

Suffocating tumors could lead to new cancer drugs

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Scientists have discovered a new molecule that prevents cancer cells from responding and surviving when starved of oxygen and which could be developed into new treatments for the disease, according to new research published in the *Journal of the American Chemical Society* today (Friday).

Cancer Research UK scientists at the University of Southampton found that this molecule targets the master switch—HIF-1—that [cancer cells](#) use to adapt to low [oxygen levels](#), a common feature in the disease.

The researchers uncovered a way to stop cancer cells using this switch through an approach called 'synthetic biology'. By testing 3.2 million potential compounds, made by specially engineered bacteria, they were able to find a molecule that stopped HIF-1 from working.

All cells need a blood supply to provide them with the oxygen and nutrients they require to survive. Cancer tumours grow rapidly and as the tumour gets bigger it outstrips the supply of oxygen and nutrients that the surrounding blood vessels can deliver.

But, to cope with this low-oxygen environment, HIF-1 acts as a master switch that turns on hundreds of genes, allowing cancer cells to survive. HIF-1 triggers the formation of new blood vessels around tumours, causing more oxygen and nutrients to be delivered to the starving tumour, which in turn allows it to keep growing.

Dr Ali Tavassoli, a Cancer Research UK scientist whose team discovered and developed the compound at the University of Southampton, said: "We've found a way to target the steps that cancer cells take to survive and we hope that our research will one day lead to effective drugs that can stop cancers adapting to a low oxygen environment, stopping their growth. The next step is to further develop this molecule to create an effective treatment."

Dr Julie Sharp, senior science information manager at Cancer Research UK, said: "Finding ways to disrupt the tools that cancer cells use to adapt and grow when starved of oxygen has been a hot topic in cancer research, but finding drugs that do this effectively has proved elusive.

"For the first time our scientists have found a way to block a master switch controlling cells response to low levels of [oxygen](#)—an important step towards creating drugs that could halt cancer in its tracks."

Provided by University of Southampton

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