

Study shows starving cancer cells of key nutrient slows tumour growth

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Depriving cancer cells of a key amino acid dramatically cuts their ability to grow and multiply, according to a new Cancer Research UK study published in *Nature*.

Scientists at Cancer Research UK's Beatson Institute looked at how cancer cells are able to survive and continue growing when starved of the amino acid serine. Cells are normally able to make serine themselves, but the team at the Beatson found that tumours lacking the [p53 protein](#) – which is faulty in at least half of all cancers – could not adapt to this switch and so grew at a much slower rate.

The p53 protein was first discovered by Cancer Research UK scientists and is often referred to as the 'guardian of the genome' as it halts the growth of damaged cells, activates [DNA repair](#) or triggers [cell death](#).

The findings suggest that by targeting the ways which cancer cells use to generate the energy and [building blocks](#) needed to grow, new approaches to treat cancers could be developed.

Dr Oliver Maddocks, lead researcher based at Cancer Research UK's Beatson Institute, said: "We know that the [p53 protein](#) blocks the growth of cancer cells, but we are increasingly aware that p53 has a 'split personality'. When cells are starved of key nutrients p53 helps them adapt, and could be helping cancer cells survive.

"Gaining insights of this interplay between cell metabolism and p53 may help us to identify new ways to treat cancer. Reducing the availability of serine to cancer cells, particularly those lacking p53, is a promising new concept, but we're still a long way from knowing whether this could work in patients."

Cancer cells take up large amounts of serine and use it as a building block to quickly grow and generate new cells. This research builds on [previous work](#) at the Beatson Institute that found that levels of serine in cancer cells controls a key step in [energy production](#).

Professor Nic Jones, Cancer Research UK's chief scientist, said: "This work shows how we're still learning more about the role p53 can play in cancer, 30 years on from its discovery by Cancer Research UK scientists.

"Understanding how [cancer cells](#) are able to generate the extra energy and molecular building blocks to grow rapidly is becoming an important area of research. Disrupting [cell metabolism](#) could lead to a whole new arsenal of drugs to treat cancer and Cancer Research UK scientists are at the forefront of this research."

More information: Maddocks O.D.K., Berkers C.R., Mason S.M.,

Zheng L., Blyth K., Gottlieb E. & Vousden K.H. (2012). Serine starvation induces stress and p53-dependent metabolic remodelling in cancer cells, *Nature*, [DOI: 10.1038/nature11743](https://doi.org/10.1038/nature11743)

Provided by Cancer Research UK

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