Claims.

1. An ingestible composition comprising a prebiotic effective amount of a sphingan oligosaccharide (SOS).

2. The ingestible composition of claim 1,

wherein the amount of the sphingan SOS is selected from about 1 g to about 10 g, about 1 g to about 9 g, about 1 g to about 8 g, about 1 g to about 7 g, about 1 g to about 6 g, about 1 g to about 5 g, about 1 g to about 4 g, about 1 g to about 3 g, or about 2 g.; and

3. The ingestible composition of any one of claims 1-2, wherein the sphingan comprises a high, intermediate, or low acyl sphingan selected from a high acyl gellan, an intermediate acyl gellan, a low acyl gellan, a high acyl welan, an intermediate acyl welan, a low acyl welan, a high acyl rhamsan, an intermediate acyl rhamsan, a low acyl rhamsan, a high acyl diutan, an intermediate acyl diutan, a low acyl diutan, S-88, S-198, S-7, or a combination thereof.

4. The ingestible composition of any one of claims 1-2, wherein the sphingan comprises a high acyl sphingan polysaccharide, an intermediate acyl sphingan polysaccharide, a low acyl sphingan polysaccharide, or a combination thereof.

5. The ingestible composition of any one of claims 1-2, wherein the sphingan SOS comprises a high acyl sphingan oligosaccharide, an intermediate acyl sphingan oligosaccharide, a low acyl sphingan oligosaccharide, or a combination thereof.

62. The ingestible composition of any one of claims 1-2 claim 1, wherein the sphingan comprises a high, intermediate, or low acyl sphingan oligosaccharide (SOS) is obtained obtainable by a process, which comprises comprising:

preparing a first composition comprising a high/intermediate/low acyl sphingan or a high/intermediate/low acyl sphingan polysaccharide and a liquid medium;

hydrolyzing a glycosidic bond of the high/intermediate/low acyl sphingan or the high/intermediate/low acyl sphingan polysaccharide to obtain a second composition;

subjecting the second composition to ultrafiltration, size-exclusion chromatography, precipitation, centrifugation, or a combination thereof to obtain a third composition comprising the high/intermediate/low acyl SOS; and

optionally, isolating or recovering the third composition SOS.

3. The ingestible composition of claim 2, wherein said hydrolyzing is mediated by an acid, an enzyme, sonication, high-pressure homogenization, radiation, or a combination thereof.

4. The ingestible composition of claim 3, wherein the enzyme is a gellanase, a rhamnogalacturonan endolyase (EC 4.2.2.23), a rhamnogalacturonan exolyase (EC 4.2.2.24), a gellan lyase (EC 4.2.2.25), or a combination thereof.

5. The ingestible composition of claim 2, wherein said subjecting comprises filtering the second composition through a membrane having a molecular weight cutoff of 5 kDa to 10kDa to obtain a filtrate comprising the SOS.

~~7~~6. The ingestible composition of any one of claims ~~1-2 and 5-6~~ 1 to 5, wherein the ~~sphingan~~ SOS comprises a high/intermediate/low sphingan oligosaccharide selected from:

(i) a composition comprising Glc,GlcA, Glc,GlcA,Glyc, Glc,GlcA,Rha, Glc,GlcA,Rha,Glyc, Glc,GlcA,Rha,-H2O, Glc,Rha, Glc,Rha+28 , Glc2,GlcA, Glc2,GlcA,Rha, Glc2,GlcA,Rha,+28, Glc2,GlcA,Rha,Ac, Glc2,GlcA,Rha,Glyc, Glc2,GlcA,Rha,Glyc,+28, Glc2,GlcA,Rha,Glyc.-H2O, Glc2,GlcA,Rha,-H2O, Glc2,GlcA,Rha2,Glyc, Glc2,GlcA2,Rha, Glc2,GlcA2,Rha2,Ac2,Glyc2,-H2O, Glc2,Rha, Glc3,GlcA,Rha, Glc3,GlcA,Rha2, Glc3,GlcA,Rha2, Glc3,GlcA,Rha2, Glc3,GlcA,Rha2,Glyc, Glc3,GlcA2,Rha, Glc3,GlcA2,Rha,Glyc, Glc3,GlcA2,Rha2,Glyc, Glc3,GlcA3,Rha2, Glc3,GlcA3,Rha2, Glc4,GlcA,Rha2,+43, Glc4,GlcA,Rha2,Ac, Glyc, Glc4,GlcA2,Rha, Glc4,GlcA2,Rha,Ac,Glyc,-H2O, Glc4,GlcA2,Rha,Ac,Glyc2, Glc4,GlcA2,Rha2,Ac,Glyc, Glc4,GlcA2,Rha2,Glyc, Glc4,GlcA3,Rha2, Glc4,GlcA2,Rha3,Ac, Glc4,GlcA3,Rha2/Glc4,GlcA2,Rha2,Glyc2, Glc5,GlcA2,Rha2, Glc5,GlcA2,Rha2, Glc5,GlcA2,Rha2,Ac, Glc5,GlcA4,Rha2, Glc6,GlcA3,Rha3, Glc(Ac/Glyc)x,GlcAx,Glcx,Rhax (where x is 4 to ~~about~~ 25), Glcx,GlcAx,Glcx,Rhax (where x is 4 to ~~about~~ 25), or a combination thereof;

(ii) a composition comprising a tetramer (Glc,GlcA,Glc,Rha), a tetramer (Glc,GlcA,Glc,Rha) with acetate and/or glycerate, an octamer (Glc,GlcA,Glc,Rha,Glc,GlcA,Glc,Rha), an octamer (Glc,GlcA,Glc,Rha,Glc,GlcA,Glc,Rha) with acetate and/or glycerate, Glc,GlcA,Glc, Rha,Glc,GlcA, Glc,Rha;

(iii) a composition comprising a tetramer (Glc,GlcA,Glc,Rha), an octamer (Glc,GlcA,Glc,Rha,Glc,GlcA,Glc,Rha), a pentamer (Glc,GlcA,Glc,Rha,Glc), GlcA,Glc,Rha, Glc,GlcA,Glc, Glc,GlcA;

(iv) a composition comprising Glc(Glc-Glc),GlcA, Glc(Glc-Glc), GlcA,Glc, Glc,Glc;

(v) a composition comprising a tetramer (Glc,GlcA,Glc,Rha), GlcA,Glc,(Rha-Rha), Glc,(Rha-Rha),Rha, GlcA,Glc,Rha, Glc,GlcA,Glc, Rha,Glc, GlcA,Glc;

(vi) a composition comprising Glc,GlcA, Glc,GlcA,Glyc, Glc,GlcA,Rha, Glc,GlcA,Rha,Glyc, Glc,Rha, Glc,Rha+28 , Glc2,GlcA, Glc2,GlcA,Rha, Glc2,GlcA,Rha,+28, Glc2,GlcA,Rha,Ac, Glc2,GlcA,Rha,Glyc, Glc2,GlcA,Rha,Glyc,+28, Glc3,GlcA,Rha, Glc3,GlcA,Rha2, Glc3,GlcA,Rha2, Glc3,GlcA,Rha2, Glc3,GlcA,Rha2,Glyc, Glc3,GlcA2,Rha,Glyc, Glc3,GlcA2,Rha2,Glyc, Glc3,GlcA3,Rha2, Glc4,GlcA,Rha2,Ac, Glyc, Glc4,GlcA2,Rha2,Ac,Glyc, Glc4,GlcA2,Rha2,Glyc, Glc4,GlcA2,Rha3,Ac, Glc4,GlcA3,Rha2/Glc4,GlcA2,Rha2,Glyc2, Glc5,GlcA2,Rha2, Glc5,GlcA2,Rha2,Ac, Glc(Ac/Glyc)x,GlcAx,Glcx,Rhax (where x is 4 to ~~about~~ 25), or a combination thereof;

(vii) a composition comprising Glc,GlcA, Glc,GlcA,Rha, Glc,Rha, Glc,Rha+28 , Glc2,GlcA,Rha, Glc2,GlcA,Rha,+28, Glc2,GlcA2,Rha, Glc3,GlcA,Rha, Glc3,GlcA,Rha2, Glc3,GlcA2,Rha, Glc3,GlcA3,Rha2, Glc3,GlcA3,Rha2, Glc4,GlcA,Rha2,+43, Glc4,GlcA2,Rha, Glc4,GlcA3,Rha2, Glc5,GlcA2,Rha2, Glc5,GlcA2,Rha2, Glc5,GlcA4,Rha2, Glc6,GlcA3,Rha3, Glc(Ac/Glyc)x,GlcAx,Glcx,Rhax (where x is 4 to ~~about~~ 25), or a combination thereof;

(viii) a composition comprising Glc,GlcA,Rha,-H2O, Glc,Rha, Glc2,GlcA,Rha,-H2O, Glc2,Rha; and

(ix) a composition comprising Glc,GlcA, Glc,GlcA,Glyc, Glc,GlcA,Rha, Glc,GlcA,Rha,Glyc, Glc,Rha, Glc,Rha+28 , Glc2,GlcA, Glc2,GlcA,Rha, Glc2,GlcA,Rha,+28, Glc2,GlcA,Rha,Ac, Glc2,GlcA,Rha,Glyc, Glc2,GlcA,Rha,Glyc,+28, Glc2,GlcA,Rha,Glyc.-H2O, Glc2,GlcA,Rha2,Glyc, Glc2,GlcA2,Rha2,Ac2,Glyc2,-H2O, Glc3,GlcA,Rha, Glc3,GlcA,Rha2, Glc3,GlcA,Rha2,Glyc, Glc3,GlcA2,Rha,Glyc, Glc3,GlcA2,Rha2,Glyc, Glc3,GlcA3,Rha2, Glc4,GlcA,Rha2,+43, Glc4,GlcA,Rha2,Ac, Glyc,

Glc4,GlcA2,Rha,Ac,Glyc,-H2O, Glc4,GlcA2,Rha,Ac,Glyc2, Glc4,GlcA2,Rha2,Ac,Glyc, Glc4,GlcA2,Rha2,Glyc, Glc4,GlcA3,Rha2, Glc4,GlcA2,Rha3,Ac, Glc4,GlcA3,Rha2/Glc4,GlcA2,Rha2,Glyc2, Glc5,GlcA2,Rha2, Glc5,GlcA2,Rha2,Ac, Glc(Ac/Glyc)x,GlcAx,Glcx,Rhax (where x is 4 to ~~about~~ 25), or a combination thereof;

or a combination thereof.

~~8~~7. ~~A method for~~

~~(A)~~ Use of an effective schedule of the ingestible composition according to any one of claims 1 to 6 and an ingestible medium for promoting beneficial bacterial growth in the colon of a human ~~mammal, said method comprising ingesting on an effective schedule a beneficial bacterial growth effective amount of a sphingan and an ingestible medium;~~

~~(B) decreasing propionate and/or increasing butyrate levels in the colon of a mammal, said method comprising: ingesting on an effective schedule a composition comprising an effective amount of a sphingan and an ingestible medium;~~

~~(C) improving intestinal barrier integrity in the colon of a mammal, said method comprising: ingesting on an effective schedule a composition comprising an intestinal barrier integrity effective amount of a sphingan and an ingestible medium; or~~

~~(D) reducing levels of TNF-α and/or IL-8 in the colon of a mammal, said method comprising: ingesting on an effective schedule a composition comprising a TNF-α and/or IL-8 reducing effective amount of a sphingan and an ingestible medium~~.

~~9~~8. The ~~method~~ use of claim ~~8~~7, wherein ~~the mammal is a human and~~ the amount of the ~~sphingan~~ SOS is selected from ~~about~~ 10 mg/kg to ~~about~~ 150 mg/kg, ~~about~~ 10 mg/kg to ~~about~~ 140 mg/kg, ~~about~~ 10 mg/kg to ~~about~~ 130 mg/kg, ~~about~~ 10 mg/kg to ~~about~~ 120 mg/kg, ~~about~~ 10 mg/kg to ~~about~~ 110 mg/kg, ~~about~~ 10 mg/kg to ~~about~~ 100 mg/kg, ~~about~~ 10 mg/kg to ~~about~~ 90 mg/kg, ~~about~~ 10 mg/kg to ~~about~~ 80 mg/kg, ~~about~~ 10 mg/kg to ~~about~~ 70 mg/kg, ~~about~~ 10 mg/kg to ~~about~~ 60 mg/kg, 10 mg/kg to ~~about~~ 50 mg/kg, ~~about~~ 10 mg/kg to ~~about~~ 40 mg/kg, or ~~about~~ 20 mg/kg to ~~about~~ 30 mg/kg of the human ingesting the composition.

~~10. The method of any one of claims 8-9, wherein the sphingan comprises a high, intermediate, or low acyl sphingan selected from a high acyl gellan, an intermediate acyl~~

gellan, a low acyl gellan, a high acyl welan, an intermediate acyl welan, a low acyl welan, a high acyl rhamsan, an intermediate acyl rhamsan, a low acyl rhamsan, a high acyl diutan, an intermediate acyl diutan, a low acyl diutan, S-88, S-198, S-7, or a combination thereof.

11. The method of any one of claims 8-9, wherein the sphingan comprises a high acyl sphingan polysaccharide, an intermediate acyl sphingan polysaccharide, a low acyl sphingan polysaccharide, or a combination thereof.

12. The method of any one of claims 8-9, wherein the sphingan comprises a high acyl sphingan oligosaccharide, an intermediate acyl oligosaccharide, a low acyl sphingan oligosaccharide, or a combination thereof.

13. The method of any one of claims 8-9, wherein the sphingan comprises a high, intermediate, or low acyl sphingan oligosaccharide (SOS) obtained by a process, which comprises:

preparing a first composition comprising a high/intermediate/low acyl sphingan or a high/intermediate/low acyl sphingan polysaccharide and a liquid medium;

hydrolyzing a glycosidic bond of the high/intermediate/low acyl sphingan or the high/intermediate/low acyl sphingan polysaccharide to obtain a second composition;

subjecting the second composition to ultrafiltration, size-exclusion chromatography, precipitation, centrifugation, or a combination thereof to obtain a third composition comprising the high/intermediate/low acyl SOS; and

optionally, isolating or recovering the third composition.

14. The method of any one of claims 8-9 and 12-13, wherein the sphingan comprises a high/intermediate/low acyl sphingan oligosaccharide selected from

(i) a composition comprising Glc,GlcA, Glc,GlcA,Glyc, Glc,GlcA,Rha, Glc,GlcA,Rha,Glyc, Glc,GlcA,Rha, H2O, Glc,Rha, Glc,Rha+28 , Glc2,GlcA, Glc2,GlcA,Rha, Glc2,GlcA,Rha,+28, Glc2,GlcA,Rha,Ac, Glc2,GlcA,Rha,Glyc, Glc2,GlcA,Rha,Glyc,+28, Glc2,GlcA,Rha,Glyc.-H2O, Glc2,GlcA,Rha,-H2O, Glc2,GlcA,Rha2,Glyc, Glc2,GlcA2,Rha, Glc2,GlcA2,Rha2,Ac2,Glyc2, H2O, Glc2,Rha, Glc3,GlcA,Rha, Glc3,GlcA,Rha2, Glc3,GlcA,Rha2, Glc3,GlcA,Rha2, Glc3,GlcA,Rha2,Glyc, Glc3,GlcA2,Rha, Glc3,GlcA2,Rha,Glyc, Glc3,GlcA2,Rha2,Glyc, Glc3,GlcA3,Rha2, Glc3,GlcA3,Rha2, Glc4,GlcA,Rha2,+43,

~~Glc4,GlcA,Rha2,Ac, Glyc, Glc4,GlcA2,Rha, Glc4,GlcA2,Rha,Ac,Glyc, H2O, Glc4,GlcA2,Rha,Ac,Glyc2, Glc4,GlcA2,Rha2,Ac,Glyc, Glc4,GlcA2,Rha2,Glyc, Glc4,GlcA3,Rha2, Glc4,GlcA2,Rha3,Ac, Glc4,GlcA3,Rha2/Glc4,GlcA2,Rha2,Glyc2, Glc5,GlcA2,Rha2, Glc5,GlcA2,Rha2, Glc5,GlcA2,Rha2,Ac, Glc5,GlcA4,Rha2, Glc6,GlcA3,Rha3, Glc(Ac/Glyc)x,GlcAx,Glcx,Rhax (where x is 4 to about 25), Glcx,GlcAx,Glcx,Rhax (where x is 4 to about 25), or a combination thereof;~~

~~(ii) a composition comprising a tetramer (Glc,GlcA,Glc,Rha), a tetramer (Glc,GlcA,Glc,Rha) with acetate and/or glycerate, an octamer (Glc,GlcA,Glc,Rha,Glc,GlcA,Glc,Rha), an octamer (Glc,GlcA,Glc,Rha,Glc,GlcA,Glc,Rha) with acetate and/or glycerate, Glc,GlcA,Glc, Rha,Glc,GlcA, Glc,Rha;~~

~~(iii) a composition comprising a tetramer (Glc,GlcA,Glc,Rha), an octamer (Glc,GlcA,Glc,Rha,Glc,GlcA,Glc,Rha), a pentamer (Glc,GlcA,Glc,Rha,Glc), GlcA,Glc,Rha, Glc,GlcA,Glc, Glc,GlcA;~~

~~(iv) a composition comprising Glc(Glc-Glc),GlcA, Glc(Glc-Glc), GlcA,Glc, Glc,Glc;~~

~~(v) a composition comprising a tetramer (Glc,GlcA,Glc,Rha), GlcA,Glc,(Rha-Rha), Glc,(Rha-Rha),Rha, GlcA,Glc,Rha, Glc,GlcA,Glc, Rha,Glc, GlcA,Glc;~~

~~(vi) a composition comprising Glc,GlcA, Glc,GlcA,Glyc, Glc,GlcA,Rha, Glc,GlcA,Rha,Glyc, Glc,Rha, Glc,Rha+28 , Glc2,GlcA, Glc2,GlcA,Rha, Glc2,GlcA,Rha,+28, Glc2,GlcA,Rha,Ac, Glc2,GlcA,Rha,Glyc, Glc2,GlcA,Rha,Glyc,+28, Glc3,GlcA,Rha, Glc3,GlcA,Rha2, Glc3,GlcA,Rha2, Glc3,GlcA,Rha2, Glc3,GlcA,Rha2,Glyc, Glc3,GlcA2,Rha,Glyc, Glc3,GlcA2,Rha2,Glyc, Glc3,GlcA3,Rha2, Glc4,GlcA,Rha2,Ac, Glyc, Glc4,GlcA2,Rha2,Ac,Glyc, Glc4,GlcA2,Rha2,Glyc, Glc4,GlcA2,Rha3,Ac, Glc4,GlcA3,Rha2/Glc4,GlcA2,Rha2,Glyc2, Glc5,GlcA2,Rha2, Glc5,GlcA2,Rha2,Ac, Glc(Ac/Glyc)x,GlcAx,Glcx,Rhax (where x is 4 to about 25), or a combination thereof;~~

~~(vii) a composition comprising Glc,GlcA, Glc,GlcA,Rha, Glc,Rha, Glc,Rha+28 , Glc2,GlcA,Rha, Glc2,GlcA,Rha,+28, Glc2,GlcA2,Rha, Glc3,GlcA,Rha, Glc3,GlcA,Rha2, Glc3,GlcA2,Rha, Glc3,GlcA3,Rha2, Glc3,GlcA3,Rha2, Glc4,GlcA,Rha2,+43, Glc4,GlcA2,Rha, Glc4,GlcA3,Rha2, Glc5,GlcA2,Rha2,~~

~~Glc5,GlcA2,Rha2, Glc5,GlcA4,Rha2, Glc6,GlcA3,Rha3, Glc(Ac/Glyc)x,GlcAx,Glcx,Rhax (where x is 4 to about 25), or a combination thereof;~~

~~(viii) a composition comprising Glc,GlcA,Rha,-H2O, Glc,Rha, Glc2,GlcA,Rha,-H2O, Glc2,Rha;~~

~~(ix) a composition comprising Glc,GlcA, Glc,GlcA,Glyc, Glc,GlcA,Rha, Glc,GlcA,Rha,Glyc, Glc,Rha, Glc,Rha+28 , Glc2,GlcA, Glc2,GlcA,Rha, Glc2,GlcA,Rha,+28, Glc2,GlcA,Rha,Ac, Glc2,GlcA,Rha,Glyc, Glc2,GlcA,Rha,Glyc,+28, Glc2,GlcA,Rha,Glyc. H2O, Glc2,GlcA,Rha2,Glyc, Glc2,GlcA2,Rha2,Ac2,Glyc2, H2O, Glc3,GlcA,Rha, Glc3,GlcA,Rha2, Glc3,GlcA,Rha2,Glyc, Glc3,GlcA2,Rha,Glyc, Glc3,GlcA2,Rha2,Glyc, Glc3,GlcA3,Rha2, Glc4,GlcA,Rha2,+43, Glc4,GlcA,Rha2,Ac, Glyc, Glc4,GlcA2,Rha,Ac,Glyc, H2O, Glc4,GlcA2,Rha,Ac,Glyc2, Glc4,GlcA2,Rha2,Ac,Glyc, Glc4,GlcA2,Rha2,Glyc, Glc4,GlcA3,Rha2, Glc4,GlcA2,Rha3,Ac, Glc4,GlcA3,Rha2/Glc4,GlcA2,Rha2,Glyc2, Glc5,GlcA2,Rha2, Glc5,GlcA2,Rha2,Ac, Glc(Ac/Glyc)x,GlcAx,Glcx,Rhax (where x is 4 to about 25), or a combination thereof;~~

~~or a combination thereof.~~

~~15. The method of claim 8, wherein the sphingan comprises a native sphingan and the bacteria is *Bifidobacteriaceae.*~~

~~16~~9. The ~~method~~ use of claim ~~15~~7, wherein the ~~sphingan~~ SOS comprises a gellan oligosaccharide obtained from a gellan gum.

~~17. The method of claim 8, wherein the mammal is a human and the *Bifidobacteriaceae* levels increase in the lumen of the proximal colon range from (a) about 20% to about 180% during treatment compared to control or (b) from about 330% to about 590% during treatment compared to untreated control.~~

~~18. The method of claim 8, wherein the mammal is a human and the sphingan comprises a high/low acyl sphingan oligosaccharide and the bacteria is *Blautia*, *Parabacteroides*, *Faecalibacterium*, *Clostridium XVIII, or a combination thereof.*~~

~~19. The method of claim 18, wherein one or more of the following occurs:~~

~~(a) the *Blautia* levels increase up to at least about 5-fold compared to untreated control~~

(b) the *Parabacteroides* levels increase from about 2-fold to about 40-fold compared to untreated control.

(c) the *Faecalibacterium* levels increase from about 10-fold to about 190-fold during treatment compared to untreated control, and

(d) the *Clostridium XVIII* levels increase from about 12-fold to about 60-fold compared to untreated control.

20. A process for preparing a high/intermediate/low acyl sphingan oligosaccharide ("SOS") as in any one of the preceding claims, which comprises:

preparing a first composition comprising a high/intermediate/low acyl sphingan or a high/intermediate/low acyl sphingan polysaccharide and a liquid medium;

hydrolyzing a glycosidic bond of the high/intermediate/low acyl sphingan or the high/intermediate/low acyl sphingan polysaccharide to obtain a second composition;

subjecting the second composition to ultrafiltration, size-exclusion chromatography, precipitation, centrifugation, or a combination thereof to obtain a third composition comprising the high/intermediate/low acyl SOS; and

optionally, isolating or recovering the third composition.

21. The process of claim 20, wherein said hydrolyzing is mediated by an acid, an enzyme, sonication, high-pressure homogenization, radiation, or a combination thereof.

22. The process of claim 21, wherein the enzyme is a gellanase, a rhamnogalacturonan endolyase (EC 4.2.2.23), a rhamnogalacturonan exolyase (EC 4.2.2.24), a gellan lyase (EC 4.2.2.25), or a combination thereof.

23. The process of claim 21, wherein said subjecting comprises filtering the second composition through a membrane having a molecular weight cutoff of either about 5 kDa or about 10kDa to obtain a filtrate comprising the third composition.

24. A composition comprising the SOS as prepared by any one of claims 20-23.