

Commonly used diabetes drug may help to prevent primary liver cancer

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Metformin, a drug widely used to treat Type II diabetes, may help to prevent primary liver cancer, researchers at the University of Maryland Marlene and Stewart Greenebaum Cancer Center report in the April 2012 issue of *Cancer Prevention Research*. Primary liver cancer, or hepatocellular carcinoma, is an often-deadly form of cancer that is on the rise worldwide and is the fastest-growing cause of cancer-related deaths among American men.

Patients with Type II diabetes have a two- to three-fold increased relative risk of developing primary liver cancer. Also at risk are people who are obese, have hepatitis or non-alcoholic [fatty liver disease](#) (NAFLD). [Metformin](#), which is derived from the French lilac, is used to treat NAFLD as well as diabetes, and currently is being studied in connection with the prevention of a variety of cancers. This pre-clinical study is the first to focus on liver cancer.

"Our research demonstrated that metformin prevents primary liver cancer in animal models. Mice treated with metformin had significantly smaller and fewer tumors than those who did not receive the medication," says the study's senior author, Geoffrey D. Girnun, Ph.D., assistant professor of biochemistry and molecular biology at the University of Maryland School of Medicine and a research scientist at the University of Maryland Greenebaum Cancer Center. "Based on these findings, we believe metformin should be evaluated as a preventive agent in people who are at high risk. Many patients with diabetes already are taking this medication, with few side effects."

Dr. Girnun adds, "There have been several retrospective epidemiological studies linking metformin with reduced risk of liver cancer, but our study is the first to formally test whether metformin can protect against carcinogenesis - not just tumor growth and development, but actual tumor formation in the liver." He says he will seek federal

funding for a clinical trial to study the anti-cancer effects of metformin in patients who have Type II diabetes.

E. Albert Reece, M.D., Ph.D., M.B.A., vice president of medical affairs at the University of Maryland and dean of the University of Maryland School of Medicine, says, "Hepatocellular carcinoma represents a serious public health threat worldwide. With the alarming increases in obesity, [Type II diabetes](#) and hepatitis B and C, an even greater number of people will be at risk of developing this cancer in the future. Not only do we need to find more effective treatments, we must also find ways to prevent it. This study conducted by Dr. Girnun and his colleagues is an excellent first step that may ultimately help us to prevent [liver cancer](#) in targeted populations."

Kevin J. Cullen, M.D., professor of medicine at the University of Maryland School of Medicine and director of the University of Maryland Greenebaum Cancer Center, says, "This study increases our knowledge of cancer cell metabolism and offers new insights into a possible mechanism for preventing a difficult-to-treat cancer. Translational research is an important focus of our cancer center, and we plan to continue this important area of research as part of a clinical study to determine if there is a possible benefit to patients."

The study is featured on the cover of [Cancer Prevention Research](#), a journal published by the American Association for Cancer Research. Kavita Bhalla, Ph.D., a postdoctoral fellow at the University of Maryland School of Medicine and a Greenebaum Cancer Center research scientist, is the lead author.

Glucose is converted into fatty acids in the liver through a process called lipogenesis. This process is increased in people who have diabetes, hepatitis, fatty liver disease as well as cancer. Dr. Girnun says metformin reduces the level of glucose and

inhibits this fatty acid synthesis. "When you block this process, you prevent the cells from making more building blocks to make more cells. There is also no energy to put the building blocks together, and the cells are not able to proliferate, thereby preventing tumors from developing," he explains.

In the study, researchers found that mice treated with metformin in their food developed 57 percent fewer liver tumors than the mice that did not receive the drug; the size of the tumors was reduced by about 37 percent.

Provided by University of Maryland Medical Center

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