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**New treatment can destroy prostate cancer from within**

**A 'Trojan horse' system developed by researchers at the Universities of Sheffield and York attacks cancerous cells from within and potentially offers a safer treatment for prostate tumours.**

The technique involves the use of a patient's own white blood cells called macrophages to deliver an oncolytic viruses to tumours that is tailored specifically to grow in and destroy the cancer cells.  
  
In this approach macrophages are infected to create a 'virus factory' that produces large amounts of the cancer-dissolving viruses inside the cancer itself.

The findings are published in the latest edition of the US journal Cancer Research.  
  
Up to now, the use of oncolytic viruses in cancer patients has been restricted by the need to inject large amounts of virus to produce the saturation coverage required at small tumour sites outside the prostate.  
  
However Dr Munitta Muthana and Professor Claire Lewis from the University of Sheffield's Department of Infection and Immunity and the Department of Oncology respectively developed ways of infecting the patients' own macrophages with a prostate cancer-specific oncolytic virus.

The virus was developed in Sweden as part of an EU-wide collaboration in the YCR Cancer Research Unit, directed by Professor Norman Maitland at York University.  
  
They then showed that these virus-infected macrophages will migrate into prostate tumours (where there is very little oxygen) and this causes an engineered trigger in the cells to sense the low oxygen (or hypoxia).

This then turns the macrophages infected with the therapeutic virus into virus factories within the tumour.

They then produce large amounts of the cancer-dissolving virus inside the tumour.

This 'Trojan horse' system uses considerably less virus, protects the virus from immune attack, and offers a safer alternative to current virus therapies.  
  
The study opens up the possibility of treating other cancers using the same method, by changing the type of tissue targeted by the virus.

The project was intially established with funding from Yorkshire Cancer Research, the largest independent regional cancer research charity in the UK and completed with funding from the Prostate Cancer Charity and PROMPT prostate cancer collaborative programme.  
  
In a parallel study funded by the BBSRC (Biotechnology and Biological Sciences Research Council), also published in Cancer Research, Dr Muthana and Professor Lewis, collaborated with mathematicians at the University of Nottingham to use state-of-the-art mathematical models to predict the effect of this new treatment on tumours.

Mathematical modelling is increasingly being used to understand the complex biological processes that need to be overcome in treating cancer, and thus develop effective new therapeutic strategies.

In this particular case, it was used to demonstrate how treating tumours with the above macrophage-based gene therapy would enhance the efficacy of more traditional anti-cancer treatments like chemotherapy.  
  
Dr Lewis added: "This new method will make it much easier to treat hard to reach cancers as it uses part of the body's own immune system to do so.

"Our collaborative research with mathematicians at the University of Nottingham also demonstrates that mathematical modelling can be used to design, and maximise the efficacy of, combined therapeutic approaches in cancer."  
  
Professor Maitland said: "While the study is still in the pre-clinical testing stage, it has met all requirements so far for both safety and efficacy, showing a remarkable improvement over current techniques in both the amount of virus used, and the ability to target small disparate tumour deposits."  
  
Dr Helen Rippon, Head of Research Management at The Prostate Cancer Charity which part funded the project, explains: "This new research, which explores a highly innovative approach to treating prostate cancer, is an exciting development.

It is important to remember however that this technology is still in its infancy and it will still be some time before it reaches men with prostate cancer."

**Notes for Editors:** To view the research paper, entitled 'Use of macrophages to target therapeutic adenovirus to human prostate tumours', visit [Cancer Research](http://cancerres.aacrjournals.org/content/71/5/1805.short)  
  
To view the research paper concerning the mathematical modelling, entitled 'Mathematical modelling predicts synergistic anti-tumour effects of combining a macrophage-based, hypoxia-targeted, gene therapy with chemotherapy', visit: [Cancer Research](http://cancerres.aacrjournals.org/content/early/2011/02/25/0008-5472.CAN-10-2834.long)  
  
The institutions involved in the two studies include the University of Sheffield, University of York, University of Oxford, University of Liverpool, University of Kent, Sheffield Hallam University, University of Leicester, Uppsala University in Sweden and the University of Nottingham.  
  
For more information on the University of Sheffield's Department of Oncology, visit:  
[Department of Oncology](http://www.shef.ac.uk/medicine/oncology)  
  
The Prostate Cancer Charity was set up in 1996, and provide support to those affected by the disease, fund research and raise awareness.  
<http://www.prostate-cancer.org.uk/>  
  
Yorkshire Cancer Research is the region's leading cancer charity, supporting research, diagnoses and treatment throughout the area.  
<http://www.yorkshirecancerresearch.org.uk/>  
  
The Biotechnology and Biological Sciences Research Council (BBSRC) is the UK research council funding research and related postgraduate training in the biological sciences.  
<http://www.bbsrc.ac.uk/home/home.aspx>

**For further information please contact: Kyle Christie, Media Relations Assistant, on 0114 2229852 or email** [**k.christie@sheffield.ac.uk**](mailto:k.christie@sheffield.ac.uk)