

Compounds in mate tea induce death in colon cancer cells

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Could preventing colon cancer be as simple as developing a taste for yerba mate tea? In a recent University of Illinois study, scientists showed that human colon cancer cells die when they are exposed to the approximate number of bioactive compounds present in one cup of this brew, which has long been consumed in South America for its medicinal properties.

"The caffeine derivatives in mate tea not only induced death in human colon cancer cells, they also reduced important markers of inflammation," said Elvira de Mejia, a U of I associate professor of [food chemistry](#) and food toxicology.

That's important because inflammation can trigger the steps of [cancer progression](#), she said.

In the in vitro study, de Mejia and former graduate student Sirima Puangraphant isolated, purified, and then treated human [colon cancer cells](#) with caffeoylquinic acid (CQA) derivatives from mate tea. As the scientists increased the CQA concentration, cancer cells died as a result of apoptosis.

"Put simply, the cancer cell self-destructs because its DNA has been damaged," she said.

The ability to induce apoptosis, or cell death, is a promising tactic for therapeutic interventions in all [types of cancer](#), she said.

de Mejia said they were able to identify the mechanism that led to [cell death](#). Certain CQA derivatives dramatically decreased several markers of inflammation, including NF-kappa-B, which regulates many genes that affect the process through the production of important enzymes. Ultimately cancer cells died with the induction of two specific enzymes, caspase-3 and caspase-8, de Mejia said.

"If we can reduce the activity of NF-kappa-B, the important marker that links inflammation and cancer, we'll be better able to control the transformation of normal cells to [cancer cells](#)," she added.

The results of the study strongly suggest that the caffeine derivatives in mate tea have potential as anti-cancer agents and could also be helpful in other diseases associated with inflammation, she said.

But, because the colon and its microflora play a major role in the absorption and metabolism of caffeine-related compounds, the anti-inflammatory and anti-cancer effects of mate tea may be most useful in the colon.

"We believe there's ample evidence to support drinking mate tea for its bioactive benefits, especially if you have reason to be concerned about colon cancer. Mate tea bags are available in health food stores and are increasingly available in large supermarkets," she added.

The scientists have already completed and will soon publish the results of a study that compares the development of [colon cancer](#) in rats that drank mate tea as their only source of water with a control group that drank only water.

This in vitro study was published in *Molecular Nutrition & Food Research*, vol. 55, pp. 1509-1522, in 2011. Co-authors include Sirima Puangpraphant, now an assistant professor at Kasetsart University in

Thailand; Greg Potts, an undergraduate student of the U of I; and Mark A. Berhow and Karl Vermillion of the USDA, ARS, National Center for Agricultural Utilization Research in Peoria, Illinois. The work was funded by the U of I Research Board and Puangpraphant's Royal Thai Government Scholarship.

Provided by University of Illinois at Urbana-Champaign

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