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**A New Role for Milk: Delivering Polyphenols with Anti-Cancer Activity  
Milk Can Serve as a Protective Carrier of Bioactive Molecules,  
Suggests Report in the *Journal of Dairy Science*®**

Philadelphia, PA, December 19, 2013 – Polyphenols found in tea manifest anti-cancer effects but their use is limited by poor bioavailability and disagreeable taste. A new study in the *Journal of Dairy Science*® finds that when epigallocatechin gallate (EGCG), the major extractable polyphenol in green tea and the most biologically active, when diluted in skim milk or other milk complexes remains bioactive and continues to reduce colon cancer cell proliferation in culture at concentrations higher than 0.03 mg of EGCG/mL.

“These results support a new role for milk as an ideal platform for delivery of bioactive compounds and opens the door to a new generation of dairy products providing additional benefits to human health,” say authors Sanaz Haratifar and Milena Corredig, of the Department of Food Science and Department of Human Health and Nutritional Sciences of the University of Guelph, Ontario, Canada.

The majority of extractable polyphenols in tea are flavan-3-ols, commonly referred to as catechins. EGCG is the major catechin found in tea. Tea polyphenols have been shown to inhibit tumor formation, reduce cancer cell proliferation, increase normal cell death (apoptosis), and/or suppress the formation of new blood vessels feeding tumors (angiogenesis). For several reasons, tea catechins have poor bioavailability and the goal of the current study was to encapsulate EGCG in casein (milk protein) molecular aggregates, known as micelles, to maintain and enhance catechin bioavailability.

In one experiment, human colorectal cancer cells (HT-29) were grown for 24 hours in the presence of EGCG in water or dispersed in milk. The number of living cancer cells (cell viability) was measured, and it was shown that EGCG reduced cell viability in a dose-dependent fashion although at higher

concentrations (0.15 mg/mL and above), the antiproliferative effect of EGCG in water was greater than in milk.

Another experiment evaluated cancer cell proliferation after EGCG was added to different milk products, including skim milk, milk whey, and milk serum. While some differences were noted in cell proliferation at lower concentrations between EGCG in control medium and EGCG diluted in the milk components, at higher EGCG concentrations (0.8 mg/mL and above), EGCG reduced cancer cell growth by 80% or more, whether diluted in milk or not.

"In order to exert their biological health benefits *in vivo*, polyphenols must be available and still active, even when present in a food matrix," comments Dr. Haratifar. "This study showed that the binding of EGCG to the casein micelles did not affect the bioefficacy of EGCG and cell uptake at concentrations higher than 0.03 mg of EGCG/mL of skim milk."

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#### **NOTES FOR EDITORS**

"Antiproliferative activity of tea catechins associated with casein micelles, using HT29 colon cancer cells," by S. Haratifar, K. A. Meckling, and M. Corredig. *Journal of Dairy Science*, Volume 97, Issue 2 (February 2014), <http://dx.doi.org/10.3168/jds.2013-7263>, published by Elsevier.

Full text of the article is available to credentialed journalists upon request. Contact Eileen Leahy at +1 732-238-3628 or [jdsmedia@elsevier.com](mailto:jdsmedia@elsevier.com) to obtain copies. Journalists wishing to set up interviews with the authors should contact University of Guelph Communications, Lori Bona Hunt, at 519-824-4120, Ext. 53338 or [lhunt@uoguelph.ca](mailto:lhunt@uoguelph.ca).

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