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Abstract (publication only)

The impact of probiotic Lactobacillus fermentum ME-3 and ofloxacin on persistent Salmonella typhimurium infection in mice

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We aimed to detect the microbiological, biochemical, and morphological responses in the gut and liver evoked by the addition of Lactobacillus fermentum ME-3 to ofloxacin (OFL) treatment in an experimental infection model of Salmonella enterica serovar Typhimurium. Materials and methods Altogether 91 NIH line mice were investigated. After the challenge with a single dose of S. Typhimurium ST(10ˆ5 cfu/ml) and treatment according to different schemes: either with OFL (20mg/kg) intragastrically daily and or addition of L. fermentum ME-3 (10ˆ8 cfu/ml) in drinking water, the mice were sacrificed on Day 10. The uninfected mice were administered L. fermentum ME-3 or saline. At autopsy the blood, liver, spleen and ileum were seeded onto XLD and MRS media to detect ST and lactobacilli. Histological slides were prepared from liver, spleen and ileum. The oxidised glutathione GSSG and reduced glutathione GSH ratio, lipid peroxides (LPO) in mucosa of ileum and liver were estimated. Results: In gut the number of mice with viable S. Typhimurium decreased in both OFL containing treatment regimens: OFL treatment ($p<0.006$) and combined with L. fermentum ME-3 ($p<0.001$) if compared to ST infected mice. However, in liver the decrease was observed only if L. fermentum was added to OFL treatment ($p<0.001$). No statistically significant alterations in the total number of lactobacilli in gut were detected. Still, we found that higher counts of intestinal lactobacilli were associated with absence of granulomas in liver of ST experimental infection. The addition of L. fermentum ME-3 to OFL decreased the number of mice with granulomas both in liver ($p<0.001$), and in spleen ($p<0.001$) if compared to ST infected ones. The indices of oxidative stress i.e. the level of LPO and the ratio of oxidised and reduced glutathione were highest in mice challenged with ST. The ratio of oxidised GSSG and reduced GSH decreased in small intestine by combined OFL and L. fermentum ME-3 treatment when compared to ST challenged mice ($p=0.005$). Similarly, the addition of L. fermentum ME-3 to OFL treatment reduced the LPO values when compared to ST infected mice group ($p<0.005$). Conclusion: The addition of antimicrobial and antioxidative probiotic L. fermentum ME-3 to ofloxacin treatment increased the eradication of S. Typhimurium from tested sites, reduced the presence of typhoid nodules in the liver, and decreased the values of oxidative stress indices in experimental murine model.