CLAIMS

1. Use of a composition in the manufacture of a medicament for elevating the level of interferon beta (IFNβ) in the gut of a mammal wherein the composition comprises a live bacterium and a prebiotic that is consumed by said live bacterium, and

   wherein the mammal has or is at risk of one or more of the following conditions: an acute viral infection, a chronic viral infection, an autoimmune or allergic disease; or

   wherein the mammal has or is at risk of suffering from gut dysbiosis associated with an autoimmune disease selected from the group consisting of rheumatoid arthritis, psoriasis, multiple sclerosis, celiac disease, inflammatory bowel diseases (Crohn's, ulcerative colitis,) IBS, Type 1 diabetes mellitus, and idiopathic pulmonary fibrosis; or

   wherein the mammal has or is at risk of suffering from gut dysbiosis associated with an allergic disease selected from the group consisting of atopic dermatitis, asthma, or food allergy.

2. The use of claim 1, wherein the composition is used as an adjuvant or complementary treatment to drug therapy for a particular disease or condition.

3. The use of claim 1, wherein the composition is to specifically prevent or treat food allergy; and/or

   wherein desensitizing amounts of allergenic proteins are to be administered to the mammal; and/or
   wherein the allergic protein is found in milk, egg, soy, wheat, shellfish, tree nut, peanut, fish, or sesame; and/or
   wherein the amount of allergenic protein is less than 1 mg, less than 5 mg, less than 10 mg, less than 20 mg, less than 30 mg, less than 40mg, less than 50 mg, less than 60 mg, less than 100 mg or more than 100 mg; and/or
   wherein the allergenic protein is added in increasing amounts over time as part of a treatment regime.

4. The use in the manufacture of a medicament as defined in claim 1 wherein the composition is for the treatment or prevention of gut dysbiosis in mammals with acute or chronic viral infections, wherein a production of a therapeutically effective amount of interferon-beta in the mammal is to be stimulated, wherein the mammal suffers from, or is at risk of suffering from such infection; and

   wherein the mammal has or is at risk of a virus causing a chronic viral infection, such as HIV, herpes, or hepatitis; or
   wherein the mammal has or is at risk of an acute viral infection selected from a respiratory or gastrointestinal virus; and/or
   wherein the respiratory viruses are selected from coronaviridae family, influenza, pneumonia, or respiratory syncytial virus; and/or
   wherein the virus is in the family *Coronaviridae,* optionally wherein the virus is SARS-CoV-2 (COVID19) or one of its variants; and
   wherein treatment success may result in less viral shedding, viral carriage, less, complications, less neuronal complications, and/or improved recovery time.

5. The use of claim 1 wherein the medicament is for reducing viral carriage in a mammal, wherein an anti-viral composition comprising a live bacterium and a mammalian milk oligosaccharide (MMO) prebiotic that is consumed by that live bacterium is to be provided to the mammal.

6. The use of claim 1, wherein the composition contains one or more live bacterium selected from *Bifidobacterium* and/or *Lactobacillus*; and/or

   wherein the live bacterium is *Bifidobacterium* selected from the group consisting of *B. adolescentis, B. animalis, B. animalis* subsp. *animalis, B. animalis* subsp. *lactis, B. bifidum, B. breve, B. catenulatum, B. longum, B. longum* subsp. *infantis, B. longum* subsp. *longum, B. longum* subsp. *suis, B. pseudocatanulatum,* and *B. pseudolongum;* and/or
   wherein the *Bifidobacterium* is *B. infantis*, optionally where it *is B. infantis* is strain EVC001 or a genetic equivalent to strain EVC001; and/or
   wherein the *B. infantis* has a functional H5 gene cluster and/or has function to cleave N-glycans from whey or other glycosylated proteins *in vivo;* and/or

wherein the live bacterium is *Lactobacillus* selected from the group consisting of *L. acidophilus, L. brevis, L. casei, L. crispatus, L. curvatus, L. fermentum, L. pentosus, L. plantarum,* and *L. sakei L. antri, L. coleohominis, L. gasseri, L. johnsonii, L. mucosae, L. reuteri, L. rhamnosus, and L. salivarius; or*

wherein the Lactobacillus is *L. rhamnosus* or *L. reuteri;* and/or

wherein *L. rhamnosus* is LGG; and/or

wherein the live bacterium is activated and dried prior to administration; and/or

wherein the live bacterium is stabilized and dried and/or;

wherein the live bacterium is present in 0.1 million to 500 billion colony forming units (CFU) per serving, per gram, per ml or per unit dose of the composition, optionally wherein the bacterium is present in 1 million to 100 billion CFU or 5 million to 50 billion CFU per serving, per gram, per ml or per unit dose of the composition; and/or

wherein the dried bacterium is suspended in oil; and/or

wherein the dried bacterium is suspended in oil; and/or

wherein the oil is medium chain triglyceride (MCT), mineral, palm olein, soy, coconut, high oleic sunflower oil.

7. The use of claim 1, wherein the prebiotic composition comprises a MMO, a galacto-oligosaccharide (GOS), a fructo-oligosaccharide (FOS), a polydextrose (PDX) or resistant starch; and/or

   wherein the prebiotic comprises one or more MMO selected from group consisting of lacto-N-biose (LNB), N-acetyl lactosamine, lacto-N-triose, lacto-N-tetraose (LNT), lacto-N-neotetraose (LNnT), fucosyllactose (FL), lacto-N-fucopentaose (LNFP), lactodifucotetraose, (LDFT) sialyllactose (SL), disialyllacto-N-tetraose (DSLNT), 2'-fucosyllactose (2FL), 3'-sialyllactosamine (3SLN), 3'-fucosyllactose (3FL), 3'-sialyl-3-fucosyllactose(3S3FL), 3'-sialyllactose (3SL), 6'-sialyllactosamine (6SLN), 6'-sialyllactose (6SL), difucosyllactose (DFL), lacto-N-fucopentaose I (LNFPI), lacto-N-fucopentaose II (LNFPII), lacto-N-fucopentaose III (LNFPIII), lacto-N-fucopentaose V (LNFPV), sialyllacto-N-tetraose (SLNT), their derivatives, or combinations thereof.

8. The use of claim 1, wherein the prebiotic comprises MMO that is an HMO; and

wherein the HMO is LNT and LNnT; and

wherein LNT and LNnT are in 10:1 ratio or a ratio of 4:3; and/or

wherein the prebiotic comprises MMO having at least one structure with sialic acid that is not sialyllactose, at least one structure with fucose that is not fucosyllactose, and at least one of LNT or LNnT; and/or

wherein the MMO comprises at least 2 MMO selected from 2'FL, 3'FL, 3'SL, 6'SL, LNT, LNnT, LNFP, and DFL; and/or

wherein the prebiotic, MMO or HMO composition is provided in a sterile liquid, a gel or a paste; and

wherein the sterile liquid is water with an HMO concentration of at least 1 g/L, at least 2 g/L, at least 4 g/L, at least 6 g/L, at least 8 g/L, at least 10 g/L, at least 12 g/L, at least 15 g/L, at least 20 g/L, or at least 30 g/L; and/or

wherein the prebiotic in sterile liquid is consumed throughout the day to deliver a total daily intake of 1 gram (g), at least 4 g, at least 8 g, at least 12 g, at least 15 g, at least 20 g, at least 25 g, at least 30 g, at least 35 g, at least 40 g, at least 45 g, at least 50 g, or more than 50 g; and/or

wherein the prebiotic in sterile liquid is used to prepare infant formula or other prepared food for a mammal of any age.

9. The use of claim 8, wherein the medicament further comprises GOS, FOS, PDX or resistant starch; and

wherein the GOS is provided in a 1:10 to 10:1 ratio with the MMO; and

wherein the GOS is preferably DP4 and DP5.

10. The use of claim 8, wherein the infant formula does not contain FOS, GOS, PDX or other resistant starches.

11. The use of claim 1, wherein the mammal's diet is restricted to provide low or no non-MMO dietary fiber; and

wherein the live bacterium is to be administered once daily; and/or

wherein the daily intake of MMO is modified to increase or decrease based on effectiveness of elevating IFNβ; and/or

wherein the live bacterium and HMO are provided contemporaneously in a stabilized powder format.

12. The use of claim 1, wherein the composition further comprises DHA and ARA; or

wherein the composition further comprises vitamin A and/or vitamin D; or

wherein the composition further comprises glycosylated whey protein and/or tryptophan or a milk fat globule membrane complex.

13. The use of claim 1 further comprising pre-administration and/or contemporaneous administration of an exogenous source of IFNβ to a mammal, said administration may be oral, rectal, intramuscular, intravenous, or in a nebulized form.

14. The use of claim 1, wherein the medicament is to be administered as a unit dose, a food, an infant food, a medical food, a dietary supplement, or a pharmaceutical agent; and/or

wherein the composition is to be delivered as part of a dietary regime specific to the needs of the mammal during treatment; or

wherein the food is an infant food, or a food for a mammal with an acute viral infection, a chronic viral infection, an autoimmune or allergic disease; and/or

wherein the composition is used to supplement human milk, human milk fortifier of human or bovine origin, infant formula, follow-on formula, a prepared food, enteral nutrition, or a meal replacer for a subject of any age; and

wherein said mammal is a human, non-human primate, cow, horse, sheep, pig, goat, buffalo, dog or cat; and/or

wherein the human mammal is selected from an age group comprising infant 0-3 months, infant 3-6 months, infant 6-12 months, toddler 1-3 years, child 3-5, 5-10, 1-16, 16-18 years or an adult 18+, 20+, 30 +, 40+, 50+, 60+, 70 + 80+, 90+ or 100+ years.

15. The use of claim 1, wherein the IFNβ is measured enterically or systemically from a stool or blood sample; and

    wherein the measurement from said stool or blood sample is used to diagnose need and/or monitor effectiveness of compositions used in treatment; and/or
    wherein *Bifidobacteriaceae,* and/or certain cytokines, calprotectin, or *Enterobacteriaceae* is monitored to tailor treatment to achieve necessary clinical improvements.

16. The use of claim 15 wherein the medicament is to improve symptoms of rheumatoid arthritis or psoriasis, comprising delivering a live bacterium and MMO to a mammal having said symptoms, and monitoring increase in IFNβ and decrease IL-7, IL-21 and IL-22.

17. The use of claim 15 for maintaining IFNβ production, wherein enteric and systemic inflammation are to be monitored to prevent HIV-1 progression of disease towards AIDS.

18. Use of a composition in the manufacture of a medicament for reducing viral carriage in a mammal, wherein an anti-viral composition comprising a live bacterium and a MMO that is consumed by that live bacterium is to be provided to said mammal; and

    wherein reducing the carriage of a virus in a patient comprises the steps of:
    a. a daily dosing of from 10^6 to 10^{11} cfu of *B. infantis* contemporaneously with from 1-50 g of a mammalian milk oligosaccharide is to be provided to the patient who is infected with the virus;
    b. the patient is to be monitored for the presence of the virus; and
    c. the daily dosing is to be repeated until the titer of the virus drops by 95%; and/or
    wherein the virus is a Corona Virus.