New discovery is a significant boost to cancer research

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A team of scientists led by the University of East Anglia (UEA) has discovered a brand new group of molecules which could help fight the spread of cancer and other diseases.

The new molecules are synthetic derivatives of a natural product known as UDP-Galactose, and block the activity of a group of enzymes called glycosyltransferases. Glycosyltransferases are used by biological cells to turn simple sugars into elongated sugar chains and branched structures.

Published online today by the journal *Nature Chemical Biology*, the findings could lead to a significant therapeutic advance in the treatment of cancer, inflammation and infection.

Many biological cells - including cancer cells and bacterial cells - are literally covered by a coating of sugar. This sugar coating influences the way cells communicate with their environment and with each other.

For example, when a cancer spreads through the body or a bacterium infiltrates its human host many of the contacts the rogue cells make with other cells are through these sugars on their cell surface.

To form the complex sugar structures that decorate their surface, cells rely on gylcosyltransferases to join individual sugar building blocks together. The UEA researchers have found that synthetic UDP-Galactose derivatives block these enzymes effectively. These molecules can therefore potentially be used to interfere with harmful biological

processes such as cancer metastasis and bacterial infection.

The work was carried out by researchers at UEA's School of Pharmacy, working alongside colleagues at the Carlsberg Research Centre in Denmark.

"This exciting discovery of a potent enzyme inhibitor with a completely new mechanism of action has considerable therapeutic potential in cancer, inflammation and infection," said lead author Dr Gerd Wagner of UEA.

"Our results also provide a general strategy for how to design and improve such inhibitors in the future. The 'snapshots' we have taken of one of these enzymes, together with the new inhibitor itself, can provide very valuable guidance for the development of new anti-cancer and anti-infective drug candidates."

More information: 'Structural and mechanistic basis for a new mode of glycosyltransferase inhibition' by T Pesnot (UEA), R Jorgensen (Carlsberg Research Centre, Copenhagen), M Palcic (Carlsberg Research Centre, Copenhagen) and G Wagner (UEA) is published in *Nature Chemical Biology* online on April 4.

Provided by University of East Anglia