disorders, obesity, or low diversity in dietary intake. The *Bifidobacterium* is preferably selected from *B. longum, B. pseudocatanulatum, B. adolescentis, B. animalis* (e.g., *B. animalis* subsp. *animalis*, *B. animalis* subsp. *lactis*), *B. longum* subsp. *longum, B. pseudolongum,* and *B. breve*, and more preferably, the *B. longum* is *B. longum* subs. *infantis*. The mammalian milk sources may be human, caprine, porcine, ovine, equine, or bovine, and preferably, the bovine source is from bovine colostrum. The MMO may be from whey, whey mother liquor, whey powder, whey permeates, and/or the mammalian milk oligosaccharide may be fucosylated, sialylated or be derivatives thereof. In particular, the MMO may comprise 2'-fucosyllactose, 3'-fucosyllactose, difucosyllactose, lacto-N-fucosylpentose I, lacto-N-fucosylpentose II, lacto-N-fucosylpentose III, lacto-N-fucosylpentose V, 3'-sialyllactose, 6'-sialyllactose, 3'-sialyl-3-fucosyllactose, sialyllacto-N-tetraose, 3'-sialyllactoseamin, and 6'-sialyllactosamine, produced synthetically and purified or isolated from natural sources or recombinant microorganisms. The *Bifidobacterium* is typically provided in a daily dose of from 10 million to 1 trillion cfu, preferably 10 million to 100 billion cfu, and more preferably from 4 billion to 50 billion cfu. The MMO is provided in a daily dose of from 1 to 60 g, preferably from 2 to 40 g.

[0010a] Disclosed is a composition described herein for use in treating gastrointestinal dysbiosis by providing a patient with said composition for at least 5 days.

[0010b] In one aspect, the present disclosure refers to use of a composition in the manufacture of a medicament for treating gastrointestinal dysbiosis in a non-infant patient in need thereof, said composition comprising a mammalian milk oligosaccharide, wherein the non-infant patient in need thereof is a patient with a dysbiotic microbiome, particularly wherein the dysbiotic microbiome is a bacterial overgrowth of opportunistic pathogens and/or overt pathogens, more particularly wherein the dysbiotic microbiome has a reduced microbial diversity, preferably wherein the mammalian milk is from human, bovine, or caprine sources, or wherein the bovine source is from bovine colostrum, or wherein the mammalian milk oligosaccharide is from whey permeate, preferably wherein the mammalian milk oligosaccharide is selected from lacto-N-tetraose, lacto-N-neotetraose, fucosyllactose, sialyllactose, combinations thereof, and derivatives thereof, and/or wherein the mammalian milk oligosaccharide is selected from synthetically produced and purified lacto-N-tetraose, lacto-N-neotetraose, 2'-fucosyllactose, 3-fucosyllactose, difucosyllactose, lacto-N-fucosylpentaose I, lacto-N-fucosylpentaose II, lacto-N-fucosylpentaose III, lacto-N-fucosylpentaose V, 3'-sialyllactose, 6'-sialyllactose, 3'-sialyl-3-fucosyllactose, sialyllacto-N-

tetraose, N-acetylgalactosamine, 6'-sialyllactosamine, and combinations thereof, or wherein the mammalian milk is from human sources.

[0010c] In one aspect, the present disclosure refers to use of a mammalian milk oligosaccharide and a bifidobacteria that internalizes said mammalian milk oligosaccharide prior to its hydrolysis, in the manufacture of a medicament for treating intestinal distress in a non-infant patient, wherein the bifidobacteria is *B. longum* subsp. *infantis* or *B. breve*.

[0011] Some examples of the instant disclosure include compositions comprising a MMO and a microorganism wherein the MMO induces a change in the microorganism such that the MMO then becomes an energy source for the organism, and when ingested by a mammal, the induced or activated microorganism provides a benefit to the gut of that mammal. Additional examples involve the maintenance of the induced microorganism in the gut of the mammal by maintaining the dietary supply of MMOs or other glycans that are selective for that microorganism. A further example involves the subsequent clearance of the microorganism from the gut by the cessation of the supply of the MMO to the mammal.

[0011a] In another aspect, the present disclosure refers to a composition comprising human milk oligosaccharides (HMO) or bovine milk oligosaccharieds (BMO) and fucosylated glycans (SPF) and/or sialylated glycans (SPS), wherein the SPF and/or SPS are not of milk origin, preferably wherein the ratio of HMO:SPF is from 20:1 to 1:5, and/or wherein the composition comprises human milk oligosaccharides and synthetically-produced and purified sialyl glycans (SPS), and wherein the ratio of HMO:SPS is from 5:1 to 1:1, particularly wherein the SPF or SPS comprises one or more of 2'-fucosyllactose, 3'-fucosyllactose, difucosyllactose, lacto-N-fucosylpentose I, lacto-N-fucosylpentose II, lacto-N-fucosylpentose III, lacto-N-fucosylpentose V, 3'-sialyllactose, 6'-sialyllactose, 3'-sialyl-3-fucosyllactose, sialyllacto-N-tetraose, and 6'-sialyllactosamine, and/or wherein HMO or BMO further comprise synthetic lacto-N-tetraose and/or lacto-N-neotetraose, wherein the composition is formulated to provide dietary fiber in an amount suitable for a non-infant patient, preferably wherein the non-infant patient is at least 6 months of age, more preferably wherein the composition is formulated to provide a daily ration sufficient to support the intestinal microbiome of a patient with a body weight greater than 10 kg.

[0012] In one mode of this disclosure, the MMO and the bifidobacteria are provided in a dry form which may also be enrobed in a material that would provide enteric protection. In another mode, the MMO and the bifidobacteria are encapsulated, and the capsule may further comprise an enteric coating such as a coating that is not disrupted by passage through the stomach. In another mode, the MMO is provided as a solution and the bifidobacteria is provided as an enteric-coated powder, tablet, or capsule.

[0013] In yet another mode, the method of this disclosure further comprises administering *Lactobacillus* or *Pediococcus* contemporaneously with the composition. The *Lactobacillus* may

CLAIMS

1. Use of a mammalian milk oligosaccharide and a bifidobacteria that internalizes said mammalian milk oligosaccharide prior to its hydrolysis, in the manufacture of a medicament for treating intestinal distress in a non-infant patient, wherein the bifidobacteria is *B. longum* subsp. *infantis* or *B. breve*.
2. The use of claim 1, wherein the intestinal distress represents a microbial dysbiosis, which may be the result of Irritable Bowel Disease, Crohn's Disease, Ulcerative colitis, Necrotizing Enterocolitis, bacterial or viral overgrowth, bacterial induced diarrhea, antibiotic treatment, eating disorders, autism, obesity, or low diversity in dietary intake.
3. The use of any one of claims 1–2, wherein the bifidobacteria is *B. longum* subsp. *infantis*, said bifidobacteria preferably being provided in a daily dose of from 10 million to 1 trillion CFU, more preferably a daily dose of from 10 billion to 50 billion CFU.
4. The use of any one of claims 1–3, wherein the mammalian milk oligosaccharide is from mammalian milk, which may be from human, bovine, or caprine sources, or wherein the bovine source is from bovine colostrum, or wherein the mammalian milk oligosaccharide is from whey permeate, or wherein the mammalian milk oligosaccharide comprises lacto-N-tetraose, lacto-N-neotetraose, fucosyllactose, sialyllactose or derivatives thereof, or wherein the mammalian milk oligosaccharide comprises one or more carbohydrates selected from synthetically produced and purified lacto-N-tetraose, lacto-N-neotetraose, 2'-fucosyllactose, 3-fucosyllactose, difucosyllactose, lacto-N-fucosylpentaose I, lacto-N-fucosylpentaose II, lacto-N-fucosylpentaose III, lacto-N-fucosylpentaose V, 3'-sialyllactose, 6'-sialyllactose, 3'-sialyl-3-fucosyllactose, sialyllacto-N-tetraose, N-acetylgalactosamine, and 6'-sialyllactosamine.
5. The use of any one of claims 1–4, wherein the medicament further comprises Lactobacillus and/or Pediococcus, the Lactobacillus preferably being selected from *L. plantarum, L. antri, L. brevis, L. coleohominis, L. fermentum, L. gasseri, L. johnsonii, L. pentosus, L. sakei, L. salivarius, L. casei, L. rhamnosus (e.g., LGG), L. acidophilus*, *L. curvatus*, *L. reuteri, L. mucosae,* and *L. crispatus*, the Lactobacillus more preferably being *L. reuteri*, the Lactobacillus preferably being provided in a daily dose of from 10 million to 1 trillion cfu, more preferably a daily dose of from 10 billion to 50 billion cfu.

6. The use of any one of claims 1–5, wherein the mammalian milk oligosaccharide is in the form of a powder, more preferably wherein the medicament is in the form of a powder.

7. The use of any of claims 1–6, wherein the oligosaccharide is formulated to provide dietary fiber in an amount suitable for the non-infant patient, the non-infant patient being preferably at least 6 months of age, or wherein the medicament is formulated to provide a daily ration sufficient to support the intestinal microbiome of the non-infant patient, the non-infant patient having a body weight greater than 10 kg.

8. The use of any one of claims 1-7, wherein the mammalian milk oligosaccharide is to be provided in a daily dose of from 1-20 g, preferably a daily dose of from 1-10g.

9. The use according to claim 1, wherein the medicament is for treating gastrointestinal dysbiosis by providing the non-infant patient with said composition for at least 5 days.

10. The use of any one of claims 1-9, wherein the mammalian milk oligosaccharide and the bifidobacteria are present in a dry form and enrobed in a material that would provide enteric protection, such as when the mammalian milk oligosaccharide and the bifidobacteria are encapsulated and the capsule has an enteric coating, or wherein the mammalian milk oligosaccharide is to be provided as a solution and the bifidobacteria is to be provided as an enteric-coated tablet or capsule.

11. The use of any one of claims 1-10, wherein the non-infant patient is on a strict diet restricting all other dietary fiber when said composition is to be provided to said patient.

12. The use of any one of claims 1-11, wherein the mammalian milk oligosaccharide is in the form of a powder, and/or wherein the composition is in the form of a powder.

13. A composition comprising human milk oligosaccharides (HMO) or bovine milk oligosaccharieds (BMO) and fucosylated glycans (SPF) and/or sialylated glycans (SPS), wherein the SPF and/or SPS are not of milk origin, preferably wherein the ratio of HMO:SPF is from 20:1 to 1:5, and/or wherein the composition comprises human milk oligosaccharides and synthetically-produced and purified sialyl glycans (SPS), and wherein the ratio of HMO:SPS is from 5:1 to 1:1, particularly wherein the SPF or SPS comprises one or more of 2'-fucosyllactose, 3'-fucosyllactose, difucosyllactose, lacto-N-fucosylpentose I, lacto-N-fucosylpentose II, lacto-N-fucosylpentose III, lacto-N-fucosylpentose V, 3'-sialyllactose, 6'-sialyllactose, 3'-sialyl-3-fucosyllactose, sialyllacto-N-tetraose, and 6'-sialyllactosamine, and/or wherein HMO or BMO further comprise

synthetic lacto-N-tetraose and/or lacto-N-neotetraose, wherein the composition is formulated to provide dietary fiber in an amount suitable for a non-infant patient, preferably wherein the non-infant patient is at least 6 months of age, more preferably wherein the composition is formulated to provide a daily ration sufficient to support the intestinal microbiome of a patient with a body weight greater than 10 kg.

14. Use of a composition in the manufacture of a medicament for treating gastrointestinal dysbiosis in a non-infant patient in need thereof, said composition comprising a mammalian milk oligosaccharide, wherein the non-infant patient in need thereof is a patient with a dysbiotic microbiome, particularly wherein the dysbiotic microbiome is a bacterial overgrowth of opportunistic pathogens and/or overt pathogens, more particularly wherein the dysbiotic microbiome has a reduced microbial diversity, preferably wherein the mammalian milk is from human, bovine, or caprine sources, or wherein the bovine source is from bovine colostrum, or wherein the mammalian milk oligosaccharide is from whey permeate, preferably wherein the mammalian milk oligosaccharide is selected from lacto-N-tetraose, lacto-N-neotetraose, fucosyllactose, sialyllactose, combinations thereof, and derivatives thereof, and/or wherein the mammalian milk oligosaccharide is selected from synthetically produced and purified lacto-N-tetraose, lacto-N-neotetraose, 2'-fucosyllactose, 3-fucosyllactose, difucosyllactose, lacto-N-fucosylpentaose I, lacto-N-fucosylpentaose II, lacto-N-fucosylpentaose III, lacto-N-fucosylpentaose V, 3'-sialyllactose, 6'-sialyllactose, 3'-sialyl-3-fucosyllactose, sialyllacto-N-tetraose, N-acetylgalactosamine, 6'-sialyllactosamine, and combinations thereof, or wherein the mammalian milk is from human sources.

15. The use of claim 14, wherein the mammalian milk oligosaccharide is in the form of a powder.

16. The use of any one of claims 14-15, wherein the mammalian milk oligosaccharide is formulated to provide dietary fiber in an amount suitable for the non-infant patient, and/or wherein the non-infant patient is at least 6 months of age, preferably wherein the mammalian milk oligosaccharide is formulated to provide a daily ration sufficient to support the intestinal microbiome of a patient with a body weight greater than 10 kg.