Combination cell-gene therapy for lung cancer to be tested in UK patients

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A pioneering new combined cell-gene therapy to treat [**lung cancer**](http://www.medicalnewstoday.com/info/lung-cancer/) will be tested in NHS patients this year, after receiving £2m of Biomedical Catalyst funding from the Medical Research Council (MRC).

Researchers led by Professor Sam Janes at UCL/UCLH will carry out the first UK clinical trial of a combined [**stem cell**](http://www.medicalnewstoday.com/info/stem_cell/)and gene therapy for the disease which kills around 34,000 people a year in the UK.

The treatment uses stem cells as a delivery vehicle for a potent anti-cancer gene, which induces a self-destruct pathway in [**cancer**](http://www.medicalnewstoday.com/info/cancer-oncology/), but not healthy cells.

Early tests of the experimental treatment in mice have shown it can reduce and in some cases clear tumours. The team will now test the treatment in human volunteers, firstly to check that the treatment is safe and then in 56 lung cancer patients to see how effective the gene/cell therapy plus [**chemotherapy**](http://www.medicalnewstoday.com/articles/158401.php) is compared with standard care.

Principle Investigator Sam Janes, a Wellcome Trust Senior Research Fellow and Professor of Respiratory Medicine at UCL and Consultant in Respiratory Medicine at UCLH, said:

"Lung cancer is very difficult to treat because the vast majority of patients are not diagnosed until the cancer has spread to other parts of the body. One therapy option for these patients is chemotherapy, but even if successful this treatment can normally only extend lives by a handful of months. Chemotherapy can also cause widespread toxic side-effects.

"We aim to improve prospects for lung cancer patients by using a highly targeted therapy using stem cells, which have an innate tendency to home to home in on tumours when they're injected into the body. Once there, they switch on a 'kill' pathway in the cancer cells, leaving healthy surrounding cells untouched. If clinical trials are successful, our treatment could be transformative for the treatment of lung cancer, and possibly other types of [**tumour**](http://www.medicalnewstoday.com/articles/249141.php) in future."

The therapy works by modifying donor stem cells so that they express an anti-cancer gene called TRAIL\*. Being encased within a cell protects the genetic material from being degraded by the body so that when it reaches the tumour it is able to trigger a signalling pathway that kills the cancer cells.

Each patient in the trial will receive almost a billion cells over three infusions, three weeks apart (injected one day after they receive chemotherapy). Over the next three years 100 billion cells will be created at the Royal Free Hospital's £2.1 million, state-of-the-art cell manufacturing lab, which is run by Dr Mark Lowdell, director of cellular therapy and biobanking at the Royal Free London NHS Foundation Trust.

A key advantage of the treatment is that the cells can be used 'off the shelf' and do not need to be from a close relative or tissue match. This is because they have relatively few proteins on the surface and do not induce an immune response in the recipient.

The clinical trial is being funded through the Biomedical Catalyst, a programme managed jointly by the MRC and Innovate UK to bridge the funding gap between discovery science and commercial development, which helps to bring new treatments and technologies to patients faster.

Dr Chris Watkins, Director of Translational Research who oversees the Biomedical Catalyst at the MRC, said:

"Lung cancer kills more men and women than any other cancer and improving the outcome for patients with this terrible disease is one of the biggest challenges we face. This new therapy, which uses modified stem cells to target the tumour directly is truly at the cutting edge and will draw on the UK's unique position as a leader in the field of cell-based therapies."