

Scientists discover nucleoli damage could kill cancer cells

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(Medical Xpress) -- Damaging a cell's nucleolus could destroy cancer cells by increasing levels of the most important tumour prevention protein, p53, reveals research presented at the National Cancer Research Institute (NCRI) Cancer Conference in Liverpool, today.

Scientists at The University of Liverpool have discovered that the nucleolus – a cell component found inside the nucleus – directly regulates the level of a cancer-protector protein called p53. And p53, called the ‘guardian of the genome’, blocks tumour development by triggering a ‘stop’ signal which prevents cells dividing out of control.

The team, whose research was jointly funded by Cancer Research UK, Yorkshire Cancer Research, North West Cancer Research Fund and Mersey Kidney Research, discovered that p53 proteins enter nucleoli to be labelled for destruction. These ‘tagged’ p53 proteins are then ‘broken up’ in another part of the cell.

But cell stresses, such as heat, lack of nutrients, high or low salt levels and DNA damage, stop the nucleolus from working. This in turn prevents p53 from being destroyed, so p53 levels automatically increase and stop the cell dividing. Eventually the cell dies.

This suggests that nucleoli are a powerful new target for the development of new cancer drugs.

Dr. Carlos Rubbi, based at the Liverpool Cancer Research UK Centre,

the University of Liverpool, presenting the research, said: “This research implies that scientists can kill cancer cells by targeting the nucleoli to increase levels of protective p53.

“It explains how levels of the most important cancer protector protein, p53, increase in response to such a wide variety of cell stresses.

“This potentially means there is a whole range of new drug targets available to us, and suggests that it may not be necessary to use only DNA damage techniques - such as chemotherapy and radiotherapy - to raise levels of p53.”

Until now, nucleoli were just thought to be the places where ribosomes – ‘protein factories’ – are made. This research shows nucleoli have additional cell control functions and provide the link between the detection of cell stress and the cells’ response.

Professor Sir David Lane, co-discoverer of p53, said: “We discovered p53 – the first natural ‘tumour suppressor protein,’ which protects cells from turning cancerous – more than 30 years ago.

“But decades later, our team and other scientists are still making incredible discoveries about the behaviour of p53 – and the many ways it regulates cells.

“Today it is at the heart of new techniques being developed to treat cancer. And this latest finding, that a simple part of the cell could potentially be targeted to increase the levels of p53, is exciting news and has the potential to influence greatly the development of future approaches to destroying [cancer cells](#).”

More information: [www.ncri.org.uk/ncriconference ...racts/B155.html](http://www.ncri.org.uk/ncriconference...racts/B155.html) ;

Provided by Cancer Research UK

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