

Possible new combination treatment for cancer

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This image depicts Jonas Nilsson of the Sahlgrenska Cancer Center at the University of Gothenburg. Credit: The University of Gothenburg

Scientists at the Sahlgrenska Academy have developed a new cancer treatment that has proved to be effective in mice. The treatment, which is presented in the prestigious scientific journal PNAS, is based on newly discovered properties of the so-called BET bromodomain inhibitors.

A few years ago, a molecule known as "JQ1" was developed, which can block so called BET bromodomain proteins. This switch off the known cancer gene MYC thereby preventing [cancer cells](#) from dividing.

The discovery was regarded as a major breakthrough. A problem was that JQ1 did not function optimally in animal experiments, and this means that it has not been possible to test the [treatment](#) on cancer patients.

New molecule

Jonas Nilsson and his research group have developed, in collaboration with the Canadian company Zenith epigenetics, a new molecule known as "RVX2135", which has been tested in mice with MYC-driven lymphoma. The study will be published this week in the early edition of the prestigious scientific journal PNAS and shows that the new molecule not only causes cancer cells in culture to stop growing, it also causes tumors to die. This means that the mice survive their cancer longer.

"We hypothesized that the new molecule could also switch off the MYC gene. However, our studies show that neither the JQ1 molecule nor the RVX2135 molecule have this property in these types of cells. This means that the mode of action is probably not as simple as we believed," says Jonas Nilsson, Group Leader at the Sahlgrenska Cancer Center.

Increased survival in mice

The scientists in Gothenburg also discovered that the RVX2135 molecule activates the same genes as those activated by molecules known as "HDAC inhibitors", which are already used to treat [cancer](#). The scientists then tested HDAC inhibitors together with the newly discovered [molecules](#) and it turned out that the combination increased

survival in mice with lymphoma.

"It was also possible to reduce the dose of HDAC inhibitors when used in combination with RVX2135 and this reduced adverse effects. We see this as a breakthrough in the clinical development of this type of treatment," Jonas Nilsson explains.

Further development

Jonas Nilsson has recently founded the Sahlgrenska Translational Melanoma Group together with surgeons and oncologists at the Sahlgrenska University Hospital. This group will investigate whether the treatment can be used also for malignant melanoma.

"The work is challenging, but we believe that the prospects for success with combination treatments are good," says Jonas Nilsson.

More information: www.pnas.org/content/early/2014/06/19/1406722111.abstract

Provided by University of Gothenburg

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