Abstract

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Human breast milk is considered a gold standard in infant nutrition due to its multiple evident benefits on human health. However, breastfeeding is not always possible for various reasons; thus, it is a huge challenge to provide infant formulae which best mimic the composition and effects of human milk. Prebiotics added to infant formulae may greatly contribute to these prospective notable improvements in infant nutrition. The aim of this study was to evaluate the effect of a novel dietary prebiotic supplementation (under patent) on growth, fecal consistency, and immune maturation in suckling rats. G14 Lewis suckling rats were distributed into 2 experimental groups (n = 21/group): reference and prebiotic group. Vehicle or the prebiotic was administered by oral gavage daily from day 2 to 16 of life. Animals were weighed daily and their size and related variables were measured on day 8 and 16. For the detection and quantification of serum immunoglobulin isotypes and several intestinal cytokines in the gut wash on day 8 and 16, immunoassays based on the Luminex® xMAP® technology were used. The prebiotic intervention showed growth promoting effect without influencing the fecal consistency. Based on measurements of serum immunoglobulin and intestinal cytokine levels, the supplementation significantly stimulated immunoglobulin (IgG2a, IgG2b, IgG2c, and IgA) production, increased the Th1/Th2 Ig as well as the IL-10/TNFα ratios and reduced the levels of most detected intestinal cytokines. According to the results, the tested prebiotic demonstrated the immunomodulatory impact on neonatal immune development in this preclinical rat model and showed a potential to become a beneficial component of a new infant formula.