WHAT IS CLAIMED IS:

1. Use of a nutritional composition in the manufacture of a medicament for improving insulin production and/or improving insulin secretion in a subject in need thereof, wherein the nutritional composition comprises lysine, arginine, and beta-hydroxy-beta-methylbutyrate (HMB) and the medicament is to be administered to the subject.

2. The use of claim 1, wherein the subject is suffering from diabetes or prediabetes.

3. The use of any one of claims 1 to 2, wherein the medicament is to be administered to the subject with a sugar alcohol or with myo-inositol.

4. The use of any one of claims 1 to 3, wherein the HMB is selected from the group consisting of alkali metal HMB, alkaline earth metal HMB, HMB free acid, HMB lactone and combinations thereof, or the HMB is selected from the group consisting of sodium HMB, potassium HMB, magnesium HMB, chromium HMB, calcium HMB and combinations thereof, or the HMB is calcium HMB monohydrate.

5. The use of any one of claims 1 to 4, wherein the molar ratio of lysine to arginine in the nutritional composition is about 10:1 to about 1:1, or about 5:1 to about 1:1, or about 3:1 to about 1:1, and wherein the molar ratio of a combination of lysine and arginine to HMB in the nutritional composition is about 15:1 to about 1:1, or about 10:1 to about 1:1, or about 5:1 to about 1:1, or about 3:1 to about 1:1.

6. The use of any one of claims 1 to 5, wherein the nutritional composition is to be administered to the subject orally.

7. The use of any one of claims 1 to 6, wherein the medicament is to be administered to the subject at a dose of about 1 to about 10 g, or about 2 to about 5 g of HMB per day; and/or about 0.1 to about 30 g, about 1 to about 10 g, or about 4 to about 5 g of lysine per day; and/or
about 0.1 to about 20 g, about 1 to about 10 g, or about 2 to about 3 g of arginine per day.

8. The use of any one of claims 1 to 7, wherein the nutritional composition further comprises protein, carbohydrate, and/or fat.

9. The use of claim 8, wherein the protein comprises whey protein concentrate, whey protein isolate, whey protein hydrolysate, milk protein concentrate, milk protein isolate, milk protein hydrolysate, organic milk protein concentrate, soy protein concentrate, soy protein isolate, soy protein hydrolysate, pea protein concentrate, pea protein isolate, pea protein hydrolysate, acid casein, sodium caseinate, calcium caseinate, potassium caseinate, casein hydrolysate, nonfat dry milk, condensed skim milk, collagen protein, collagen protein isolate, L-Carnitine, taurine, lutein, rice protein concentrate, rice protein isolate, rice protein hydrolysate, fava bean protein concentrate, fava bean protein isolate, fava bean protein hydrolysate, meat protein, potato protein, chickpea protein, canola protein, mung protein, quinoa protein, amaranth protein, chia protein, hemp protein, flax seed protein, earthworm protein, insect protein, or combinations of two or more thereof.

10. The use of any one of claims 8 and 9, wherein the carbohydrate comprises fiber, human milk oligosaccharides (HMOs), maltodextrin, resistant maltodextrin, corn maltodextrin, organic corn maltodextrin, corn syrup, corn syrup solids, sucralose, cellulose gel, cellulose gum, gellan gum, carrageenan, fructooligosaccharides (FOS), inositol, hydrolyzed starch, glucose polymers, rice-derived carbohydrates, sucrose, glucose, lactose, honey,

isomaltulose, sucromalt, pullulan, potato starch, galactooligosaccharides, oat fiber, soy fiber, corn fiber, gum arabic, sodium carboxymethylcellulose, methylcellulose, guar gum, locust bean gum, konjac flour, hydroxypropyl methylcellulose, tragacanth gum, karaya gum, gum acacia, chitosan, arabinoglactins, glucomannan, xanthan gum, alginate, pectin, low methoxy pectin, high methoxy pectin, cereal beta-glucans, psyllium, inulin, and combinations of two or more thereof.

11. The use of claim 10, wherein the carbohydrate comprises isomaltulose, sucromalt, maltodextrin, resistant maltodextrin, FOS, inulin, oat fiber, soy fiber, or a combination of two or more thereof.

12. The use of any one of claims 8 to 11, wherein the fat comprises coconut oil, fractionated coconut oil, soy oil, soy lecithin, corn oil, safflower oil, sunflower oil, palm olein, canola oil monoglycerides, lecithin, canola oil, medium chain triglycerides, linoleic acid, alpha-linolenic acid, olive oil, medium chain triglyceride oil (MCT oil), high gamma linolenic (GLA) safflower oil, palm oil, palm kernel oil, marine oil, fish oil, algal oil, borage oil, cottonseed oil, fungal oil, interesterified oil, transesterified oil, structured lipids, omega-3 fatty acid, or combinations of two or more thereof.

13. A nutritional composition comprising:
    about 0.01 to about 15 wt % HMB;
    about 0.03 to about 40 wt % lysine; and
    about 0.02 to about 30 wt % arginine, all based on the weight of the nutritional composition.

14. The nutritional composition of claim 13, wherein the nutritional composition comprises:

about 0.01 to about 10 wt %, about 0.01 to about 8 wt %, about 0.01 to about 5.0 wt %, about 0.1 to about 10 wt %, about 0.1 to about 8 wt %, about 0.1 to about 5.0 wt %, about 0.2 to about 5.0 wt %, about 0.3 to about 3 wt %, about 0.3 to about 2 wt %, about 0.3 to about 1.5 wt %, about 0.3 to about 1.0 wt %, about 0.3 to about 0.6 wt %, or about 0.4 to about 1.5 wt % of HMB;

about 0.03 to about 30 wt %, about 0.03 to about 20 wt %, or about 0.1 to about 10 wt % of lysine; and

about 0.02 to about 20 wt %, about 0.02 to about 10 wt %, or about 0.05 to about 5 wt % of arginine, all based on the weight of the nutritional composition

15. The nutritional composition of any one of claims 13 to 14, wherein the nutritional composition further comprises a sugar alcohol, or further comprises myo-inositol.

16. The nutritional composition of any one of claims 13 to 15, wherein the nutritional composition further comprises protein, carbohydrate, and/or fat.

17. The nutritional composition of claim 16, wherein the protein comprises whey protein concentrate, whey protein isolate, whey protein hydrolysate, milk protein concentrate, milk protein isolate, milk protein hydrolysate, organic milk protein concentrate, soy protein concentrate, soy protein isolate, soy protein hydrolysate, pea protein concentrate, pea protein isolate, pea protein hydrolysate, acid casein, sodium caseinate, calcium caseinate, potassium caseinate, casein hydrolysate, nonfat dry milk, condensed skim milk, collagen protein, collagen protein isolate, L-Carnitine, L-Lysine, taurine, lutein, rice protein concentrate, rice protein isolate, rice protein hydrolysate, fava bean protein concentrate, fava bean protein isolate, fava bean protein hydrolysate, collagen protein, collagen protein isolate, meat protein, potato protein, chickpea protein, canola protein, mung protein, quinoa

protein, amaranth protein, chia protein, hemp protein, flax seed protein, earthworm protein, insect protein, or combinations of two or more thereof.

18. The nutritional composition of any one of claims 16 to 17, wherein the carbohydrate comprises fiber, human milk oligosaccharides (HMOs), maltodextrin, resistant maltodextrin, corn maltodextrin, organic corn maltodextrin, corn syrup, corn syrup solids, sucralose, cellulose gel, cellulose gum, gellan gum, carrageenan, fructooligosaccharides, inositol, hydrolyzed starch, glucose polymers, rice-derived carbohydrates, sucrose, glucose, lactose, honey, isomaltulose, sucromalt, pullulan, potato starch, galactooligosaccharides, oat fiber, soy fiber, corn fiber, gum arabic, sodium carboxymethylcellulose, methylcellulose, guar gum, locust bean gum, konjac flour, hydroxypropyl methylcellulose, tragacanth gum, karaya gum, gum acacia, chitosan, arabinoglactins, glucomannan, xanthan gum, alginate, pectin, low methoxy pectin, high methoxy pectin, cereal beta-glucans, psyllium, inulin, and combinations of two or more thereof.

19. The nutritional composition of claim 18, wherein the carbohydrate comprises isomaltulose, sucromalt, maltodextrin, resistant maltodextrin, FOS, inulin, oat fiber, soy fiber, or a combination of two or more thereof

20. The nutritional composition of any one of claims 16 to 19, wherein the fat comprises coconut oil, fractionated coconut oil, soy oil, soy lecithin, corn oil, safflower oil, sunflower oil, palm olein, canola oil monoglycerides, lecithin, canola oil, medium chain triglycerides, one or more fatty acids such as linoleic acid, alpha-linolenic acid, olive oil, medium chain triglyceride oil (MCT oil), high gamma linolenic (GLA) safflower oil, palm oil, palm kernel oil, marine oils, fish oils, algal oils, borage oil, cottonseed oil, fungal oils, interesterified oils,

transesterified oils, structured lipids, omega-3 fatty acid, or combinations of two or more thereof.

21. The nutritional composition of any one of claims 16 to 20, wherein the nutritional composition comprises about 1 to about 15 wt % of protein, about 0.5 to about 10 wt % fat, and about 1 to about 20 wt % carbohydrate, based on the weight of the nutritional composition.