WHAT IS CLAIMED IS:

1. A composition formulated for oral consumption, comprising:
   (a) at least 500 mg of leucine and/or at least 200 mg of one or more leucine metabolites, wherein the one or more leucine metabolites are selected from the group consisting of keto-isocaproic acid (KIC), alpha-hydroxy-isocaproic acid, and hydroxymethylbutyrate (HMB); and
   (b) at least 10 mg of a polyphenol; and
   (c) an anti-diabetic agent,
   wherein the composition comprises less than 1% ~~is substantially free~~ of the individual amino acids alanine, glutamic acid, glycine, and proline.
2. The composition of claim 1, wherein the molar ratio of component (a) to (b) in said composition is greater than 20.
3. The composition of claim 1, wherein the polyphenol is in an amount of at least 35 mg.
4. The composition of claim 1, wherein the anti-diabetic agent is metformin or rosiglitazone.
5. The composition of claim 1, wherein the composition comprises less than 1% of the individual amino acids alanine, glutamic acid, glycine, and proline.
6. The composition of claim 1, wherein the composition comprises at least 1000 mg of leucine and at least 100 mg of metformin.
7. The composition of claim 1, wherein the polyphenol is resveratrol.
8. The composition of claim 1, wherein the polyphenol is selected from the group consisting of chlorogenic acid, resveratrol, caffeic acid, cinnamic acid, ~~hydroxycinnamic acid,~~ ferulic acid, piceatannol, ellagic acid, and epigallocatechin gallate.
9. ~~The composition of claim 1, wherein the polyphenol is a hydroxycinnamic acid or a stilbene.~~
10. 9. The composition of claim 1, wherein the molar ratio of component (a) to (c) in said composition is greater than 2, wherein component (a) is leucine and component (c) is metformin.

~~11.~~10. The composition of claim 1, wherein the composition is formulated as a tablet, capsule, or gel capsule.

~~12.~~11. The composition of claim 1, wherein the composition comprises at least 250 mg of metformin.

~~13.~~12. The composition of claim 1, wherein the composition comprises less than 1% of the individual amino acids alanine, glutamic acid, glycine, and proline, and wherein the composition comprises less than 1% ~~is additionally substantially free~~ of an individual non-branched amino acid selected from the group consisting of arginine, asparagine, aspartic acid, cysteine, glutamine, histidine, lysine, methionine, phenylalanine, serine, threonine, tryptophan, and tyrosine.

~~14.~~13. Use of a composition of claims 1-~~13~~ 12 in the manufacture of a medicament for reducing obesity in a subject.

~~15.~~14. Use of a composition of claims 1-~~13~~ 12 in the manufacture of a medicament for treating diabetes in a subject.