system. It is thought that the secretion of various immune signaling molecules in response to β-glucans is involved in the immune-enhancing properties of natural remedies.

[0005] To meet the increasing demand for natural remedies having increasingly beneficial immune-enhancing properties, there exists a need for additional and improved immunostimulatory compositions containing natural components.

BRIEF SUMMARY

[0005a] In one aspect of the present disclosure, there is provided an immunostimulatory composition comprising a β-glucan preparation, a ginseng extract, and a mushroom extract; wherein the β-glucan preparation is present in the range of 40% to 80% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract in the composition; wherein the ginseng extract is present in the range of 10% to 30% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract in the composition; and wherein the mushroom extract is present in the range of 1% to 20% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract in the composition.

[0005b] In another aspect of the present disclosure, there is provided an orally consumable product comprising the composition disclosed herein.

[0005c] In a further aspect of the present disclosure, there is provided a method of preparing a composition, the method comprising combining a β-glucan preparation, a ginseng extract, and a mushroom extract into a composition, wherein the composition is formulated such that the β-glucan preparation is present in the range of 40% to 80% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract in the composition, the ginseng extract is present in the range of 10% to 30% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract in the composition, and the mushroom extract is present in the range of 1% to 20% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract in the composition.

[0005d] In another aspect of the present disclosure, there is provided a use of the composition disclosed herein or the product disclosed herein, in the manufacture of a medicament for enhancing an immune function in a subject.

[0005e] In a further aspect of the present disclosure, there is provided a kit for enhancing immune function in a subject, the kit comprising the immunostimulatory composition disclosed herein or the product disclosed herein.

[0005f] In another aspect of the present disclosure, there is provided a use of a composition comprising 220 mg to 250 mg of a β-glucan preparation, 75 to 90 mg of a ginseng extract, and 20 mg to 40 mg of a mushroom extract, in the manufacture of a medicament for enhancing an immune function in a subject, wherein the composition is to be administered once daily to said subject.

[0005g] In a further aspect of the present disclosure, there is provided a use of a composition comprising 250 mg to 325 mg of a β-glucan preparation, 90 to 120 mg of a ginseng extract, and 30 mg to 50 mg of a mushroom extract, in the manufacture of a medicament for enhancing an immune function in a subject, wherein the composition is to be administered once daily to said subject.

[0005h] In another aspect of the present disclosure, there is provided a use of a composition comprising 150 mg to 200 mg β-glucans from a β-glucan preparation, 5 mg to 10 mg polysaccharides from a ginseng extract, and 8 mg to 16 mg polysaccharides from a mushroom extract, in the manufacture of a medicament for enhancing an immune function in a subject, wherein the composition is to be administered once daily to said subject.

[0005i] In a further aspect of the present disclosure, there is provided a use of a composition comprising 150 mg to 200 mg β-glucans from a β-glucan preparation, 20 mg to 30 mg polysaccharides from a ginseng extract, and 10 mg to 20 mg polysaccharides from a mushroom extract, in the manufacture of a medicament for enhancing an immune function in a subject, wherein the composition is to be administered once daily to said subject.

[0005j] In another aspect of the present disclosure, there is provided a use of a composition comprising 175 mg to 225 mg β-glucans from a β-glucan preparation, 25 mg to 45 mg polysaccharides from a ginseng extract, and 15 mg to 30 mg polysaccharides from a mushroom extract, in the manufacture of a medicament for enhancing an immune function in a subject, wherein the composition is to be administered once daily to said subject.

CLAIMS

What is claimed is:

1. An immunostimulatory composition comprising a β-glucan preparation, a ginseng extract, and a mushroom extract;
wherein the β-glucan preparation is present in the range of 40% to 80% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract in the composition;
wherein the ginseng extract is present in the range of 10% to 30% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract in the composition; and
wherein the mushroom extract is present in the range of 1% to 20% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract in the composition.

2. The composition of claim 1, wherein the β-glucan preparation is prepared from yeast extract.

3. The composition of claim 2, wherein the yeast extract is obtained from *Saccharomyces cerevisiae*.

4. The composition of any one of claims 1-3, wherein the β-glucan preparation is:

a) present at 60% to 80% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract, or;

b) present at 65% to 70% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract.

5. The composition of any one of claims 1-4, wherein the concentration of β-glucan in the β-glucan preparation is:

a) in the range of 60% to 80% of the total dry weight of the β-glucan preparation, or;

b) 60% to 75% of the total dry weight of the preparation, or;

c) at least 60%, 65%, 70%, or 80% of the total dry weight of the preparation.

6. The composition of any one of claims 1-5, wherein the ginseng extract is prepared from Chinese ginseng or American ginseng.

7. The composition of any one of claims 1-6, wherein the ginseng extract is:

a) present at 20% to 30% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract, or;

b) present at 20% to 25% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract, or;

c) present at 20%, 25%, or 30% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract.

8. The composition of any one of claims 1-7, wherein the concentration of polysaccharides in the ginseng extract is:

a) 5% to 50% of the total dry weight of the ginseng extract, or;

b) 10% to 45% polysaccharides of the total dry weight of the ginseng extract, or;

c) 20% to 35% of total dry weight of the ginseng extract.

9. The composition of any one of claims 1-8, wherein the mushroom extract is prepared from a mushroom selected from the group consisting of princess Matsutake mushroom, Reishi mushroom, Shitake mushroom, Enokie mushroom, and pine mushroom.

10. The composition of any one of claims 1-9, wherein the mushroom extract is:

a) present at 5% to 15% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract, or;

b) present at 5% to 10% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract, or;

c) 5%, 7.5%, 10%, or 15% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract.

11. The composition of any one of claims 1-10, wherein the concentration of polysaccharides in the mushroom extract is:

a) 30% to 55% of the total dry weight of the mushroom extract, or;

b) 30%, 35%, 40%, 45%, 50%, or 55% of the total dry weight of the mushroom extract.

12. The composition of any one of claims 1-11, wherein the β-glucan preparation is present at 65% to 70% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract; the ginseng extract is from Chinese ginseng and is present at 20% to 25% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract, and; the mushroom extract is from princess Matsutake mushroom and is present at 5% to 10% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract.

13. The composition of any one of claims 1-11, wherein the β-glucan preparation is present at 75% to 80% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract; the ginseng extract is from Chinese ginseng and is present at 15% to 20% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract, and; the mushroom extract is from princess Matsutake mushroom and is present at 1% to 5% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract.

14. The composition of any one of claims 1-11, wherein the β-glucan preparation is present at 65% to 70% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract; the ginseng extract is from Chinese ginseng and is present at 10% to 15% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract, and; the mushroom extract is from princess Matsutake mushroom and is

present at 15% to 20% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract.

15. The composition of any one of claims 1-11, wherein the β-glucan preparation is present at 65% to 70% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract; the ginseng extract is from American ginseng and is present at 20% to 25% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract, and; the mushroom extract is from princess Matsutake mushroom and is present at 5% to 10% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract.

16. The composition of any one of claims 1-11, wherein the β-glucan preparation is present at 65% to 70% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract; the ginseng extract is from Chinese ginseng and is present at 20% to 25% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract, and; the mushroom extract is from Reishi mushroom and is present at 5% to 10% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract.

17. An orally consumable product comprising the composition of any one of claims 1-16.

18. The product of claim 17, wherein the orally consumable product is selected from the group consisting of a foodstuff composition, a beverage product, a dietary supplement, a nutraceutical, an edible gel mix, an edible gel composition, a granulated powder, a soft gel composition, a flash dissolve composition, and a pharmaceutical composition.

19. The product of claim 17, wherein the orally consumable product is formulated into a tablet or capsule.

20. The product of claim 17, wherein the orally consumable product is a foodstuff composition selected from the group consisting of a confectionary composition, a condiment, a cereal composition, a baked good, and a dairy product.

21. The product of claim 17, wherein the orally consumable product is a carbonated or non-carbonated beverage product.

22. The product of claim 17, wherein the orally consumable product is a beverage product selected from the group consisting of a soft drink, a fountain beverage, a frozen and ready-to-drink beverage, coffee, tea, a dairy beverage, a powdered soft drink, a liquid concentrate, fruit juice, a sport drink, and an energy drink.

23. The product of any one of claims 17-22, further comprising one or more additives selected from the group consisting of a carbohydrate, a polyol, an amino acid or salt thereof, a poly-amino acid or salt thereof, a sugar acid or salt thereof, a nucleotide, an organic acid, an inorganic acid, an organic salt, an organic acid salt, an organic base salt, an inorganic salt, a bitter compound, a flavorant, a flavoring ingredient, an astringent compound, a protein, a protein hydrolysate, a surfactant, an emulsifier, a flavonoid, an alcohol, a polymer, and combinations thereof.

24. A method of preparing a composition, the method comprising combining a β-glucan preparation, a ginseng extract, and a mushroom extract into a composition, wherein the composition is formulated such that the β-glucan preparation is present in the range of 40% to 80% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract in the composition, the ginseng extract is present in the range of 10% to 30% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract in the composition, and the mushroom extract is present in the range of 1% to 20% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract in the composition.

25. The method of claim 24, wherein the β-glucan preparation is prepared from yeast extract.

26. The method of claim 25, wherein the yeast extract is obtained from *Saccharomyces cerevisiae*.

27. The method of any one of claims 24-26, wherein the β-glucan preparation is:

a) present at 60% to 80% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract, or;

b) present at 65% to 70% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract.

28. The method of any one of claims 24-27, wherein the concentration of β-glucan in the β-glucan preparation is:

a) in the range of 60% to 80% of the total dry weight of the preparation, or;

b) 60% to 75% of the total dry weight of the preparation, or;

c) at least 60%, 65%, 70%, or 80% of the total dry weight of the preparation.

29. The method of any one of claims 24-28, wherein the ginseng extract is prepared from Chinese ginseng or American ginseng.

30. The method of any one of claims 24-29, wherein the ginseng extract is:

a) present at 20% to 30% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract, or;

b) present at 20% to 25% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract, or;

c) 20%, 25%, or 30% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract.

31. The method of any one of claims 24-30, wherein the concentration of polysaccharides in the ginseng extract is:

a) 5% to 50% of the total dry weight of the ginseng extract, or;

b) 10% to 45% polysaccharides of the total dry weight of the ginseng extract, or;

c) 20% to 35% of total dry weight of the ginseng extract.

32. The method of any one of claims 24-31, wherein the mushroom extract is prepared from a mushroom selected from the group consisting of princess Matsutake mushroom, Reishi mushroom, Shitake mushroom, Enokie mushroom, and pine mushroom.

33. The method of any one of claims 24-32, wherein the mushroom extract is:

a) present at 5% to 15% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract, or;

b) present at 5% to 10% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract, or;

c) 5%, 7.5%, 10%, or 15% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract.

34. The method of any one of claims 24-33, wherein the concentration of polysaccharides in the mushroom extract is:

a) 30% to 55% of the total dry weight of the mushroom extract, or;

b) 30%, 35%, 40%, 45%, or 50% of the total dry weight of the mushroom extract.

35. The method of any one of claims 24-34, wherein the β-glucan preparation is present at 65% to 70% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract; the ginseng extract is from Chinese ginseng and is present at 20% to 25% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract, and; the mushroom extract is from princess Matsutake mushroom and is present at 5% to 10% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract.

36. The method of any one of claims 24-34, wherein the β-glucan preparation is present at 75% to 80% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract; the ginseng extract is from Chinese ginseng and is present at 15% to 20% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract, and; the mushroom extract is from princess Matsutake mushroom and is present at 1% to 5% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract.

37. The method of any one of claims 24-34, wherein the β-glucan preparation is present at 65% to 70% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract; the ginseng extract is from Chinese ginseng and is present at 10% to 15% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract, and; the mushroom extract is from princess Matsutake mushroom and is present at 15% to 20% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract.

38. The method of any one of claims 24-34, wherein the β-glucan preparation is present at 65% to 70% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract; the ginseng extract is from American ginseng and is present at 20% to 25% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract, and; the mushroom extract is from princess Matsutake mushroom and is present at 5% to 10% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract.

39. The method of any one of claims 24-34, wherein the β-glucan preparation is present at 65% to 70% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract; the ginseng extract is from Chinese ginseng and is present at 20% to 25% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract, and; the mushroom extract is from Reishi mushroom and is present at 5% to 10% of the total dry weight of the β-glucan preparation, the ginseng extract, and the mushroom extract.

40. The method of any one of claims 24-39, further comprising combining one or more additives into the composition.

41. The method of any one of claims 24-40, further comprising preparing the composition into an orally consumable product.

42. Use of the composition of any one of claims 1-16 or the product of any one of claims 17-23, in the manufacture of a medicament for enhancing an immune function in a subject.

43. The use of claim 42, wherein the subject is a human or other animal.

44. The use of any one of claims 42-43, wherein the enhanced immune function comprises enhanced lymphocyte proliferation and/or enhanced production of one or more cytokines.

45. The use of claim 44, wherein the one or more cytokines are selected from the group consisting of IFN-γ, IL-12, and IL-10.

46. A kit for enhancing immune function in a subject, the kit comprising the immunostimulatory composition of any one of claims 1-16 or the product of any one of claims 17-23.

47. The kit of claim 46, wherein the kit comprises instructions for administering the immunostimulatory composition to the subject.

48. Use of a composition comprising 220 mg to 250 mg of a β-glucan preparation, 75 to 90 mg of a ginseng extract, and 20 mg to 40 mg of a mushroom extract, in the manufacture of a medicament for enhancing an immune function in a subject, wherein the composition is to be administered once daily to said subject.

49. The use of claim 48, wherein the composition comprises (1) 220 mg, 230 mg, 240 mg, or 250 mg of a β-glucan preparation; and/or (2) 80 mg, 82 mg,

84 mg, 86 mg, 88 mg, or 90 mg of a ginseng extract; and/or (3) 20 mg, 25 mg, 30 mg, 33 mg, 35 mg, 38 mg, or 40 mg of a mushroom extract.

50. Use of a composition comprising 250 mg to 325 mg of a β-glucan preparation, 90 to 120 mg of a ginseng extract, and 30 mg to 50 mg of a mushroom extract, in the manufacture of a medicament for enhancing an immune function in a subject, wherein the composition is to be administered once daily to said subject.

51. The use of claim 50, wherein the composition comprises (1) 250 mg, 265 mg, 275 mg, 290 mg, 300 mg, 310 mg, or 325 mg of a β-glucan preparation; and/or (2) 90 mg, 95 mg, 100 mg, 105 mg, 110 mg, 115 mg, or 120 mg of a ginseng extract of a ginseng extract; and/or (3) 30 mg, 35 mg, 40 mg, 45 mg, or 50 mg of a mushroom extract.

52. Use of a composition comprising 150 mg to 200 mg β-glucans from a β-glucan preparation, 5 mg to 10 mg polysaccharides from a ginseng extract, and 8 mg to 16 mg polysaccharides from a mushroom extract, in the manufacture of a medicament for enhancing an immune function in a subject, wherein the composition is to be administered once daily to said subject.

53. The use of claim 52, wherein the composition comprises (1) 150 mg β-glucans, 175 mg β-glucans, or 200 mg β-glucans from a β-glucan preparation; and/or (2) 5 mg, 6 mg, 7 mg, 8 mg, 9 mg, or 10 mg polysaccharides from a ginseng extract; and/or (3) 8 mg, 9 mg, 10 mg, 11 mg, 12 mg, 13 mg, 14 mg, 15 mg, or 16 mg polysaccharides from a mushroom extract.

54. Use of a composition comprising 150 mg to 200 mg β-glucans from a β-glucan preparation, 20 mg to 30 mg polysaccharides from a ginseng extract, and 10 mg to 20 mg polysaccharides from a mushroom extract, in the manufacture of a

medicament for enhancing an immune function in a subject, wherein the composition is to be administered once daily to said subject.

55. The use of claim 54, wherein the composition comprises (1) 150 mg β-glucans, 175 mg β-glucans, or 200 mg β-glucans from a β-glucan preparation; and/or (2) 20 mg, 25 mg, or 30 mg polysaccharides from a ginseng extract; and/or (3) 10 mg, 12 mg, 14 mg, 16 mg, 18 mg, or 20 mg polysaccharides from a mushroom extract.

56. Use of a composition comprising 175 mg to 225 mg β-glucans from a β-glucan preparation, 25 mg to 45 mg polysaccharides from a ginseng extract, and 15 mg to 30 mg polysaccharides from a mushroom extract, in the manufacture of a medicament for enhancing an immune function in a subject, wherein the composition is to be administered once daily to said subject.

57. The use of claim 56, wherein the composition comprises (1) 175 mg β-glucans, 195 mg β-glucans, 200 mg β-glucans, 205 mg β-glucans, 210 mg β-glucans, 215 mg β-glucans, or 225 mg β-glucans from a β-glucan preparation; and/or (2) 25 mg, 28 mg, 30 mg, 32 mg, 35 mg, 38 mg, 40 mg, 42 mg, or 45 mg polysaccharides from a ginseng extract; and/or (3) 15 mg, 18 mg, 20 mg, 22 mg, 24 mg, 25 mg, or 30 mg polysaccharides from a mushroom extract.