

CLAIMS

1. A method for treating or preventing a disease, disorder, or condition associated with one or more of dysbiosis of the intestinal microbiome, inflammation, infection, allergy, or immune dysfunction in a subject in need thereof, the method comprising administering to the subject (i) a prebiotic mixture comprising one or more human milk oligosaccharides and (ii) at least one probiotic strain of bacterium capable of consuming the one or more human milk oligosaccharides.
2. The method of claim 1, wherein the probiotic strain is capable of internalizing the one or more human milk oligosaccharides.
3. The method of claims 1 or 2, wherein the probiotic strain of bacterium comprises a bacterial strain of the genus *Bifidobacterium*.
4. The method of any claims 1-3, wherein the probiotic strain of bacterium comprises a strain of *B. longum subsp. infantis*, *B. longum subsp. longum*, *B. breve*, or *B. bifidum*.
5. The method of any claims 1-4, wherein the probiotic strain of bacterium comprises *B. longum subsp. infantis*.
6. A method for treating or preventing a disease, disorder, or condition associated with one or more of dysbiosis of the intestinal microbiome, inflammation, infection, allergy, or immune dysfunction in a subject in need thereof, the method comprising administering to the subject (i) a prebiotic mixture comprising one or more human milk oligosaccharides and (ii) a probiotic strain of *B. longum subsp. infantis*.
7. The method of any of claims 1-6, wherein the prebiotic mixture comprises at least 5, at least 10, at least 25, at least 50, or at least 100 human milk oligosaccharides.
8. A method for treating or preventing a disease, disorder, or condition associated with one or more of dysbiosis of the intestinal microbiome, inflammation, infection, allergy, or immune dysfunction in a subject in need thereof, the method comprising

administering to the subject (i) a prebiotic mixture comprising at least 5, at least 10, at least 25, at least 50, or at least 100 human milk oligosaccharides and (ii) a probiotic strain of the genus *Bifidobacterium*.

9. The method of any of claims 1-8, wherein the disease, disorder, or condition comprises one or more of obesity, type II diabetes, a chronic inflammatory disease, an autoimmune disease, an infection, an infectious disease domination, bowel resection, or a condition associated with chronic diarrhea.

10. The method of any of claims 1-8, wherein the disease, disorder, or condition comprises one or more of irritable bowel syndrome (IBS), inflammatory bowel disease (IBD), short bowel syndrome (SBS), celiac disease, small intestinal bacterial overgrowth (SIBO), gastroenteritis, leaky gut syndrome, pouchitis, or gastric lymphoma.

11. The method of any of claims 1-8, wherein the disease, condition, or disorder is graft versus host disease.

12. The method of claim 11, wherein the subject has received or will receive an allogenic hematopoietic stem cell transplant.

13. A method of preventing or reducing the incidence or severity of graft versus host disease in a subject in need thereof, wherein the subject has received or will receive an allogenic hematopoietic stem cell transplant, the method comprising administering to the subject (i) a prebiotic mixture comprising at least 5, at least 10, at least 25, at least 50, or at least 100 human milk oligosaccharides and (ii) a probiotic strain of *B. longum* subsp. *infantis*.

14. The method of any of claims 1-8, wherein the disease, condition, or disorder is associated with an infection.

15. The method of claim 14, wherein the infection comprises a bacterial infection or gut domination.

16. A method for treating or preventing an infection in a subject in need thereof, the method comprising administering to the subject (i) a prebiotic mixture comprising at least 5, at least 10, at least 25, at least 50, or at least 100 human milk oligosaccharides and (ii) a probiotic strain of *B. longum* subsp. *infantis*, wherein the infection comprises a bacterial infection or gut domination.

17. The method of claim 15 or 16, wherein the bacterial infection or gut domination comprises an infection or gut domination by one or more species, subspecies, or strains of *Aeromonas*, *Bacillus*, *Blautia*, *Bordetella*, *Borrelia*, *Brucella*, *Burkholderia*, *Campylobacter*, *Chlamydia*, *Chlamydophila*, *Citrobacter*, *Clostridium*, *Corynebacterium*, *Coxiella*, *Ehrlichia*, *Enterobacter*, *Enterobacteriaceae*, *Enterococcus*, *Escherichia*, *Faecalicatena*, *Francisella*, *Haemophilus*, *Helicobacter*, *Hungatella*, *Klebsiella*, *Lachnospiraceae*, *Legionella*, *Leptospira*, *Listeria*, *Morganella*, *Mycobacterium*, *Mycoplasma*, *Neisseria*, *Orientia*, *Plesiomonas*, *Proteus*, *Pseudomonas*, *Rickettsia*, *Salmonella*, *Shigella*, *Staphylococcus*, *Streptococcus*, *Treponema*, *Vibrio*, or *Yersinia*, optionally one or more of *Aeromonas hydrophila*, *Bacillus cereus*, *Campylobacter fetus*, *Campylobacter jejuni*, *Clostridium botulinum*, *Clostridium difficile*, *Clostridium perfringens*, enteroaggregative *Escherichia coli*, enterohemorrhagic *Escherichia coli*, enteroinvasive *Escherichia coli*, enteropathogenic *E. coli*, enterotoxigenic *Escherichia coli*, *Escherichia coli* 0157:H7, *Helicobacter pylori*, *Klebsiella pneumonia*, *Listeria monocytogenes*, *Salmonella paratyphi*, *Salmonella typhi*, *Staphylococcus aureus*, *Vibrio cholerae*, *Vibrio parahaemolyticus*, *Vibrio vulnificus*, or *Yersinia enterocolitica*.

18. The method of any of claims 15-17, wherein the bacterial infection or gut domination comprises an infection or gut domination by one or more of *Anaerostipes caccae*, *Anaerotruncus colihominis*, *Bifidobacterium longum*, *Blautia* spp., *Butyricicoccus pullicaecorum*, *Butyrivibrio crossotus*, *Caproiciproducens*, *Citrobacter freundii*, *Citrobacter koseri*, *Clostridium aldenense*, *Clostridium asparagiforme*, *Clostridium bolteae*, *Clostridium citroniae*, *Clostridium clostridioforme*, *Clostridium lavalense*, *Clostridium nexile*, *Clostridium populeti*, *Clostridium symbiosum*, *Coproccoccus comes*, *Coproccoccus eutactus*, *Dorea formicigenerans*, *Dorea longicatena*, *Enterobacter aerogenes*, *Enterobacter cloacae*, *Enterococcus faecalis*, *Enterococcus faecium*, *Escherichia coli*, *Ethanoligenens*, *Eubacterium hallii*, *Eubacterium rectale*, *Eubacterium ventriosum*, *Eubacterium siraeum*,

Faecalibacterium prausnitzii, *Faecalicatena*, *Flavonifractor plautii*, *Hungatella*, *Klebsiella oxytoca*, *Klebsiella pneumoniae*, *Lactobacillus acidophilus*, *Morganella morganii*, *Oscillibacter*, *Papillibacter cinnamivorans*, *Papillibacter*, *Proteus mirabilis*, *Pseudoflavonifractor*, *Roseburia hominis*, *Roseburia intestinalis*, *Roseburia inulinivorans*, *Ruminococcus faecis*, *Ruminococcus lactaris*, *Ruminococcus torques*, *Ruminococcus bromii*, *Serratia marcescens*, *Sporobacter*, *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Streptococcus anginosus*, *Streptococcus australis*, *Streptococcus constellatus*, *Streptococcus cristatus*, *Streptococcus gordonii*, *Streptococcus infantis*, *Streptococcus intermedius*, *Streptococcus mitis*, *Streptococcus mutans*, *Streptococcus oligofermentans*, *Streptococcus oralis*, *Streptococcus parasanguinis*, *Streptococcus peroris*, *Streptococcus pneumoniae*, *Streptococcus pseudopneumoniae*, *Streptococcus salivarius*, *Streptococcus sanguinis*, *Streptococcus sobrinus*, *Streptococcus tigurinus*, *Streptococcus vestibularis*, *Subdoligranulum variable*, *Subdoligranulum*, or *Syntrophococcus sp.*

19. The method of any of claims 15-18, wherein the bacterial infection or gut domination comprises an infection or gut domination by drug-resistant bacteria.

20. The method of any of claims 15-19, wherein the drug-resistant bacteria comprises one or more of antibiotic-resistant bacterium (ARB), Antibiotic-resistant Proteobacteria, Carbapenem-resistant *Enterobacteriaceae* (CRE), Extended Spectrum Beta-Lactamase producing *Enterobacteriaceae* (ESBL-E), fluoroquinolone-resistant *Enterobacteriaceae*, extended spectrum beta-lactam resistant *Enterococci* (ESBL), vancomycin-resistant *Enterococci* (VRE), multi-drug resistant *E. coli*, or multi-drug resistant *Klebsiella*.

21. The method of any of claims 1-8, wherein the subject has undergone or will undergo an ileal pouch-anal anastomosis (IPAA) surgery, and wherein the disease, condition, or disorder comprises pouchitis.

22. A method of preventing or reducing the incidence or severity of pouchitis in a subject in need thereof, wherein the subject has undergone or will undergo an ileal pouch-anal anastomosis (IPAA) surgery, the method comprising administering to the subject (i) a prebiotic mixture comprising at least 5, at least 10, at least 25, at least 50, or at least 100

human milk oligosaccharides and (ii) a probiotic strain of *B. longum* subsp. *infantis*, wherein the infection comprises a bacterial infection.

23. The method of any of claims 1-22, wherein the prebiotic mixture comprises at least 10 human milk oligosaccharides.

24. The method of any of claims 1-23, wherein the prebiotic mixture comprises at least 25 human milk oligosaccharides.

25. The method of any of claims 1-24, wherein the prebiotic mixture comprises at least 50 human milk oligosaccharides.

26. The method of any of claims 1-25, wherein the prebiotic mixture comprises at least 50 human milk oligosaccharides.

27. The method of any of claims 1-26, wherein the prebiotic mixture comprises one or more of 2'-fucosyl-lactose, 3'-fucosyl-lactose, 3'-sialyl-lactose, 6'-sialyl-lactose, Lacto-N-tetraose, lacto-N-difucohexaose I, lactodifucotetraose, Lacto-N-fucopentaose I, sialyl-lacto-N-tetraose c, sialyl-lacto-N-tetraose b, or disialyl-lacto-N-tetraose.

28. The method of any of claims 1-27, wherein the prebiotic mixture comprises 2'-fucosyl-lactose, 3'-fucosyl-lactose, 3'-sialyl-lactose, 6'-sialyl-lactose, Lacto-N-tetraose, lacto-N-difucohexaose I, lactodifucotetraose, Lacto-N-fucopentaose I, sialyl-lacto-N-tetraose c, sialyl-lacto-N-tetraose b, and disialyl-lacto-N-tetraose.

29. The method of any of claims 1-28, wherein the prebiotic mixture comprises 2'-fucosyl-lactose, 3'-fucosyl-lactose, 3'-sialyl-lactose, 6'-sialyl-lactose, Lacto-N-tetraose, Lacto-N-neo-tetraose, Lacto-N-fucopentaose I, Lacto-N-fucopentaose II, Lacto-N-fucopentaose III, Sialyl-lacto-N-tetraose b, Sialyl-lacto-N-tetraose c, Lacto-N-difuco-hexaose I, Lacto-N-difuco-hexaose II, Lacto-N-hexaose, para-Lacto-N-hexaose, Disialyl-lacto-N-tetraose, Fucosyl-Lacto-N-hexaose, Difucosyl-Lacto-N-hexaose a, and Difucosyl-Lacto-N-hexaose b.

30. The method of any of claims 1-29, wherein the prebiotic mixture is, is derived from, or comprises a concentrated permeate from pooled human milk, wherein the permeate is obtained from the ultrafiltration of human skim milk, wherein the human skim milk is obtained by removing cream from pooled human milk, and wherein the pooled human milk is pooled from the milk of multiple human milk donors.

31. A method for treating or preventing a disease, disorder, or condition associated with one or more of dysbiosis of the intestinal microbiome, inflammation, infection, allergy, or immune dysfunction in a subject in need thereof, the method comprising administering to the subject

(i) a prebiotic mixture comprising at least 5, at least 10, at least 25, at least 50, or at least 100 human milk oligosaccharides, wherein the prebiotic mixture is, is derived from, or comprises a concentrated human milk permeate, wherein the human milk permeate is obtained from the ultrafiltration of human skim milk obtained from pooled human milk, and wherein the pooled human milk is pooled from the milk of multiple human milk donors; and

(ii) a probiotic strain of *B. longum* subsp. *infantis*.

32. The method of claim 30 or 31, wherein the pooled human milk is pooled from the milk of at least 25, 50, or 100 human milk donors.

33. The method of any of claims 1-32, wherein the prebiotic mixture comprises at least one synthetic human milk oligosaccharide.

34. The method of any claims 1-33, wherein the prebiotic mixture and the probiotic strain are administered orally.

35. The method of any of claims 1-34, wherein the prebiotic mixture and the probiotic strain are administered on the same day for at least one day.

36. The method of any of claims 1-35, wherein the prebiotic mixture and the probiotic strain are administered on the same day for at least three consecutive days.

37. The method of any of claims 1-36, wherein the prebiotic mixture and the probiotic strain are administered on the same day for at least seven consecutive days.

38. The method of any of claims 1-37, wherein the method comprises at least a first treatment phase and a second treatment phase, wherein the first treatment phase comprises administering to the subject the prebiotic mixture and the probiotic strain on the same day for at least one day, and wherein the second treatment phase begins after the end of the first treatment phase, optionally immediately after, and comprises administering the prebiotic mixture for at least one day, wherein the probiotic strain is not administered during the second treatment phase.

39. The method of claim 38, wherein the second treatment phase comprises administering to the subject the prebiotic mixture each day for at least three consecutive days.

40. The method of claim 38 or 39, wherein the second treatment phase comprises administering to the subject the prebiotic mixture each day for at least seven consecutive days.

41. The method of any of claims 38-40, wherein the first treatment phase is between 3 and 14 days in length and wherein the second treatment phase is between 3 and 14 days in length.

42. The method of any of claims 38-41, wherein the first treatment phase is about 7 days in length and wherein the second treatment phase is about 7 days in length.

43. The method of any of claims 1-42, wherein the probiotic strain is administered in an amount of at least 5×10^6 colony forming units (CFU) per day.

44. The method of any of claims 1-43, wherein the probiotic strain is administered in an amount of at least 8×10^7 colony forming units (CFU) per day.

45. The method of any of claims 1-44, wherein the prebiotic mixture is administered in an amount of at least 500 mg of total human milk oligosaccharides per day.

46. The method of any of claims 1-45, wherein the prebiotic mixture is administered in an amount of between 0.5 g and 25 g, 1 g and 5 g, 2 g and 3 g, 3 g and 6 g, 4 g and 5 g, 5 g and 10 g, 8 g and 10 g, 10 g and 20 g, 15 g and 25 g, 15 g and 20 g, or 17 g and 19 g of total human milk oligosaccharides per day.

47. The method of any of claims 1-46, wherein the prebiotic mixture and/or the probiotic strain is administered with an enteric coating.

48. The method of any of claims 1-47, further comprising administering a histamine-2 receptor antagonist, wherein the histamine-2 receptor antagonist is administered at least 1 hour prior to administration of the probiotic strain, optionally wherein the histamine-2 receptor antagonist is famotidine.

49. The method of any of claims 1-47, wherein the subject has not been administered a proton pump inhibitor at least about 6 hours, 12 hours, 24 hours, 36 hours, 48 hours, 60 hours, 2 days, 3 days, 4 days, 5 days, 7 days, 10 days, 2 weeks, 3 weeks, or 4 weeks prior to administration of the probiotic strain.

50. The method of any of claims 1-47, wherein the subject has not been administered a benzimidazole derivative for at least about 6 hours, 12 hours, 24 hours, 36 hours, 48 hours, 60 hours, 2 days, 3 days, 4 days, 5 days, 7 days, 10 days, 2 weeks, 3 weeks, or 4 weeks prior to administration of the probiotic strain.

51. The method of any of claims 1-48, wherein the subject has not been administered omeprazole for at least about 6 hours, 12 hours, 24 hours, 36 hours, 48 hours, 60 hours, 2 days, 3 days, 4 days, 5 days, 7 days, 10 days, 2 weeks, 3 weeks, or 4 weeks prior to administration of the probiotic strain.

52. The method of any of claims 1-51, wherein both of the probiotic strain and the prebiotic mixture are free or essentially free of a benzimidazole derivative.

53. The method of any of claims 1-52, wherein the subject is a human subject at least 6 months, 12 months, 2 years, 5 years, 12 years, or 18 years of age.
54. The method of any of claims 1-53, wherein the subject is human subject that is a child, an adolescent, or an adult.
55. The method of any of claims 1-54, wherein the subject is a human adult.
56. Use of a prebiotic mixture and at least one probiotic strain for the treatment or prevention of a disease, disorder, or condition associated with one or more of dysbiosis of the intestinal microbiome, inflammation, infection, allergy, or immune dysfunction in a subject in need thereof, wherein the prebiotic mixture comprises one or more human milk oligosaccharides and the probiotic strain is capable of consuming the one or more human milk oligosaccharides.
57. A prebiotic mixture and at least one probiotic strain for use in the manufacture of medicaments for the treatment or prevention of a disease, disorder, or condition associated with one or more of dysbiosis of the intestinal microbiome, inflammation, infection, allergy, or immune dysfunction, wherein the prebiotic mixture comprises one or more human milk oligosaccharides and wherein the probiotic strain is capable of consuming the one or more human milk oligosaccharides.
58. A kit comprising at least one probiotic strain of bacterium and a prebiotic mixture comprising one or more human milk oligosaccharides, wherein probiotic strain is capable of internalizing and consuming the one or more human milk oligosaccharides.
59. The kit of claim 58, wherein the probiotic strain comprises a strain of *Bifidobacterium*.
60. The kit of claim 58 or claim 59, wherein the probiotic strain comprises a strain of *B. longum* subsp. *infantis*, *B. longum* subsp. *longum*, *B. breve*, or *B. bifidum*.

61. The kit of any of claims 58-60, wherein the prebiotic mixture comprises at least 2, at least 5, at least 10, at least 25, at least 50, at least 100, at least 125, or at least 150 human milk oligosaccharides.
62. The kit of any of claims 58-61, wherein the prebiotic mixture comprises at least 25 human milk oligosaccharides.
63. The kit of any of claims 58-62, wherein the prebiotic mixture is free or essentially free of oligosaccharides that are not human milk oligosaccharides.
64. The kit of any of claims 58-63, wherein the prebiotic mixture is, is obtained from, or comprises a concentrated ultra-filtered permeate from pooled human milk.
65. The kit of any of claims 58-64, wherein the probiotic strain is incorporated into one or more individual probiotic doses and wherein the prebiotic mixture is incorporated into one or more individual prebiotic doses.
66. The kit of claim 65, wherein the one or more individual probiotic doses each comprise at least 1×10^3 colony forming units (CFU).
67. The kit of claim 65 or 66, wherein the one or more individual probiotic doses each comprise at least 8×10^7 colony forming units (CFU).
68. The kit of any of claims 65-67, wherein the one or more prebiotic doses comprises between 500 mg and 25 g of total human milk oligosaccharides.
69. The kit of any of claims 65-68, wherein the one or more individual prebiotic doses comprises between 0.5 g and 25 g, 1 g and 5 g, 2 g and 3 g, 3 g and 6 g, 4 g and 5 g, 5 g and 10 g, 8 g and 10 g, 10 g and 20 g, 15 g and 25 g, 15 g and 20 g, or 17 g and 19 g of total human milk oligosaccharides per day.
70. The kit of any of claims 65-69, wherein the one or more individual prebiotic doses comprises less than 0.1% lactose.

71. An article of manufacture, comprising the kit of any of claims 58-70 and instructions for use, wherein the instructions for use describing the method of any of claims 1-55.

72. A method of treating hyperammonemia, comprising administering to a subject in need thereof a prebiotic mixture comprising oligosaccharides, wherein (i) the mixture is free or essentially free of oligosaccharides that incorporate an N-acetyl glucosamine residue or (ii) the percentage by weight of oligosaccharides comprising nitrogen in the mixture is less than 50%.

73. A method of decreasing the level or amount of ammonia in a subject in need thereof, comprising administering to the subject a prebiotic mixture comprising oligosaccharides, wherein (i) the mixture is free or essentially free of oligosaccharides that incorporate an N-acetyl glucosamine residue or (ii) the percentage by weight of oligosaccharides comprising nitrogen in the mixture is less than 50%.

74. The method of claim 72 or 73, further comprising administering a probiotic strain of bacterium capable of consuming each oligosaccharide of the mixture.

75. The method of any of claims 72-74, wherein the subject has, is at risk of having, or is suspected of having hyperammonemia, hepatic encephalopathy, or a urea cycle disorder.

76. The method of any of claims 72-75, wherein the prebiotic mixture comprises one or more human milk oligosaccharides (HMOs).

77. The method of any of claims 72-76, wherein all or essentially all of the oligosaccharides of the prebiotic mixture are human milk oligosaccharides (HMOs).

78. The method of any of claims 72-77, wherein the prebiotic mixture is free or essentially free of oligosaccharides that incorporate an N-acetyl glucosamine residue.

79. The method of any of claims 72-78, wherein the prebiotic mixture comprises at least 2, at least 3, at least 4, at least 5, at least 6, or at least 7 oligosaccharides.

80. The method of any of claims 72-79, wherein the percentage by weight of oligosaccharides in the prebiotic mixture comprising nitrogen is less than 50%, 40%, 30%, 25%, 20%, 10%, 5%, or 1%.

81. The method of any of claims 72-80, wherein the mixture is free or essentially free of oligosaccharides that comprise nitrogen.

82. The method of any of claims 72-81, wherein less than 50%, 40%, 30%, 25%, 20%, 10%, 5%, or 1% by weight of the oligosaccharides in the prebiotic mixture are oligosaccharides comprising five or more monosaccharide residues.

83. The method of any of claims 72-82, wherein the prebiotic mixture is free or essentially free of oligosaccharides comprising five or more monosaccharide residues.

84. The method of any of claims 72-83, wherein the probiotic strain is a strain of Bifidobacterium, optionally a strain of *B. longum* subsp. *infantis*, *B. longum* subsp. *longum*, *B. breve*, or *B. bifidum*.

85. The method of any of claims 72-84, wherein the probiotic strain is capable of internalizing the oligosaccharides of the mixture.

86. A method of treating or preventing hyperammonemia, comprising administering to a subject in need thereof (i) a prebiotic mixture comprising oligosaccharides, wherein all or essentially all of the oligosaccharides of the prebiotic mixture are human milk oligosaccharides that do not incorporate an N-acetyl glucosamine residue, and (ii) a probiotic strain of bacterium, wherein the probiotic strain is a Bifidobacterium capable of internalizing HMOs.

87. A method of reducing ammonia in a subject in need thereof, comprising administering to a subject (i) a prebiotic mixture of oligosaccharides, wherein all or

essentially all of the oligosaccharides of the prebiotic mixture are human milk oligosaccharides (HMOs) that do not incorporate an N-acetyl glucosamine residue, and (ii) a probiotic strain of bacterium, wherein the probiotic bacterium strain is a Bifidobacterium strain capable of internalizing HMOs.

88. The method of any of claims 74-87, wherein the probiotic strain is a strain of *B. longum* subsp. *infantis*.

89. The method of any of claims 72-88, wherein the prebiotic mixture comprises one or more of 2'-fucosyllactose, 3-fucosyllactose, difucosyllactose, 3'-sialyllactose, or 6'-sialyllactose.

90. The method of any of claims 72-88, wherein the prebiotic mixture comprises 2'-fucosyllactose, 3-fucosyllactose, difucosyllactose, 3'-sialyllactose, and 6'-sialyllactose.

91. The method of any of claims 72-88, wherein the oligosaccharides of the prebiotic mixture consist or consist essentially of 2'-fucosyllactose, 3-fucosyllactose, difucosyllactose, 3'-sialyllactose, and 6'-sialyllactose.

92. The method of any of claims 72-88, wherein the prebiotic mixture comprises one or more of 2'-fucosyllactose, 3-fucosyllactose, or difucosyllactose.

93. The method of any of claims 72-88, wherein the prebiotic mixture comprises of 2'-fucosyllactose, 3-fucosyllactose, and difucosyllactose.

94. The method of any of claims 72-88, wherein the oligosaccharides of the mixture consist or consist essentially of 2'-fucosyllactose, 3-fucosyllactose, and difucosyllactose.

95. A method of treating or preventing hyperammonemia comprising administering to a subject in need thereof i) a prebiotic mixture comprising 2'-fucosyllactose, 3-fucosyllactose, difucosyllactose, 3'-sialyllactose, and 6'-sialyllactose and ii) a probiotic strain of *B. longum* subsp. *infantis*.

96. A method of treating or preventing hyperammonemia comprising administering to a subject in need thereof i) a prebiotic mixture comprising 2'-fucosyllactose, 3-fucosyllactose, and difucosyllactose and ii) a probiotic strain of *B. longum* subsp. *infantis*

97. The method of any of claims 72-96, wherein the subject has, is suspected of having, or is at risk of having hepatic encephalopathy.

98. The method of any of claims 72-96, wherein the subject has, is suspected of having, or is at risk of having a urea cycle disorder.