Could Green Tea Help Prevent Liver Cancer?

A recent study in mice found that a high dose of green tea extract had a beneficial effect on a new sign of liver cancer progression.

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If you're at risk for liver cancer, you might do well to drink green tea. That's the message from a liver expert at the Mayo Clinic, reacting to a new study that investigated a green tea extract's effect on a newly identified marker of liver cancer prognosis.

People at risk for hepatocellular carcinoma (HCC, the most common form of liver cancer), include those with hepatitis B or C virus (HBV/HCV). Whether members of this population can reduce their risk of liver cancer by regularly drinking green tea or consuming green tea extract is a matter for further study—scientists still need to identify whether there is a causal connection between the disease and the drink or daily capsules.

According to the author of the new study, Fung-Lung Chung, PhD, a senior faculty member in the department of oncology at Georgetown University, taking the type of green tea extract that's readily available as a dietary supplement at the very least probably couldn't hurt. However, given the lax governmental regulation of the supplements industry, the quality of store-bought green tea extract is not guaranteed. Recent investigations have found that for many supplements the connection between what's promised on the label and what's inside is tenuous at best.

Published in the journal Hepatology, Chung and his colleagues' study looked at a potential liver cancer biomarker known as g-OHPdG in three different types of mouse research models that have been created to help scientists study the progression of liver cancer in the animals. Chung and his team, who were looking to determine whether this biomarker was a good predictor of liver cancer prognosis, also tested g-OHPdG's effects on tissue samples from humans with liver cancer.

As for what g-OHPdG actually does to the body, it can cause mutations to DNA and has been well established by previous research as a major driver of genetic mutation in smoking-driven lung cancer. What remains unknown is what role g-OHPdG may play in liver cancer.

Chung and his fellow researchers found that g-OHPdG levels rose with age in certain mice that had initially been engineered to study skin cancer. These animals lacked a key gene that gives rise to a mechanism that repairs DNA damage associated with that cancer. Previous research showed that

such mice were also at high risk for liver cancer, so Chung decided to repurpose them for his own research in that field.

To study how suppressing g-OHPdG might have a beneficial effect on liver cancer progression, Chung's group tested the related effects of three antioxidants, including one called Theaphenon E, a green tea extract known to have quite strong antioxidative effects. The scientists found that the extract not only lowered g-OHPdG levels the most of the three antioxidants, but it also prevented liver tumors from forming and lowered the number and size of such tumors.

In the final step of their research, the investigators tested the levels of g-OHPdG in humans who had liver cancer and had a liver resection, meaning that part of their liver had been surgically removed. (The liver can regenerate itself if a part has been taken out, which allows for such surgeries.) It turned out that higher levels of the biomarker were strongly linked to a shorter survival time as well as to surviving without a recurrence of the liver cancer.

Consequently, the researchers concluded that g-OHPdG levels can help predict the prognosis of liver cancer in humans.

Harmeet Malhi, MBBS, of the division of gastroenterology and hepatology at the Mayo Clinic in Rochester, Minnesota, published an accompanying analysis of the study in Hepatology. Her essay posed more broad questions about whether imbibing green tea could help prevent liver cancer in humans.

Malhi noted that the study's evidence that Theaphenon E could help prevent liver cancer is in line with a few large studies that have examined green tea's possible effects on large groups of people. One study conducted in China compared about 200 people with liver cancer with about 400 cancer-free individuals and found that more green tea consumption was associated with a lower risk of such cancer. The group with the lowest risk of liver cancer included those who had drunk the beverage for longer than 30 years—they had a 56 percent lower risk of the disease compared with those who didn't drink green tea.

Another study of East Asian populations, which included 465,000 people who experienced 3,700 cases of liver cancer, found that consuming green tea was associated with a 12 percent reduced risk of the disease.

A European study including data on nearly half a million people with a median of 11 years of follow-up among them concluded that green tea was tied to a 59 percent lower risk of liver cancer.

Importantly, these studies are all limited by the fact that they were observational in nature. Because they did not randomize a study group to drink green tea or refrain from doing so, they could not determine a cause-and-effect relationship between the beverage and liver cancer.

Asked whether individuals could try to replicate the effects of green tea extract as seen in the mice he studied, Chung says that to achieve an equivalent dose of Theaphenon E by simply drinking green tea would require individuals to consume an impractically massive amount of the

liquid.

“You’d need to drink a couple thousand cups of tea a day,” he estimates. “So it’s not realistic.”

Could individuals go for green tea extract instead then?

“I don’t think it would hurt,” Chung says, but underlines the need for clinical trials of the extract’s effects in humans.

His team is already doing just that, studying whether among those with cirrhosis of the liver, a green tea extract called polyphenol E can prevent liver cancer. This clinical grade of extract is approved by the Food and Drug Administration (FDA) and thus manufactured under strict protocols to ensure its potency and consistency.

Chung’s study about g-OHPdG is limited by the fact that it was based on tissue samples from only a small number of humans. Additionally, his group was not able to determine whether levels of the biomarker are independently associated with health outcomes after controlling for other known factors that predict liver cancer prognosis, including tumor size, the number of lesions on the organ and others. The researchers also could not determine whether g-OHPdG itself actually causes the progression of liver cancer.

All that said, Malhi argued in her essay that in g-OHPdG, Chung and his team had found an important biomarker “that can help select a subgroup of [liver cancer] patients who may benefit from Theaphenon E/green tea consumption.”

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