

Researchers discover new weapon in fight against cervical cancer

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Scientists at the University of Leeds have found a way to target and destroy a key protein associated with the development of cervical and other cancers.

The E7 protein is produced early in the lifecycle of the human papillomavirus (HPV) and blocks the body's natural defences against the uncontrolled division of cells that can lead to cancer.

Researchers at the University of Leeds' School of [Molecular and Cellular Biology](#) have synthesised a molecule, called an RNA aptamer, that latches onto the carcinogenic protein and targets it for destruction, significantly reducing its presence in cells in the laboratory derived from cervical cancers.

There are many types of human papillomavirus. Some are transmitted by sexual contact and associated not only with cervical cancer but also [head and neck cancer](#). Although an increasing proportion of young women in the United Kingdom are vaccinated against the virus, most women in their mid-20s or older are not vaccinated and many may already be HPV positive.

"We therefore need to maintain screening and to develop novel [therapeutic strategies](#)," lead researcher Dr Nicola Stonehouse said.

"Currently, if you have advanced [cervical cancer](#) or head and neck cancer—both of which are associated with [human papillomavirus](#)—you really have little choice but surgery. If we can use this aptamer to target

the carcinogenic protein, we might be talking about much less [radical surgery](#) in the future."

Aptamers are a relatively new tool for molecular biologists and a topic of intense research interest. Like the much better understood antibodies, aptamers can identify and target other molecules as well as [viruses and bacteria](#). However, unlike traditional antibodies, they offer the possibility of insertion into live cells and can be artificially designed in the test tube.

The Leeds team, which received funding from Yorkshire Cancer Research and the BBSRC, was originally looking for an aptamer for use as a research tool.

"We were not trying to develop a therapy. We wanted to create better ways of looking at the virus infection because the current tools that we have are very limited," Dr Stonehouse said. "But what we found was that the aptamers caused the E7 protein to actually disappear. They seem to target it to be degraded. In a cell which is producing lots of E7 and is therefore dangerous, the level of E7 goes down if these RNA aptamers are there".

The new study is based on laboratory cell lines rather than real cancer cases, but the discovery of a molecule that targets one of the key proteins involved in HPV-related cancers raises the possibility of less invasive treatments.

The new aptamer might be used in the future to help stop residual cancerous material from re-establishing itself after surgery and therefore allow less aggressive approaches to surgery. The next challenge is to effectively target the new [aptamer](#) at real cancers.

The paper is published in the journal *PLOS One*.

More information: Clare Nicol, Özlem Cesur, Sophie Forrest, Tamara Belyaeva, David Bunka, G. Eric Blair, Nicola Stonehouse, 'An RNA aptamer provides a novel approach for the induction of apoptosis by targeting the HPV16 E7 oncoprotein,' *PLOS ONE* (2013) [DOI: 10.1371/journal.pone.0064781](https://doi.org/10.1371/journal.pone.0064781)

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