Gene fuelled transporter causes breast cancer cells to self-destruct

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Scientists at Queen's University Belfast have shown that they can deliver a gene directly into breast cancer cells causing them to self-destruct, using an innovative, miniscule gene transport system, according to research published today (28 February) in the *International Journal of Pharmaceutics*.

Using a transport system called a Designer Biomimetic Vector (DBV), Dr Helen McCarthy, from Queen's School of Pharmacy, funded by Breast Cancer Campaign, packaged a gene into a nanoparticle 400 times smaller than the width of a human hair, allowing it to be delivered straight into breast cancer cells in the laboratory.

The gene called iNOS, is targeted specifically to breast cancer cells using the DBV where it forces the cells to produce poisonous nitric oxide; either killing the cells outright or making them more vulnerable to being destroyed by chemotherapy and radiotherapy. As this approach leaves normal healthy breast cells unaffected, this would overcome many of the toxic side effects of current treatments.

Further investigation is needed but it could be trialled in patients in as little as five years. Dr McCarthy's next step is to turn the nanoparticles into a dried powder that could be easily transported and reconstituted before being given to patients.

Dr McCarthy said: "A major stumbling block to using gene therapy in the past has been the lack of an effective delivery system. Combining the

Designer Biomimetic Vector with the iNOS gene has proved successful in killing breast cancer cells in the laboratory. In the long term, I see this being used to treat people with metastatic breast cancer that has spread to the bones, ideally administered before radiotherapy and chemotherapy."

Dr Lisa Wilde, Research Information Senior Manager, Breast Cancer Campaign said: "Gene therapy could potentially be an exciting avenue for treating breast cancer. Although at an early stage, Dr McCarthy's laboratory research shows that this system for delivering toxic genes to tumour cells holds great promise and we look forward to seeing how it is translated into patients."

Provided by Queen's University Belfast