

Fluorescent dye pinpoints tiniest signs of oesophageal cancer

A fluorescent dye that can be sprayed onto the oesophagus - the food pipe - could be used to detect [oesophageal cancer](#) earlier and spare patients unnecessary treatment, according to research published yesterday, 15 January in [Nature Medicine](#)¹.



Cancer of the oesophagus, CT with contrast, axial image. (Image: Tdvorak, via Wikimedia Commons)

When sprayed onto the oesophagus the dye attaches to normal, healthy, cells but is unable to stick to cancer cells or those in the early stages of turning cancerous. This gives doctors a clear signpost to where the disease is developing.

The researchers, funded by the [Medical Research Council \(MRC\)](#) and Cancer Research UK, studied samples of a particular type of oesophageal cancer called adenocarcinoma, cases of which are soaring. Before this disease develops there is a detectable pre-cancerous stage called Barrett's oesophagus, which can be easily treated successfully.

The fluorescent dye works by attaching to glycans - molecules on the surface of cells in the oesophagus. When the cells begin to turn cancerous the glycan structures change, meaning that the dye no longer sticks to the surface of these cells. This gives an early warning of where the cancer is developing.

At this point the cancer can be treated with [radiofrequency ablation](#) - an electrical current applied to the affected area to kill the cancer cells.

[Dr Rebecca Fitzgerald](#), lead author based at the [MRC Cancer Cell Unit](#) in Cambridge, said: "Current methods to screen for oesophageal cancer are controversial - they are costly, uncomfortable for the patient and are not completely accurate. Our technique highlights the exact position of a developing oesophageal cancer, and how advanced it is, giving a more accurate picture. This could spare patients radical surgery to remove the oesophagus that can result in having to eat much smaller more regular meals and worse acid-reflux."

After pilot studies on large numbers of biopsies the researchers used four patients having removal of early cancer to show how the spray could be used. In two of the cases, pre-cancerous areas were not detected using conventional imaging, but the spray clearly highlighted an area that needed treating.

In another patient, their entire oesophagus had been removed because a small pre-cancerous area had been identified. Using current techniques it had been impossible to determine how developed the cancer was, but using the fluorescent spray, the researchers found the affected area was small and could have been treated with a less radical procedure.

[Professor Kevin Brindle](#), one of the researchers based at Cancer Research UK's Cambridge Research Institute, said: "The benefit of using this dye is that it is specific, relatively cheap and is found in our normal diets so unlikely to cause any unwanted effects at the levels we use. We now need to test our technique in newly diagnosed patients, but it has great potential to be used with current imaging techniques to help improve treatment for oesophageal cancer."

Oesophageal cancer is the ninth most common cancer in the UK. Each year around 8000 people are diagnosed with

oesophageal cancer and the incidence of the disease in men has risen by more than 50% in a generation.

Dr Julie Sharp, senior science information manager at Cancer Research UK, said: "Oesophageal cancer is one of the most difficult cancers to detect and treat, with only 8% of people with the disease surviving at least five years. We urgently need new ways to detect the cancer earlier, and this dye offers a great opportunity to treat the cancer more promptly and more successfully, potentially saving many lives a year."

1. Bird-Lieberman, E.L., et al Molecular imaging using fluorescent lectins permits rapid endoscopic identification of dysplasia in Barrett's esophagus. *Nature Medicine* (2012) DOI: 10.1038/nm.2616

Source: Cancer Research UK

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