COMPOSITIONS COMPRISING POLAR LIPIDS FOR MAINTAINING OR INCREASING MOBILITY AND VITALITY

FIELD OF THE INVENTION

[0001] The present invention relates to the use of polar lipids, in particular, polar lipids derived from milk, to maintain or increase mobility and vitality. Methods for using the polar lipids and compositions comprising the polar lipids are also provided.

BACKGROUND TO THE INVENTION

[0002] There is a progressive decline in muscle mass, strength, function and power that begins around the age of 40-45 years and accelerates in later life (Doherty. J Appl Physiol (1985). 2003 Oct;95(4):1717-27; Janssen et al. J Appl Physiol (1985). 2000 Jul;89(1):81-8; Lindle et al. J Appl Physiol (1985). 1997 Nov;83(5):1581-7). Clinically, age-related muscle loss is significant because it is associated with impairments in mobility and vitality and with an increased risk for falls and fractures and other common chronic metabolic diseases (Fielding et al., J Am Med Dir Assoc. 2011 May;12(4):24956; Cruz-Jentoft et al., Age Ageing. 2018 Oct 12).

[0003] Current consensus guidelines and expert opinion recommend regular exercise, particularly progressive resistance training (PRT), and an adequate intake of food and vitamins. At present, there are no pharmaceutical agents available to prevent muscle loss or functional decline.

[0004] There remains a need for methods and compositions to maintain or increase mobility and vitality.

[0005] It is an object of the present invention to go some way towards meeting this need, or to at least provide the public with a useful choice.

SUMMARY

[0006] In one aspect, the present disclosure provides a non-therapeutic method of maintaining or increasing mobility and/or vitality in a subject, the method comprising daily administration of a composition comprising milk fat globule membrane material comprising one or more polar lipids for a period of at least three months, wherein

(a) maintaining or increasing mobility comprises:

(i) increasing muscle power comprising increasing countermovement jump height by at least 0.65 cm and/or increasing countermovement jump power-to-weight ratio by at least 6.75%, wherein the subject is undertaking exercise on at least two days per week compared with performance of the subject before daily administration of the composition commenced, and/or

(ii) maintaining or increasing trunk lean muscle mass and/or maintaining or reducing trunk fat mass; and

(b) maintaining or increasing vitality comprises:

(i) increasing daily activity and decreasing sedentary time in a subject; or

(ii) decreasing sedentary time by at least 7 minutes per day and/or increasing light intensity physical activity time by at least 3 minutes per day, wherein the subject is undertaking exercise on at least two days per week compared with sedentary and/or light intensity physical activity time per day for the subject before daily administration of the composition commenced.

In one example the disclosure relates to a method of maintaining or increasing mobility and/or vitality in a subject, the method comprising administration of a composition comprising one or more polar lipids to a subject.

[0007] In another example the disclosure relates to use of one or more polar lipids in the manufacture of a composition or medicament for maintaining or increasing mobility and/or vitality in a subject.

CLAIMS

1. A non-therapeutic method of maintaining or increasing mobility and/or vitality in a subject, the method comprising a composition comprising milk fat globule membrane material comprising one or more polar lipids to be administered daily for a period of at least three months, wherein

(a) maintaining or increasing mobility comprises:

(i) increasing muscle power comprising increasing countermovement jump height by at least 0.65 cm and/or increasing countermovement jump power-to-weight ratio by at least 6.75%, wherein the subject is undertaking exercise on at least two days per week compared with performance of the subject before daily administration of the composition commenced, and/or

(ii) maintaining or increasing trunk lean muscle mass and/or maintaining or reducing trunk fat mass; and

(b) maintaining or increasing vitality comprises:

(i) increasing daily activity and decreasing sedentary time in a subject; or

(ii) decreasing sedentary time by at least 7 minutes per day and/or increasing light intensity physical activity time by at least 3 minutes per day, wherein the subject is undertaking exercise on at least two days per week compared with sedentary and/or light intensity physical activity time per day for the subject before daily administration of the composition commenced.

2. The non-therapeutic method of claim 1, wherein

(a) countermovement jump height is increased by at least 0.7, 0.8, 0.9 or 1 cm or from 0.65 to 4 cm, and/or

(b) countermovement jump power-to-weight ratio is increased by at least 6.8, 6.9, 7, or 7.2%

, and wherein the subject is undertaking exercise on at least two days per week compared with performance of the subject before daily administration of the composition commenced.

3. The non-therapeutic method of claim 1, wherein trunk lean muscle mass is increased by at least 0.25, 0.3, 0.4 or 0.5 kg or from 0.25 to 1 kg, following administration of the

composition daily for a period of at least three or four months and wherein the subject is undertaking exercise on at least two days per week compared with trunk lean muscle mass in the subject before administration of the composition commenced.

4. The non-therapeutic method of claim 1, wherein

(a) sedentary time is decreased by at least 10, 15 or 20 minutes per day, and/or

(b) light intensity physical activity time is increased by at least 5, 7 or 10 minutes per day

wherein the subject is undertaking exercise on at least two days per week compared with sedentary and/or light intensity physical activity time per day for the subject before daily administration of the composition commenced.

5. The non-therapeutic method of claim 1 wherein maintaining or increasing vitality further comprises

(a) increasing moderate-vigorous physical activity time by at least 1.25, 1.5, 2.5, 3 or 5 minutes per day, and/or

(b) increasing the score of the subject on the subjective vitality scale by at least 2.6, 2.75, 3, or 3.25,

wherein the subject is undertaking exercise on at least two days per week compared with moderate-vigorous physical activity time per day and/or score for the subject before daily administration of the composition commenced.

6. The non-therapeutic method of any one of claims 1 to 5, wherein the subject is aged from 45 to 75 years, preferably from 45 to 70 years, most preferably from 45 to 65 years.

7. The non-therapeutic method of any one of claims 1 to 6, wherein the composition is formulated to provide at least 200 mg of the one or more polar lipids per day.

8. The non-therapeutic method of any one of claims 1 to 7, wherein the composition is

(a) a nutritional composition; or

(b) a beverage, preferably a fruit juice, a sports drink or a milk drink, a bar, a gel, a shot, cultured milk, UHT milk, yoghurt, custard, ice cream, cheese, crisps, chocolate, multi-layered bites, a supplement, a tablet, a capsule, confectionery or milk powder.

9. The non-therapeutic method of any one of claims 1 to 8, wherein the composition is formulated to provide or is to be administered separately, simultaneously or sequentially with one or more of

(a) at least 5 g protein per day,

(b) from 0.1 to 10 g lipid per day,

(c) at least 0.75 g calcium per day,

(d) at least 7.5 µg vitamin D per day,

(e) any combination of any two or more of (a) to (d), or

(f) the composition is formulated to provide

(i) at least 5 g protein per day,

(ii) from 0.1 to 10 g lipid per day,

(iii) at least 0.75 g calcium per day, and

(iv) at least 7.5 µg vitamin D per day.

10. The non-therapeutic method of any one of claims 1 to 9, wherein the composition comprises at least 0.3 g of the one or more polar lipids per 100 g of the composition on a dry basis.

11. The non-therapeutic method of any one of claims 1 to 10, wherein the composition comprises on a dry basis

(a) at least 5% by weight protein,

(b) from 0.01 to 20% by weight lipid,

(c) at least 1% by weight calcium,

(d) at least 10 µg vitamin D per 100 g of the composition,

(e) any combination of any two or more of (a) to (d), or

(f) the composition comprises on a dry basis

(i) at least 5% by weight protein,

(ii) from 0.01 to 20% by weight lipid,

(iii) at least 1% by weight calcium, and

(iv) at least 10 µg vitamin D per 100 g of the composition.

12. The non-therapeutic method of any one of claims 1 to 11, wherein the one or more polar lipids comprise one or more phospholipids, one or more gangliosides, one or more ceramides, one or more cerebrosides, one or more sphingolipids or any combination of any two or more thereof.

13. The non-therapeutic method of claim 12, wherein

(a) the one or more gangliosides comprises GD3, GM3 or a combination thereof;

(b) the one or more phospholipids comprises one or more phosphatidylcholines, one or more phosphatidylinositols, one or more phosphatidylserines, one or more lysophospholipids, one or more phosphatidylethanolamines, one or more sphingomyelins, one or more dihydrosphingomyelins, one or more glycerophospholipids, phosphatidylglycerol, or any combination of any two or more thereof;

(c) the one or more lysophospholipids comprises lysophosphatidylcholine, lysophosphatidylserine, lysophosphatidylethanolamine or any combination of any two or more thereof;

(d) the one or more sphingomyelins comprises sphingomyelin, dihydrosphingomyelin or any combination thereof; and/or

(e) the one or more glycerophospholipids comprises phosphatidylglycerol.

14. The non-therapeutic method of any one of claims 1 to 13, wherein the composition comprises one or more strains of probiotic microorganisms.

15. The non-therapeutic method of any one of claims 1 to 14, wherein the composition is to be administered

within 16 hours of the subject undertaking exercise.

16. The non-therapeutic method of any one of claims 1 to 15, wherein

(a) the subject is aged 45 to 65 years;

(b) the subject is female;

(c) the subject is sedentary for at least 6 hours per day; and/or

(d) the subject is undertaking exercise on at least two days per week.

17. The non-therapeutic method of any one of claims 1 to 16, wherein the composition maintains or increases mobility and/or vitality in a subject after less than six, four or three months of commencement of administration of the composition.