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Prebiotic lactitol effects on gut microbiome in constipated old people

Daniele Scevola
University of Pavia, Italy

Trillions of bacteria -ten microbial cells for every cell of our body-form a "metaorganism or metagenome" living inside the gut(the 40%-55% of solid stool matter) that influence many local and general vital functions like cancer, aging process and related diseases. Microbial metabolite choline is involved in colon cancer, nitric oxide affects host longevity, short chain fatty acids (SCFAs) are beneficial in constipation. We studied the action of disaccharide lactitol compared to polyethylene glycol 3350 (PEG)on fecal content of bacteria, short chain fatty acid (SCFAs) and enzymes in old persones with constipation. Subjects aging >60 years suffering from chronic idiopathic constipation, defined as <3 spontaneous bowel movements per week, received 20g of lactitol or 15g of PEG a day for four weeks. The study was an open, randomized, parallel groups, third party (laboratory) blinded trial. Compliance and clinical effects were similar and all subjects with both treatments experienced an increased in the number and a decreased in the consistency of stool per day. Total fecalSCFAs, and particularly acetate and butyrate concentrations increased with lactitol ands fell with PEG ($p<0.05$). In lactitol group Bifidobacteria and Lactobacilli counts correlate with total SCFAs ($r=0.48$,<0-05), acetate ($r=0.50$,$p<0.05$), propionate ($r=0.44$, p<0-05), and respectively with total SCFAs ($r=0.44$, $p<0.05$), butyrate ($r=0.46$, $p<0.05$), isobutyrate ($r=0.69$,$p<0.001$), valerate ($r=0.53$, $p<0.001$) and isovalerate ($r=0.58$, $p<0.005$) . In PEG group the the correlations resulted significant between Enerobacteria and total SCFAs, acetate, propionate, butyrate, isobutyrate, valerate, isovalerate. The β-galactosidase vas significantly increased by lactitol and decreased by PEG ($p<0.05$). B-glucuronidase fell with both treatments ($p<0.05$). pH from baseline value of 7.5 ±0.7 turned toward acidity (6.6 ±0.8) with lactitol and from 7.4 ± 0.7 toward alkalinity (7.7±0.5) with PEG. In conclusion: lactitol and PEG both normalize the frequency of evacuations but with different mechanisms. Lactitol works as a prebiotic increasing stool SCFAs concentration, particularly butyrate and acetate, while PEG, as pure osmotic laxative, negatively interferes with colonic fermentation reducing SCFAs production

e: daniele.scevola@unipv.it