

New cancer imaging technique uses vitamin C to detect more aggressive tumours

August 4 2011

Cancer research UK scientists have developed a new imaging technique that uses vitamin C to detect cancers likely to be more aggressive or resistant to treatment, according to a study published in the *Journal of the American Chemical Society*.

The most aggressive cancers are those which are able to divide rapidly without levels of oxidative [stress](#) – a process which leads to destructive molecules called free radicals building up in the cell and causing DNA damage – becoming high enough to trigger cell death.

Antioxidants like vitamin C are involved in helping to prevent this damage, by mopping up rogue free radicals.

Studies show that boosting the levels of the enzymes involved in the antioxidant action of vitamin C is one way in which [cancer](#) cells increase their capacity to withstand oxidative stress.

The vitamin C inside a cell exists in a different form from that in the blood stream, and is converted from one to the other by enzymes found inside the cell.

Looking at lymphoma cancer cells in the lab and then in mice, the researchers were able to develop specially labelled versions of the two vitamin C forms and use these to detect tumours capable of dealing with higher levels of oxidative stress, which may be more resistant to chemotherapy.

Lead researcher Dr Sarah Bohndiek, based at Cancer Research UK's Cambridge Research Institute, said: "This is the first time we've been able to show that [vitamin C](#) can be used as a marker for imaging regions of high levels of oxidative stress in the body. This not only helps identify tumours more likely to be aggressive or resistant to treatment, it could also provide an accurate means of monitoring treatment response.

"Importantly, oxidative stress is also associated with other neurodegenerative diseases, such as Alzheimer's and Parkinson's disease, meaning this technique could also have wider applications. Clinical trials exploring how this new imaging technique can be used in the clinic are already planned for the near future."

This [imaging technique](#) was developed in conjunction with GE Healthcare. Jonathan A. Murray, general manager for Metabolic Imaging at GE Healthcare, said: "GE's Metabolic imaging technology continues to enable wonderful biochemical discovery, we are delighted to collaborate with Cambridge."

Dr Julie Sharp, senior science information manager at Cancer Research UK, said: "We know that cancers capable of dealing with higher levels of oxidative stress are more likely to spread and be resistant to chemotherapy, but we don't have an effective way of detecting this before treatment. New imaging techniques like this could help signal early on whether or not a drug is working, allowing doctors to better tailor treatments to a patient's individual cancer."

More information: *J. Am. Chem. Soc.*, 2011, 133 (30), pp 11795–11801 [DOI: 10.1021/ja2045925](https://doi.org/10.1021/ja2045925)

Provided by Cancer Research UK

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