for improving the health of the woman, improving the lean body mass development and formation of the offspring, and reducing long term adverse health effects, including obesity, glucose intolerance, related co-morbidities associated to metabolic syndrome (cardiovascular disease and hypertension), sarcopenia, and sarcopenic obesity in the offspring later in life. Specifically, the present disclosure is directed to the administration of a carbohydrate system comprising a slow rate of digestion simple carbohydrate, such as isomaltulose, and a complex carbohydrate, such as a maltodextrin, in combination with a non-absorbent carbohydrate, such as an insoluble dietary fiber, and/or an indigestible carbohydrate, such as fructooligosaccharides, to a pregnant woman, and optionally to the woman during lactation, to improve the health of the woman, improve lean body mass development and formation in the offspring, and reduce long term adverse health effects, such as obesity, sarcopenia, sarcopenic obesity, glucose intolerance, and related co-morbidities associated to metabolic syndrome (cardiovascular disease and hypertension) later in life in the offspring. In addition to the substantial long term health benefits that the carbohydrate system can provide the offspring, the system may also provide the pregnant or pregnant and then lactating mother with improved glycemia and insulinemia during gestational and lactation periods, which may not only benefit the mother's health during these periods, but may also benefit the offspring.

[0007a] In one aspect, there is provided use of the combination of a slow rate of digestion simple carbohydrate, a complex carbohydrate, a nonabsorbent carbohydrate, and an indigestible oligosaccharide for the manufacture of a medicament for use in the treatment of a pregnant woman wherein the treatment results in an improvement in the health of the offspring of the pregnant woman.

[0007b] In one aspect, there is provided a nutritional composition comprising a carbohydrate system, the carbohydrate system comprising:

(a) a complex carbohydrate selected from the group consisting of a maltodextrin, corn starch, rice starch, wheat starch, and combinations thereof,

(b) a nonabsorbent carbohydrate selected from the group consisting of inulin, dietary insoluble fibers, digestion resistant maltodextrins, and combinations thereof,

(c) isomaltulose, and

(d) an indigestible oligosaccharide selected from the group consisting of fructooligosaccharides, galactooligosaccharides, trans-galactooligosaccharides, xylooligosaccharides, and combinations thereof.

[0008] Thus, in one embodiment, the present disclosure is directed to a method of reducing sarcopenia later in the life of an offspring. The method comprises administering to a pregnant woman a nutritional composition comprising a carbohydrate system. The carbohydrate system comprises a slow rate of digestion simple carbohydrate, a complex carbohydrate, a nonabsorbent carbohydrate, and an indigestible oligosaccharide.

[0009] In another embodiment, the present disclosure is directed to a method of improving lean body mass development and formation in an offspring. The method comprises administering to a pregnant woman a nutritional composition comprising a carbohydrate system. The carbohydrate system comprises a slow rate of digestion simple carbohydrate, a complex carbohydrate, a nonabsorbent carbohydrate, and an indigestible oligosaccharide.

[0010] Thus, in one embodiment, the present disclosure is directed to a method of reducing obesity later in the life of an offspring. The method comprises administering to a pregnant woman a nutritional composition comprising a carbohydrate system. The

WHAT IS CLAIMED IS:

1. The combination of a slow rate of digestion simple carbohydrate, a complex carbohydrate, a nonabsorbent carbohydrate, and an indigestible oligosaccharide for use in a method of treating a pregnant woman wherein the method results in an improvement in the health of the offspring of the pregnant woman.

2. The combination according to claim 1, wherein the improvement in the health of the offspring is a reduction in at least one long term adverse health effect.

3. The combination according to claim 2, wherein the long term adverse health effect comprises one or more of sarcopenia, obesity, and glucose intolerance.

4. The combination according to claim 1, wherein the improvement in the health of the offspring is an improvement in lean body mass development and formation of the offspring.

5. The combination according to any of claims 1-4, wherein the method includes administration of the combination to the woman during a period of lactation.

6. The combination according to claim 1 wherein at least one of the following is met:

(a) the complex carbohydrate is selected from the group consisting of a maltodextrin, corn starch, rice starch, wheat starch, and combinations thereof,

(b) the nonabsorbent carbohydrate is selected from the group consisting of inulin, dietary insoluble fibers, digestion resistant maltodextrins, and combinations thereof,

(c) the slow rate of digestion simple carbohydrate is selected from the group consisting of isomaltulose, sucromalt, and combinations thereof,

(d) the indigestible oligosaccharide is selected from the group consisting of fructooligosaccharides, galactooligosaccharides, trans-galactooligosaccharides, xylooligosaccharides, and combinations thereof.

7. The combination according to claim 6, wherein the maltodextrin has a Dextrose Equivalent of from 9 to 16.

8. The combination according to claim 1, wherein the use includes daily administration of the combination for at least the last three months of the pregnancy.

9. The combination according to claim 1, wherein the use includes consumption of from about 20 to about 175 grams of the combination per day.

10. The combination according to claim 1, comprising from about 40% to about 80% by weight slow rate of digestion simple carbohydrate, from about 1% to about 15% by weight complex carbohydrate, from about 5% to about 25% by weight nonabsorbent carbohydrate, and from about 1% to about 20% by weight indigestible carbohydrate.

11. The combination according to any one of claims 1-10, wherein the combination is incorporated into a nutritional composition suitable for oral consumption.

12. Use of the combination of a slow rate of digestion simple carbohydrate, a complex carbohydrate, a nonabsorbent carbohydrate, and an indigestible oligosaccharide for the manufacture of a medicament for use in the treatment of a pregnant woman wherein the treatment results in an improvement in the health of the offspring of the pregnant woman.

13. Use according to claim 12, wherein the improvement in the health of the offspring is a reduction in at least one long term adverse health effect.

14. Use according to claim 13, wherein the long term adverse health effect comprises one or more of sarcopenia, obesity, and glucose intolerance.

15. Use according to claim 12, wherein the improvement in the health of the offspring is an improvement in lean body mass development and formation of the offspring.

16. Use according to claim 12, wherein the treatment includes administering the medicament to the woman during a period of lactation.

17. Use according to claim 12, wherein at least one of the following is met:

(a) the complex carbohydrate is selected from the group consisting of a maltodextrin, corn starch, rice starch, wheat starch, and combinations thereof,

(b) the nonabsorbent carbohydrate is selected from the group consisting of inulin, dietary insoluble fibers, digestion resistant maltodextrins, and combinations thereof,

(c) the slow rate of digestion simple carbohydrate is selected from the group consisting of isomaltulose, sucromalt, and combinations thereof,

(d) the indigestible oligosaccharide is selected from the group consisting of fructooligosaccharides, galactooligosaccharides, trans-galactooligosaccharides, xylooligosaccharides, and combinations thereof.

18. Use according to claim 17, wherein the maltodextrin has a Dextrose Equivalent of from 9 to 16.

19. Use according to claim 12, wherein the medicament is administered daily for at least the last three months of the pregnancy.

20. Use according to claim 12, wherein about 20 to about 175 grams of the combination is consumed by the woman per day.

21. Use according to claim 12, wherein the combination comprises from about 40% to about 80% by weight slow rate of digestion simple carbohydrate, from about 1% to about 15% by weight complex carbohydrate, from about 5% to about 25% by weight nonabsorbent carbohydrate, and from about 1% to about 20% by weight indigestible carbohydrate.

22. Use according to any one of claims 12-21, wherein the medicament is a nutritional composition suitable for oral consumption.

WHAT IS CLAIMED IS:

1. Use of the combination of a slow rate of digestion simple carbohydrate, a complex carbohydrate, a nonabsorbent carbohydrate, and an indigestible oligosaccharide for the manufacture of a medicament for use in the treatment of a pregnant woman wherein the treatment results in an improvement in the health of the offspring of the pregnant woman.

2. Use according to claim 1, wherein the improvement in the health of the offspring is a reduction in one or more of sarcopenia, obesity, and glucose intolerance.

3. Use according to claim 1, wherein the improvement in the health of the offspring is a reduction in one or more of cardiovascular disease and hypertension.

4. Use according to claim 1, wherein the improvement in the health of the offspring is an improvement in lean body mass development and formation of the offspring.

5. Use according to claim 1, wherein the medicament is to be administered to the woman during a period of lactation.

6. Use according to claim 1, wherein at least one of the following is met:

(a) the complex carbohydrate is selected from the group consisting of a maltodextrin, corn starch, rice starch, wheat starch, and combinations thereof,

(b) the nonabsorbent carbohydrate is selected from the group consisting of inulin, dietary insoluble fibers, digestion resistant maltodextrins, and combinations thereof,

(c) the slow rate of digestion simple carbohydrate is selected from the group consisting of isomaltulose, sucromalt, and combinations thereof,

(d) the indigestible oligosaccharide is selected from the group consisting of fructooligosaccharides, galactooligosaccharides, trans-galactooligosaccharides, xylooligosaccharides, and combinations thereof.

7. Use according to claim 6, wherein the maltodextrin has a Dextrose Equivalent of from 9 to 16.

8. Use according to claim 1, wherein the medicament is administered daily for at least the last three months of the pregnancy.

9. Use according to claim 1, wherein about 20 to about 175 grams of the combination is consumed by the woman per day.

10. Use according to claim 1, wherein the combination comprises from about 40% to about 80% by weight slow rate of digestion simple carbohydrate, from about 1% to about 15% by weight complex carbohydrate, from about 5% to about 25% by weight nonabsorbent carbohydrate, and from about 1% to about 20% by weight indigestible carbohydrate.

11. Use according to any one of claims 1-10, wherein the medicament is a nutritional composition suitable for oral consumption.

12. A nutritional composition comprising a carbohydrate system, the carbohydrate system comprising:

(a) a complex carbohydrate selected from the group consisting of a maltodextrin, corn starch, rice starch, wheat starch, and combinations thereof,

(b) a nonabsorbent carbohydrate selected from the group consisting of inulin, dietary insoluble fibers, digestion resistant maltodextrins, and combinations thereof,

(c) isomaltulose, and

(d) an indigestible oligosaccharide selected from the group consisting of fructooligosaccharides, galactooligosaccharides, trans-galactooligosaccharides, xylooligosaccharides, and combinations thereof.

13. The nutritional composition of claims 12, wherein the slow rate of digestion simple carbohydrate is isomaltulose

14. The nutritional composition of claim 13, wherein the complex carbohydrate is maltodextrin, the indigestible oligosaccharide is fructooligosaccharides, and the nonabsorbent carbohydrate is an insoluble fiber.

15. The nutritional composition of any one of claims 12 to 14, further comprising at least one of fat and protein.

16. The nutritional composition of any one of claims 12 to 15, wherein the nutritional composition is a nutritional liquid.

17. The nutritional composition of any one of claims 12 to 15, wherein the nutritional composition is an emulsion.

18. The nutritional composition of claim 12 further comprising sucromalt.

19. Use of a composition according to any one of claims 12-18 for the manufacture of a medicament for treating a pregnant woman wherein the treatment results in an improvement in the health of the offspring of the pregnant woman, wherein said improvement is a reduction in one or more of cardiovascular disease and hypertension.