Mild heat-treated bovine whey protein concentrate as a supplement to infant formula and human donor milk

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Aim:

1) To investigate the effects of mild heat-treatment on the bioactivity of sweet WPC to stimulate intestinal maturation and protection in preterm newborn pigs and an intestinal cell model.
2) To investigate the effects of raw vs. Holder and UV-C pasteurization on the bioactivity of DM to stimulate intestinal maturation and protection in preterm newborn pigs and an intestinal cell model.
3) To investigate if infant formula containing a mild heat-treated sweet WPC has effects more comparable to DM on intestinal maturation comparing with a conventionally heat-treated WPC in preterm newborn pigs and an intestinal cell model.

Description:

Human milk is designed to provide optimal nutrition and protection from pathogens and food antigens for newborn infants by providing not only nutrients, but also growth factors and immunosuppressive factor that protect against inflammation and infection. These bioactive components are particularly important when the gut is immature or sensitive to infection, such as in preterm infants. Donor human milk (DM) and/or infant formula are the alternatives when mother's own milk is not available. DM is the preferred alternative, but as infant formula, DM is pasteurized, leading to a decrease in the bioactivity of these important milk proteins. Furthermore, there is often a need to supplement mature DM, which contains lower amounts of protein than the early milk, with extra protein. A quality concentrate of bovine milk with conserved bioactivity would be of particular interest. In this project we investigate if a mild heat-treatment of bovine whey protein concentrate (WPC) and raw DM increase maturation and protection of the newborn intestine compared to normal pasteurization. Furthermore, the physiological effects of WPC compared to DM will be investigated. This will be investigated in a pig model of intestinal inflammation in preterm neonates with supplementing bioactivity studies in cell models. The results have implications for treatment of milk products for sensitive newborn infants as well as for more robust children.