Alcohol-breakdown molecule may play a role in breast cancer development

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(Medical Xpress)—New research looking at the biological process involved in breast cancer development has strengthened the argument for a potential link between alcohol consumption and the disease.

Scientists from The University of Manchester – part of the Manchester Cancer Research Centre – and the University of Salford looked at a particular enzyme, a biological molecule that accelerates chemical reactions - known as CYP2E1.

Their findings offer a possible target to improve outcomes for patients in the later stages of the disease.

Dr Costas Demonacos, based at The University's Manchester Pharmacy School who led the research, said: "This enzyme, known as CYP2E1, has been implicated in various liver diseases linked to alcohol consumption (Alcoholic Liver Disease (ALD), as well as diabetes, obesity and cancer.

"We wanted to understand why an enzyme known to function mainly in the liver was found to be heavily present in some types of breast cancer tissues. We also wanted to explore what other activities this enzyme might have that control the development of breast cancer."

The enzyme breaks down various molecules within cells, including alcohol. The by-products of this metabolism include reactive oxygen species (ROS), resulting in something called oxidative stress - in normal physiological conditions this aids cellular functions, whereas when

concentrations of ROS are high or oxidative stress becomes chronic, cells can be seriously damaged.

Previous studies have shown that the enzyme is most strongly expressed in early-stage breast tumours rather than more developed tumours and scientists believe that it contributes to the progression of breast cancer. The Manchester team looked at the role it plays in various cellular functions in breast cancer cells.

The study, published in *Breast Cancer Research*, found that depending on the stage of the breast cancer, high levels of the enzyme can help cells survive during stress.

They also found that inhibiting the activity of the enzyme in cells with high migratory potential promoted cell migration – a process linked to cancer spreading – known as metastasis.

Dr Demonacos said: "Now that we have a clearer picture of the role played by this enzyme in breast cancer development, scientists could use it as a target in the later stages of the disease, to slow down the spread of cancer as well as to personalise anti-cancer therapy.

"Since CYP2E1 is involved in alcohol metabolism too, our findings should allow new insight on the potential link between chronic alcohol consumption and breast cancer, by showing how alcohol influences the progression of cancer."

More information: Full text of the study: breast-cancer-research.com/content/15/6/R107

Provided by University of Manchester