

# Oxygen levels in tumours affect response to treatment

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(Medical Xpress)—The genetic make-up of a patient's tumour could be used to personalise their treatment, and help to decide whether they would benefit from receiving additional drugs as part of their radiotherapy programme, according to a recent study involving scientists from the Manchester Cancer Research Centre.

Tumours with lower levels of oxygen – known as hypoxia – often respond less well to radiation therapy. There are several agents that can be given to [patients](#) before radiotherapy to reduce hypoxia, but these are not given as standard. Being able to measure how well-oxygenated an individual's tumour is would give doctors a valuable way of identifying which patients might benefit from treatment with hypoxia reducing agents before radiotherapy.

Hypoxia has previously been investigated by looking at the expression of certain genes, and Manchester researchers have come up with a genetic profile for tumours that should indicate the overall level of oxygenation.

Researchers at The University of Manchester, part of the Manchester Cancer Research Centre, carried out the study in patients diagnosed with cancer of the bladder and larynx. These patients subsequently underwent either standard radiotherapy or radiotherapy with the addition of two agents which in combination are known to increase oxygenation: nicotinamide and carbogen.

The team tested patients' tumour samples for 26 genes in order to

classify them as more or less hypoxic, and then analysed whether this hypoxia score related to the results of treatment.

Professor Catharine West, from The University's Institute of Cancer Sciences who led the research, said: "Our goal is to find ways of predicting how patients will respond to different treatments. Future cancer treatments will be personalised so that patients get the best therapy for their tumour.

"Personalising therapy will not only increase the number of people surviving cancer but also decrease side-effects, as patients would be spared from having treatments that are unlikely to work in their tumour."

A paper recently published in *Clinical Cancer Research* describes how the group found that for laryngeal tumours, those classed as more hypoxic saw a significant benefit from receiving additional agents as well as [radiation therapy](#). However, in bladder cancer, patients with more hypoxic tumours did not benefit from adding extra agents.

Professor West added: "We will now test how the hypoxia score works in the clinic in a trial starting in December in patients with head and neck [cancer](#). I have studied ways of measuring [hypoxia](#) in tumours for many years so this is a very exciting finding that could help us optimise how we use [radiotherapy](#) to get the best outcome for patients."

**More information:** *Clinical Cancer Research* 1 September 2013, 19(17): 4879-88. [DOI: 10.1158/1078-0432](https://doi.org/10.1158/1078-0432.CCR-13-0542). CCR-13-0542. "A 26-gene hypoxia signature predicts benefit from hypoxia-modifying therapy in laryngeal cancer but not bladder cancer."

Provided by University of Manchester

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