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Single blast of ultrasound destroys cancer cells

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Scientists at the [University of Dundee](#) have demonstrated that cancer cells can be targeted and destroyed by a single blast of ultrasound according to an article published in leading scientific journal "[Nature-Physics](#)".

Military technology has been used to develop and prove this ground breaking technique that will end the need for traumatic surgery and extensive drug therapy for cancer patients.

The treatment is not specific to one particular type of cancer and could subject to clinical trials be available to all cancer patients in as little as 5 years.

Previous research has shown that gas bubbles injected intravenously will naturally cluster around the cancerous cells. The team from Dundee have proved for the first time that when those bubbles are stimulated by a microsecond range burst of high intensity ultrasound energy, the gas bubbles can puncture the cancer cells and kill them. They were able to establish this process beyond doubt using an ultra-fast imaging system, photographing a million frames per second, and developed by the army specifically to observe the impact of ballistic shells and bullets with armour plates.

The research has been led by physicist Dr Paul Campbell at the University of Dundee, and Professor Sir Alfred Cuschieri at the Department of Surgery and Molecular Oncology at Ninewells Hospital in Dundee. Prof Cuschieri is a pioneering figure in the

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area of [keyhole surgery](#) and continues to develop routes to less invasive surgical procedures. Advanced optics involving lasers and holography to hold the gas bubbles close to the tissue plane using only the force of light itself were developed by Paul Prentice, a PhD student with Dr Campbell's group, in collaboration with Professor Kishan Dholakia at St Andrews University.

Commenting on the research, Dr Paul Campbell said: "Conventional cancer treatment usually requires surgery to cut out the diseased tissues, causing significant trauma, pain and discomfort to the patient, often delaying recovery for extended period of many months. This new ultrasound treatment can focus energy directly to a tumour site inside the body and deliver a single blast of energy, without harming any surrounding tissues."

The ultrasound treatment could eventually make systemic [chemotherapy](#) treatments a thing of the past. The gas bubbles injected into the [cancer](#) patient can be coated with anti-cancer drugs that then enter the punctured cancer cells. The drugs are therefore targeted to flood only the cancer cells in a one shot process, rather than repeatedly flooding the patient's entire body with the chemotherapy drugs. Such coated bubbles have already been developed in the United States. This should dramatically reduce the patient's recovery time and the associated pain and suffering of surgery and chemotherapy.

" It is a sniper treatment for cancer" said Dr Campbell. "The ultrasound activated bubbles target with single cell precision, so that the technique overall is a little like sniping at specific [cancer](#) cells, whilst ensuring that healthy tissues remain untouched."

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