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Searching for cancer's fingerprints gives clues to tumour growth

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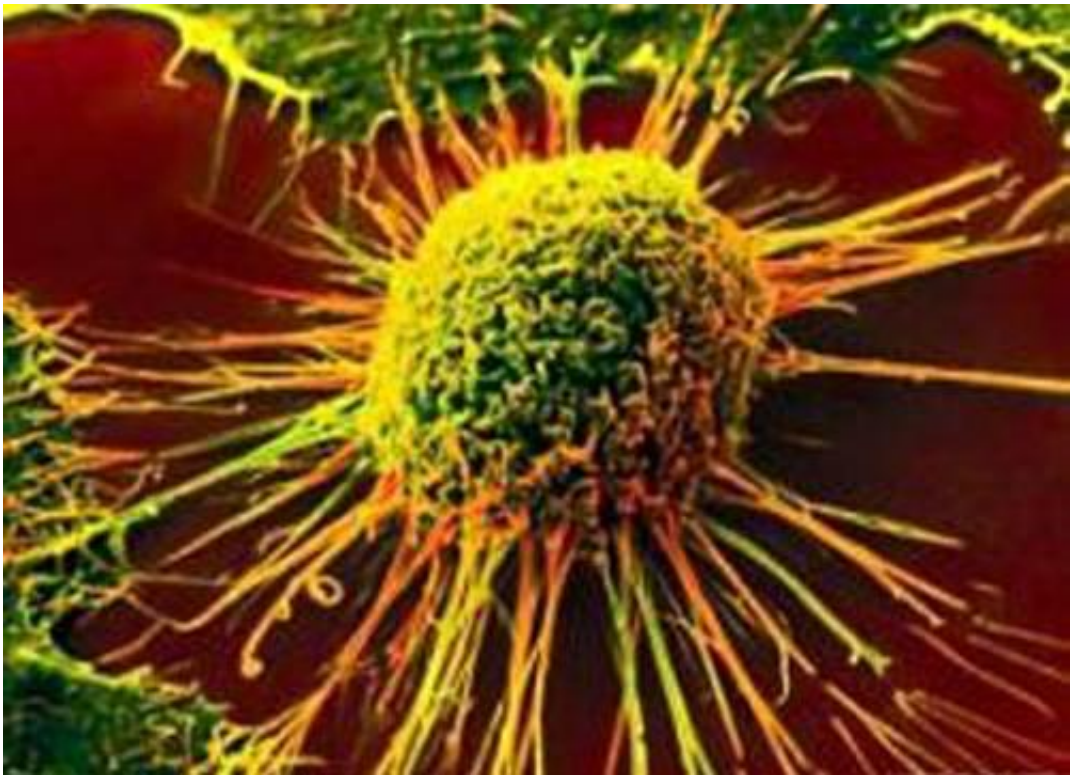

A University of Manchester study has shed light on a chain of events that allows tumour cells to thrive in tough environments, identifying potential new ways to diagnose and treat cancer.

Because of the rapid nature of cancer growth, tumours often lack a fully

functioning blood supply. This leads to low levels of oxygen within the tumour – a condition known as hypoxia. Lack of oxygen is known to lead to more aggressive tumours with a higher chance of spreading throughout the body.

However, to overcome these low oxygen conditions, cancer cells need to evolve alternative ways to produce energy; controlled by a range of signalling molecules, most importantly Hypoxia Inducible Factors (HIFs).

The latest research from a research group at The University of Manchester looked at cells in various oxygen environments and compared their metabolic fingerprint – the hallmarks of energy production. The team explored those features linked to HIF and those that acted independently, in two different types of cancer cell, in order to fully understand how each process interacted.

Professor Kaye Williams, who led the study, said: "If we deprive cells of oxygen in controlled conditions, we can see which new processes kick in to overcome hypoxic stress. We can only stop cancer in its tracks when we understand all of its survival mechanisms."

The experiments revealed four different fingerprints – patterns indicating how the cells respond to different oxygenation conditions. This insight offers a different way to target cancer growth, by identifying specific processes to block with new drugs - in order to only affect tumour cells.

These findings also could also be a tool to aid diagnosis and prognosis. "By looking for these metabolic fingerprints in patients, we could better understand the level of hypoxia present in each individual tumour. Such knowledge would aid doctors when choosing how to best treat their cancer," added Professor Williams.

More information: Emily G. Armitage et al. Metabolic profiling reveals potential metabolic markers associated with Hypoxia Inducible Factor-mediated signalling in hypoxic cancer cells, *Scientific Reports* (2015). DOI: 10.1038/srep15649