

Healthcare industry BW

Substance in broccoli supports pancreatic cancer therapy

The new cancer medication sorafenib inhibits resistant tumour stem cells in pancreatic cancer and is especially effective when combined with sulforaphane, an organic compound found in broccoli and cauliflower.

Sorafenib is a new cancer drug used for the treatment of advanced liver and kidney cancer. It also appears to be effective against cancer stem cells in pancreatic cancer. A team led by Professor Dr. Ingrid Herr, Head of the Department of Molecular Oncosurgery, a cooperative research group of the Department of Surgery at Heidelberg University Hospital (Managing Director: Professor Dr. Markus W. Büchler) and the German Cancer Research Centre (DKFZ), tested the new substance in mice and in human pancreatic cancer cells. The researchers found that sorafenib inhibits resistant tumour stem cells and is especially effective in combination with sulforaphane, an organic compound of broccoli. The results have been published online in the prestigious medical journal "Cancer Research".

Around 12,900 people in Germany develop pancreatic cancer every year. The disease is frequently noticed too late and very few patients survive for more than a year after diagnosis. Early precursor cells of the tumour known as cancer stem cells are frequently responsible for the uncontrollable growth of the cancer, metastasisation to other organs, and recurrence shortly after surgery. These cancer stem cells are extremely resistant to conventional therapy and are the object of new treatment strategies.

Sorafenib is also effective in pancreatic cancer

In tests involving cancer cells and mice, the researchers showed that sorafenib inhibited typical properties of cancer stem cells from pancreas tumours and greatly reduced tumour growth. However, this effect only lasted for a short time; after four weeks, new colonies of cancer stem cells formed that no longer reacted to further treatment with sorafenib.

"This resistance is probably related to a certain metabolic pathway, the NF-KB pathway, which is activated by sorafenib," explained Vanessa Rausch, a young researcher in the Department of Surgery at Heidelberg University Hospital and lead author of the article published in "Cancer Research".



Prof. Dr. Ingrid Herr (left) and Prof. Dr. h.c. Markus W. Büchler, together with the presenter of the "ARD Buffet" programme in the SWR studio (broadcast on 23rd Sept. 2009). Herr and Büchler were invited to express their expert opinion on "cancer prevention and diagnosis".
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Broccoli reinforces the effect of sorafenib

Substances that block this undesired NF-KB pathway, thus making the dangerous cells vulnerable are found in nature: vegetables from the cruciferous family such as broccoli and cauliflower contain high levels of sulforaphane, an anti-cancer compound. The experiments showed that sulforaphane prevents the activation of the NF-KB pathway by sorafenib. The combined use of sorafenib and sulforaphane reinforced the effect of sorafenib without causing additional side effects: the invasive potential of cancer cells was prevented, metastasis was completely blocked in cell culture experiments. "We assume that nutrition may be a suitable approach to breaking the resistance of cancer stem cells to therapy, thus making tumour treatment more effective," said Professor Herr.

Literature:

Vanessa Rausch, Li Liu, Georgios Kallifatidis, Bernd Baumann, Jürgen Mattern, Jury Gladkich, Thomas Wirth, Peter Schemmer, Markus W. Büchler, Margot Zöller, Alexei V. Salnikov, Ingrid Herr. Synergistic activity of sorafenib and sulforaphane abolishes pancreatic cancer stem cell characteristics. Cancer Research 2010 in press.

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