

Cell cycle dysregulation induced by cytoplasmic fraction of *Lactococcus lactis* ssp. *lactis* in a human colon cancer cell line

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Whole cells, cytoplasm, and peptidoglycans of 10 different lactic acid bacteria (LAB) were tested for in vitro cytotoxicity on human cancer cell lines using ³H-thymidine incorporation assay. Some of cellular fractions including peptidoglycans and cytoplasm as well as heat-killed whole cells from the above LAB showed significant antiproliferative activities against several cancer cell lines. Among these cellular fractions including whole cells, the cytoplasmic fraction of *Lactococcus lactis* ssp. *lactis* exhibited the strongest antiproliferative activity against SNUC2A, a human colon cancer cell line. The proliferation of SNUC2A was found to be inhibited by the treatment of cytoplasmic fraction of *Lactococcus lactis* ssp. *lactis* (Llac) in a dose-dependent and partially reversible manner. After exposure to the cytoplasmic fraction of Llac for 72 h, strong antiproliferative activity was observed with accumulation of S phase in SNUC2A. Also, the results from the analysis of cell cycle regulatory proteins demonstrated that the cytoplasmic fraction enhances the level of cyclin A protein but slightly reduces the activity of CDK2.