resistance or insulin resistance-related complications, such as dyslipidemia and type 2 diabetes mellitus as well as insulin-resistance in endocrine diseases (e.g., obese subjects with type 1 diabetes mellitus, Cushing's disease or lipodystrophy syndromes), cardiovascular disease, ovarian aging, polycystic ovary syndrome, neurodegenerative disorders, such as Alzheimer's disease, multiple sclerosis and dementia, encephalopathy, or others. There is also a need for beneficial GI bacteria that are capable of metabolizing or degrading fructose-lysine to prevent or reduce formation of AGEs.

SUMMARY OF THE INVENTION

In one aspect, the present invention provides a human intestinal isolate bacterium comprising a lysine pathway gene set that allows said bacterium to convert L-lysine into butyric acid and/or butyrate or a salt or ester thereof, and further comprising a fructose-lysine uptake and degradation operon that allows said bacterium to convert fructose-lysine into butyric acid and/or butyrate or a salt or ester thereof, or a strain comprising said lysine pathway gene set and said fructose-lysine uptake and degradation operon and which strain has been derived from said bacterium by mutagenesis, preferably through radiation, UV light, or chemical treatment, wherein

- the lysine pathway gene set comprises genes encoding of the proteins: Lysine 2,3-aminomutase; L-beta-lysine 5,6-aminomutase alpha subunit; L-beta-lysine 5,6-aminomutase beta subunit; 3,5-diaminobexanoate dehydrogenase; 3-keto-5-aminohexanoate cleavage enzyme; 3-aminobutyryl-CoA ammonia-lyase; butyrate-acetoacetate CoA-transferase subunit A; butyrate-acetoacetate CoA-transferase subunit B; acetyl-CoA:acetoacetyl-CoA transferase, and wherein

- the fructose-lysine uptake and degradation operon comprises of the genes encoding the proteins: fructose-lysine kinase; fructosamine deglycase; ABC transporter periplasmic spermidine putrescine-binding protein PotD; spermidine putrescine ABC transporter permease component PotC; spermidine putrescine ABC transporter permease component PotB; and putrescine transport ATP-binding protein PotA.

In yet another aspect, the present invention provides composition comprising a human intestinal isolate bacterium disclosed herein and a physiologically acceptable carrier.

In yet another aspect, the present invention provides a human intestinal isolate bacterium disclosed herein or a composition disclosed herein for use as a medicament.

compared to when the bacterium is grown on equimolar amounts of glucose and acetate as sole carbon source.

4. The human intestinal isolate bacterium according to any one of the previous claims, wherein the expression of at least one of the genes encoding the proteins: fructose-lysine kinase; fructoselysine 3-epimerase; fructosamine deglycase; ABC transporter periplasmic spermidine putrescine-binding protein PotD; spermidine putrescine ABC transporter permease component PotC; spermidine putrescine ABC transporter permease component PotB; putrescine transport ATP-binding protein PotA, is upregulated and/or at least one of the proteins: fructose-lysine kinase; fructoselysine 3-epimerase; fructosamine deglycase; ABC transporter periplasmic spermidine putrescine-binding protein PotD; spermidine putrescine ABC transporter permease component PotC; spermidine putrescine ABC transporter permease component PotB; putrescine transport ATP-binding protein PotA, is overexpressed when the bacterium is grown on L-lysine as the sole carbon source as compared to when the bacterium is grown on equimolar amounts of glucose and acetate as sole carbon source.

5. The human intestinal isolate bacterium according to any of the preceding claims, which is sensitive to erythromycin, having a minimum inhibitory concentration of erythromycin of less than 20 µg/ml.

6. The human intestinal isolate bacterium according to claim 1, wherein the human intestinal isolate bacterium is deposited as CBS 139326 or a strain comprising said lysine pathway gene set and said fructose-lysine uptake and degradation operon and which strain has been derived from said bacterium by mutagenesis, preferably through radiation, UV light, or chemical treatment.

7. Composition comprising a human intestinal isolate bacterium according to any one of the preceding claims and a physiologically acceptable carrier.

8. Composition according to claim 7, which is a food composition, preferably a dairy product, more preferably a fermented dairy product, preferably a yogurt or a yogurt drink.

9. Composition according to claim 7 or 8, which is a pharmaceutical composition, preferably in solid dosage form, such as a capsule, a tablet, or a powder.

10. Composition according to claim 9, wherein the bacteria belonging to the bacterial strain are present in lyophilized or microencapsulated or other form preserving their activity.