

Coffee break: Compound brewing new research in colon, breast cancer (w/ Podcast)

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Dr. Clinton Allred, Texas AgriLife Research nutrition scientist, and his team found that the compound trigonelline in coffee beans is estrogenic. Credit: (Texas AgriLife Research photo by Kathleen Phillips)

A compound in coffee has been found to be estrogenic in studies by Texas AgriLife Research scientists.

Though the studies have not been conducted to determine recommended consumption amounts, scientists say the compound, called trigonelline or "trig," may be a factor in estrogen-dependent <u>breast cancer</u> but beneficial against colon cancer development.

"The important thing to get from this is that 'trig' has the ability to act like a hormone," said Dr. Clinton Allred, AgriLife Research nutrition scientist. "So there is a tie to cancer in the sense that we are looking at estrogen-dependent <u>cancer cells</u>. But that doesn't suggest that it would actually cause the disease. I don't believe there should be any concern



about drinking coffee at this point."

His report was published in the <u>Journal of Nutrition</u>. Allred's lab studies dietary compounds that can mimic the hormone estradiol - the primary hormone in women. His main focus has been to look at how estrogen protects against the development of colon cancer. Estradiol is one of three estrogen hormones. "There's a history of these compounds in crops such as soy," Allred said. "Soy has a number of different compounds that actually can mimic estradiol in several disease states some of which are good and some of which have the potential to be more deleterious-type effects."

Allred said a former colleague mentioned an interest in finding the properties of "trig" - a natural compound used in traditional Indian culture for post-menopausal women.

Because the <u>chemical structure</u> of "trig" was so unlike estradiol, Allred didn't think the compound would be estrogenic.

"Estrogen-dependent tumors in the presence of estradiol will grow faster," Allred said. "If you use those cells in a laboratory setting, you can determine whether something is estrogenic because they will literally make a tumor grow faster."

He said that a series of experiences and different approaches showed that "trig," a vitamin derivative, was fairly estrogenic at very low concentrations.

"We haven't gotten as far as to suggest that if a woman had the disease that it would necessarily be a problem. But what we've proven is that the compound is estrogenic or can be at certain concentrations and doses," Allred said.



He added that "trig" is in coffee beans, though in different amounts depending on the variety of coffee bean. The two major types of coffee beans used for what is consumed in the U.S. both contain it, he said.

"The more you roast a coffee bean, the less there is," Allred said. "But the most critical aspect is that when you do a water extract of ground coffee, which is basically how you make a cup of coffee. It does in fact come out in the water, so we know it is in a cup of coffee."

Nevertheless, the researchers have no idea what the exposure level would be or whether a particularly exposure - say from one cup of coffee would be in the range seen in the laboratory tests.

"It is way too early to say that drinking a cup of coffee is exposing you to something that is definitely going to be estrogenic. All we know is that there is a compound in there that can be estrogenic in our systems. That is really the take-home message," Allred said.

Allred also cautioned that people often narrow one compound in a food without considering the total mix of compounds and how they interact with each other or in a human body.

"There is never a single compound when you're looking at food, and a cup of coffee is a food," Allred said. "There's a whole bunch of other things in it. There's caffeine. There's actually a little bit of fat. There are all sorts of others things in a cup of coffee that could interact with this."

The numerous compounds in each food product means there are complex interactions, he explained, which is why nutritionists advise people that the whole food is better than any individual compound.

"That's why you can't take supplements to make up for food. You can never take all the things that are in a carrot and replace a carrot. In the



end, you need to eat the carrot," he said. "We're a long way from understanding what this compound could do in the context of a food."

He said a concern is that <u>menopausal women</u> seek over-the-counter phytoestrogen compounds to relieve symptoms such as hot flashes. Women want what they believe to be a natural and/or safe mechanism, he said, because hormone replacement therapy has such a negative connotation.

But, Allred said, researchers estimate that from the time an estrogendependent breast tumor begins until it is diagnosed in a woman is about 30 years.

"That means there will be a number of women out there who will become menopausal, and begin to take phytoestrogens in supplement form," he said. "The majority of those come from soy. So our concern was, what if a woman becomes menopausal which means her estrogen levels are going to be low, she has estrogen-dependent breast cancer and doesn't even know it. And now she's consuming phytoestrogens.

"Physicians would never recommend you be on hormone replacement therapy if you had estrogen-dependent cancer. From a toxicology standpoint, it would that be a bad thing if you were consuming these phytoestrogens in high enough doses. It could be really dangerous."

A problem is that people believe that natural or plant-derived compounds are automatically safe which is not necessarily always true, he said. Also, consuming a compound in its pure form as a supplement in high doses may not be healthy.

"If we were getting a hormone from an animal, you wouldn't see people do that," he said. "The only difference is that this is a plant-derived compound, so they feel it is safe when that may not be so."



Yet, Allred added, scientists are finding that at least some of these compounds are doing positive things to prevent colon cancer.

"So there's going to be places that it's good - just as we've seen with estradiol," he noted. "There are going to be some disease states that it is quite good for and some disease states that you need to be mindful of."

Still, the compound's potential as a weapon against colon cancer has the researchers "pretty excited about that."

"We're seeing very interesting information as far as tumor formation and the ability of phytoestrogens to prevent <u>colon cancer</u> formation. So any other new, natural phytoestrogen that we are able to identify and relate to the diet, that would be the model we'd bring it in to," Allred said of possible future studies on "trig."

He said a hope would be to develop a drug that could treat colon tissue without getting into the entire body, thus exploiting the compound's mechanism to protect again cancer formation without producing other estrogenic effects.

"It's really important for us to come up with strategies that we can have the benefits in the colon without the risks associated with (estrogenic compounds)," Allred said.

Source: Texas A&M AgriLife Communications

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