

MECHANISMS OF PROTECTIVE EFFECTS BY COMPLEX CARBOHYDRATES, AND INTESTINAL BACTERIA DURING COLON CARCINOGENESIS.

B. L. Pool-Zobel, I. Wollowski, S. Ji, Institut für Ernährungsphysiologie, Bundesforschungsanstalt für Ernährung, Karlsruhe, Germany

Complex carbohydrates may lead to an increase of lactic acid-producing bacteria (LAB) in the gut. It is expected that LAB may contribute to colon cancer prevention. We have studied the ability of LAB to prevent genotoxicity in colon cells (1,2). Using the Comet assay, our studies in rats *in vivo* have shown that *L. casei*, *L. gasseri*, *L. acidophilus*, *L. confusus*, *B. breve* and *B. longum*, *S. thermophilus* and *L. delbrueckei* ssp. *bulgaricus* prevent DNA damage induced by N-Methyl-N-nitro-N-nitrosoguanidine (MNNG) and dimethylhydrazine (DMH). Antigenotoxic properties could be due to bacterial metabolites or to cell components. Pellets of stationary *L. acidophilus* cultures were supplemented with fresh medium to generate such metabolites and were effective antigenotoxic samples. Also an acetone extract isolated from the pellet culture was effectively antigenotoxic *in vitro*. Putative metabolites of LAB and of other beneficial bacteria (acetate, 2 isomers of lactate, butyrate, palmitic acid, *iso*-palmitic acid, cystein, glutathione) were investigated for antigenotoxic effects in rat colon cells, as were whole freeze dried cells, cell wall skeleton, cytoplasm and peptidoglycans. Some metabolites (acetate, butyrate, cystein, glutathione) did reduce the extent of genotoxicity induced by MNNG, as did peptidoglycans and whole freeze dried cells. Thus, one conceivable mechanism of protective activity by beneficial microflora could be the production of metabolites which inactivate carcinogens in the gut lumen prior to reaching the colon cells.

1. B. L. Pool-Zobel, C. Neudecker, I. Domizlaff, S. Ji, U. Schillinger, et al, Nutr Canc **26**, 365 (1996)
2. B. L. Pool-Zobel, S. L. Abrahamse, G. Rechkemmer, Protective effects of short-chain fatty acids on early events of carcinogenesis: Antigenotoxic effects of butyrate in rat and human colon cells (1996). Proceedings of COST 92, Helsinki Finland *in press*

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ABSTRACTS