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Inflammation in colon may get doused before fueling cancer development

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A tiny molecule found in most plant-based foods douses the flames before damaging lesions can form in the colon, according to a study by Texas AgriLife Research scientist Dr. Nancy Turner.

Even better, the compound can be obtained easily by eating vegetables and fruit rather than by taking expensive prescriptions or supplements, Turner said.

The molecule is quercetin. Tiny but potent, quercetin gets into the body through onions, peppers, tomatoes and most other common produce but also in "fun things like wine," she said. "Just about any plant-based food in the human diet has some level of quercetin."

Previous studies showed quercetin was effective in reducing the rate of colon cancer in laboratory tests, but Turner's latest research, published in the *Journal of Nutrition*, shows how the compound works. That means researchers may now begin to understand how quercetin could help other inflammatory bowel diseases such as Crohn's and celiac disease.

"The nice thing is that albeit high relative to what you see in the American diet, the level used in this study is actually similar to what can be achieved in diets around the world such as in, say, the Mediterranean-style diets," she said. "So it's not an unachievable goal for us good ol' Americans if we do the right thing with our food consumption."

For this study, Turner's team examined the response of quercetin-

supplement diets in lab rats -- some in the early stages of colon cancer formation and others without cancer.

"Early lesions in a colon are some of the first true changes in the colon that can be observed visually," she said. "This in not just something you see in our animal model. You see it in human patients as well."

Called "aberrant crypts," they are thought to be a marker or predictor of tumor formation. Quercetin is known to reduce the number of these crypts, she noted, "But we wanted to know how it might be protecting."

Cancer is often characterized as an uncontrolled growth in our bodies, but scientists now say that a natural process of cell death, or "apoptosis," is also critically important in cancer, Turner said. That is, a healthy body should have an equilibrium between new cells and cells that have done their job and are ready to be sloughed off.

"We found that we were deriving benefit from both of those," Turner said of the quercetin diet study. "We were able to decrease the number of cells that were proliferating in the colon. And we were able to increase the number of cells that were undergoing apoptosis. So the net effect of that is, we were able to maintain almost a normal number of cells."

Turner's team then decided to examine relatively new findings - that inflammation is one of the biggest contributors of the development of colon cancer.

They targeted two enzymes - known to researchers as Cox-1 and Cox-2. The first is a routine protein that the body expresses all the time, she said. But the second Cox has implications in a lot of diseases.

"Cox-2 is an inducible protein that is expressed in the body when there is

some kind of external stimulous to a cell. We think of high levels of Cox-2 as being a bad thing."

One of those bad things is colon cancer. Not only is Cox-2 present in that disease, but recent research showed that before Cox-2 levels rose in colon cancer, the Cox-1 levels first became elevated. Cox-1, therefore, has some sort of control over whether Cox-2 gets expressed, she explained.

"We did see that both groups - both the control groups and the carcinogen-injected groups that were consuming quercetin in their diets - had lower levels of both Cox-1 and Cox-2," Turner said. "So that would tend to suggest that there may be opportunity for quercetin to suppress tumor development."

She said that additional research is needed on this portion of the work to better understand the connections. But she advised people to go ahead and eat plenty of fruits and vegetables.

"Overall, one of the best recommendations we've all heard from the day we were children is 'an apple a day keeps the doctor away.' The only addition is, don't peel your apple," she said. Compounds such as quercetin in plants are initially there to protect the plant against pests, UV sun rays and other problems, Turner said. "So these compounds are located where the plant most needs them, which is typically on the outside - in the peel. Try your best to eat the whole food where ever possible, so that you can get the most from these beneficial compounds."

She noted that in addition to colon cancer, quercetin has shown positive impacts in warding off other chronic ailments such as cardiovascular disease.

Source: Texas A&M AgriLife Communications