

# New study sheds light on cancer-protective properties of milk

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Milk consumption has been linked to improved health, with decreased risks of diabetes, metabolic syndrome, and colon cancer. A group of scientists in Sweden found that lactoferricin4-14 (Lfcin4-14), a milk protein with known health effects, significantly reduces the growth rate of colon cancer cells over time by prolonging the period of the cell cycle before chromosomes are replicated. In a new study, investigators report that treatment with Lfcin4-14 reduced DNA damage in colon cancer cells exposed to ultraviolet (UV) light. Their results are published in the October issue of the *Journal of Dairy Science*.

"We previously hypothesized that the prolongation of the cell cycle in [colon cancer](#) cells as a result of Lfcin4-14 treatment may give the cells extra time for DNA repair," says one of the lead investigators, Professor Stina Oredsson, of the Department of Biology at the University of Lund, Sweden. "Indeed, UV light-induced damage was decreased in colon cancer cells treated with Lfcin4-14 compared with controls. The differences were small but significant."

Investigators exposed [colon cancer cells](#) to UV light that caused [DNA damage](#) and then grew the cells in the absence or presence of Lfcin4-14. They evaluated DNA damage using a sensitive technique known as comet assay. After the cells are processed, the cells with DNA damage resemble a comet with a tail, and the intensity of the tail compared to the comet head indicates the number of DNA breaks. UV light exposure resulted in an increase in the number of comets while treatment with Lfcin4-14 reduced the number of comets in UV light-exposed cells.

To understand the mechanism by which Lfcin4-14 reduced DNA damage, investigators evaluated the levels of several proteins involved in cell cycle progression, DNA repair, and cell death. They found an increase in flap endonuclease-1, a protein associated with [DNA synthesis](#); a decrease

in b-cell lymphoma 2-associated X protein, which is involved with cell death; and a decrease in the level of  $\gamma$ -H2AX, indicating more efficient DNA repair. "These changes in expression support our hypothesis that Lfcin4-14 treatment resulted in increased DNA repair," says Dr. Oredsson.

Dr. Oredsson notes that cancer cells, in general, have defects in the [DNA repair](#) mechanisms. Thus, Lfcin4-14 may have a greater effect on normal cells than on cancer cells. "Our data suggest that the effects of Lfcin4-14 in prolonging the cell cycle may contribute to the cancer preventive effect of milk. This must be further investigated in different systems," she concludes.

**More information:** "Reduction of UV light-induced DNA damage in human colon cancer cells treated with lactoferrin-derived peptide," C. Freiburghaus, H. Lindmark-Månsson, M. Paulsson, and S. Oredsson. *Journal of Dairy Science*, Volume 95, Issue 10 (October 2012), [dx.doi.org/10.3168/jds.2011-5279](http://dx.doi.org/10.3168/jds.2011-5279)

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