Scientists unlock key to cancer cell death mystery

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An international team of scientists has announced a new advance in the ability to target and destroy certain cancer cells.

A group led by the University of Leicester has shown that particular cancer cells are especially sensitive to a protein called p21. This protein usually forces normal and cancer cells to stop dividing but it was recently shown that in some cases it can also kill cancer cells.

However, scientists have been unclear about how this happens.

Researcher Salvador Macip, from the University of Leicester Department of Biochemistry, said: "If we could harness this 'killing power' that p21 has, we could think of designing new therapies aimed at increasing its levels in tumours. This is what motivated us to look into it".

Now the team from the universities of Leicester and Cardiff in the UK, University of South Carolina, USA and Karolinska Institutet, Sweden has discovered that cells from sarcomas tend to die in response to p21 and that this is determined by the sensitivity of their mitochondria to oxidants.

They have published their findings in The Journal of Biological Chemistry. The research was funded by the MRC, the NIH, CONACYT and the Swedish Cancer Society

Dr Macip added: "Our research also showed that p21 can kill cells even in the absence of p53, a protein that is in the main responsible for cell death but is inactivated in most cancers.

"This shows that certain types of cancer, sarcomas for instance, but maybe also others, should respond well to drugs that increase the levels of p21, even if they don't have an active p53. The side effects of these therapies should be minimal, since our experiments show that normal cells would arrest but not die in response to p21.

"There are already drugs available that selectively increase p21. Our results provide a rationale for testing them in certain types of cancers, which could be identified using the experiments we describe."

More information: Reactive oxygen species and mitochondrial sensitivity to oxidative stress determine induction of cancer cell death by p21. Masgras I, Carrera S, de Verdier PJ, Brennan P, Majid A, Makhtar W, Tulchinksy E, Jones GD, Roninson IB, Macip S. *J Biol Chem.* 2012 Feb 6. [Epub ahead of print]

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