CLAIMS

1. Use of a composition in the manufacture of a medicament for administering ketone bodies and ketone body precursors to a subject to cause at least one of ~~appetite suppression, weight loss, fat loss, reduced blood glucose level, improved mental alertness, increased physical energy, improved cognitive function,~~ reduction in traumatic brain injury, reduction in effect of diabetes, ~~improvement of neurological disorder,~~ reduction of cancer, ~~anti-aging, antiglycation,~~ reduction in epileptic seizure, ~~improved mood, increased strength, increased muscle mass, or improved body composition,~~ comprising:

a dietetically or pharmaceutically acceptable carrier; and

S-beta-hydroxybutyrate or a non-racemic mixture of S-beta-hydroxybutyrate and R-beta-hydroxybutyrate,

wherein the composition comprises from 52% to 100% by enantiomeric equivalents of the S-beta-hydroxybutyrate and 48% to 0% by enantiomeric equivalents of the R-beta-hydroxybutyrate.

2. The use of claim 1, wherein the non-racemic mixture contains from 53% to 98% by enantiomeric equivalents of the S-beta-hydroxybutyrate and 47% to 2% by enantiomeric equivalents of the R-beta-hydroxybutyrate, or 55% to 96% by enantiomeric equivalents of the S-beta-hydroxybutyrate and 45% to 4% by enantiomeric equivalents of the R-beta-hydroxybutyrate, or 57% to 93% by enantiomeric equivalents of the S-beta-hydroxybutyrate and 43% to 7% by enantiomeric equivalents of the R-beta-hydroxybutyrate; or 60% to 90% by enantiomeric equivalents of the S-beta-hydroxybutyrate and 40% to 10% by enantiomeric equivalents of the R-beta-hydroxybutyrate; or 65% to 85% by enantiomeric equivalents of the S-beta-hydroxybutyrate and 35% to 15% by enantiomeric equivalents of the R-beta-hydroxybutyrate.

~~3. The use of claim 1 or 2, wherein the non-racemic mixture contains from 55% to 96% by enantiomeric equivalents of the S-beta-hydroxybutyrate and 45% to 4% by enantiomeric equivalents of the R-beta-hydroxybutyrate.~~

~~4. The use of any one of claims 1 to 3, wherein the non-racemic mixture contains from 57% to 93% by enantiomeric equivalents of the S-beta-hydroxybutyrate and 43% to 7% by enantiomeric equivalents of the R-beta-hydroxybutyrate.~~

~~5. The use of any one of claims 1 to 4, wherein the non-racemic mixture contains from 60% to 90% by enantiomeric equivalents of the S-beta-hydroxybutyrate and 40% to 10% by enantiomeric equivalents of the R-beta-hydroxybutyrate.~~

~~6. The use of any one of claims 1 to 5, wherein the non-racemic mixture contains from 65% to 85% by enantiomeric equivalents of the S-beta-hydroxybutyrate and 35% to 15% by enantiomeric equivalents of the R-beta-hydroxybutyrate.~~

~~7.~~3. The use of ~~any one of~~ claim~~s~~ 1 or 2~~to 6~~, wherein the composition comprises one or more salts of S-beta-hydroxybutyrate, wherein the one or more salts of S-beta-hydroxybutyrate comprise at least one of a sodium salt, potassium salt, magnesium salt, calcium salt, transition metal salt, or amino acid salt that includes at least one amino acid or amino acid metabolite selected from arginine, lysine, leucine, iso-leucine, histidine, ornithine, citrulline, glutamine, or creatine.

~~8. The use of claim 7, wherein the one or more salts of S-beta-hydroxybutyrate comprise at least one of a sodium salt, potassium salt, magnesium salt, calcium salt, transition metal salt, or amino acid salt.~~

~~9. The use of claim 8, wherein the amino acid salt includes at least one amino acid or amino acid metabolite selected from arginine, lysine, leucine, iso-leucine, histidine, ornithine, citrulline, glutamine, or creatine.~~

~~10.~~4. The use of any one of claims 1 to ~~3~~9, wherein the non-racemic mixture contains at least one S-beta-hydroxybutyrate ester.

~~11. The use of claim 10, wherein the S-beta-hydroxybutyrate ester is a di-ester of a diol and S-beta-hydroxybutyrate.~~

~~12.~~5. The use of claim ~~4~~10, wherein the S-beta-hydroxybutyrate ester comprises at least one of a di-ester of a diol and S-beta-hydroxybutyrate ester, mono-ester of ethanol, mono-ester of 1-propanol, mono-ester of 1,3-propanediol, di-ester of 1,3-propanediol, mono- or di-ester of S-1,3-butanediol, mono- or di-ester of R-1,3-butanediol, mono- or di-ester of S-R-1,3-butanediol, or mono-, di-, or tri-ester of glycerin.

~~13.~~6. The use of any one of claims 1 to ~~5~~12, wherein the non-racemic mixture is a solid, such as a powder.

~~14.~~7. The use of any one of claims 1 to ~~6~~13, wherein the carrier comprises a powder, a liquid, a tablet, a capsule, a food product, a food additive, a beverage, a beverage additive, or a food supplement.

~~15.~~8. The use of any one of claims 1 to 7~~14~~, further comprising vitamin D_3, such as in an amount of 5 µg to 200 µg, or 10 µg to 100 µg, or 15 µg to 75 µg, or in an amount of 200 IU to 8000 IU, or 400 IU to 4000 IU, or 600 IU to 3000 IU.

~~16.~~9. The use of any one of claims 1 to 8~~15~~, further comprising at least one medium chain fatty acid, or a mono-, di- or triglyceride of the at least one medium chain fatty acid, wherein the at least one medium chain fatty acid has from 6 to 12 carbons, or from 8 to 10 carbons.

~~17. The use of claim 16, wherein the at least one medium chain fatty acid has from 6 to 12 carbons, or from 8 to 10 carbons.~~

~~18.~~10. The use of any one of claims 1 to 9~~17~~, further comprising at least one of (i) a short chain fatty acid, or a mono-, di- or triglyceride of the at least one short chain fatty acid, having less than 6 carbons or (ii) a long chain fatty acid, or a mono-, di- or triglyceride of the at least one long chain fatty acid, having more than 12 carbons.

~~19.~~11. Use of a composition in the manufacture of a medicament for controlling ketone body levels in a subject to cause at least one of ~~appetite suppression, weight loss, fat loss, reduced blood glucose level, improved mental alertness, increased physical energy, improved cognitive function,~~ reduction in traumatic brain injury, reduction in effect of diabetes, ~~improvement of neurological disorder,~~ reduction of cancer, ~~reduction of inflammation, anti-aging, antiglycation,~~ reduction in epileptic seizure, ~~improved mood, increased strength, increased muscle mass, or improved body composition,~~ comprising:

a non-racemic mixture of S-beta-hydroxybutyrate and R-beta-hydroxybutyrate,

wherein the non-racemic mixture contains from ~~about~~ 52% to 99% by enantiomeric equivalents of the S-beta-hydroxybutyrate and 48% to 1% by enantiomeric equivalents of the R-beta-hydroxybutyrate.

12. A method for administering ketone bodies and ketone body precursors to a subject using a composition, wherein the administration of ketone bodies and ketone body precursors results in appetite suppression, weight loss, fat loss, reduced blood glucose level, improved mental alertness, increased physical energy, improved cognitive function, anti-aging, antiglycation, improved mood, increased strength, increased muscle mass, or improved body composition, and wherein the composition comprises:

a dietetically or pharmaceutically acceptable carrier; and

S-beta-hydroxybutyrate or a non-racemic mixture of S-beta-hydroxybutyrate and R-beta-hydroxybutyrate,

wherein the composition comprises from 52% to 100% by enantiomeric equivalents of the S-beta-hydroxybutyrate and 48% to 0% by enantiomeric equivalents of the R-beta-hydroxybutyrate.

13. The method of claim 12, wherein the non-racemic mixture contains from 53% to 98% by enantiomeric equivalents of the S-beta-hydroxybutyrate and 47% to 2% by enantiomeric equivalents of the R-beta-hydroxybutyrate, or 55% to 96% by enantiomeric equivalents of the S-beta-hydroxybutyrate and 45% to 4% by enantiomeric equivalents of the R-beta-hydroxybutyrate, or 57% to 93% by enantiomeric equivalents of the S-beta-hydroxybutyrate and 43% to 7% by enantiomeric equivalents of the R-beta-hydroxybutyrate, or 60% to 90% by enantiomeric equivalents of the S-beta-hydroxybutyrate and 40% to 10% by enantiomeric equivalents of the R-beta-hydroxybutyrate, or 65% to 85% by enantiomeric equivalents of the S-beta-hydroxybutyrate and 35% to 15% by enantiomeric equivalents of the R-beta-hydroxybutyrate.

14. The method of claim 12 or 13, wherein the composition comprises one or more salts of S-beta-hydroxybutyrate, wherein the one or more salts of S-beta-hydroxybutyrate comprise at least one of a sodium salt, potassium salt, magnesium salt, calcium salt, transition metal salt, or amino acid salt that includes at least one amino acid or amino acid metabolite selected from arginine, lysine, leucine, iso-leucine, histidine, ornithine, citrulline, glutamine, or creatine.

15. The method of any one of claims 12 to 14, wherein the non-racemic mixture contains at least one S-beta-hydroxybutyrate ester.

16. The method of claim 15, wherein the S-beta-hydroxybutyrate ester comprises at least one of a di-ester of a diol and S-beta-hydroxybutyrate mono-ester of ethanol, mono-ester of 1-propanol, mono-ester of 1,3-propanediol, di-ester of 1,3-propanediol, mono- or di-ester of S-1,3-butanediol, mono- or di-ester of R-1,3-butanediol, mono- or di-ester of S-R-1,3-butanediol, or mono-, di-, or tri-ester of glycerin.

17. The method of any one of claims 12 to 16, wherein the non-racemic mixture is a solid, such as a powder.

18. The method of any one of claims 12 to 17, wherein the carrier comprises a powder, a liquid, a tablet, a capsule, a food product, a food additive, a beverage, a beverage additive, or a food supplement.

19. The method of any one of claims 12 to 18, further comprising vitamin D_3, such as in an amount of 5 µg to 200 µg, or 10 µg to 100 µg, or 15 µg to 75 µg, or in an amount of 200 IU to 8000 IU, or 400 IU to 4000 IU, or 600 IU to 3000 IU.

20. The method of any one of claims 12 to 19, further comprising at least one medium chain fatty acid, or a mono-, di- or triglyceride of the at least one medium chain fatty acid, wherein the at least one medium chain fatty acid has from 6 to 12 carbons, or from 8 to 10 carbons.

21. The method of any one of claims 12 to 20, further comprising at least one of (i) a short chain fatty acid, or a mono-, di- or triglyceride of the at least one short chain fatty acid, having less than 6 carbons or (ii) a long chain fatty acid, or a mono-, di- or triglyceride of the at least one long chain fatty acid, having more than 12 carbons.

22. A method for controlling ketone body levels in a subject using a composition, wherein the controlling of ketone body levels results in appetite suppression, weight loss, fat loss, reduced blood glucose level, improved mental alertness, increased physical energy, improved cognitive function, anti-aging, antiglycation, improved mood, increased strength, increased muscle mass, or improved body composition, and wherein the composition comprises:

a non-racemic mixture of S-beta-hydroxybutyrate and R-beta-hydroxybutyrate,

wherein the non-racemic mixture contains from 52% to 99% by enantiomeric equivalents of the S-beta-hydroxybutyrate and 48% to 1% by enantiomeric equivalents of the R-beta-hydroxybutyrate.