

CLAIMS:

1. A method of stimulating production of one or more short chain fatty acids (SCFAs) by a subject's gut microbiota comprising administering to the subject a liquid, non-dairy probiotic preparation comprising a population of lactic acid bacteria.
2. A method of promoting gastrointestinal health in a subject comprising administering a liquid, non-dairy probiotic preparation comprising a population of lactic acid bacteria, wherein administration of the probiotic preparation promotes production of one or more short chain fatty acids (SCFAs) by the subject's gut microbiota, thereby promoting intestinal health.
3. A method according to claim 1 or claim 2 wherein the one or more SCFAs is selected from butyrate, propionate and acetate, preferably butyrate.
4. A method of promoting growth of one or more bacterial phyla selected from Actinobacteria (e.g. Bifidobacteriaceae), Firmicutes (e.g. Veillonellaceae, Lachnospiraceae, Streptococcaceae, Eubacteriaceae, Ruminococcaceae, Erysipelotrichaceae, Clostridiaceae), Proteobacteria (e.g. Enterobacteriaceae) in the gut microbiota of a subject, the method comprising administering to the subject a liquid, non-dairy probiotic preparation comprising a population of lactic acid bacteria.
5. A method of inhibiting growth of one or more bacterial phyla selected from Actinobacteria (e.g. Coriobacteriaceae, Eggerthellaceae), Bacteroidetes (e.g. Bacteroidaceae, Rikenellaceae, Lachnospiraceae, Ruminococcaceae), Firmicutes (e.g., Acidaminococcaceae, Enterococcaceae, Clostridiaceae, Peptostreptococcaceae), Proteobacteria (e.g. Enterobacteriaceae), Synergistetes (e.g. Synergistaceae) and Verrucomicrobio (e.g. Akkermansiaceae) in the gut microbiota of a subject, the method comprising administering to the subject a liquid, non-dairy probiotic preparation comprising a population of lactic acid bacteria.
6. A method according to claim 4 or claim 5, wherein the effect on the growth of the one or more bacterial phyla is in the gut mucosal compartment.

7. A method according to any one of claims 4-6, wherein the effect on the growth of the one or more bacterial phyla is in the gut luminal compartment.
- 5 8. A method of promoting intestinal barrier integrity in a subject, the method comprising administering to the subject a liquid, non-dairy probiotic preparation comprising a population of lactic acid bacteria, wherein administration of the probiotic preparation promotes said intestinal barrier integrity.
- 10 9. A method according to claim 8, wherein the method prevents or reduces loss of intestinal barrier integrity in a subject.
- 10 10. A method according to claim 8 or claim 9, wherein the subject is at risk of loss of intestinal barrier integrity.
- 15 11. A method according to claim 8, wherein the method promotes intestinal barrier repair.
- 20 12. A method for promoting a tolerogenic gut phenotype in a subject, the method comprising administering to the subject a liquid, non-dairy probiotic preparation comprising a population of lactic acid bacteria, wherein administration of the probiotic preparation promotes said tolerogenic gut phenotype.
- 25 13. A method according to any one of the preceding claims wherein the method is a non-therapeutic method.
14. A method according to any one of the preceding claims wherein the subject is a healthy individual.
- 30 15. A method according to any one of the preceding claims wherein the subject is in a state of intestinal dysbiosis.
16. A method according to any one of claims 1-12 and 15, wherein the method is a therapeutic method.

17. A method according to any one of claims 1-12 and 15-16 wherein the subject has a condition selected from Parkinson's Disease, liver cirrhosis, inflammatory bowel disease (IBD), *Clostridium difficile* infection, MRSA infection, *E. coli* infection, salmonella infection, norovirus infection, giardiasis, coeliac disease, chronic kidney disease, HIV/AIDS, cystic fibrosis, type I diabetes, obesity, and chronic fatigue syndrome.
18. A method according to any one of claims 1-12 and 15-17, wherein the subject has Parkinson's Disease.
19. A method according to any one of claims 1-12 and 15-17, wherein the subject has liver cirrhosis.
20. A method according to any one of claims 1-12 and 15-17, wherein the subject has IBD.
21. A method of treating or preventing Parkinson's Disease in a subject, the method comprising administering to the subject a liquid, non-dairy probiotic preparation comprising a population of lactic acid bacteria.
22. A method according to claim 21, wherein administration of the probiotic preparation improves in the subject one or more of: motor symptoms, non-motor symptoms, systemic inflammatory markers.
23. A method according to claim 21 or claim 22, wherein administration of the probiotic preparation improves non-motor symptoms in the subject, optionally improves gastrointestinal non-motor symptoms in the subject.
24. A method according to any one of claims 21-23, wherein administration of the probiotic preparation improves intestinal barrier integrity.
25. A method according to any one of claims 21-24, wherein administration of the probiotic preparation improves intestinal barrier repair.

26. A method according to any one of claims 21-25, wherein administration of the probiotic preparation promotes a tolerogenic gut phenotype in the subject.
- 5 27. A method according to any one of claims 21-25 wherein administration of the probiotic preparation treats or prevents Parkinson's Disease in the subject by reducing the severity or slowing the progression of motor symptoms or by slowing or preventing the onset of motor symptoms.
- 10 28. A method according to any one of claims 21-26 wherein the subject is in a state of gastrointestinal dysbiosis, optionally wherein the subject is exhibiting an elevated level of *Firmicutes* and/or a reduced level of *Bacteroidetes* in their gut microbiota compared to healthy controls.
- 15 29. A method according to any one of the preceding claims, wherein the method promotes production of one or more anti-inflammatory molecules by intestinal epithelial cells, optionally wherein the one or more anti-inflammatory molecules are selected from IL-6 and IL-10.
- 20 30. A method according to any one of the preceding claims, wherein the method reduces production of one or more pro-inflammatory molecules by intestinal epithelial cells, optionally wherein the one or more pro-inflammatory molecules are selected from CXCL-10, TNF α , IL-8 and MCP-1.
- 25 31. A method according to any one of claims 4-30, wherein the method promotes production of one or more SCFAs, preferably acetate, propionate or butyrate, preferably butyrate.
- 30 32. A method according to any one of the preceding claims wherein the population of lactic acid bacteria comprises one or more of *Lactobacillus rhamnosus*, *Lactobacillus acidophilus*, *Lactobacillus plantarum* and *Enterococcus faecium* bacteria.
- 35 33. A method according to any one of the preceding claims wherein the population of lactic acid bacteria comprises each of *Lactobacillus rhamnosus*, *Lactobacillus acidophilus*, *Lactobacillus plantarum* and *Enterococcus faecium* bacteria.

34. A method according to any one of the preceding claims wherein the method reduces production of one or more branched chain fatty acids (BCFA) and/or ammonium by the subject's gut microbiota
- 5
35. A method according to claim 34 wherein the one or more BCFAs is selected from isobutyrate, isovalerate and 2-methylbutyrate.
36. A method according to any one of the preceding claims wherein the probiotic composition is administered to the subject at least once a week, preferably once a day.
- 10
37. A method according to any one of the preceding claims wherein the probiotic composition is administered to the subject for a period of at least 1 month, at least 2 months or at least 3 months.
- 15