Casein addition to a whey-based formula has limited effects on gut function in preterm pigs
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Preterm infants are susceptible to necrotizing enterocolitis (NEC). Using preterm pigs, we determined whether a whey–casein-based formula would be superior to a formula based on whey protein alone. Twenty cesarean-derived preterm pigs (92% gestation) were given total parenteral nutrition for 36 h followed by 30 h of enteral feeding with whey [protein fraction of milk formula based on whey (WHEY); n = 11] or casein and/or whey [protein fraction of milk formula based on a combination of casein and whey (CASEIN); n = 9]-based formulas. Sugar absorptive function was investigated at 6 and 30 h after initiation of enteral feeding using bolus feedings with galactose and mannitol. Pigs were killed after the last in vivo sugar absorption test and evaluated for NEC and the mid intestine was used for ex vivo measurements of hexose absorption. Microbiota profile and short chain fatty acid (SCFA) levels were studied in gut contents. Severity of NEC lesions was similar between diet groups but galactose absorption was markedly higher in CASEIN than in WHEY (P <0.01) although only 6 h after the start of the enteral feeding period. There were no differences in ex vivo 14C-D-glucose uptake, digestive enzymes, microbiota profile, or SCFA concentration. Casein may transiently stimulate intestinal sugar absorption but has limited effects on gut structure, microbiota, and NEC in preterm pigs.

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Contributors: Thymann, T., Støy, A. C. F., Bering, S. B., Mølbak, L., Sangild, P. T.
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