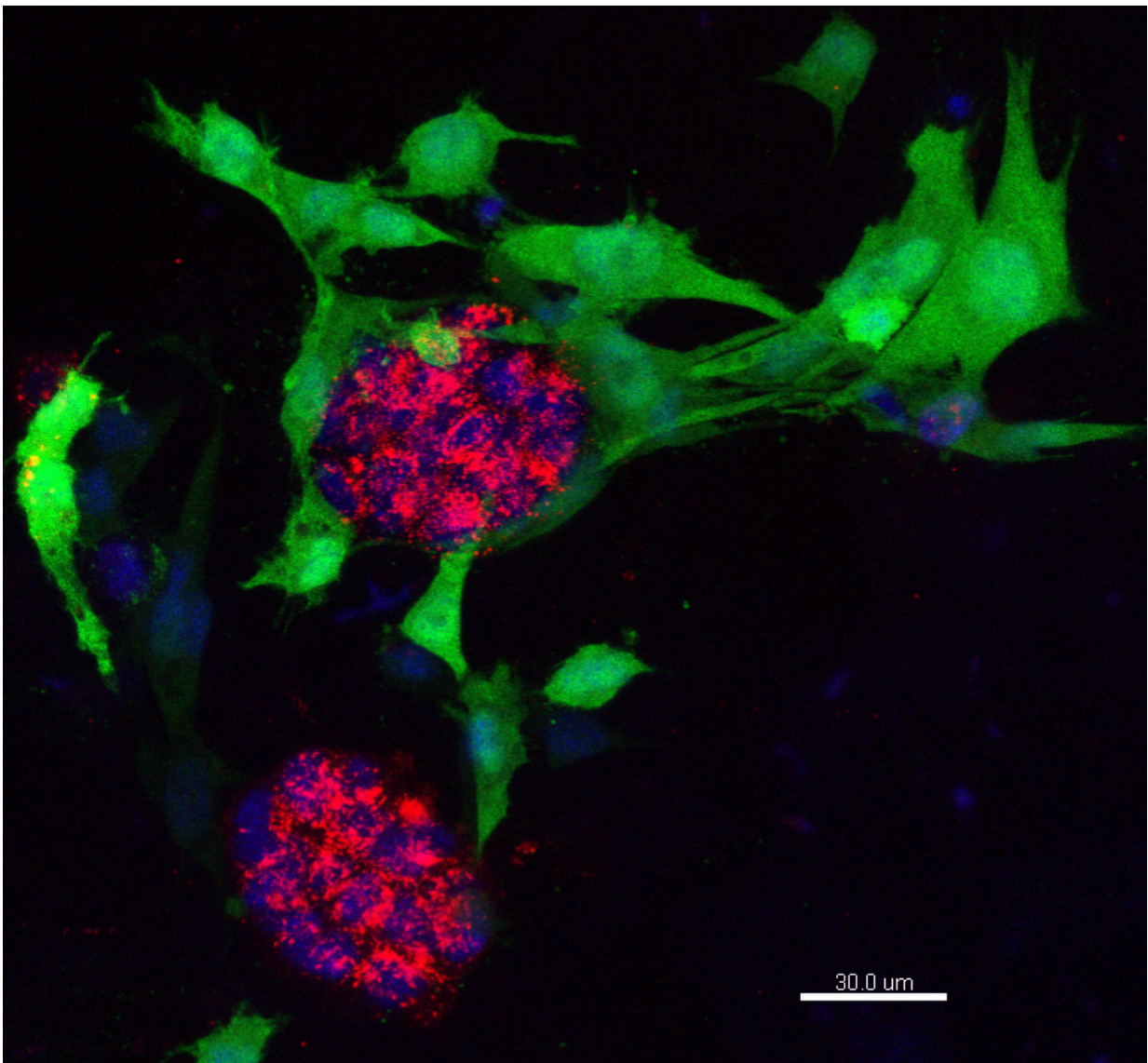


# Developing a gel that mimics human breast for cancer research to reduce the need for animal models

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Breast cells growing in hydrogel.

Scientists at the Universities of Manchester and Nottingham have been funded to develop a gel that will match many of the biological structures of human breast tissue, to advance cancer research and reduce animal testing.

The £417,000 award from the National Centre for the Replacement, Refinement & Reduction of Animals in Research (NC3Rs) will be used to develop a [gel](#), originally created for stem cell research, to incorporate many of the key features found in human [breast](#) tissue such as proteins and sugars from the matrix surrounding the breast cells.

Currently, studies investigating breast cell behaviour often use rodent models. The team will provide an alternative lab based gel to mimic human [breast tissue](#). This will allow breast cell models to be grown in the lab and to help the researchers understand the influence of the breast matrix in [breast cancer](#) progression.

The hydrogel technology was developed at The University of Manchester. The initial interdisciplinary development of the gel was funded from grants from UMI3 as well as the Engineering and Physical Sciences Research Council. The team started working together after inter-faculty networking sessions highlighted their complementary expertise.

One of the developers who will be working on the new project is Dr Cathy Merry, now of the University of Nottingham. She said: "By developing a bespoke gel which can be programmed to behave in the same way as human breast tissue we will be able to investigate how cancers are influenced by the adjacent normal cells and the non-cellular

stroma without the need to use animals."

"Currently non-animal tumour models poorly represent the complex environment experienced by cancer cells but the approach planned with this gel has the potential to replicate the cancer environment seen in humans."

The gels will be produced in collaboration with The University of Manchester's Dr Gillian Farnie and Professor Tony Howell, who provide expertise in primary breast cell culture, ductal carcinoma in situ (DCIS) and breast ECM/density. Dr Farnie said: "There is strong evidence showing the development of breast cancers is influenced by interactions between breast tissue and cells within the breast.

"The protein and sugar components of breast tissue are different in normal and cancer samples and these changes occur in the early stages of breast cancer development such as ductal carcinoma in-situ.

"Our preliminary evidence indicates that the innovative hydrogel technology will enable us to manipulate the environment of pre-cancers to determine the exact mechanism of the interactions which we believe will lead to new ways to treat and prevent breast cancers."

As well as replicating aspects of the complex mixture of proteins that embed and support cells, the hydrogel will also be manipulated to mimic breast density – a key predictor of breast cancer recurrence and development.

Professor Howell added: "The synthetic hydrogels allow us to manipulate the matrix environment and density to measure the response of pre-cancerous breast cells. The advance is that complex interactions can now be studied in a highly systematic and reproducible way. Understanding the interactions will potentially lead to new approaches to breast cancer

prevention and treatment. Thankfully these experiments are now possible without animal models thus saving animals and on expense. "

The research team believe this research will also pave the way for further hydrogels which mimic alternative tissues which could then be used for other solid cancers.

Provided by University of Manchester

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