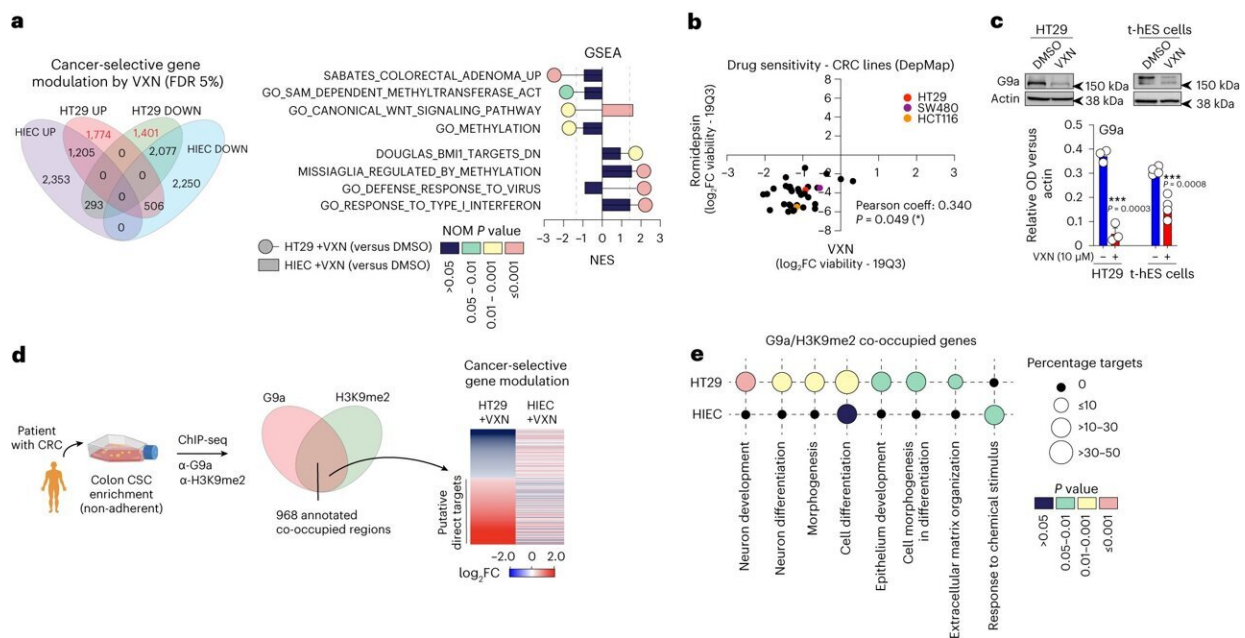


Drug used for cocaine addiction may pave way for new treatment of advanced colon cancer

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Multi-omic characterization of VXN cancer-selective effect on cell functions. Credit: *Nature Cancer* (2024). DOI: 10.1038/s43018-024-00727-y

A new, cutting-edge study from the University of Ottawa (uOttawa) has found vanoxerine, a drug initially developed for the treatment of cocaine addiction, could impede advanced colorectal cancer stem cells by essentially re-wiring critical gene networks.

This new research [published in *Nature Cancer*](#) led by Dr. Yannick Benoit, Principal Investigator and Associate Professor in the Department of Cellular and Molecular Medicine (Faculty of Medicine) at uOttawa, has revealed that vanoxerine plays an entirely unexpected mechanism in cancer.

The investigators observed that vanoxerine packs a powerful punch when suppressing cancer stem cell activity in colon cancer patients' tissues and in tumors implanted in laboratory animals. It interferes with a protein that transports dopamine, the brain chemical involved in sensations of pleasure and reward, and represses an enzyme dubbed G9a in colorectal tumors.

"Notably, the tumors treated with vanoxerine become more susceptible to attack by the immune system due to the reactivation of ancient viral DNA fragments accumulated in our genome throughout evolution. This finding is quite significant, considering that colorectal tumors tend to show poor response to standard immunotherapy," says Dr. Benoit, who was one of six national winners of the Gairdner Foundation's 2022 Early Career Investigator competition.

A silent killer

Colorectal cancer—when cells grow and divide uncontrollably in the colon or rectum—is the world's second leading cause of cancer-related deaths and is considered a "silent cancer" since it typically doesn't cause symptoms during early stages. While the risks increase with age, new statistics show [an alarming increase among younger adults](#).

Because it's frequently diagnosed at advanced stages when treatment options are few, it is imperative to discover new methods of beating back colorectal cancer cells and tumors. When seeking a drug safely tested in patients, the most promising option turned out to be vanoxerine,

a dopamine reuptake inhibitor.

The research team observed such minimal toxicity from vanoxerine treatments when testing in healthy human and mouse tissues that Dr. Benoit says their work potentially floats "a safe way to eliminate [cancer stem cells](#) in colorectal tumors without harming the 'good stem cells' in the body's organs."

New and promising treatment

While prevention and early detection remain the best weapons against colorectal cancer, these highly compelling findings may pave the way for a new and promising treatment option for patients struggling with advanced disease.

"For those unfortunate people diagnosed with advanced and aggressive forms of colorectal cancer, we profoundly hope our work can lead to the development of powerful options for treatment in the future and substantially increase their survival chances," says Dr. Benoit.

Roots of collaboration

The study was strongly collaborative, benefitting from expertise across the uOttawa Faculty of Medicine's broad research ecosystem.

The first author is Christopher Bergin, a recent Ph.D. graduate from Dr. Benoit's lab who methodically tested vanoxerine for its anti-cancer stem cell properties in patient-derived organoids. Dr. Rebecca Auer, scientific director of The Ottawa Hospital's Cancer Therapeutics Program, provided access to [colorectal cancer](#) patients' tissues. Dr. Mario Tiberi and Dr. Michele Ardolino provided critical insights and expertise.

While working on this study, Dr. Benoit's lab hosted Dr. Tanguy Fenouil, a gastrointestinal pathologist from France whose collaborative work was key.

More information: Christopher J. Bergin et al, The dopamine transporter antagonist vanoxerine inhibits G9a and suppresses cancer stem cell functions in colon tumors, *Nature Cancer* (2024). [DOI: 10.1038/s43018-024-00727-y](https://doi.org/10.1038/s43018-024-00727-y)

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