Supplementation with Lactobacillus paracasei or Pediococcus pentosaceus does not prevent diarrhoea in neonatal pigs infected with Escherichia coli F18

Infectious diarrhoea is a worldwide problem in newborns. Optimal bacterial colonisation may enhance gut maturation and protect against pathogenic bacteria after birth. We hypothesised that lactic acid bacteria (LAB) administration prevents pathogen-induced diarrhoea in formula-fed newborns. Newborn caesarean-delivered, colostrum-deprived term piglets on parenteral nutrition for the first 15 h, were used as models for sensitive newborn infants. A commercially available probiotic strain, *Lactobacillus paracasei* F19 (LAP, \(10^8\) colony-forming units (CFU)/kg per d) and a novel LAB isolate, *Pediococcus pentosaceus* (PEP, \(10^9\) CFU/kg per d), were administered for 5 d with or without inoculation of the porcine pathogen, *Escherichia coli* F18 (F18, \(10^9\) CFU/d). This resulted in six treatment groups: Controls (n 9), LAP (n 10), PEP (n 10), F18 (n 10), F18-LAP (n 10) and F18-PEP (n 10). The pathogen challenge increased diarrhoea and density of F18 in the intestinal mucosa (P<0·05). LAB supplementation further increased the diarrhoea score, relative to F18 alone (P=0·01). Intestinal structure and permeability were similar among groups, whereas brush border enzymes were affected in variable intestinal regions with decreased activities in most cases after F18 and LAB inoculation. Bacterial density in colon mucosa increased after F18 inoculation (P<0·05) but was unaffected by LAB supplementation. In colon contents, acetic and butyric acids were increased by PEP (P<0·05). The LAB used in this study failed to reduce *E. coli*-induced diarrhoea in sensitive newborn pigs. In vulnerable newborns there may be a delicate balance among bacterial composition and load, diet and the host. Caution may be required when administering LAB to compromised newborns suffering from enteric infections.

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