CLAIMS

What is claimed is:

1. Use of bacterial metabolites for the manufacture of a composition for improving the composition of the gut microbiome and metabolic profile of a pediatric subject, wherein the composition is an infant formula or a growing up milk, the composition comprising:

a. up to 7 g/100 kcal of a protein or protein equivalent;

b. up to 7 g/100 kcal of a fat or lipid;

c. at least 5 g/100 kcal of a carbohydrate;

d. at least 0.05 mg/100 kcal of bacterial metabolites, wherein the bacterial metabolites are produced by microbiota fermentation and comprise acetate, propionate, butyrate, or combinations thereof, at a level of 0.5 mg/100 kcal to 1 g/100 kcal;

e. a probiotic composition; and

f. a prebiotic composition, which comprises 0.1 g/100 kcal to 1 g/100 kcal of a prebiotic composition comprising polydextrose and galacto-oligosaccharide.

2. The use of claim 1, wherein the probiotic comprises *Lactobacillus rhamnosus* GG (ATCC number 53103) in an amount of from 1 x 10^4 cfu/100 kcal to 1.5 x 10^{10} cfu/100 kcal.

3. The use of claim 1, which further comprises at least 5 mg/100 kcal of a long chain polyunsaturated fatty acid.

4. The use of claim 1, wherein the protein source comprises lactoferrin at a level of 10 mg/100 kcal to 200 mg/100 kcal.

5. The use of claim 1, wherein the bacterial metabolites further comprise at least one metabolite selected from the group consisting of 6-beta-hydroxylithocholate, hyocholate, glycohyocholate, hyodeoxycholate, taurohyodeoxycholate, glycohyodeoxycholic acid, equol, 3,4-Dihydroxyphenyl acetic acid (DOPAC), 5-(3’,4’-Dihydroxyphenyl)-γ-valerolactone, gamma-aminobutyric acid (GABA), noradrenaline, serotonin, dopamine, and acetylcholine.