



(51) International Patent Classification:

A23L 33/135 (2016.01) A61K 35/742 (2015.01)

A61K 35/74 (2015.01) A61P 1/00 (2006.01)

A61K 35/741 (2015.01) C12N 1/20 (2006.01)

(21) International Application Number:

PCT/US2019/034069

(22) International Filing Date:

24 May 2019 (24.05.2019)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

62/676,236 24 May 2018 (24.05.2018) US

(71) Applicant: **SERES THERAPEUTICS, INC.** [US/US];
200 Sidney Street, Cambridge, Massachusetts 02139 (US).

(72) Inventors: **MARTINEZ, Asuncion**; 200 Sidney Street,
Cambridge, Massachusetts 02139 (US). **O'BRIEN, Ed-
ward J.**; 200 Sidney Street, Cambridge, Massachusetts
02139 (US). **SIMMONS, Sheri Lynn**; 200 Sidney Street,
Cambridge, Massachusetts 02139 (US). **COOK, David**;
200 Sidney Street, Cambridge, Massachusetts 02139 (US).

(74) Agent: **FRUEAUF, Jeremiah B.** et al.; Sterne, Kessler,
Goldstein & Fox P.L.L.C., 1100 New York Avenue, N.W.,
Washington, District of Columbia 20005 (US).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ,
CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO,
DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,
HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP,
KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME,

MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ,
OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA,
SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN,
TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available):

ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))
- with sequence listing part of description (Rule 5.2(a))

(54) Title: DESIGNED BACTERIAL COMPOSITIONS AND USES THEREOF

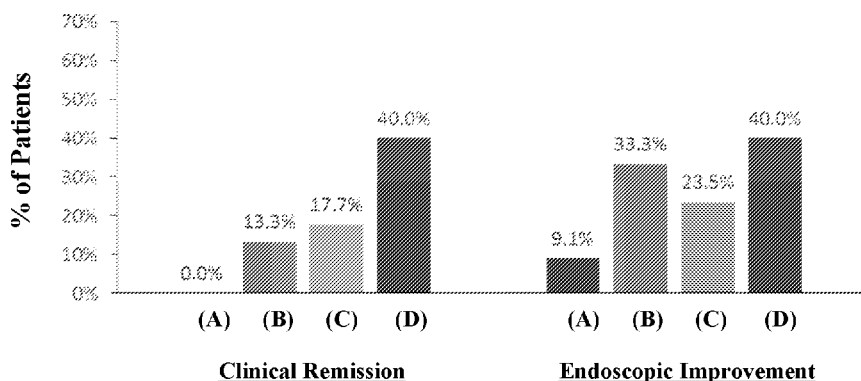


FIG. 1

(57) Abstract: Our client, Seres Therapeutics, has asked us to file a new provisional application related to bacterial compositions and the use of such compositions for the treatment of inflammatory bowel disease.

DESIGNED BACTERIAL COMPOSITIONS AND USES THEREOF

REFERENCE TO SEQUENCE LISTING SUBMITTED
ELECTRONICALLY VIA EFS-WEB

[0001] The content of the electronically submitted sequence listing in ASCII text file (Name: 4268.016PC01_SequenceListing_ST25.txt; Size: 836,765 bytes; and Date of Creation: May 24, 2019) filed with the application is herein incorporated by reference in its entirety.

FIELD OF THE DISCLOSURE

[0002] The present disclosure relates to bacterial compositions designed to have certain functional features that are useful for treating and/or preventing a range of diseases and disorders, such as those associated with dysbiosis of the gastrointestinal microbiome (*e.g.*, inflammatory bowel disease (IBD), for example, ulcerative colitis and certain cancers).

BACKGROUND OF THE DISCLOSURE

[0003] A healthy gut microbiota is essential for the overall well-being of an individual. Accordingly, dysbiosis of the gut microbiota has been implicated in the pathogenesis of many diseases and disorders, such as inflammatory bowel disease (*e.g.*, colitis), irritable bowel syndrome, coeliac disease, allergy, asthma, metabolic syndrome, cardiovascular disease, and obesity. Carding, S. *et al.*, *Micro Ecol Health Dis* 26 (2015).

[0004] Methods of treating a dysbiosis-related condition have included fecal microbiome transplantation (FMT), which can provide microorganisms to the gastrointestinal tract (GI). However, fecal transplant presents a number of issues, including those related to safety and methods of delivery, such as naso-duodenal-, transcolonoscopic-, or enema-based methods that generally require in-clinic procedures and may introduce adverse events. Treatments using FMT have a likelihood of being inherently inconsistent because of the variability between individuals donating the feces for transplant. FMT methods also introduce a risk of infection by pathogenic organisms, including viruses, bacteria, fungi and protists in the source material. Furthermore, there can be issues related to the stability and storage of donated feces, for example, related to the survival of bacterial

species. Some treatments using fecal bacteria delivered in capsules have required that patients take large numbers of capsules, which can be difficult for people with GI illnesses and may reduce compliance with complete treatment.

[0005] Accordingly, there is a need for compositions that deliver a consistent product containing cultured bacteria that are of sufficient complexity and that can exhibit key functional features that are useful for the treatment of a dysbiosis or dysbiosis-related condition.

SUMMARY OF THE DISCLOSURE

[0006] Provided herein is a composition comprising a first purified bacterial population and a second purified bacterial population, wherein the first purified bacterial population comprises one or more bacteria selected having a 16S rDNA sequence that is at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence set forth in SEQ ID NO: 215, SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116, SEQ ID NO: 188, SEQ ID NO: 212, SEQ ID NO: 160, SEQ ID NO: 186, SEQ ID NO: 203, SEQ ID NO: 104, SEQ ID NO: 208, SEQ ID NO: 189, SEQ ID NO: 187, SEQ ID NO: 207, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 209, SEQ ID NO: 110, SEQ ID NO: 150, SEQ ID NO: 175, SEQ ID NO: 158, SEQ ID NO: 210, or SEQ ID NO: 106, and wherein the second purified bacterial population comprises one or more bacteria having one or more features selected from the group consisting of: (i) capable of engrafting when administered to a subject, (ii) capable of having anti-inflammatory activity, (iii) not capable of inducing pro-inflammatory activity, (iv) capable of producing a secondary bile acid, (v) capable of producing a tryptophan metabolite, (vi) capable of restoring epithelial integrity as determined by a primary epithelial cell monolayer barrier integrity assay, (vii) capable of being associated with remission of an inflammatory bowel disease, (viii) capable of producing a short-chain fatty acid, (ix) capable of inhibiting a HDAC activity, (x) capable of producing a middle-chain fatty acid, (xi) capable of expressing catalase activity, (xii) capable of having alpha-fucosidase activity, (xiii) capable of inducing Wnt activation, (xiv) capable of producing a B vitamin, (xv) capable of modulating host metabolism of endocannabinoid, (xvi) capable of producing a polyamine and/or modulating a host metabolism of a polyamine, (xvii)

capable of reducing fecal levels of a sphingolipid, (xviii) capable of modulating host production of kynurenine, (xix) capable of reducing fecal calprotectin level, (xx) not capable of activating a toll-like receptor pathway (*e.g.*, TLR4 or TLR5), (xxi) capable of activating a toll-like receptor pathway (*e.g.*, TLR2), and (xxii) any combination thereof.

[0007] Also provided herein is a composition comprising a first purified bacterial population and a second purified bacterial population, wherein the first bacterial population comprises one or more bacteria having a 16S rDNA sequence that is at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence set forth in SEQ ID NO: 118, SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, or SEQ ID NO: 137, and wherein the second purified bacterial population comprises one or more bacteria having one or more features selected from the group consisting of: (i) capable of engrafting when administered to a subject, (ii) capable of having anti-inflammatory activity, (iii) not capable of inducing pro-inflammatory activity, (iv) capable of producing a secondary bile acid, (v) capable of producing a tryptophan metabolite, (vi) capable of restoring epithelial integrity as determined by a primary epithelial cell monolayer barrier integrity assay, (vii) capable of being associated with remission of an inflammatory bowel disease, (viii) capable of producing a short-chain fatty acid, (ix) capable of inhibiting a HDAC activity, (x) capable of producing a middle-chain fatty acid, (xi) capable of expressing catalase activity, (xii) capable of having alpha-fucosidase activity, (xiii) capable of inducing Wnt activation, (xiv) capable of producing a B vitamin, (xv) capable of modulating host metabolism of endocannabinoid, (xvi) capable of producing a polyamine and/or modulating a host metabolism of a polyamine, (xvii) capable of reducing fecal levels of a sphingolipid, (xviii) capable of modulating host production of kynurenine, (xix) capable of reducing fecal calprotectin level, (xx) not capable of activating a toll-like receptor pathway (*e.g.*, TLR4 or TLR5), (xxi) capable of activating a toll-like receptor pathway (*e.g.*, TLR2), and (xxii) any combination thereof.

[0008] Provided herein is also composition comprising a first purified bacterial population and a second purified bacterial population, wherein the first bacterial population comprises one or more bacteria having a 16S rDNA sequence that is at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100%

identical to a 16S rDNA sequence set forth in SEQ ID NO: 117, SEQ ID NO: 137, SEQ ID NO: 111, or SEQ ID NO: 103, and wherein the second purified bacterial population comprises one or more bacteria having one or more features selected from the group consisting of: (i) capable of engrafting when administered to a subject, (ii) capable of having anti-inflammatory activity, (iii) not capable of inducing pro-inflammatory activity, (iv) capable of producing a secondary bile acid, (v) capable of producing a tryptophan metabolite, (vi) capable of restoring epithelial integrity as determined by a primary epithelial cell monolayer barrier integrity assay, (vii) capable of being associated with remission of an inflammatory bowel disease, (viii) capable of producing a short-chain fatty acid, (ix) capable of inhibiting a HDAC activity, (x) capable of producing a middle-chain fatty acid, (xi) capable of expressing catalase activity, (xii) capable of having alpha-fucosidase activity, (xiii) capable of inducing Wnt activation, (xiv) capable of producing a B vitamin, (xv) capable of modulating host metabolism of endocannabinoid, (xvi) capable of producing a polyamine and/or modulating host metabolism of a polyamine, (xvii) capable of producing a sphingolipid, (xviii) capable of modulating host production of kynurenine, (xix) capable of reducing fecal calprotectin level, (xx) not capable of activating a toll-like receptor pathway (*e.g.*, TLR4 or TLR5), (xxi) capable of activating a toll-like receptor pathway (*e.g.*, TLR2), and (xxii) any combination thereof.

[0009] In some embodiments, the one or more features are selected from (i) capable of engrafting when administered to a subject; (ii) capable of having anti-inflammatory activity, (iii) not capable of inducing pro-inflammatory activity, (iv) capable of producing a secondary bile acid, (v) capable of producing a tryptophan metabolite, (vi) capable of restoring epithelial integrity as determined by a primary epithelial cell monolayer barrier integrity assay, (vii) capable of being associated with remission of an inflammatory bowel disease, (viii) capable of producing a short-chain fatty acid, (ix) capable of inhibiting a HDAC activity, (x) capable of producing a middle-chain fatty acid, or (xi) any combination thereof.

[0010] In some embodiments, the second purified bacterial population comprises a long-term engrafter and/or a transient engrafter. In certain embodiments, the second purified bacterial population comprises two, three, four, five, six, seven or more long-term engrafters. In further embodiments, the second purified bacterial population comprises two, three or more transient engrafters. In certain embodiments, a combination of the first

purified bacterial population and the second purified bacterial population comprises three or more transient engrafters and/or seven or more long-term engrafters.

[0011] In some embodiments, the second purified bacterial population comprises one or more bacteria that are capable of producing a tryptophan metabolite. In some embodiments, the second purified bacterial population comprises one or more bacteria that are capable of producing a secondary bile acid. In some embodiments, the second purified bacterial population comprises one or more bacteria that are capable of having anti-inflammatory activity. In certain embodiments, the second purified bacterial population comprises one or more bacteria that are not capable of inducing pro-inflammatory activity. In some embodiments, the second purified bacterial population comprises one or more bacteria that are capable of producing a short-chain fatty acid. In some embodiments, the second purified bacterial population comprises one or more bacteria that are capable of producing a medium-chain fatty acid. In some embodiments, the second purified bacterial population comprises one or more bacteria that are capable of inhibiting HDAC activity.

[0012] Also provided herein is a composition comprising a purified bacterial population, wherein the composition comprises one or more features selected from the group consisting of: (i) capable of engrafting when administered to a subject, (ii) capable of having anti-inflammatory activity, (iii) not capable of inducing pro-inflammatory activity, (iv) capable of producing a secondary bile acid, (v) capable of producing a tryptophan metabolite, (vi) capable of restoring epithelial integrity as determined by a primary epithelial cell monolayer barrier integrity assay, (vii) capable of being associated with remission of an inflammatory bowel disease, (viii) capable of producing a short-chain fatty acid, (ix) capable of inhibiting a HDAC activity, (x) capable of producing a middle-chain fatty acid, (xi) capable of expressing catalase activity, (xii) capable of having alpha-fucosidase activity, (xiii) capable of inducing Wnt activation, (xiv) capable of producing a B vitamin, (xv) capable of modulating host metabolism of endocannabinoid, (xvi) capable of producing a polyamine and/or modulating a host metabolism of a polyamine, (xvii) capable of reducing fecal levels of a sphingolipid, (xviii) capable of modulating host production of kynurenine, (xix) capable of reducing fecal calprotectin level, (xx) not capable of activating a toll-like receptor pathway (*e.g.*, TLR4 or TLR5), (xxi) capable of activating a toll-like receptor pathway (*e.g.*, TLR2), and (xxii) any combination thereof.

[0013] In some embodiments, the one or more features are selected from (i) capable of engrafting when administered to a subject; (ii) capable of having anti-inflammatory activity, (iii) not capable of inducing pro-inflammatory activity, (iv) capable of producing a secondary bile acid, (v) capable of producing a tryptophan metabolite, (vi) capable of restoring epithelial integrity as determined by a primary epithelial cell monolayer barrier integrity assay, (vii) capable of being associated with remission of an inflammatory bowel disease, (viii) capable of producing a short-chain fatty acid, (ix) capable of inhibiting a HDAC activity, (x) capable of producing a middle-chain fatty acid, or (xi) any combination thereof.

[0014] In some embodiments, the purified bacterial population of a composition disclosed herein comprises one or more bacteria having a 16S rDNA sequence that is at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence set forth in SEQ ID NO: 215, SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116, SEQ ID NO: 188, SEQ ID NO: 212, SEQ ID NO: 160, SEQ ID NO: 186, SEQ ID NO: 104, SEQ ID NO: 208, SEQ ID NO: 189, SEQ ID NO: 187, SEQ ID NO: 207, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 209, SEQ ID NO: 110, SEQ ID NO: 159, SEQ ID NO: 175, SEQ ID NO: 158, SEQ ID NO: 210, or SEQ ID NO: 106.

[0015] In some embodiments, the purified bacterial population comprises one or more bacteria having a 16S rDNA sequence that is at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence set forth in SEQ ID NO: 185, SEQ ID NO: 183, SEQ ID NO: 161, SEQ ID NO: 206, SEQ ID NO: 102, SEQ ID NO: 214, SEQ ID NO: 184, SEQ ID NO: 204, SEQ ID NO: 216, SEQ ID NO: 217, SEQ ID NO: 218, SEQ ID NO: 219, SEQ ID NO: 220, SEQ ID NO: 221, SEQ ID NO: 222, SEQ ID NO: 223, SEQ ID NO: 224, SEQ ID NO: 225, SEQ ID NO: 226, SEQ ID NO: 227, SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 109, SEQ ID NO: 138, SEQ ID NO: 139, SEQ ID NO: 140, SEQ ID NO: 141, SEQ ID NO: 142, SEQ ID NO: 143, SEQ ID NO: 144, SEQ ID NO: 145, SEQ ID NO: 146, SEQ ID NO: 147, SEQ ID NO: 192, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 107, SEQ ID NO: 137, SEQ ID NO: 198, SEQ ID NO: 199, SEQ ID NO: 200, SEQ ID NO: 201, SEQ ID NO: 202, SEQ ID NO: 133, SEQ ID NO: 193, SEQ ID NO: 194, SEQ ID NO: 195, SEQ ID NO: 196, SEQ

ID NO: 197, SEQ ID NO: 126, SEQ ID NO: 127, SEQ ID NO: 103, SEQ ID NO: 108, SEQ ID NO: 124, SEQ ID NO: 165, SEQ ID NO: 136, SEQ ID NO: 125, SEQ ID NO: 111, SEQ ID NO: 164, SEQ ID NO: 205, SEQ ID NO: 128, SEQ ID NO: 129, SEQ ID NO: 130, SEQ ID NO: 131, SEQ ID NO: 132, SEQ ID NO: 162, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 105, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 170, SEQ ID NO: 171, SEQ ID NO: 172, SEQ ID NO: 173, SEQ ID NO: 174, SEQ ID NO: 163, SEQ ID NO: 182, SEQ ID NO: 135, SEQ ID NO: 134, SEQ ID NO: 179, SEQ ID NO: 180, SEQ ID NO: 181, SEQ ID NO: 203, or SEQ ID NO: 213.

[0016] Provided herein is a composition comprising a purified bacterial population, comprising two or more bacteria, wherein the two or more bacteria comprises a long-term engrafter and a transient engrafter.

[0017] In some embodiments, the purified bacterial population further comprises one or more bacteria, which has one or more features selected from the group consisting of: (i) capable of engrafting when administered to a subject, (ii) capable of having anti-inflammatory activity, (iii) not capable of inducing pro-inflammatory activity, (iv) capable of producing a secondary bile acid, (v) capable of producing a tryptophan metabolite, (vi) capable of restoring epithelial integrity as determined by a primary epithelial cell monolayer barrier integrity assay, (vii) capable of being associated with remission of an inflammatory bowel disease, (viii) capable of producing a short-chain fatty acid, (ix) capable of inhibiting a HDAC activity, (x) capable of producing a middle-chain fatty acid, (xi) capable of expressing catalase activity, (xii) capable of having alpha-fucosidase activity, (xiii) capable of inducing Wnt activation, (xiv) capable of producing a B vitamin, (xv) capable of modulating host metabolism of endocannabinoid, (xvi) capable of producing a polyamine and/or modulating host metabolism of polyamines, (xvii) capable of reducing fecal levels of a sphingolipid, (xviii) capable of modulating host production of kynurenine, (xix) capable of reducing fecal calprotectin level, (xx) not capable of activating a toll-like receptor pathway (*e.g.*, TLR4 or TLR5), (xxi) capable of activating a toll-like receptor pathway (*e.g.*, TLR2), and (xxii) any combination thereof.

[0018] In some embodiments, the one or more features are selected from (i) capable of engrafting when administered to a subject; (ii) capable of having anti-inflammatory activity, (iii) not capable of inducing pro-inflammatory activity, (iv) capable of producing

a secondary bile acid, (v) capable of producing a tryptophan metabolite, (vi) capable of restoring epithelial integrity as determined by a primary epithelial cell monolayer barrier integrity assay, (vii) capable of being associated with remission of an inflammatory bowel disease, (viii) capable of producing a short-chain fatty acid, (ix) capable of inhibiting a HDAC activity, (x) capable of producing a middle-chain fatty acid, or (xi) any combination thereof.

[0019] In some embodiments, a composition comprising a purified bacterial population disclosed herein comprises two, three, four, five, six, seven or more long-term engrafters. In certain embodiments, the purified bacterial population comprises two, three, four, five, six, seven or more transient engrafters. In some embodiments, the purified bacterial population comprises three or more transient engrafters and/or seven or more long-term engrafters.

[0020] In some embodiments, the purified bacterial population comprises one or more bacteria that are capable of producing a tryptophan metabolite. In some embodiments, the purified bacterial population comprises one or more bacteria that are capable of producing a secondary bile acid. In certain embodiments, the purified bacterial population comprises one or more bacteria that are capable of having anti-inflammatory activity. In other embodiments, the purified bacterial population comprises one or more bacteria that are not capable of inducing pro-inflammatory activity. In some embodiments, the purified bacterial population comprises one or more bacteria that are capable of producing a short-chain fatty acid. In some embodiments, the purified bacterial population comprises one or more bacteria that are capable of producing a medium-chain fatty acid. In some embodiments, the purified bacterial population comprises one or more bacteria that are capable of inhibiting HDAC activity.

[0021] In some embodiments, the tryptophan metabolite disclosed herein comprises indole, 3-methyl indole, indoleacrylate, or any combination thereof. In certain embodiments, the tryptophan metabolite is indole. In certain embodiments, the tryptophan metabolite is 3-methyl indole.

[0022] In some embodiments, one or more bacteria capable of producing a secondary bile acid has 7 α -dehydroxylase activity. In some embodiments, the one or more bacteria capable of producing a secondary bile acid has bile salt hydrolase (BSH) activity. In certain embodiments, the first purified bacterial population and/or the second purified

bacterial population of a composition disclosed herein does not comprise a bacterium having 7 β -hydroxysteroid dehydrogenase (7 β -HSDH) activity. In some embodiments, the secondary bile acid comprises deoxycholic acid (DCA), 3 α 12-oxo-deoxycholic acid, 3 β 12 α -deoxycholic acid (3-isodeoxycholic acid), 7 α 3-oxo-chenodeoxycholic acid, lithocholic acid (LCA), 3-oxo LCA, or any combination thereof.

[0023] In some embodiments, one or more bacteria capable of having anti-inflammatory activity comprises (i) bacteria capable of producing a short-chain fatty acid, (ii) bacteria capable of inhibiting histone deacetylase (HDAC) activity, (iii) bacteria capable of inhibiting TNF- α -driven IL-8 secretion in epithelial cells in vitro, or (iv) any combination thereof. In some embodiments, one or more bacteria not capable of inducing pro-inflammatory activity comprises (i) bacteria not capable of inducing IL-8 secretion in epithelial cells in vitro and/or (ii) bacteria not capable of activating Toll-like receptor 4 (TLR4) and/or Toll-like receptor 5 (TLR5) *in vitro*.

[0024] In some embodiments, a short-chain fatty acid disclosed herein comprises formate, acetate, propionate, butyrate, isobutyrate, valerate, isovalerate, or any combination thereof. In certain embodiments, the short-chain fatty acid is propionate. In certain embodiments, the short-chain fatty acid is butyrate. In some embodiments, a medium-chain fatty acid comprises hexanoate, octanoate, decanoate, dodecanoate, or any combination thereof. In certain embodiments, the medium-chain fatty acid is hexanoate or pentanoate.

[0025] In some embodiments, a long-term engrafter that can be included in a composition disclosed herein has a 16S rDNA sequence that is at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence of a long-term engrafter provided in Table 5. In certain embodiments, the long-term engrafter has a 16S rDNA sequence that is at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence set forth in SEQ ID NO: 161, SEQ ID NO: 211, SEQ ID NO: 185, SEQ ID NO: 208, SEQ ID NO: 203, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 206, SEQ ID NO: 159, SEQ ID NO: 182, SEQ ID NO: 183, SEQ ID NO: 135, SEQ ID NO: 165, SEQ ID NO: 209, SEQ ID NO: 179, SEQ ID NO: 180, SEQ ID NO: 181, or SEQ ID NO: 189.

[0026] In some embodiments, a transient-engrafter disclosed herein has a 16S rDNA sequence that is at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at

least 99.5%, or 100% identical to a 16S rDNA sequence of a transient engrafter provided in Table 5. In some embodiments, the transient engrafter has a 16S rDNA sequence that is at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence set forth in SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 103, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 118, SEQ ID NO: 163, SEQ ID NO: 133, SEQ ID NO: 192, SEQ ID NO: 134, SEQ ID NO: 137, SEQ ID NO: 128, SEQ ID NO: 129, SEQ ID NO: 130, SEQ ID NO: 131, SEQ ID NO: 132, or SEQ ID NO: 175.

[0027] Provided herein is a composition comprising a purified bacterial population, which comprises one or more bacteria having a 16S rDNA sequence that is at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence set forth in SEQ ID NO: 215, SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116, SEQ ID NO: 188, SEQ ID NO: 212, SEQ ID NO: 160, SEQ ID NO: 186, SEQ ID NO: 104, SEQ ID NO: 208, SEQ ID NO: 189, SEQ ID NO: 187, SEQ ID NO: 207, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 209, SEQ ID NO: 110, SEQ ID NO: 159, SEQ ID NO: 175, SEQ ID NO: 158, SEQ ID NO: 210, or SEQ ID NO: 106.

[0028] In some embodiments, the purified bacterial population further comprises one or more bacteria having a 16S rDNA sequence that is at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence set forth in SEQ ID NO: 185, SEQ ID NO: 183, SEQ ID NO: 161, SEQ ID NO: 206, SEQ ID NO: 102, SEQ ID NO: 214, SEQ ID NO: 184, SEQ ID NO: 204, SEQ ID NO: 216, SEQ ID NO: 217, SEQ ID NO: 218, SEQ ID NO: 219, SEQ ID NO: 220, SEQ ID NO: 221, SEQ ID NO: 222, SEQ ID NO: 223, SEQ ID NO: 224, SEQ ID NO: 225, SEQ ID NO: 226, SEQ ID NO: 227, SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 109, SEQ ID NO: 138, SEQ ID NO: 139, SEQ ID NO: 140, SEQ ID NO: 141, SEQ ID NO: 142, SEQ ID NO: 143, SEQ ID NO: 144, SEQ ID NO: 145, SEQ ID NO: 146, SEQ ID NO: 147, SEQ ID NO: 192, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 107, SEQ ID NO: 137, SEQ ID NO: 198, SEQ ID NO: 199, SEQ ID NO: 200, SEQ ID NO: 201, SEQ ID NO: 202, SEQ ID NO: 133, SEQ ID NO: 193, SEQ ID NO: 194, SEQ ID NO: 195, SEQ ID NO: 196, SEQ ID NO: 197, SEQ ID NO: 126, SEQ ID NO: 127, SEQ ID NO: 103, SEQ

ID NO: 108, SEQ ID NO: 124, SEQ ID NO: 165, SEQ ID NO: 136, SEQ ID NO: 125, SEQ ID NO: 111, SEQ ID NO: 164, SEQ ID NO: 205, SEQ ID NO: 128, SEQ ID NO: 129, SEQ ID NO: 130, SEQ ID NO: 131, SEQ ID NO: 132, SEQ ID NO: 162, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 105, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 170, SEQ ID NO: 171, SEQ ID NO: 172, SEQ ID NO: 173, SEQ ID NO: 174, SEQ ID NO: 163, SEQ ID NO: 182, SEQ ID NO: 135, SEQ ID NO: 134, SEQ ID NO: 179, SEQ ID NO: 180, SEQ ID NO: 181, SEQ ID NO: 203, or SEQ ID NO: 213.

[0029] Disclosed herein is a composition comprising a purified population of bacteria having 16S rDNA sequences that are at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence selected from the group consisting of: (1) SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116, SEQ ID NO: 188, SEQ ID NO: 186, SEQ ID NO: 104, SEQ ID NO: 187; (2) SEQ ID NO: 186; (3) SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116, SEQ ID NO: 188, SEQ ID NO: 186, SEQ ID NO: 104, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 175; (4) SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116, SEQ ID NO: 188, SEQ ID NO: 186, SEQ ID NO: 203, SEQ ID NO: 104; (5) SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116, SEQ ID NO: 186, SEQ ID NO: 203, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 175; (6) SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116, SEQ ID NO: 104; (7) SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116, SEQ ID NO: 104, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 175; (8) SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116, SEQ ID NO: 203, SEQ ID NO: 104; (9) SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116, SEQ ID NO: 203, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 175; (10) SEQ ID NO: 159, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211; (11) SEQ ID NO: 212, SEQ ID NO: 203, SEQ ID NO: 189, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 159, SEQ ID NO: 175, SEQ ID NO: 210; (12) SEQ ID NO: 212, SEQ ID NO: 203, SEQ ID NO: 189, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 159, SEQ ID NO: 175; (13) SEQ ID NO: 212, SEQ ID NO: 203, SEQ ID NO: 189,

SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 159; (14) SEQ ID NO: 212, SEQ ID NO: 203, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 159; (15) SEQ ID NO: 203, SEQ ID NO: 189, SEQ ID NO: 211, SEQ ID NO: 175; (16) SEQ ID NO: 203, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 175; (17) SEQ ID NO: 203, SEQ ID NO: 189, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 175; (18) SEQ ID NO: 203, SEQ ID NO: 208, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 159, SEQ ID NO: 175; (19) SEQ ID NO: 203, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 159, SEQ ID NO: 175; (20) SEQ ID NO: 203, SEQ ID NO: 208, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 159, SEQ ID NO: 175; (21) SEQ ID NO: 203, SEQ ID NO: 208, SEQ ID NO: 189, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 159, SEQ ID NO: 175; (22) SEQ ID NO: 203, SEQ ID NO: 208, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 21, SEQ ID NO: 209, SEQ ID NO: 159; (23) SEQ ID NO: 203, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 209, SEQ ID NO: 159; (24) SEQ ID NO: 215, SEQ ID NO: 160, SEQ ID NO: 158, SEQ ID NO: 106; and (25) any combination thereof.

[0030] In some embodiments, the purified bacterial population further comprises 16S rDNA sequences that are at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence selected from the group consisting of: (1) SEQ ID NO: 184, SEQ ID NO: 204, SEQ ID NO: 216, SEQ ID NO: 217, SEQ ID NO: 218, SEQ ID NO: 219, SEQ ID NO: 220, SEQ ID NO: 221, SEQ ID NO: 222, SEQ ID NO: 223, SEQ ID NO: 224, SEQ ID NO: 225, SEQ ID NO: 226, SEQ ID NO: 227, SEQ ID NO: 198, SEQ ID NO: 199, SEQ ID NO: 200, SEQ ID NO: 201, SEQ ID NO: 202, SEQ ID NO: 126, SEQ ID NO: 127, SEQ ID NO: 103, SEQ ID NO: 128, SEQ ID NO: 129, SEQ ID NO: 130, SEQ ID NO: 131, SEQ ID NO: 132, SEQ ID NO: 162, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123; (2) SEQ ID NO: 204, SEQ ID NO: 103; (3) SEQ ID NO: 204, SEQ ID NO: 103, SEQ ID NO: 205; (4) SEQ ID NO: 185, SEQ ID NO: 204, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 117; (5) SEQ ID NO: 184, SEQ ID NO: 204, SEQ ID NO: 198, SEQ ID NO: 199, SEQ ID NO: 200, SEQ ID NO: 201, SEQ ID NO: 202, SEQ ID NO: 103, SEQ ID NO: 162, SEQ ID NO: 134; (6) SEQ ID NO: 184, SEQ ID NO: 204, SEQ ID NO: 198, SEQ ID NO: 199, SEQ ID NO: 200, SEQ ID

NO: 201, SEQ ID NO: 202, SEQ ID NO: 103, SEQ ID NO: 165, SEQ ID NO: 162, SEQ ID NO: 182; (7) SEQ ID NO: 184, SEQ ID NO: 204, SEQ ID NO: 103, SEQ ID NO: 165, SEQ ID NO: 162, SEQ ID NO: 182, SEQ ID NO: 134; (8) SEQ ID NO: 184, SEQ ID NO: 204, SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 128, SEQ ID NO: 129, SEQ ID NO: 130, SEQ ID NO: 131, SEQ ID NO: 132, SEQ ID NO: 162, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123; (9) SEQ ID NO: 184, SEQ ID NO: 204, SEQ ID NO: SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 162, SEQ ID NO: 118, SEQ ID NO: 134; (10) SEQ ID NO: 184, SEQ ID NO: 204, SEQ ID NO: SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 162, SEQ ID NO: 118, SEQ ID NO: 182; (11) SEQ ID NO: 184, SEQ ID NO: 204, SEQ ID NO: SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 162, SEQ ID NO: 118, SEQ ID NO: 182, SEQ ID NO: 134; (12) SEQ ID NO: 111, SEQ ID NO: 135, SEQ ID NO: 134; (13) SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 137, SEQ ID NO: 111, SEQ ID NO: 135, SEQ ID NO: 134; (14) SEQ ID NO: 183, SEQ ID NO: 204, SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 137, SEQ ID NO: 133, SEQ ID NO: 103, SEQ ID NO: 111, SEQ ID NO: 118, SEQ ID NO: 163, SEQ ID NO: 135, SEQ ID NO: 134; (15) SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 137, SEQ ID NO: 193, SEQ ID NO: 194, SEQ ID NO: 195, SEQ ID NO: 196, SEQ ID NO: 197, SEQ ID NO: 111, SEQ ID NO: 118, SEQ ID NO: 170, SEQ ID NO: 171, SEQ ID NO: 172, SEQ ID NO: 173, SEQ ID NO: 174, SEQ ID NO: 135, SEQ ID NO: 134; (16) SEQ ID NO: 133, SEQ ID NO: 111, SEQ ID NO: 128, SEQ ID NO: 129, SEQ ID NO: 130, SEQ ID NO: 131, SEQ ID NO: 132, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 182, SEQ ID NO: 135, SEQ ID NO: 134; (17) SEQ ID

NO: 111, SEQ ID NO: 182, SEQ ID NO: 135, SEQ ID NO: 134; (18) SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 137, SEQ ID NO: 111, SEQ ID NO: 118, SEQ ID NO: 182, SEQ ID NO: 135, SEQ ID NO: 134; (19) SEQ ID NO: 184, SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 137, SEQ ID NO: 111, SEQ ID NO: 118, SEQ ID NO: 135, SEQ ID NO: 134; (20) SEQ ID NO: 183, SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 137, SEQ ID NO: 136, SEQ ID NO: 111, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 135, SEQ ID NO: 134; (21) SEQ ID NO: 185, SEQ ID NO: 183, SEQ ID NO: 161, SEQ ID NO: 206, SEQ ID NO: 137, SEQ ID NO: 133, SEQ ID NO: 103, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163; (22) SEQ ID NO: 183, SEQ ID NO: 161, SEQ ID NO: 206, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163, SEQ ID NO: 134; (23) SEQ ID NO: 185, SEQ ID NO: 183, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163, SEQ ID NO: 134; (24) SEQ ID NO: 206, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 182, SEQ ID NO: 13; (25) SEQ ID NO: 185, SEQ ID NO: 183, SEQ ID NO: 206, SEQ ID NO: 192, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 165, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 163; (26) SEQ ID NO: 185, SEQ ID NO: 183, SEQ ID NO: 206, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163, SEQ ID NO: 182; (27) SEQ ID NO: 206, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 165, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163, SEQ ID NO: 182; (28) SEQ ID NO: 185, SEQ ID NO: 183, SEQ ID NO: 206, SEQ ID NO:

137, SEQ ID NO: 103, SEQ ID NO: 165, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163, SEQ ID NO: 182, SEQ ID NO: 135; (29) SEQ ID NO: 185, SEQ ID NO: 161, SEQ ID NO: 206, SEQ ID NO: 137, SEQ ID NO: 133, SEQ ID NO: 103, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163, SEQ ID NO: 182, SEQ ID NO: 135; (30) SEQ ID NO: 185, SEQ ID NO: 183, SEQ ID NO: 206, SEQ ID NO: 192, SEQ ID NO: 137, SEQ ID NO: 133, SEQ ID NO: 103, SEQ ID NO: 165, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163; (31) SEQ ID NO: 185, SEQ ID NO: 183, SEQ ID NO: 206, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163, SEQ ID NO: 182, SEQ ID NO: 135; (32) SEQ ID NO: 185, SEQ ID NO: 183, SEQ ID NO: 161, SEQ ID NO: 206, SEQ ID NO: 192, SEQ ID NO: 137, SEQ ID NO: 133, SEQ ID NO: 103, SEQ ID NO: 165, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163, SEQ ID NO: 182, SEQ ID NO: 135, SEQ ID NO: 134; (33) SEQ ID NO: 185, SEQ ID NO: 183, SEQ ID NO: 161, SEQ ID NO: 206, SEQ ID NO: 192, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 165, SEQ ID NO: 111, SEQ ID NO: 128, SEQ ID NO: 129, SEQ ID NO: 130, SEQ ID NO: 131, SEQ ID NO: 132, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163, SEQ ID NO: 182, SEQ ID NO: 134, SEQ ID NO: 179, SEQ ID NO: 180, SEQ ID NO: 181; (34) SEQ ID NO: 185, SEQ ID NO: 161, SEQ ID NO: 206, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 111, SEQ ID NO: 128, SEQ ID NO: 129, SEQ ID NO: 130, SEQ ID NO: 131, SEQ ID NO: 132, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163, SEQ ID NO: 182, SEQ ID NO: 179, SEQ ID NO: 180, SEQ ID NO: 181; (35) SEQ ID NO: 102, SEQ ID NO: 216, SEQ ID NO: 217, SEQ ID NO: 218, SEQ ID NO: 219, SEQ ID NO: 220, SEQ ID NO: 221, SEQ ID NO: 222, SEQ ID NO: 223, SEQ ID NO: 224, SEQ ID NO: 225, SEQ ID NO: 226, SEQ ID NO: 227, SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169,

SEQ ID NO: 109, SEQ ID NO: 107, SEQ ID NO: 103, SEQ ID NO: 108, SEQ ID NO: 117, SEQ ID NO: 105, SEQ ID NO: 179, SEQ ID NO: 180, SEQ ID NO: 181; and (36) any combination thereof.

[0031] In some embodiments, a composition disclosed herein further comprises one or more enteric polymers.

[0032] Present disclosure also provides pharmaceutical formulation comprising any of the bacterial compositions disclosed herein, and a pharmaceutically acceptable excipient. In some embodiments, the excipient is glycerol. In certain embodiments, the composition is lyophilized. In further embodiments, the composition is formulated for oral delivery.

[0033] Provided herein is a method of treating an inflammatory disease in a subject in need thereof, comprising administering to the subject an effective amount of a composition disclosed herein. In certain embodiments, administering the effective amount of the composition ameliorates one or more signs or symptoms of the inflammatory disease or maintains a remission of the inflammatory disease. In some embodiments, the inflammatory disease comprises an inflammatory bowel disease. In certain embodiments, the inflammatory bowel disease comprises Crohn's disease, autoimmune-mediated gastrointestinal diseases, gastrointestinal inflammation, or colitis, such as ulcerative colitis, colitis ulcerosa, microscopic colitis, collagenous colitis, colitis polyposa, necrotizing enterocolitis, transmural colitis, or any combination thereof.

[0034] Also provided herein a use of a compositions disclosed herein (*e.g.*, designed bacterial composition) in the manufacture of a medicament for treating an inflammatory disease in a subject in need thereof. Present disclosure also provides a composition disclosed herein for use in a method of treating an inflammatory disease, comprising administering the composition to the subject.

[0035] Provided herein is a method of modulating the level of a biological molecule in a subject in need thereof, comprising administering to the subject an effective amount of a composition disclosed herein. In certain embodiments, the biological molecule comprises a fecal calprotectin, a a secondary bile acid, a tryptophan metabolite, a short-chain fatty acid, a medium-chain fatty acid, a sphingolipid, a kynurenine, or any combination thereof.

[0036] In some embodiments, the level of fecal calprotectin is reduced by at least about 10%, at least about 20%, at least about 30%, at least about 40%, at least about 50%, at

least about 60%, at least about 70%, at least about 80%, or at least about 90% in the subject compared to a corresponding level in a reference.

[0037] In certain embodiments, the level of a secondary bile acid is increased by at least about 10%, at least about 20%, at least about 30%, at least about 40%, at least about 50%, at least about 60%, at least about 70%, at least about 80%, or at least about 90% in the subject compared to a corresponding level in a reference. In some embodiments, the secondary bile acid comprises deoxycholic acid (DCA), 3 α 12-oxo-deoxycholic acid, 3 β 12 α -deoxycholic acid (3-isodeoxycholic acid), 7 α 3-oxo-chenodeoxycholic acid, lithocholic acid (LCA), 3-oxo LCA, or any combination thereof.

[0038] In some embodiments, the level of a tryptophan metabolite is increased by at least about 10%, at least about 20%, at least about 30%, at least about 40%, at least about 50%, at least about 60%, at least about 70%, at least about 80%, or at least about 90% in the subject compared to a corresponding level in a reference. In some embodiments, the tryptophan metabolite is selected from the group consisting of indole, 3-methylindole, and combinations thereof.

[0039] In some embodiments, the level of a short-chain fatty acid is increased by at least about 10%, at least about 20%, at least about 30%, at least about 40%, at least about 50%, at least about 60%, at least about 70%, at least about 80%, or at least about 90% in the subject compared to a corresponding level in a reference. In certain embodiments, the short-chain fatty acid comprises formate, acetate, propionate, butyrate, isobutyrate, valerate, isovalerate, or any combination thereof.

[0040] In some embodiments, the the reference is a predetermined level or a level in the subject prior to the administration. In some embodiments, the modulation of the biological molecule is associated with remission of an inflammatory disease.

[0041] Also provided herein is a method of treating a cancer in a subject in need thereof, comprising administering to the subject an effective amount of a composition of the present disclosure. Present disclosure further provides the use of any of the compositions disclosed herein in the manufacture of a medicament for treating a cancer in a subject in need thereof. Also disclosed is a composition disclosed herein for use in a method of treating a cancer, comprising administering the composition to the subject.

[0042] Provided herein is a method for inhibiting a growth of a tumor or reducing the size of a tumor in a subject in need thereof, comprising administering to the subject an

effective amount of a composition disclosed herein. Also provided is a use of a composition disclosed herein 57 in the manufacture of a medicament for inhibiting a growth of a tumor or reducing the size of a tumor in a subject in need thereof. Also disclosed herein is a composition of the present disclosure for use in a method of treating a cancer, comprising administering the composition to the subject.

[0043] Provided herein is a method of enhancing an immune response in a subject in need thereof, comprising administering to the subject an effective amount of a composition disclosed herein. Also provided herein is a use of a composition of the present disclosure in the manufacture of a medicament for enhancing an immune response in a subject in need thereof. Also disclosed herein is a composition of the present disclosure for use in a method of enhancing an immune response in a subject in need thereof.

[0044] In some embodiments, the subject has a cancer.

[0045] In some embodiments, the methods, the use, or the composition for use further comprises administering an additional therapeutic agent to the subject. In certain embodiments, the additional therapeutic agent comprises an immune checkpoint inhibitor. In some embodiments, the immune checkpoint inhibitor comprises an anti-PD-1 antibody, an anti-PD-L1 antibody, or an anti-CTLA-4 antibody.

[0046] In some embodiments, the cancer comprises a bladder cancer, breast cancer, uterine/cervical cancer, ovarian cancer, prostate cancer, testicular cancer, esophageal cancer, gastrointestinal cancer, pancreatic cancer, colorectal cancer, colon cancer, kidney cancer, head and neck cancer, lung cancer, stomach cancer, germ cell cancer, bone cancer, liver cancer, thyroid cancer, skin cancer, neoplasm of the central nervous system, lymphoma, leukemia, myeloma, sarcoma, virus-related cancer, or any combinations thereof.

[0047] In some embodiments, administering a composition disclosed herein to a subject results in increased number of tumor infiltrating lymphocytes in a tumor of the subject. In some embodiments, the number of tumor infiltrating lymphocytes in the tumor is increased by at least about 5%, at least about 10%, at least about 20%, at least about 30%, at least about 40%, at least about 50%, at least about 60%, at least about 70%, at least about 80%, or at least about 90% or more compared to a reference. In some embodiments, the reference comprises the number of tumor infiltrating lymphocytes in a tumor of a subject that did not receive the composition.

EMBODIMENTS

- [0048] Embodiment 1. A composition comprising a purified population of bacteria, wherein the purified population of bacteria comprises one or more bacteria from the family *Ruminococcaceae*, *Lachnospiraceae*, *Sutterellaceae*, *Clostridiaceae*, *Erysipelotrichaceae*, *Bacteroidaceae*, *Akkermansiaceae*, or *Desulfovibrionaceae*.
- [0049] Embodiment 2. The composition of Embodiment 1, wherein the purified population of bacteria comprises bacteria from at least two, three, four, five, six, seven, or all of the families.
- [0050] Embodiment 3. A composition comprising a purified population of bacteria, wherein the purified population of bacteria comprises one or more bacteria selected from the group consisting of *Gemmiger formicilis*, *Roseburia hominis*, *Clostridium bolteae*, *Parasutterella excrementihominis*, *Holdemanian filiformis*, *Holdemanian massiliensis*, *Bacteroides ovatus*, *Akkemansia muciniphila*, *Clostridium leptum*, *Bilophila wadsworthia*, *Dielma fastidiosa*, *Clostridium symbiosum*, *Eubacterium siraeum*, *Agathobaculum desmolans*, *Agathobaculum butyriciproducens*, and *Bacteroides vulgatus*.
- [0051] Embodiment 4. The composition of Embodiment 3, wherein the one or more bacteria is *Gemmiger formicilis*, *Roseburia hominis*, *Clostridium bolteae*, *Holdemanian filiformis*, *Holdemanian massiliensis*, *Clostridium leptum*, *Dielma fastidiosa*, *Clostridium symbiosum*, *Eubacterium siraeum*, or combinations thereof.
- [0052] Embodiment 5. A composition comprising a purified population of bacteria, wherein the purified population of bacteria comprises one or more bacteria selected from the group consisting of *Anaerotruncus colihominis*, *Blautia producta*, *Clostridium bolteae*, *Clostridium disporicum*, *Clostridium ghonii*, *Clostridium glycolicum*, *Clostridium innocuum*, *Clostridium lactatifermentans*, *Clostridium viride*, *Eubacterium* sp. WAL 14571, *Lachnospiraceae bacterium 3 1 57FA*, *Lachnospiraceae bacterium* oral taxon F15, *Lactonifactor longoviformis*, and *Ruminococcus lactaris*.
- [0053] Embodiment 6. A composition comprising a purified population of bacteria, wherein the purified population of bacteria comprises one or more bacteria having a 16S rDNA sequence that is at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% identical to a 16S rDNA sequence set forth in SEQ ID NOs: 1-14, 16-30, 32-36, 39, 41, 44, 45, 47-51, 59-62, 64-68, and 72-76.

- [0054] Embodiment 7. The composition of any one of Embodiments 1 to 6, wherein the purified population of bacteria comprises at least two, three, four, five, six, seven, eight, nine, or more bacteria.
- [0055] Embodiment 8. The composition of any one of Embodiments 1 to 7, wherein the one or more bacteria are associated with remission of an inflammatory bowel disease.
- [0056] Embodiment 9. The composition of any one of Embodiments 1 to 8, wherein the one or more bacteria can modulate the level of a biological molecule, wherein the biological molecule comprises a fecal calprotectin, a secondary bile acid, a tryptophan metabolite, a short-chain fatty acid, a medium-chain fatty acid, a sphingolipid, a kynurenine, or combinations thereof. .
- [0057] Embodiment 10. The composition of Embodiment 9, wherein the tryptophan metabolite comprises indole, 3-methylindole, kynurenine, indoleacrylate, or combinations thereof.
- [0058] Embodiment 11. The composition of Embodiment 9 or 10, wherein the one or more bacteria can modulate the level of the biological molecule in vivo.
- [0059] Embodiment 12. The composition of any one of Embodiments 9 to 11, wherein the one or more bacteria can modulate the level of the biological molecule in a subject diagnosed with ulcerative colitis or in an animal model of ulcerative colitis.
- [0060] Embodiment 13. The composition of Embodiment 9, wherein the one or more bacteria can modulate the level of the biological molecule in vitro.
- [0061] Embodiment 14. The composition of Embodiment 9, wherein the one or more bacteria can modulate the level of the biological molecule in a culture or a synthetic gastrointestinal system.
- [0062] Embodiment 15. The composition of Embodiment 9, wherein the level of a fecal calprotectin is reduced by at least 10%, at least 20%, at least 30%, at least 40%, at least 50%, at least 60%, at least 70%, at least 80%, or at least 90% compared to a corresponding level in a reference.
- [0063] Embodiment 16. The composition of Embodiment 9, wherein the level of a secondary bile acid is increased by at least 10%, at least 20%, at least 30%, at least 40%, at least 50%, at least 60%, at least 70%, at least 80%, or at least 90% compared to a corresponding level in a reference.

- [0064] Embodiment 17. The composition of Embodiment 16, wherein the secondary bile acid is selected from the group consisting of deoxycholic acid (DCA), 3 α 12-oxo-deoxycholic acid, 3 β 12 α -deoxycholic acid (3-isodeoxycholic acid), 7 α 3-oxo-chenodeoxycholic acid, lithocholic acid (LCA), 3-oxo LCA, and combinations thereof.
- [0065] Embodiment 18. The composition of Embodiment 9, wherein the level of a tryptophan metabolite is increased by at least 10%, at least 20%, at least 30%, at least 40%, at least 50%, at least 60%, at least 70%, at least 80%, or at least 90% compared to a corresponding level in a reference.
- [0066] Embodiment 19. The composition of any one of Embodiments 1 to 18, wherein the one or more bacteria augments the number of spore-forming bacteria in a microbiome of a subject.
- [0067] Embodiment 20. The composition of any one of Embodiments 1 to 19, wherein the one or more bacteria augments the number of non-spore-forming bacteria in a microbiome of a subject.
- [0068] Embodiment 21. The composition of any one of Embodiments 15, 16, and 18, wherein the reference is a predetermined level or a level in a subject prior to a treatment with the composition.
- [0069] Embodiment 22. The composition of any one of Embodiments 1 to 21, wherein the one or more bacteria are spore-forming bacteria.
- [0070] Embodiment 23. The composition of any one of Embodiments 1 to 22, wherein the one or more bacteria are capable of being engrafted into a subject's microbiome when administered to the subject.
- [0071] Embodiment 24. A composition comprising a purified population of bacteria, wherein the purified population of bacteria does not include one or more bacteria selected from *Eubacterium contortum*, *Clostridium aldenense*, *Flavonifractor plautii*, *Ruminococcus gnavus*, *Clostridium hathewayi*, *Erysipelatoclostridium ramosum*, *Clostridium SC174*, *Blautia SC109*, *Ruminococcus SC103*, *Bifidobacterium dentium*, *Dialister invisus*, *Prevotella copri*, *Veillonella atypica*, *Veillonella dispar*, *Veillonella parvula*, or *Veillonella ratti*.
- [0072] Embodiment 25. A composition comprising a purified population of bacteria, wherein the purified population of bacteria does not include one or more bacteria having a 16S rDNA sequence that is at least 85%, at least 90%, at least 95%, at least 96%, at least

97%, at least 98%, at least 99%, or 100% identical to a 16S rDNA sequence set forth in SEQ ID NOs: 15, 31, 37, 38, 40, 42, 43, 46, 52-58, 63, 69-71, and 83-101.

- [0073] Embodiment 26. The composition of Embodiment 24 or 25, wherein the purified population of bacteria does not include at least two, three, four, five, six, seven, eight, nine, ten, eleven, or all of the excluded bacteria.
- [0074] Embodiment 27. The composition of any one of Embodiments 24 to 26, wherein the one or more excluded bacteria is not associated with remission of an inflammatory bowel disease.
- [0075] Embodiment 28. A composition comprising one or more bacteria having at least 2, 3, 4, 5, 6, or 7 of the following features: (i) the ability to produce hexanoate, (ii) the ability to produce valerate, (iii) the ability to produce indole, (iv) the ability to produce 3-methylindole, (v) the ability to induce regulatory T cells (Tregs) (e.g., CD4+/FoxP3+ cells), (vi) the ability to inhibit HDAC activity, or (vii) the ability to show efficacy (e.g., have a significant lower pathology score relative to a disease control) in a T-cell model in aggregate.
- [0076] Embodiment 29. The composition of Embodiment 28, wherein the one or more bacteria have no 7-alpha dehydrogenase activity.
- [0077] Embodiment 30. The composition of Embodiment 28 or 29, wherein the features are associated with an improvement of an inflammatory bowel disease.
- [0078] Embodiment 31. The composition of any one of Embodiments 8, 27, and 30 wherein the inflammatory bowel disease is ulcerative colitis.
- [0079] Embodiment 32. A pharmaceutical formulation comprising the composition of any one of Embodiments 1 to 31 and a pharmaceutically acceptable excipient.
- [0080] Embodiment 33. The pharmaceutical formulation of Embodiment 32, wherein the excipient is glycerol.
- [0081] Embodiment 34. The pharmaceutical formulation of Embodiment 32 or 33, wherein the composition is lyophilized.
- [0082] Embodiment 35. The pharmaceutical formulation of any one of Embodiments 32 to 34, wherein the composition is formulated for oral delivery.
- [0083] Embodiment 36. A method of treating an inflammatory bowel disease in a subject in need thereof, comprising administering to the subject an effective amount of a

composition of any one of Embodiments 1 to 31 or a pharmaceutical formulation of any one of Embodiments 32 to 35.

[0084] Embodiment 37. The method of Embodiment 36, wherein administering the effective amount of the composition ameliorates one or more signs or symptoms of the inflammatory bowel disease or maintains a remission of the inflammatory bowel disease.

[0085] Embodiment 38. The method of Embodiment 36 or 37, wherein the inflammatory bowel disease comprises Crohn's disease, autoimmune-mediated gastrointestinal diseases, gastrointestinal inflammation, or colitis, such as ulcerative colitis, colitis ulcerosa, microscopic colitis, collagenous colitis, colitis polyposa, necrotizing enterocolitis, or transmural colitis.

[0086] Embodiment 39. A method of modulating the level of a biological molecule in a subject in need thereof, comprising administering to the subject an effective amount of a composition of any one of Embodiments 1 to 31 or a pharmaceutical formulation of any one of Embodiments 32 to 35.

[0087] Embodiment 40. The method of Embodiment 39, wherein the biological molecule comprises a fecal calprotectin, a secondary bile acid, a tryptophan metabolite, a short-chain fatty acid, a medium-chain fatty acid, a sphingolipid, a kynurenine, or combinations thereof.

[0088] Embodiment 41. The method of Embodiment 40, wherein the level of a fecal calprotectin is reduced by at least 10%, at least 20%, at least 30%, at least 40%, at least 50%, at least 60%, at least 70%, at least 80%, or at least 90% in the subject compared to a corresponding level in a reference.

[0089] Embodiment 42. The method of Embodiment 40, wherein the level of a secondary bile acid is increased by at least 10%, at least 20%, at least 30%, at least 40%, at least 50%, at least 60%, at least 70%, at least 80%, or at least 90% in the subject compared to a corresponding level in a reference.

[0090] Embodiment 43. The method of Embodiment 42, wherein the secondary bile acid is selected from the group consisting of deoxycholic acid (DCA), 3 α 12-oxo-deoxycholic acid, 3 β 12 α -deoxycholic acid (3-isodeoxycholic acid), 7 α 3-oxo-chenodeoxycholic acid, lithocholic acid (LCA), 3-oxo LCA, and combinations thereof.

[0091] Embodiment 44. The method of Embodiment 40, wherein the level of a tryptophan metabolite is increased by at least 10%, at least 20%, at least 30%, at least

40%, at least 50%, at least 60%, at least 70%, at least 80%, or at least 90% in the subject compared to a corresponding level in a reference.

[0092] Embodiment 45. The method of Embodiment 44, wherein the tryptophan metabolite is selected from the group consisting of indole, 3-methylindole, and combinations thereof.

[0093] Embodiment 46. The method of any one of Embodiments 41, 42, or 44, wherein the reference is a predetermined level or a level in the subject prior to the administration.

[0094] Embodiment 47. The method of any one of Embodiments 39 to 46, wherein the modulation of the biological molecule is associated with remission of an inflammatory bowel disease.

[0095] Embodiment 48. A method of identifying if a subject is a suitable donor for a fecal bacteriotherapy, comprising: a) obtaining a microbiome sample from the subject; b) determining the prevalence of one or more bacteria in the microbiome sample; and c) determining that the subject is a suitable donor if the microbiome comprises one or more bacteria selected from the group consisting of *Gemmiger formicilis*, *Roseburia hominis*, *Clostridium bolteae*, *Parasutterella excrementihominis*, *Holdemania filiformis*, *Holdemania massiliensis*, *Bacteroides ovatus*, *Akkemansia muciniphila*, *Clostridium leptum*, *Bilophila wadsworthia*, *Dielma fastidiosa*, *Clostridium symbiosum*, *Eubacterium siraeum*, *Agathobaculum desmolans*, *Agathobaculum butyriciproducens*, and *Bacteroides vulgatus*.

[0096] Embodiment 49. A method of identifying if a subject is a suitable donor for a fecal bacteriotherapy, comprising: a) obtaining a microbiome sample from the subject; b) determining the prevalence of one or more bacteria in the microbiome sample; and c) determining that the subject is a suitable donor if the microbiome comprises one or more bacteria having a 16S rDNA sequence that is at least 85%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, or 100% identical to a 16S rDNA sequence set forth in SEQ ID NOs: 1-14, 16-30, 32-36, 39, 41, 44, 45, 47-51, 59-62, 64-68, and 72-76.

BRIEF DESCRIPTION OF THE DRAWINGS/FIGURES

[0097] FIG. 1 shows a comparison of the clinical remission (left graph) and endoscopic improvement (right graph) at 8 weeks post initial treatment in ulcerative colitis patients

who received one of the following treatment regimens: (A) placebo pre-treatment/placebo once daily; (B) placebo pre-treatment/purified spore population derived from the feces of healthy human donors (healthy human spore product; HHSP) once weekly; (C) vancomycin pre-treatment/HHSP once weekly; or (D) vancomycin pre-treatment/HHSP once daily. Pretreatment period was 6 days and treatment period was 8 weeks. The percentages of patients from each of the groups who went into clinical remission (Total Modified Mayo (TMM) score of ≤ 2 plus endoscopic subscore of ≤ 1) or showed endoscopic improvement (decrease in endoscopic score of ≥ 1) are shown above the respective bars.

[0098] FIGs. 2A to 2C show a comparison of the number of "high confidence engrafting bacteria" species associated with HHSP detected in the fecal samples of ulcerative colitis patients from each of the 4 Arms (A, B, C, and D). In FIG. 2A, the total number of the relevant species of bacteria that engrafted were quantified in fecal samples at days 0, 3, 7, 10, 14, 56, and 84 after initiation of treatment with either placebo or an HHSP. In FIGs. 2B and 2C, the engrafting bacterial species were further divided into either long-term engrafting species (long-term engrafters) (FIG. 2B) or transient engrafting species (transient engrafters) (FIG. 2C). Engraftment was determined relative to the population of bacteria present at baseline (*i.e.*, prior to the pre-treatment regimen). High confidence engrafting bacteria comprise species present in the drug product (*i.e.*, HHSP) and not present in the pre-treatment baseline sample for an individual patient, but were observed in the patient at any time point post-treatment. This is a conservative measure of engraftment in that it does not include engraftment of a species that is present as a unique strain in the drug product and as a different strain of the same species in the patient microbiome at baseline.

[0099] FIG. 3 shows a comparison of the change in the spore-forming portion of the microbiome of ulcerative colitis patients from Arms A, B, C, and D, at various time points post initial dose of the HHSP. The change in the microbiome from the baseline composition is shown as a binary Jaccard distance between patients and their matched dose lot. Binary Jaccard measures the similarity of the spore-forming component of patient microbiomes to HHSP. A positive value indicates greater similarity to HHSP. The horizontal line indicates the composition of the spore-forming component of the patient microbiome at baseline (distance = 0 by definition).

- [0100] FIG. 4 shows a correlation between the concentrations of 7- α -dehydroxylated secondary bile acids and clinical outcome. At 8 weeks post initial treatment, ulcerative colitis patients from all treatment arms were categorized as being in remission or in non-remission. Then, the concentrations of the 7- α -dehydroxylated secondary bile acids were measured.
- [0101] FIGs. 5A and 5B show the effects of secondary bile acids deoxycholic acid (DCA) and lithocholic acid (LCA) on the production of TNF- α (FIG. 5A) and IL-10 (FIG. 5B) in LPS-stimulated peripheral blood mononuclear cells (PBMCs) *in vitro*. In both FIGs. 5A and 5B, the bars shown correspond to a concentration of the bile acid used (12.5, 25, and 50 μ M), with increase in concentration going from left to right.
- [0102] FIGs. 6A, 6B, and 6C show a comparison of different tryptophan metabolite levels in the fecal samples of remitters (Remission) and non-remitters (Non-Remission) after HHSP administration (*i.e.*, Arms B, C, and D) at 8 weeks post initial dosing (*i.e.*, at the end of the treatment period). FIG. 6A shows a comparison of the indole level. FIG. 6B shows a comparison of the 3-methylindole level. FIG. 6C also shows a comparison of the 3-methylindole level, but the patient samples were divided based on the presence of *Ruminococcus bromii* and *Eubacterium siraeum*: (i) none "(0)", (ii) one (*i.e.*, either of the two species) "(1)", or (iii) both "(2)".
- [0103] FIGs. 7A and 7B shows a comparison of the ability of different tryptophan metabolites (FIG. 7A) or bacterial supernatants (FIG. 7B) to induce AhR-mediated cyplal expression relative to β -actin in epithelial colonic organoids. In FIG. 7A, the metabolites (3-indole acetic acid, 3-methylindole, indole, indoleacrylate, 3-indole butyric acid, and indolepropionic acid, IPA) were added at three different concentrations (50, 100, and 200 μ M), with increasing concentrations from right to left. Untreated epithelial organoids (Untd) were used as a negative control. In FIG. 7B, supernatants were collected from cultures containing different bacteria (*Clostridium sporogenes* 1, *Clostridium sporogenes* 2, *Peptostreptococcus stomatis*, *Clostridium glycolicum*, *Bacteroides sp.* 4 1 36) and were provided to the epithelial organoids at two different concentrations (5% and 2% final concentration), with the left bar corresponding to the higher concentration. The SCFAs and tryptophan metabolites present in each supernatant (from FIGs. 17 and 18) are indicated. IPA: indolepropionic acid; IAcrlyl: Indole acrylate; 3Mind: 3-methylindole;

I3Carb: indole-3-carbinol; C3: propionate; C4: butyrate; C5: valerate; C6: hexanoate; BCFA: branch chain fatty acids.

[0104] FIG. 8A provides a schematic diagram of the epithelial barrier integrity assay and FIG. 8B provides a comparison of the epithelial permeability after exposure to different concentrations of IFN- γ .

[0105] FIGs. 9A and 9B show a comparison of the ability of different bacterial metabolites (butyrate, propionate, and IPA) (FIG. 9A) and different bacterial species (FIG. 9B) to restore barrier integrity in the presence of IFN- γ , as measured by the epithelial barrier integrity assay shown in FIG. 8A. In FIG. 9A, each of the metabolites tested was added to the assay at four different concentrations (right to left: 0.625 mM, 1.25 mM, 5 mM, and 10 mM). Untreated samples (*i.e.*, no metabolite, no IFN- γ) were used as a negative control. Samples treated with 5 ng/mL of IFN- γ alone (no metabolite) were used as a positive control. The dotted horizontal line represents the permeability of the negative control. Permeability values below the dotted line indicate barrier protection while values above represent additional barrier damage compared to that caused by INF- γ alone (no bacteria). In FIG. 9B, the culture supernatants of different bacterial species tested included *Escherichia coli*, *Acidaminococcus sp. D21*, *Bacteroides fragilis*, *Collinsella intestinalis*, *Bifidobacterium bifidum*, *Peptoniphilus harei* (15% final supernatant concentration). Untreated samples (*i.e.*, no bacteria, no IFN- γ) were used to measure the barrier permeability in the absence of IFN- γ driven barrier defect. Butyrate (5 mM) was added as a positive control as it is known to enhance epithelial barrier junction integrity via multiple mechanisms. Under these assay conditions, addition of 5 mM butyrate was known to decrease permeability by 50%.

[0106] FIG. 10 shows the treatment schedule for assessing the effect of spore-forming bacteria on ulcerative colitis in an adoptive T cell transfer animal model.

[0107] FIG. 11 shows a comparison of the total pathology score in the ulcerative colitis animal model after treatment with (i) antibiotics alone (ABX), (ii) an HHSP, or (iii) DE1 (a composition of 14 spore forming human commensal species obtained by axenic fermentation). Naïve animals and untreated disease animals (Disease) were used as negative and positive controls, respectively. All comparisons were made to the ABX arm. "***" indicates a p value of <0.01 compared to the antibiotics alone control. "****" indicates a p value of < 0.001 compared to the antibiotics alone control.

- [0108] FIGs. 12A, 12B, 12C, 12D, and 12E show a comparison of mRNA expression level measured by qPCR of different genes from the lamina propria of colons in the ulcerative colitis animal model after treatment with one of the following: (i) antibiotics alone (ABX), (ii) HHSP or (iii) DE1. Naïve animals, untreated disease animals (Disease) and ABX only animals were used as controls. FIGs. 12A and 12B show the expression level of the pro-inflammatory genes, *Il1b* and *TNFA*, respectively. FIGs. 12C, 12D, and 12E show the expression level of different epithelial tight junction protein molecules, *Tjp1*, *Tjp2*, and *Ocln*, respectively. In FIGs. 12A, 12B, 12C, 12D, and 12E, the mRNA expression level of the different genes are shown relative to GAPDH expression. Statistical comparisons are to ABX only animals.
- [0109] FIG. 13 provides a table showing the ability of different bacterial strains to inhibit histone deacetylase (HDAC) activity. The bacterial strains tested were grown in PY medium supplemented with one of seven different nutrient sources at 0.5% final concentration (glucose, fucose, sucrose, pectin, fos/inulin, starch, or mucin). HDAC inhibition activity is shown as a fraction compared to media only controls ($HDAC_i = 1 - (HDAC_{sample} / HDAC_{medium\ control})$). If a strain exhibits $HDAC_i$ activity of at least 0.25 in any nutrient, or 0.18 in fucose, it is considered to have $HDAC_i$ activity and it is marked with "1". Strains that do not pass the cutoff are indicated by "0". The different bacterial strains are categorized into 7 different clusters (0 to 6) based on the pattern of HDAC inhibition activity across nutrient sources (far right column).
- [0110] FIGs. 14A and 14B show the ability of different bacterial metabolites (FIG. 14A) or a supernatant of a healthy human spore preparation (HHSP) (FIG. 14B) to inhibit IL-8 secretion by HT29 epithelial cells (IECs) after stimulation with $TNF-\alpha$. In FIG. 14A, the SCFAs of butyrate (left set of bars), propionate (middle set of bars), and acetate (right set of bars) show a dose-dependent anti-inflammatory effect on IECs shown as percent IL-8 inhibition compared to $TNF-\alpha$ only control. FIG. 14B, shows a dose-dependent anti-inflammatory effect of supernatant of a HHSP culture shown as a decrease in the level of IL-8 protein produced by the IECs after $TNF-\alpha$ treatment. IECs that were either not stimulated with $TNF-\alpha$ or $TNF-\alpha$ alone were used as controls (negative and positive controls, respectively).
- [0111] FIGs. 15A and 15B show the relationship between HDAC inhibition (x-axis) and anti-inflammatory effects in IECs (as measured by the relative decrease in IL-8

production after TNF- α stimulation) using supernatants from different bacterial species. Each circle represents a separate supernatant from a bacterial strain/nutrient combination as shown in FIG. 13. Positive y-axis values indicate anti-inflammatory activity. Negative y-axis values indicate higher IL-8 production than the TNF- α only control. FIG. 15A shows a general positive correlation between HDAC inhibition and anti-inflammatory activity (dashed line), although some supernatants had significantly lower anti-inflammatory activity than expected by HDAC. FIG. 15B separates data points with pro-inflammatory activity in a separate assay (increased IL-8 secretion in the absence of TNF- α stimulation). In these supernatants, HDAC inhibition did not translate into anti-inflammatory activity in IECs.

[0112] FIG. 16 shows the relationship between HDAC inhibition (x-axis) and Wnt activation (y-axis) in HEK-293 Wnt-STF (as measured by luciferase activity after bacterial supernatant stimulation) using supernatants from different bacterial species. Each circle represents a separate supernatant from a bacterial strain/nutrient combination as shown in FIG. 13.

[0113] FIG. 17 provides phenotypic screening results of multiple strains of a single *Lachnospiraceae* species. Each row corresponds to a unique strain, and each column corresponds to an *in vitro* screening phenotype. A dark shade indicates that the strain is positive for the particular phenotype; a light shade indicates that a strain is weakly positive for the phenotype; and white indicates the strain is negative. The different *in vitro* screening phenotypes include bile acid activities (bile salt hydrolase (BSH), hydroxysteroid dehydrogenase (HSDH), 7 α -dehydroxylase) and pro-inflammatory effects (as measured by production of IL-8 by IECs when exposed to a culture supernatant from the individual strain).

[0114] FIG. 18 provides a table listing bacterial species and the short chain fatty acids (SCFAs), medium chain fatty acids (MCFAs), and branched chain fatty acids (BCFAs) produced by each of the species. "<LOD" indicates that the concentration of the fatty acid was less than the limit of detection. The limit of detection for each of the fatty acids is provided in the row labeled "Limit of Detection (LOD)." The SCFAs measured included: acetic acid, propanoic acid, and butanoic acid. The MCFAs measured included: pentanoic acid, hexanoic acid, heptanoic acid. The BCFAs measured included: 2-methyl-propanoic acid, 3-methyl-butanoic acid, and 4-methyl-pentanoic acid.

[0115] FIG. 19 provides a table listing bacterial species and tryptophan metabolites produced by the species. "<LOD" indicates that the concentration of the fatty acid was less than the limit of detection. The limit of detection for each of the fatty acids is provided in the row labeled "Limit of Detection (LOD)." The tryptophan metabolites measured included: indole, 3-methylindole, indol-3-propanoic acid, indole-3-butyric acid, 3-indoleacrylic acid, tryptamine, indole-3-acetic acid, 3-indole-glyoxylic acid, 2-picolinic acid, and 5-hydroxytryptamine.

[0116] FIGs. 20A to 20T provide a comparison of various functional attributes of eight DEs disclosed herein after they were cultured *in vitro*: (1) DE1 (DE286037.1); (2) DE3 (DE984662.1); (3) DE4 (DE002165.1); (4) DE5 (DE464167.1); (5) DE6 (DE522292.1); (6) DE7 (DE247030.1); (7) DE8 (DE349441.1); and (8) DE9 (DE821956.1). The following functional attributes are shown: (i) biomass (FIG. 20A); (ii) ability to inhibit HDAC activity (FIG. 20B); (iii) ability to inhibit IL-8 secretion by HT29 epithelial cells (IECs) after stimulation with TNF- α (FIG. 20C); (iv) ability to induce IL-8 production by IECs (FIG. 20D); (v) ability to restore barrier integrity in the presence of IFN- γ , as measured by the epithelial barrier integrity assay (FIG. 20E); (vi) ability to express catalase activity (FIG. 20F); (vii) ability to activate toll-like receptor 4 (TLR4) (FIG. 20G); (viii) ability to activate TLR5 (FIG. 20H); (ix) ability to produce butyrate (FIG. 20I); (x) ability to produce propionate (FIG. 20J); (xi) ability to produce valerate (FIG. 20K); (xii) ability to produce hexanoate (FIG. 20L); (xiii) ability to produce indole (FIG. 20M); (xiv) ability to downmodulate the transcription of CXCL1, CXCL2, CXCL3, and CXCL11 (pro-inflammatory cytokines expressed in ulcerative colitis (UC) patients) in epithelial colonic organoids (FIGs. 20N, 20O, 20P, and 20Q, respectively); and (xv) ability to activate the Wnt signaling pathway, as determined by both CD44 and LRP6 gene expression, and HEK-293 Wnt-STF reporter assay (FIGs. 20R, 20S, and 20T, respectively).

[0117] FIGs. 21A to 21Q provide a comparison of various functional attributes of fourteen additional DEs disclosed herein after they were cultured *in vitro*: (1) DE1 (DE286037.1); (2) DE6 (DE522292.1); (1) DE10 (DE698478.1); (2) DE11 (DE559846.1); (3) DE12 (DE405816.1); (4) DE13 (DE056280.1); (5) DE14 (DE390874.1); (6) DE15 (DE299561.1); (7) DE16 (DE504874.1); (8) DE17 (DE608959.1); (9) DE18 (DE124702.1); (10) DE19 (DE211714.1); (11) DE20

(DE313669.1); (12) DE21 (DE762708.1); (13) (13) DE22 (DE787951.1); and (14) DE23 (DE291114.1. For comparison purposes, DE1 and DE6 were included. The following functional attributes are shown: (i) biomass (FIG. 21A); (ii) ability to inhibit HDAC activity (FIG. 21B); (iii) ability to inhibit IL-8 secretion by HT29 epithelial cells (IECs) after stimulation with TNF- α (FIG. 21C); (iv) ability to restore barrier integrity in the presence of IFN- γ , as measured by the epithelial barrier integrity assay (FIG. 21D); (v) ability to induce IL-8 production by IECs (FIG. 21E); (vi) ability to activate TLR4 (FIG. 21F); (v) ability to activate TLR5 (FIG. 21G); (vii) ability to produce butyrate (FIG. 21H); (viii) ability to produce propionate (FIG. 21I); (ix) ability to produce valerate and hexanoate (FIGs. 21J and 21K, respectively); (x) ability to produce indole and 3-methyl indole (FIGs. 21L and 21M, respectively); (x) bile salt hydrolase activity (as measured by the amount of primary bile acids produced) (FIG. 21N); and (xi) 7 α -dehydroxylase, α -hydroxysteroid dehydrogenase, and 7 β -hydroxysteroid dehydrogenase activity (as measured by the amount of different secondary bile acids produced) (FIGs. 21N, 21O, and 21P, respectively). In FIGs. 21B to 21E, DE9 (DE821956.1), which was designed not to be anti-inflammatory, was used as a negative control.

[0118] FIGs. 22A to 22R provide a comparison of various functional attributes of twelve different DEs disclosed herein after they were cultured *in vitro*: (1) DE24 (DE070875.1); (2) DE26 (DE343482.1); (3) DE25 (DE616787.1); (4) DE30 (DE068851.1); (5) DE28 (DE055548.1); (6) DE27 (DE033849.1); (7) DE29 (DE865106.1); (8) DE32 (DE779249.1); (9) DE33 (DE433598.1); (10) DE31 (DE502105.1); (11) DE34 (DE266386.1); and (12) DE35 (DE278442.1). As negative controls, DE9 and DE38 (DE533175.1) were used. As described herein, DE9 and DE38 are bacterial compositions that were designed to not have one or more of the functional properties disclosed herein (*e.g.*, anti-inflammatory activity). The following functional attributes are shown: (i) biomass (FIG. 22A); (ii) ability to inhibit HDAC activity (FIG. 22B); (iii) anti-inflammatory activity (as measured by the ability to inhibit IL-8 secretion by HT29 epithelial cells (IECs) after stimulation with TNF- α (FIG. 22C); (iv) pro-inflammatory activity (as measured by the ability to induce IL-8 production by IECs) (FIG. 22D); (v) ability to restore barrier integrity in the presence of IFN- γ , as measured by the epithelial barrier integrity assay (FIG. 22E); (vi) ability to produce butyrate (FIG. 22F); (vii) ability to produce valerate (FIG. 22G); (viii) ability to produce hexanoate (FIG. 22H); (ix) ability

to produce indole (FIG. 22I); (x) ability to produce 3-methyl indole (FIG. 22J); (xi) bile salt hydrolase activity (as measured by the amount of primary bile acids produced) (FIG. 22K); (xii) 7 α -dehydroxylase activity (as measured by the amount of deoxycholic acid (DCA) and lithocholic acid (LCA) secondary bile acids produced) (FIG. 22L); (xiii) α -HSDH activity (as measured by the amount of oxo- secondary bile acids produced) (FIG. 22M); (xiv) ability to downmodulate the transcription of CXCL1 and ICAM1 (proteins associated with pro-inflammatory response) in epithelial colonic organoids (FIGs. 22N and 22P, respectively); (xv) ability to increase AhR-mediated Cyp1a1 expression in epithelial colonic organoids (FIG. 22O) (xvi) ability to activate TLR4 (FIG. 22Q); and (xvii) ability to activate TLR5 (FIG. 22R);

[0119] FIGs. 23A to 23H provide comparison of additional properties (*e.g.*, functional features) of DEs disclosed herein to FMT (fecal microbiota transplantation) and HHSP (spore-prep composition). In FIGs. 23A to 23D, both DE1 (DE286037.1) and DE2 (DE924221.1) are compared to FMT and HHSP. In FIGs. 23E to 23H, DE1 is compared to HHSP. The different properties shown include: (i) biomass (FIG. 23A); (ii) inhibition of HDAC activity (FIG. 23B); (iii) pro-inflammatory activity (FIG. 23C); (iv) anti-inflammatory activity (FIG. 23D); (v) valerate production (FIG. 23E); (vi) hexanoate production (FIG. 23F); (vii) indole production (FIG. 23G); and (viii) 3-methyl indole (skatole) production (FIG. 23H).

[0120] FIGs. 24A and 24B shows on x-axis the differential gene expression observed in colonic biopsies in subjects with IBD compared to subjects without IBD in the HMP2 database; on the y-axis shows differential gene expression in colonic organoids when exposed to media alone compared to media plus TNF α ; each point corresponds to a gene measured in vitro in colonic organoids and in colonic biopsies of human subjects. Each point is based on the change in gene expression when colonic organoids are exposed to supernatant from cultured HSSP, a spore preparation from healthy donors (24A, left) or from DE1 (DE286037.1) (24B, right). Only genes that were differentially expressed in organoids after treatment with TNF α ($p < 0.05$) are shown. Lighter shaded points represent genes that were differentially expressed both in organoids after TNF α treatment and HMP2, and were not significantly changed by treatment with bacterial supernatants. Darker shaded points represent genes that were differentially expressed both in organoids after TNF α treatment and HMP2, and responded to bacterial supernatant treatment (*i.e.*

their expression was elevated in organoids treated with TNF and lowered with supernatant treatment, or if their expression was decreased in organoids treated with TNF but increased with supernatant treatment).

- [0121] FIGs. 25A to 25C provide a comparison of DE1, FMT, and HHSP in their ability to downmodulate the transcription of TNF- α -mediated CXCL1 (FIG. 25A), CXCL3 (FIG. 25B), and ICAM1 (FIG. 25C) expression in epithelial colonic organoids. For FMT, two of the samples were from a healthy donor (FMT #1 and FMT #3) and one sample was from a patient with ulcerative colitis (FMT #2). "Media (+)" (media with TNF- α) and "Media (-)" (media alone, no TNF- α) were used as positive and negative controls, respectively.
- [0122] FIGs. 26A and 26B provide a comparison of the different DEs disclosed herein to FMT and DXE (HHSP) in their ability to produce indole and butyrate, respectively.
- [0123] FIGs. 27A to 27C show the efficacy of the combination of DE1 and anti-PD-1 antibody in treating MC38 tumor in an animal model. FIG. 27A shows the treatment schedule. All of the animals were treated with the DE1 composition. Some of the animals additionally received the anti-PD-1 antibody, while the control animals received an isotype control antibody. FIG. 27B shows a comparison of tumor volume in the animals from the different treatment groups from days 6 to 17 post tumor inoculation. FIG. 27C provides a comparison of the percentage of CD8 T cells (left graph) and CD8 T cell:Treg ratio (right graph) in the tumors of the animals from the different treatment groups.
- [0124] FIGs. 28A to 28C show the efficacy of the combination of DE2 and anti-PD-1 antibody in treating MC38 tumor in an animal model. Overall treatment schedule is the same as in FIG. 27A. Instead of DE1, the animals were treated with the DE2 composition. Some of the animals additionally received the anti-PD-1 antibody, while the control animals received an isotype control antibody. FIG. 28A shows a comparison of tumor volume in the animals from the different treatment groups from days 6 to 17 post tumor inoculation. FIGs. 28B and 28C provide a comparison of the percentage of CD8 T cells and CD8 T cell:Treg ratio, respectively, in the tumors of the animals from the different treatment groups.
- [0125] FIGs. 29A to 29E show the efficacy of the combination of DE1 and anti-PD-1 antibody in treating BP tumor in an animal model. FIG. 29A shows the treatment schedule. All of the animals were treated with the DE1 composition. Some of the animals additionally received the anti-PD-L1 antibody, while the control animals received an

isotype control antibody. FIG. 29B shows a comparison of tumor volume in the animals from the different treatment groups over a course of 15 days from tumor inoculation. FIGs. 29C, 29D, and 29E show a comparison of the percentage of CD8 T cells, CD8 T cell:Treg ratio, and percentage of CD4 T cells, respectively, in the tumors of the animals from the different treatment groups.

[0126] FIG. 30 provides a table identifying the bacterial species included in the designed compositions DE1-DE9. SEQ ID NOs for the 16S sequences of the bacterial species are also provided. "0" indicates that the bacterial species is not included; "1" indicates that the bacterial species is included in the given composition.

[0127] FIG. 31 provides a table identifying the bacterial species included in the designed compositions DE10-DE23. SEQ ID NOs for the 16S sequences of the bacterial species are also provided. "0" indicates that the bacterial species is not included; "1" indicates that the bacterial species is included in the given composition.

[0128] FIG. 32 provides a table identifying the bacterial species included in the designed compositions DE24-DE38. SEQ ID NOs for the 16S sequences of the bacterial species are also provided. "0" indicates that the bacterial species is not included; "1" indicates that the bacterial species is included in the given composition.

DETAILED DESCRIPTION OF DISCLOSURE

[0129] Applicant has discovered that bacterial compositions comprising certain species of commensal bacteria exhibit certain functional features (*e.g.*, those disclosed herein) and that such compositions can be used to treat and/or prevent a range of diseases and disorders, *e.g.*, those associated with dysbiosis of the intestinal microbiome. Accordingly, Applicant has identified species of commensal bacteria that can be combined to design bacterial compositions disclosed herein. Detailed disclosure of the bacterial species and the functional features of interest are provided in the present disclosure.

I. Bacterial (Microbiome) Compositions

[0130] Bacteria discovered to be associated with certain functional features (*e.g.*, those described herein) can be used to design therapeutic compositions (*e.g.*, bacterial compositions) for treating and/or preventing a range of diseases and disorders, such as those associated with dysbiosis of the intestinal microbiome. Such compositions can

include material directly derived from feces of healthy humans. The compositions comprising material directly derived from human feces can, in some cases, contain spore-forming bacteria (SFB) derived from human feces as the sole type of bacteria present in the composition. In other embodiments, such compositions can comprise spores as the sole type of bacteria present in the composition (healthy human spore product; HHSP). Collectively, SFB and HHSP are referred to herein as "spore compositions."

[0131] In some cases, one or more bacteria associated with improvement in a disease or disorder (*e.g.*, inflammatory disease) can be combined to produce the designed compositions (DEs) disclosed herein. In certain embodiments, one or more bacteria associated with certain functional features of interest (*e.g.*, those described herein) can be combined in the bacterial compositions disclosed herein. By combining different bacterial species disclosed herein, the designed compositions disclosed herein can target different biological pathways. Not to be bound by any particular theory, such ability allows the designed compositions disclosed herein to be useful for the treatment of a wide range of diseases and disorders, *e.g.*, those associated with a dysbiosis of the intestinal microbiome. Species in a designed composition can be spore-formers (in some cases, in spore form), non-spore formers, or a combination thereof. Collectively, spore compositions and designed compositions are referred to herein as "microbiome compositions." Applicants have therefore discovered that efficacious microbiome compositions can be manufactured and/or designed based on a combination of identified features.

[0132] Accordingly, provided herein are bacteria and combinations of bacteria useful for treating and/or preventing one or more signs or symptoms of a disease or disorder associated with dysbiosis of the gastrointestinal microbiome, *e.g.*, ulcerative colitis. In general, such compositions include one or more of the bacteria described herein as exhibiting one or more of the functional features of interest disclosed herein (*e.g.*, associated with remission in UC or having one or more features associated with remission in UC).

[0133] In some embodiments, the amount, level, identity, presence, and/or ratio of bacteria in the microbiome (*e.g.*, gastrointestinal microbiome) of a subject is manipulated to treat, prevent, delay, or ameliorate one or more signs or symptoms of a disease or

disorder associated with dysbiosis of the gastrointestinal microbiome (*e.g.*, an IBD, such as ulcerative colitis).

[0134] The term "microbial engraftment" or "engraftment" refers to the establishment of OTUs (bacterial species or strains) comprising a therapeutic microbial composition, *e.g.*, a bacterial composition, in a target niche that are absent or undetectable in a treated subject prior to treatment. The microbes comprising the engrafted ecology are present in the therapeutic microbial composition and establish as constituents of the subject's microbial ecology. Engrafted OTUs can establish for a transient period of time, or demonstrate long-term stability in the microbial ecology that populates the subject post treatment with a therapeutic microbial composition. Without committing to any theory, the drug product (*i.e.*, bacterial compositions disclosed herein) may catalyze a shift from a dysbiotic ecology to one representative of a healthy state, either by engraftment of drug product species, promoting ecological conditions favorable for the growth of non-product commensal microbes present in the patient (augmentation), or both.

[0135] As used herein, engraftment is indicated by one or more of the following outputs: (i) strain level engraftment, (ii) species-level population engraftment, (iii) species-level subject engraftment, and (iv) putative engraftment. "Strain level engraftment" is determined using an assay in which single nucleotide variant (SNV) frequencies unique to the drug product composition are used to determine whether strains of species detected in treated subjects are significantly more similar to strains in the composition compared to strains of species detected in subjects prior to treatment. Strain level engraftment is measured on a per-subject and per-species basis. "Species-level population engraftment" refers to significantly increased prevalence ($p \leq 0.05$) of a species in treated subjects relative to non-treated subjects at any post-treatment time point as measured with a Fisher's exact test, with the requirement that the species was not detected in treated subjects prior to treatment but was detected in the composition. Species-level population engraftment is a population-level measure and requires a significant ($p \leq 0.05$) difference across the population treated with a particular regimen compared to placebo. "Species-level subject engraftment" refers to the detection of a species present in the HHSP in a subject post-treatment when said species was not detected pre-treatment in that subject. "Putative engraftment" refers to significantly increased prevalence ($p \leq 0.05$) of a species in treated subjects relative to non-treated subjects at any post-treatment

time point as measured with a Fisher's exact test. The putative engraftment further requires that the species was detected in the drug product composition and may or may not be present in the treated subject prior to treatment. "Putative engraftment" is a population level statistic. Putative engraftment can be further evaluated using strain level metrics for engraftment.

[0136] In some embodiments, the term engraftment can be further divided into long-term engraftment and transient engraftment. "Long-term engraftment" refers to the ability of bacterial species or strains disclosed herein to durably reside in the gastrointestinal tracts of subjects after treatment. Such species or strains are described herein as "long-term engrafter" (LTE). In some embodiments, long-term engrafters continue to be present in the subject (*e.g.*, in the gastrointestinal tract) for about 4 weeks, about 8 weeks, about 12 weeks or longer after the start of dosing of a bacterial composition disclosed herein. "Transient engraftment" refers to the ability of bacterial species or strains (*e.g.*, those disclosed herein) to reside in the gastrointestinal tracts of subjects after treatment, but are only detected in the fecal samples of subjects for a limited period of time. In some embodiments, if bacteria or combinations of bacteria are detected in the fecal sample of a subject, it is generally believed that those bacteria or combinations of bacteria remain present within the gastrointestinal tract. Such species or strains are described herein as "transient engrafter" (TE). In some embodiments, transient-engrafters are no longer present in the subject (*e.g.*, no longer detected in the fecal sample of the subject) about 1 week, about 2 weeks, or about 4 weeks after the start of dosing (*i.e.*, administering a bacterial composition disclosed herein). Non-limiting examples of LTEs and TEs are provided in Table 5.

[0137] It is a key feature of a microbiome composition (*e.g.*, designed compositions) as provided herein that one or more species or OTUs of bacteria in the microbiome composition engraft in a subject treated with the composition, *e.g.*, a subject that responds to the treatment by an improvement in at least one sign or symptom of the disease being treated. In some embodiments, a microbiome composition disclosed herein comprises one or more species or OTUs of bacteria that are long-term engrafters. In other embodiments, a microbiome composition comprises one or more species or OTUs of bacteria that are transient engrafters. In certain embodiments, a microbiome composition comprises both long-term engrafters and transient engrafters. In certain embodiments, a bacterial

composition disclosed herein comprises two, three, four, five, six, seven, eight, nine, ten or more long-term engrafters. In some embodiments, a bacterial composition comprises two, three, four, five, six, seven, eight, nine, ten or more transient engrafters. In further embodiments, a bacterial composition disclosed herein comprises three or more transient engrafters and/or seven or more long-term engrafters.

[0138] As used herein, "augmentation" refers to the establishment or significant increase of a population of microbes, or selected species or OTUs, that are (i) absent or undetectable (as determined by the use of known and/or specified genomic or microbiological techniques) in an administered therapeutic microbiome composition, (ii) absent, undetectable, or present at low frequencies in the host niche (as example: gastrointestinal tract (GI tract), skin, anterior-nares, or vagina) before treatment with the microbiome composition compared to after treatment with the microbiome composition, and (iii) are found in the host (subject) after the administration of the microbiome composition or are significantly increased after treatment, for instance about 2-fold, about 5-fold, about 1×10^2 , about 1×10^3 , about 1×10^4 , about 1×10^5 , about 1×10^6 , about 1×10^7 fold, or greater than 1×10^8 fold, in cases where they were present at low frequencies. Microbes comprising an augmented population can be derived from exogenous sources such as food and the environment or grow out from micro-niches within the host where they reside at low frequency. In some aspects of the invention, after treatment with a microbiome composition as provided herein, one or more species or OTUs of bacteria are augmented in the treated subject, *e.g.*, a subject that responds to the treatment by an improvement in at least one sign or symptom of the disease being treated.

[0139] Without committing to any theory, administration of a therapeutic microbiome composition may induce a shift in the target niche, *e.g.*, the GI tract, that promotes favorable conditions for the growth of certain commensal microbes, *i.e.*, they are augmented. In the absence of treatment with a therapeutic microbiome composition, although the host may be exposed to or harbor these commensal microbes, sustained growth and the positive health effects associated with those microbes are not observed or are less frequently observed in a population treated with the microbiome composition.

[0140] In some embodiments, a bacterial composition comprises a population of bacteria that has been purified from a biological material (*e.g.*, fecal materials, such as feces or materials isolated from the various segments of the small and large intestines) obtained

from a mammalian donor subject (*e.g.*, a healthy human). In some embodiments, the biological material (*e.g.*, fecal material) is obtained from multiple donors (*e.g.*, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100, 200, 300, 400, 500, 750, 1000, or from greater than 1000 donors), and the materials are pooled prior to purification or after purification of the desired bacteria. In other embodiments, the biological material (sample) can be obtained from a single donor subject at multiple times and two or more samples pooled, *e.g.*, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 32, 35, 40, 45, 48, 50, 100 samples from a single donor. Methods of making such preparations include treatment of the feces with chloroform, acetone, ethanol, and the like, *e.g.*, *see* PCT/US2014/014745 and U.S. Pat. No. 9,011,834, which are incorporated herein by reference in their entirety.

[0141] In embodiments, a microbiome composition derived from feces is depleted in residual habitat products. "Residual habitat products" refers to material derived from the habitat of a microbiota within or on a human or animal excluding the microbiota. An individual's microbiota is in, for example, feces in the gastrointestinal tract, on the skin itself, in saliva, mucus of the respiratory tract, or secretions of the genitourinary tract, all of which contain biological and other matter associated with the microbial community. "Substantially free of residual habitat products" means that the bacterial composition contains a reduced amount of the biological matter associated with the microbial environment on or in the human or animal subject and is about 100% free, about 99% free, about 98% free, about 97% free, about 96% free, or about 95% free of any contaminating biological matter associated with the microbial community or the contaminating matter is below a level of detection. Residual habitat products can include abiotic materials (including undigested food) or it can include unwanted microorganisms. Substantially free of residual habitat products can also mean that the bacterial composition contains no detectable cells from a human or animal and that only microbial cells are detectable. In some embodiments, substantially free of residual habitat products can mean that the bacterial composition contains no detectable viral (including bacterial viruses (*i.e.*, phage)), fungal, mycoplasmal contaminants. In other embodiments, it means that fewer than about $1 \times 10^{-2}\%$, about $1 \times 10^{-3}\%$, about $1 \times 10^{-4}\%$, about $1 \times 10^{-5}\%$, about $1 \times 10^{-6}\%$, about $1 \times 10^{-7}\%$, about $1 \times 10^{-8}\%$ of the viable cells in the bacterial composition are human or animal, as compared to microbial cells. There are multiple ways to accomplish reduced presence of residual habitat products, none of which are limiting.

Thus, contamination can be reduced by isolating desired constituents through multiple steps of streaking to single colonies on solid media until replicate (such as, but not limited to, two) streaks from serial single colonies have shown only a single colony morphology. Alternatively, reduction of contamination can be accomplished by multiple rounds of serial dilutions to single desired cells (*e.g.*, a dilution of about 10^{-8} or about 10^{-9}), such as through multiple 10-fold serial dilutions. This can further be confirmed by showing that multiple isolated colonies have similar cell shapes and Gram staining behavior. Other methods for confirming adequate reduction of residual habitat products include genetic analysis (*e.g.*, PCR, DNA sequencing), serology and antigen analysis, enzymatic and metabolic analysis, and methods using instrumentation such as flow cytometry with reagents that distinguish desired constituents from contaminants.

HHSP compositions

[0142] Generally, in an HHSP composition disclosed herein, the bacterial material is substantially composed of viable bacterial spores as the live component.

[0143] As used herein, the term "spore" or "endospore" refers to an entity, particularly a bacterial entity, which is in a dormant, non-vegetative and non-reproductive stage. Spores are generally resistant to environmental stress such as radiation, desiccation, enzymatic treatment, temperature variation, nutrient deprivation, oxygen, and chemical disinfectants. In some embodiments, a spore or spore population is resistant to 50% ethanol.

[0144] A "spore population" refers to a plurality of spores present in a composition. Synonymous terms used herein include spore composition, spore preparation, ethanol treated spore fraction and spore ecology. A spore population can be purified from a fecal donation, *e.g.*, via ethanol or heat treatment, or a density gradient separation or any combination of methods described herein to increase the purity, potency and/or concentration of spores in a sample. Alternatively, a spore population can be derived through culture methods starting from isolated spore former species or spore former OTUs or from a mixture of such species, either in vegetative or spore form.

[0145] In some embodiments, the spore preparation comprises spore forming species wherein residual non-spore forming species have been inactivated by chemical or physical treatments including ethanol, detergent, heat, sonication, and the like; or wherein the non-spore forming species have been removed from the spore preparation by various separations steps including density gradients, centrifugation, filtration and/or

chromatography; or wherein inactivation and separation methods are combined to make the spore preparation. In yet another embodiment, the spore preparation comprises spore forming species that are enriched over viable non-spore formers or vegetative forms of spore formers. In this embodiment, spores are enriched by about 2-fold, about 5-fold, about 10-fold, about 50-fold, about 100-fold, about 1000-fold, about 10,000-fold or greater than about 10,000-fold compared to all vegetative forms of bacteria. In yet another embodiment, the spores in the spore preparation undergo partial germination during processing and formulation such that the final composition comprises spores and vegetative bacteria derived from spore forming species.

- [0146] The term "germinant" refers to a material or composition or physical-chemical process capable of inducing vegetative growth of a bacterium that is in a dormant spore form, or group of bacteria in the spore form, either directly or indirectly in a host organism and/or *in vitro*.
- [0147] The term "sporulation induction agent" refers to a material or physical-chemical process that is capable of inducing sporulation in a bacterium, either directly or indirectly, in a host organism and/or *in vitro*.
- [0148] The term "increase production of bacterial spores" includes an activity or a sporulation induction agent. "Production" in this context includes conversion of vegetative bacterial cells into spores and augmentation of the rate of such conversion, as well as decreasing the germination of bacteria in spore form, decreasing the rate of spore decay *in vivo*, or *ex vivo*, or to increasing the total output of spores (*e.g.*, via an increase in volumetric output of fecal material).
- [0149] In some embodiments, the preparation of an HHSP includes suspending a sample in ethanol, *e.g.*, at least about 30%, at least about 40%, at least about 50%, at least about 55%, at least about 60%, at least about 65%, at least about 70%, at least about 75%, at least about 80%, at least about 85%, at least about 90%, at least about 95%, or at least about 100%. In some cases, the preparation of an HHSP includes suspending a sample in about 30 to about 100% ethanol, about 40 to about 80% ethanol, about 50 to about 80% ethanol, about 30% ethanol, about 40% ethanol, about 50% ethanol, about 55% ethanol, about 60% ethanol, about 65% ethanol, about 70% ethanol, about 75% ethanol, about 80% ethanol, about 85% ethanol, about 90% ethanol, about 95% ethanol, or about 100%.

[0150] As used herein, the terms "purify", "purified" and "purifying" refer to the state of a population (*e.g.*, a plurality of known or unknown amount and/or concentration) of desired bacteria or bacterial spores, that have undergone one or more processes of purification, *e.g.*, a selection or an enrichment of the desired bacterium and/or bacterial spores, or alternatively a removal or reduction of residual habitat products as described herein. In some embodiments, a purified population has no detectable undesired activity or, alternatively, the level or amount of the undesired activity is at or below an acceptable level or amount. In other embodiments, a purified population has an amount and/or concentration of desired bacteria or bacterial spores, *e.g.*, in general or of selected species, at or above an acceptable amount and/or concentration. In other embodiments, the ratio of desired-to-undesired activity (*e.g.*, spores compared to vegetative bacteria), has changed by about 2-fold, about 5- fold, about 10- fold, about 30- fold, about 100- fold, about 300-fold, about 1×10^4 , about 1×10^5 , about 1×10^6 , about 1×10^7 , about 1×10^8 , or greater than about 1×10^8 . In other embodiments, a purified population of bacterial spores is enriched as compared to the starting material (*e.g.*, a fecal material) from which the population is obtained. This enrichment can be by about 10%, about 20%, about 30%, about 40%, about 50%, about 60%, about 70%, about 80%, about 90%, about 95%, about 96%, about 97%, about 98%, about 99%, about 99.9%, about 99.99%, about 99.999%, about 99.9999%, about 99.9999%, or greater than about 99.999999% as compared to the starting material.

[0151] In some embodiments, a purified population of bacteria has reduced or undetectable levels of one or more pathogens (*e.g.*, pathogenic bacteria, viruses, or fungi) one or more pathogenic activities, such as toxicity, an ability to cause infection of the mammalian recipient subject, an undesired immunomodulatory activity, an autoimmune response, a metabolic response, or an inflammatory response or a neurological response. In some embodiments, the pathogenic activity of the bacteria is reduced by at least about 5%, at least about 10%, at least about 20%, at least about 30%, at least about 40%, at least about 50%, at least about 60%, at least about 70%, at least about 80%, at least about 90%, at least about 95%, at least about 96%, at least about 97%, at least about 98%, at least about 99% compared to the reference bacteria. In some embodiments, a purified population of bacteria has reduced sensory components as compared to fecal matter, such as reduced odor, taste, appearance, and umami.

[0152] In some embodiments, a bacterial composition disclosed herein is substantially free of residual habitat products and/or substantially free of a detectable level of a pathogenic material (*e.g.*, contains no detectable viral (including bacterial viruses (*i.e.*, phage)), fungal, mycoplasmal, or toxoplasmal contaminants, or eukaryotic parasites, such as a helminth; or has an acceptable level of the foregoing. In some embodiments, a bacterial composition is substantially free of acellular material (*e.g.*, DNA, viral coat material, or non-viable bacterial material).

Designed Compositions (DEs)

[0153] Applicant has discovered that certain families, genera, species, and OTUs of bacteria in an HHSP are associated with an improvement (*e.g.*, clinical remission) of a disease or disorder associated with dysbiosis of the gastrointestinal microbiome (*e.g.*, ulcerative colitis). Furthermore, some of those families, genera, species, and OTUs were associated with engraftment. In addition, some families, genera, species, and OTUs were not present and/or not detected in a subject suffering from a disease or disorder associated with dysbiosis of the gastrointestinal tract (*e.g.*, in an ulcerative colitis patient) and were augmented in a subject whose disease state was improved after treatment with an HHSP. Such bacteria that are associated with improvement in a subject are useful in compositions for treating a disease or disorder associated with dysbiosis (*e.g.*, an inflammatory disease such as an IBD, *e.g.*, ulcerative colitis). Furthermore, applicant has discovered that certain species are negatively associated with an improvement in disease or disorder associated with dysbiosis. In general, such species are not included in a composition useful for treating such diseases. Applicants have further identified families, genera, species, and OTUs of bacteria that exhibit certain functional features that can be useful in treating a wide range of diseases and disorders, including those associated with dysbiosis of the gastrointestinal tract (*e.g.*, inflammatory diseases).

[0154] Accordingly, disclosed herein are microbiome compositions that have been designed to exhibit certain features. Non-limiting examples of such features include: (i) capable of engrafting when administered to a subject, (ii) capable of having anti-inflammatory activity, (iii) not capable of inducing pro-inflammatory activity, (iv) capable of producing a secondary bile acid (7 α -dehydroxylase and bile salt hydrolase activity), (v) not capable of producing ursodeoxycholic acid (7 β -hydroxysteroid dehydrogenase activity); (vi) capable of producing a tryptophan metabolite (*e.g.*, indole,

3-methyl indole, indolepropionic acid), (vii) capable of restoring epithelial integrity as determined by a primary epithelial cell monolayer barrier integrity assay, (viii) capable of being associated with remission of an inflammatory bowel disease, (ix) capable of not being associated with clinical non-remission of an inflammatory bowel disease, (x) capable of producing a short-chain fatty acid (*e.g.*, butyrate, propionate), (xi) capable of inhibiting a HDAC activity, (xii) capable of producing a medium-chain fatty acid (*e.g.*, valerate, hexanoate), (xiii) capable of expressing catalase activity, (xiv) capable of having alpha-fucosidase activity, (xv) capable of inducing Wnt activation, (xvi) capable of producing a B vitamin, (xvii) capable of modulating host metabolism of endocannabinoid, (xviii) capable of producing a polyamine and/or modulating host metabolism of a polyamine, (xix) capable of reducing fecal levels of a sphingolipid, (xx) capable of modulating host production of kynurenine, (xxi) capable of reducing fecal calprotectin level, (xxii) not capable of activating a toll-like receptor pathway (*e.g.*, TLR4 or TLR5), (xxiii) capable of activating a toll-like receptor pathway (*e.g.*, TLR4 or TLR5), or (xxiv) any combination thereof. Such microbiome compositions are described herein as "designed compositions" or DEs. Non-limiting examples of designed compositions are described, *e.g.*, in FIGs. , 3334, and 35. In some embodiments, a designed composition disclosed herein comprises one, two, three, four, five, six, seven, eight, nine, ten, eleven, twelve, thirteen, fourteen, fifteen, sixteen, seventeen, eighteen, nineteen, twenty, twenty-one, twenty-two, or all of the above features. In certain embodiments, a designed composition of the present disclosure can comprise features that target multiple biological pathways, such that the same composition can be used to treat a wide range of diseases and disorders.

[0155] In some embodiments, a bacterial composition disclosed herein comprises one or more features selected from (i) capable of engrafting when administered to a subject; (ii) capable of having anti-inflammatory activity, (iii) not capable of inducing pro-inflammatory activity, (iv) capable of producing a secondary bile acid, (v) capable of producing a tryptophan metabolite, (vi) capable of restoring epithelial integrity as determined by a primary epithelial cell monolayer barrier integrity assay, (vii) capable of being associated with remission of an inflammatory bowel disease, (viii) capable of producing a short-chain fatty acid, (ix) capable of inhibiting a HDAC activity, (x) capable of producing a middle-chain fatty acid, (xi) capable of inducing Wnt activation, or (xi)

any combination thereof. In some embodiments, the bacteria in a microbiome composition comprise one or more families, genera, species, or OTUs that are increased in the GI microbiome of a patient suffering from a disease or disorder associated with dysbiosis of the gastrointestinal tract (*e.g.*, an ulcerative colitis patient) or population of patients prior to treatment with a complex microbiome composition, *e.g.*, an HHSP composition, and increased in a subject or a population of subjects after treatment with an HHSP composition. In some embodiments, a bacterial composition disclosed herein comprises selected families, genera, species, or OTUs of bacteria. In general, the bacteria are commensal bacteria initially derived from, for example, a GI tract, typically the GI tract of a human, isolated and grown into pure cultures that can be used in a DE. These bacteria are selected for desired properties as described herein and used in designed composition. In some embodiments, a bacterial composition (*e.g.*, designed compositions disclosed herein) comprises more than two types of bacteria. Accordingly, in some embodiments, a bacterial composition of the present disclosure comprises at least 2, at least 3, at least 4, at least 5, at least 6, at least 7, at least 8, at least 9, at least 10, at least 11, at least 12, at least 13, at least 14, at least 15, at least 16, at least 17, at least 18, at least 19, at least 20, or at least 21, 22, 23, 24, 25, 26, 27, 28, 29 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, or at least 40, at least 50, or greater than 50 types of bacteria, as defined by species or operational taxonomic unit (OTU), or otherwise as provided herein. The bacteria in a composition may be present in approximately equal amounts of viable bacteria or each family, genus, species of OTU. In other embodiments of the invention, the bacteria are present in varying amounts in the composition. Non-limiting examples of bacterial species that can be used in designing the microbiome compositions disclosed herein are provided in Table 4, Table 5, FIG. 13, FIG. 17, FIG. 30, FIG. 31, and/or FIG. 32.

[0156] In some embodiments, the bacteria in a microbiome composition disclosed herein are from a family, genus, species, or OTU depleted in a subject suffering from a disease or disorder, such as those associated with a dysbiosis (*e.g.*, ulcerative colitis patients) and/or typically present only at low levels or are absent in patients diagnosed with a disease or disorder, such as those associated with dysbiosis (*e.g.*, ulcerative colitis). In some embodiments, a bacterial composition includes one or more additional bacteria that are present with high frequency in a population of healthy humans or subjects with a

disease or disorder associated with dysbiosis (*e.g.*, ulcerative colitis patients) but who are not exhibiting symptoms associated with active disease (*i.e.*, in clinical remission).

[0157] In some embodiments, a bacterial composition disclosed herein comprises one or more bacteria from the family *Ruminococcaceae*, *Lachnospiraceae*, *Sutterellaceae*, *Clostridiaceae*, *Erysipelotrichaceae*, *Bacteroidaceae*, *Akkermansiaceae*, *Peptostreptococcaceae*, *Eubacteriaceae*, or *Desulfovibrionaceae*. In some embodiments, a bacterial composition can comprise at least one, two, three, four, five, six, seven, or all of the families listed.

[0158] In some embodiments, a bacterial composition comprises bacteria having at least about 97%, *e.g.*, at least about 99%, identity to a 16S rDNA sequence (*e.g.*, a full length or variable region of a 16S DNA sequence) to one or more of the following bacterial species: *Gemmiger formicilis*, *Roseburia hominis*, *Clostridium bolteae*, *Parasutterella excrementihominis*, *Holdemania filiformis*, *Holdemania massiliensis*, *Bacteroides ovatus*, *Akkermansia muciniphila*, *Clostridium leptum*, *Bilophila wadsworthia*, *Dielma fastidiosa*, *Clostridium symbiosum*, *Eubacterium siraeum*, *Clostridium innocuum*, *Agathobaculum desmolans*, *Agathobaculum butyriciproducens*, or *Bacteroides vulgatus*. In some embodiments, one or more of the bacteria in a composition has at least about 97% identity, *e.g.*, about 99% identity, to a 16S rDNA of the foregoing species. In some embodiments, a bacterial composition can comprise at least one, two, three, four, five, six, seven, eight, nine, ten, eleven, twelve, thirteen, fourteen, fifteen, or all of the species listed.

[0159] In some embodiments, a bacterial composition comprises bacteria having at least about 97% identity, *e.g.*, about 99% identity, to a 16S rDNA sequence (*e.g.*, a full length or variable region or a 16S DNA sequence) to one or more of the following bacterial species: *Gemmiger formicilis*, *Roseburia hominis*, *Clostridium bolteae*, *Parasutterella excrementihominis*, *Holdemania filiformis*, *Holdemania massiliensis*, *Bacteroides ovatus*, *Akkermansia muciniphila*, *Clostridium leptum*, *Bilophila wadsworthia*, *Dielma fastidiosa*, *Clostridium symbiosum*, *Eubacterium siraeum*, *Clostridium*] *innocuum*, *Erysipelotrichaceae* SC11, *Roseburia sp* CAG 45 SC195, *Lachnospiraceae* SC188, *Lachnospiraceae* SC52, *Clostridium* SC125, *Flintibacter* SC49, *Agathobaculum desmolans*, *Agathobaculum butyriciproducens*, or *Bacteroides vulgatus*. In some embodiments, one or more of the bacteria in a composition has at least 97% identity, *e.g.*,

99% identity, to a 16S rDNA of the foregoing species. In some embodiments, a bacterial composition can comprise at least one, two, three, four, five, six, seven, eight, nine, ten, eleven, twelve, thirteen, fourteen, fifteen, or all of the species listed.

[0160] In some embodiments, a bacterial composition comprises one or more bacteria selected from the group consisting of *Gemmiger formicilis*, *Roseburia hominis*, *Clostridium bolteae*, *Holdemania filiformis*, *Holdemania massiliensis*, *Clostridium leptum*, *Dielma fastidiosa*, *Clostridium symbiosum*, *Eubacterium siraeum*, and combinations thereof. In some embodiments, one or more of the bacteria in a composition has at least about 97% identity, e.g., about 99% identity, to a 16S rDNA of the foregoing species. In some embodiments, a bacterial composition can comprise at least one, two, three, four, five, six, seven, eight, or all of the bacterial species listed.

[0161] In some embodiments, a bacterial composition comprises one or more of the following bacterial species: *Anaerotruncus colihominis*, *Blautia producta*, *Clostridium bolteae*, *Clostridium disporicum*, *Clostridium ghonii*, *Clostridium glycolicum*, *Clostridium innocuum*, *Clostridium lactatifermentans*, *Clostridium viride*, *Eubacterium* sp. WAL 14571, *Lachnospiraceae* bacterium 3 1 57FA, *Lachnospiraceae* bacterium oral taxon F15, *Lactonifactor longoviformis*, or *Ruminococcus lactaris*. In some embodiments, one or more of the bacteria in a composition has at least 97% identity, e.g., 99% identity, to a 16S rDNA of the foregoing species.

[0162] In some embodiments, a bacterial composition (e.g., designed composition) disclosed herein comprises one or more of the bacterial species disclosed in Table 4, Table 5, FIG. 13, FIG. 17, FIG. 30, FIG. 31, and/or FIG. 32.

[0163] In some embodiments, a bacterial composition of the present disclosure comprises one or more bacteria comprising a 16S rDNA sequence that is at least about 85%, at least about 90%, at least about 95%, at least about 96%, at least about 97%, at least about 97.5%, at least about 98%, at least about 98.5%, at least about 99%, at least about 99.5%, or about 100% identical to a 16S rDNA sequence set forth in SEQ ID NOs: 1-14, 16-30, 32-36, 39, 41, 44, 45, 47-51, 59-62, 64-68, 72-76, and 102-398.

[0164] The term "16S sequencing" or "16S rDNA" or "16S" refers to sequence derived by characterizing the nucleotides that comprise the 16S ribosomal RNA gene(s). The bacterial 16S rDNA is approximately 1500 nucleotides in length and is used in reconstructing the evolutionary relationships and sequence similarity of one bacterial

isolate to another using phylogenetic approaches. 16S sequences are used for phylogenetic reconstruction as they are in general highly conserved, but contain specific hypervariable regions that harbor sufficient nucleotide diversity to differentiate genera and species of most bacteria.

[0165] The term "V1-V9 regions" of the 16S rRNA refers to the first through ninth hypervariable regions of the 16S rRNA gene that are used for genetic typing of bacterial samples. These regions in bacteria are defined by nucleotides 69-99, 137-242, 433-497, 576-682, 822-879, 986-1043, 1117-1173, 1243-1294 and 1435-1465 respectively using numbering based on the *E. coli* system of nomenclature. Brosius *et al.*, Complete nucleotide sequence of a 16S ribosomal RNA gene from *Escherichia coli*, *PNAS* 75(10):4801-4805 (1978). In some embodiments, at least one of the V1, V2, V3, V4, V5, V6, V7, V8, and V9 regions are used to characterize an OTU. In some embodiments, the V1, V2, and V3 regions are used to characterize an OTU. In another embodiment, the V3, V4, and V5 regions are used to characterize an OTU. In another embodiment, the V4 region is used to characterize an OTU. A person of ordinary skill in the art can identify the specific hypervariable regions of a candidate 16S rRNA by comparing the candidate sequence in question to a reference sequence and identifying the hypervariable regions based on similarity to the reference hypervariable regions, or alternatively, one can employ Whole Genome Shotgun (WGS) sequence characterization of microbes or a microbial community.

[0166] In some embodiments, a bacterial composition disclosed herein (*e.g.*, designed compositions) comprises both a spore-forming bacteria and a non-spore forming bacteria. In some embodiments, a bacterial composition comprises only spore-forming bacteria. In some cases, the bacteria of the composition are in spore form.

[0167] Applicant has also discovered that certain bacterial species are associated with exacerbation or non-improvement of at least one sign or symptom of a disease or disorder associated with dysbiosis of the gastrointestinal microbiome (*e.g.*, ulcerative colitis). The presence of such species in a bacterial composition can be undesirable. Accordingly, in some embodiments, a bacterial composition (*e.g.*, designed compositions) does not include one or more of the following bacterial species: *Eubacterium contortum*, *Clostridium hathewayi*, *Erysipelatoclostridium ramosum*, *Bifidobacterium dentium*, *Dialister invisus*, *Prevotella copri*, *Veillonella atypica*, *Veillonella dispar*, *Veillonella*

parvula, or *Veillonella ratti*. In certain embodiments, a bacterial composition does not include one or more bacteria that has at least about 97%, *e.g.*, about 99% identity, to a 16S rDNA of the foregoing species. In some embodiments, a bacterial composition does not include at least one, two, three, four, five, six, seven, eight, nine, ten, eleven, or all of the species listed.

[0168] In some embodiments, a bacterial composition of the present disclosure does not comprise one or more bacteria comprising a 16S rDNA sequence that is at least about 85%, at least about 90%, at least about 95%, at least about 96%, at least about 97%, at least about 97.5%, at least 98%, at least about 98.5%, at least about 99%, at least about 99.5%, or about 100% identical to a 16S rDNA sequence set forth in SEQ ID NO: 15, 31, 37, 38, 40, 42, 43, 46, 52-58, 63, 69-71, and 83-101.

[0169] As described *supra*, Applicant has discovered that bacteria that are beneficial for the treatment of a disease or disorder associated with dysbiosis (*e.g.*, ulcerative colitis) are associated with certain biological functions. Accordingly, in some embodiments, types of bacteria present in a bacterial composition disclosed herein (*e.g.*, designed compositions) are associated with certain biological functions, which are useful in treating, preventing, delaying, or ameliorating one or more signs or symptoms associated with a disease or disorder disclosed herein (*e.g.*, ulcerative colitis). Non-limiting examples of relevant functional features are further described below.

Functional features

[0170] In some embodiments of the invention, a microbiome composition disclosed herein (*e.g.*, designed compositions) is a composition that includes bacteria that can carry out certain functions identified by applicant as being useful for treating and/or preventing a disease or disorder associated with dysbiosis (*e.g.*, an IBD, such as UC). In certain embodiments, bacterial species that are useful for the present disclosure comprises one or more of the following features: (1) capable of engrafting (long-term and/or transient) when administered to a subject; (2) capable of having anti-inflammatory (*e.g.*, inhibiting TNF- α -driven IL-8 secretion in epithelial cells *in vitro*, ability to downmodulate expression of inflammatory genes (*e.g.*, CXCL1, CXCL2, CXCL3, CXCL11, ICAM1)); (3) not capable of inducing pro-inflammatory activity (*e.g.*, does not induce IL-8 production by IECs); (4) capable of producing secondary bile acids (*e.g.*, 7 α -dehydroxylase and bile salt hydrolase activity); (5) not capable of producing

ursodeoxycholic acid (*e.g.*, 7 β -hydroxysteroid dehydrogenase activity); (6) capable of producing tryptophan metabolites (*e.g.*, indole, 3-methyl indole, indolepropionic acid); (7) capable of producing medium-chain (valerate and hexanoate) and/or short-chain fatty acids (butyrate and propionate); (8) capable of inhibiting HDAC activity; (9) capable of restoring epithelial integrity, as determined by a primary epithelial cell monolayer barrier integrity assay; (10) capable of being associated with clinical remission of an inflammatory bowel disease; (11) capable of not being associated with clinical non-remission of an inflammatory bowel disease (12) capable of expressing catalase activity; (13) capable of having alpha-fucosidase activity; (14) capable of inducing Wnt activation; (15) capable of producing B vitamins (*e.g.*, thiamin (B1) and pyridoxamine (B6)); (16) capable of modulating host metabolism of endocannabinoids; (17) capable of producing polyamines and/or modulating host metabolism of polyamines; 18) capable of reducing fecal levels of sphingolipids; (19) capable of modulating host production of kynurenine; (20) capable of reducing fecal calprotectin level; (21) not capable of activating a toll-like receptor pathway (*e.g.*, TLR4 or TLR5); or (22) capable of activating a toll-like receptor pathway (*e.g.*, TLR2). In certain embodiments, species that are useful for the present disclosure comprises one, two, three, four, five, six, seven, eight, nine, ten, eleven, twelve, thirteen, fourteen, fifteen, sixteen, seventeen, eighteen, nineteen, twenty, twenty-one, twenty-two, or all of the above features.

[0171] Additional disclosure relating to exemplary functional features are provided below.

Engraftment

[0172] As described *supra*, a key feature of the bacterial compositions disclosed herein is the ability of one or more bacterial species (or OTUs of bacteria) included in the compositions to engraft in a subject when administered to the subject. Accordingly, Applicant has identified bacteria and combinations of bacteria that are capable of engrafting when administered to a subject. Not to be bound by any one theory, engraftment of bacteria and combinations of bacteria disclosed herein can repopulate the gastrointestinal microbiome of a subject. In some embodiments, once engrafted, bacteria and combinations of bacteria disclosed herein prevent (*e.g.*, by outcompeting for growth nutrients) the growth of non-commensal microbes (*e.g.*, pathogenic bacteria, such as *Clostridium difficile*) that may result in inflammatory responses in the host. In further

embodiments, once engrafted, bacteria and combinations of bacteria disclosed herein can promote or augment the growth of other commensal bacteria within the subject. In further embodiments, the engrafting bacteria and combinations of bacteria can produce various factors (*e.g.*, tryptophan metabolites, fatty acids, secondary bile acids) or exert other functions (*e.g.*, those disclosed herein) to help treat and/or prevent one or more symptoms associated with a disease or disorder disclosed herein.

[0173] Whether bacteria or combinations of bacteria are capable of engrafting can be determined by various methods known in the art. Subject samples can first be collected (*e.g.*, by whole stool samples, rectal swaps, tissue biopsies, or mucosal samples) before and/or after administration of bacteria or combinations of bacteria. Subsequently, these samples can be characterized to identify the bacteria or combinations of bacteria. Administered bacterial strains can be identified in samples based on genotypic, phenotypic, and other molecular properties of the strains, for example: a) the sequence of certain genes (*e.g.*, 16S rRNA sequence) b) the presence and/or sequence identity of one or more regions of DNA (*i.e.*, linear segments) that are rarely present in other strains, rarely present in other microbiome samples, rarely present in the target patient population, or absent from the microbiome of the particular subject(s) before administration of the bacteria, c) DNA variants including SNVs, insertions and deletions (*i.e.*, indels), structural variation, gene copy number variation, or other DNA variants that are rarely present in other strains, rarely present in other microbiome samples, rarely present in the target patient population, or absent from the microbiome of the particular subject(s) before administration of the bacteria, d) other identifying phenotypic, genomic, proteomic, metabolomic or other properties of the administered strains. Molecular technologies used to identify administered bacteria or combinations of bacteria include but are not limited various DNA sequencing technologies including PCR and qPCR, amplicon sequencing, whole genome sequencing, shotgun metagenomic sequencing; other molecular technologies can be used included but not limited to microarray, nanostring and mass spectrometry. Bioinformatic methods used to analyze these data may include sequence alignment and mapping, genome or metagenome assembly, or other methods. Microbiological and culturing methods can also be used to identify and characterize strains. These mentioned methods of identification and characterization of administered bacteria or combinations of bacteria can be used alone or in combination.

[0174] In some embodiments, one or more of the bacterial species included in the bacterial compositions disclosed herein are capable of engrafting when administered to a subject. In certain embodiments, each of the bacterial species included in a bacterial composition is capable of engrafting. In some embodiments, the bacteria and combinations of bacteria that are capable of engrafting are long-term engrafters. In certain embodiments, the bacteria and combinations of bacteria that are capable of engrafting are transient engrafters. In some embodiments, the bacterial compositions disclosed herein (*e.g.*, designed compositions) comprise one or more long-term engrafters and one or more transient engrafters. In certain embodiments, a bacterial composition disclosed herein comprises two, three, four, five, six, seven, eight, nine, ten or more long-term engrafters. In some embodiments, a bacterial composition comprises two, three, four, five, six, seven, eight, nine, ten or more transient engrafters. In further embodiments, a bacterial composition disclosed herein comprises three or more transient engrafters and/or seven or more long-term engrafters. Non-limiting examples of long-term engrafters and/or transient engrafters that can be used with the present disclosure are provided in Table 5.

Bile acids

[0175] Applicant has discovered that certain secondary bile acids are associated with the treatment and/or prevention of a disease or disorder, such as those associated with a dysbiosis (*e.g.*, remission of UC). The term "bile acids" refers to a family of molecules, composed of a steroid structure with four rings, a five or eight carbon side-chain terminating in a carboxylic acid joined at the 17-position of the steroid scaffold, and the presence and orientation of different numbers of hydroxy groups. Depending on the tissue, the structure of the bile acids can vary. For instance, upon their synthesis in the liver, the bile acids are conjugated to either taurine or glycine residues ("conjugated primary bile acids" also known as bile salts) and subsequently excreted and stored in the gall bladder. During digestion, the conjugated primary bile acids are then secreted into the intestinal lumen. In some embodiments, the primary conjugated bile acids are glycocholic acid (gCA), taurocholic acid (tCA), glycochenodeoxycholic acid (gCDCA), or taurochenodeoxycholic acid (tCDCA).

[0176] Within the intestinal lumen, the resident intestinal bacteria express enzymes (*e.g.*, bile salt hydrolase (BSH)), which deconjugate the conjugated primary bile acids to produce "primary bile acids." In some embodiments, the primary bile acids comprise

cholic acid (CA) or chenodeoxycholic acid (CDCA). Primary bile acids are then further processed (via enzymes, such as hydroxysteroid dehydrogenase (HSDH) or 7 α -dehydroxylase) to become "secondary bile acids." In some embodiments, the secondary bile acids comprise deoxycholic acid (DCA), (3 or 12)-oxo-deoxycholic acid, (3 or 12)-iso-deoxycholic acid, (3, 7 or 12)-oxo-cholic acid, (3, 7 or 12)-iso-cholic acid, lithocholic acid (LCA), oxo-LCA, iso-LCA, (3 or 7)-oxo-chenodeoxy cholic acid, or (3 or 7)-iso-chenodeoxy cholic acid.

[0177] The secondary bile acids produced in the intestinal lumen can circulate back to the liver, where they are reconstituted to become "conjugated secondary bile acids." In some embodiments, the secondary conjugated bile acids of the present disclosure comprise (3 or 12)-glyco-iso-deoxycholic acid, (3 or 12)-tauro-iso-deoxycholic acid, glyco-deoxycholic acid, tauro-deoxycholic acid, (3, 7 or 12)-glyco-iso-cholic acid, (3, 7 or 12)-tauro-iso-cholic acid, sulfo-lithocholic acid, glyco-sulfo-lithocholic acid, tauro-sulfo-lithocholic acid, (3 or 7)-glyco-iso-chenodeoxycholic acid, (3 or 7)-tauro-iso-chenodeoxycholic acid, (3 or 7)-glyco-oxo-chenodeoxycholic acid, or (3 or 7)-tauro-oxo-chenodeoxycholic acid.

[0178] In some embodiments, one or more of the bacterial species that can be used in constructing the designed compositions disclosed herein comprise an enzyme involved in secondary bile acid production. In certain embodiments, the enzyme comprises BSH or HSDH. In some embodiments, a bacterial species useful for the present disclosure comprises both BSH and HSDH. Accordingly, in some embodiments, bacteria and combinations of bacteria disclosed herein can increase the level of a bile acid (*e.g.*, a secondary bile acid, *e.g.*, deoxycholic acid (DCA), 3- α -12-oxo-deoxycholic acid, 3- β -12- α -deoxycholic acid (3-isodeoxycholic acid), 7- α -3-oxo-chenodeoxycholic acid, lithocholic acid (LCA), 3-oxoLCA, oxo-LCA, iso-LCA, and combinations thereof) in a subject.

[0179] In some embodiments, the level of a secondary bile acid is increased by at least about 1%, at least about 5%, at least about 10%, at least about 15%, at least about 20%, at least about 25%, at least about 30%, at least about 35%, at least about 40%, at least about 45%, at least about 50%, at least about 55%, at least about 60%, at least about 65%, at least about 70%, at least about 75%, at least about 80%, at least about 85%, at least about 90%, at least about 95%, or at least about 100%, compared to a corresponding level in a

reference sample. In some embodiments, the reference sample is a biological sample (*e.g.*, fecal sample) obtained from a subject prior to the administration of a bacterial composition disclosed herein. In other embodiments, the reference sample is a biological sample (*e.g.*, fecal sample) obtained from a subject with an active symptom of a disease or disorder, such as those associated with dysbiosis (*e.g.*, ulcerative colitis flare-up).

[0180] In some embodiments, the increase in the level of a secondary bile acid can reduce the level of a pro-inflammatory mediators (*e.g.*, TNF- α or IL-8) produced by activated cells (*e.g.*, LPS-stimulated monocytes, LPS-stimulated PBMCs, or TNF- α -stimulated intestinal epithelial cells). In some embodiments, the increase in the level of a secondary bile acid can increase the level of anti-inflammatory mediators (*e.g.*, IL-10) produced by activated cells. In some embodiments, the increase in the level of a secondary bile acid is correlated with an improvement of at least one aspect of the disease state (*e.g.*, clinical remission or endoscopic/histologic response or reduced levels of fecal calprotectin).

[0181] In certain embodiments, the amount of pro-inflammatory mediators produced by activated cells is decreased by at least about 1%, at least about 5%, at least about 10%, at least about 15%, at least about 20%, at least about 25%, at least about 30%, at least about 35%, at least about 40%, at least about 45%, at least about 50%, at least about 55%, at least about 60%, at least about 65%, at least about 70%, at least about 75%, at least about 80%, at least about 85%, at least about 90%, at least about 95%, or at least about 100%, compared to a reference sample (*e.g.*, activated cells not treated with increased concentration of a secondary bile acid). In some embodiments, the level of anti-inflammatory mediators produced is increased by at least about 1%, at least about 5%, at least about 10%, at least about 15%, at least about 20%, at least about 25%, at least about 30%, at least about 35%, at least about 40%, at least about 45%, at least about 50%, at least about 55%, at least about 60%, at least about 65%, at least about 70%, at least about 75%, at least about 80%, at least about 85%, at least about 90%, at least about 95%, or at least about 100% compared to a reference sample (*e.g.*, activated cells not treated with increased concentration of a secondary bile acid).

[0182] In some embodiments, reducing the level of certain secondary bile acids can be important in the effective treatment of a disease or disorder disclosed herein. A non-limiting example of such a secondary bile acid is ursodeoxycholic acid. Accordingly, in certain embodiments, bacteria and combinations of bacteria that are useful for the present

disclosure are capable of reducing the level of a secondary bile acid in a subject. In some embodiments, the level of a secondary bile acid is reduced by at least about 1%, at least about 5%, at least about 10%, at least about 15%, at least about 20%, at least about 25%, at least about 30%, at least about 35%, at least about 40%, at least about 45%, at least about 50%, at least about 55%, at least about 60%, at least about 65%, at least about 70%, at least about 75%, at least about 80%, at least about 85%, at least about 90%, at least about 95%, or at least about 100%, compared to a corresponding level in a reference sample. In some embodiments, the reference sample is a biological sample (*e.g.*, fecal sample) obtained from a subject prior to the administration of a bacterial composition disclosed herein. In other embodiments, the reference sample is a biological sample (*e.g.*, fecal sample) obtained from a subject with an active symptom of a disease or disorder, such as those associated with dysbiosis (*e.g.*, ulcerative colitis flare-up).

Anti-Inflammatory Activity

[0183] Applicant has identified bacteria and combinations of bacteria that are capable of exhibiting anti-inflammatory activity when administered to a subject. As used herein, the term "anti-inflammatory activity" refers to the ability to prevent and/or reduce inflammation. The term "inflammation" or "pro-inflammatory" refers to the complex biological response of an individual's immune system to harmful stimuli, such as pathogens, damaged cells, or irritants, and includes secretion of pro-inflammatory mediators, such as pro-inflammatory cytokines, *i.e.*, cytokines which are produced predominantly by activated immune cells, such as macrophages and dendritic cells, and are involved in the amplification of inflammatory reactions.

[0184] Without being limited to any one particular theory, the anti-inflammatory activity observed with the bacteria and combinations of bacteria disclosed herein can be related to the other functional aspects of the bacteria or combinations of bacteria. For example, in some embodiments, the anti-inflammatory activity is related to the ability of the bacteria or combinations of bacteria to produce a secondary bile acid, a tryptophan metabolite, a short-chain fatty acid, inhibit HDAC inhibition, and/or inhibit TNF- α -driven IL-8 secretion in epithelial cells *in vitro*. Accordingly, in some embodiments, the bacteria and combinations of bacteria that have anti-inflammatory activity have one or more of the following features: (i) capable of producing a short-chain fatty acid, (ii) capable of inhibiting histone deacetylase (HDAC) activity, (iii) capable of inhibiting TNF- α -driven

IL-8 secretion in epithelial cells in vitro, or (iv) capable of inhibiting NF- κ B and NF- κ B target genes (v) any combination thereof. Whether bacteria or combinations of bacteria have anti-inflammatory activity can be measured using assays known in the art, including methods to measure metabolites like short-chain fatty acids (e.g., MS, LC-MS, GS-MS, LC-MS/MS), methods of measuring gene expression at the RNA and/or protein level (e.g., Luminex bead-based cytokine panels, microarray, nanostring, and RNA-sequencing).

[0185] In some embodiments, the anti-inflammatory activity of the bacteria and combinations of bacteria disclosed herein can reduce the amount of pro-inflammatory mediators produced and/or present in a subject (*e.g.*, suffering from a disease or disorder disclosed herein). In certain embodiments, the amount of pro-inflammatory mediators produced and/or present in the subject is decreased by at least about 1%, at least about 5%, at least about 10%, at least about 15%, at least about 20%, at least about 25%, at least about 30%, at least about 35%, at least about 40%, at least about 45%, at least about 50%, at least about 55%, at least about 60%, at least about 65%, at least about 70%, at least about 75%, at least about 80%, at least about 85%, at least about 90%, at least about 95%, or at least about 100%, compared to a reference sample. In some embodiments, the reference sample is a biological sample obtained from a subject prior to the administration of a bacterial composition disclosed herein. In other embodiments, the reference sample is a biological sample obtained from a subject with an active symptom of a disease or disorder, such as those associated with dysbiosis (*e.g.*, ulcerative colitis flare-up).

[0186] In some embodiments, the anti-inflammatory activity of the bacteria and combinations of bacteria disclosed herein can increase the amount of anti-inflammatory mediators in a subject. Non-limiting examples of anti-inflammatory mediators include, but are not limited to, IL-1 receptor antagonists (IL-1RA), IL-4, IL-6, IL-10, IL-11, IL-13, TGF- β , and combinations thereof. In certain embodiments, the bacteria and combinations of bacteria that are capable of exhibiting anti-inflammatory activity can increase the amount of anti-inflammatory mediators in a subject by at least about 1%, at least about 5%, at least about 10%, at least about 15%, at least about 20%, at least about 25%, at least about 30%, at least about 35%, at least about 40%, at least about 45%, at least about 50%, at least about 55%, at least about 60%, at least about 65%, at least about

70%, at least about 75%, at least about 80%, at least about 85%, at least about 90%, at least about 95%, or at least about 100%, compared to a reference sample. In some embodiments, the reference sample is a biological sample obtained from a subject prior to the administration of a bacterial composition disclosed herein. In other embodiments, the reference sample is a biological sample obtained from a subject with an active symptom of a disease or disorder, such as those associated with dysbiosis (*e.g.*, ulcerative colitis flare-up).

Tryptophan metabolism and aryl hydrocarbon receptor

[0187] As used herein, the term "tryptophan" refers to the essential amino acid tryptophan, which is an α -amino acid and has a chemical formula of $C_{11}H_{12}N_2O_2$. Besides its use in protein synthesis, tryptophan is important in a number of pathways leading to the production of, for example, serotonin (5-hydroxytryptamine), melatonin, kynurenines, and tryptamine. Tryptophan and its metabolites can affect, for example, immunosuppression, immune function, cancer, inflammatory disease, epithelial barrier function, and infection.

[0188] Certain tryptophan pathway products have been shown to function as aryl hydrocarbon receptor (Ahr) agonists. The metabolites include, for example, indole, indole-3 aldehyde, indole-3 acetate, indole-3 propionic acid, indole, 3-methylindole, indole-3 acetaldehyde, indole-3 acetonitrile, 6-formylindolo[3,2-b]carbazole (FICZ), and tryptamine. Ahr plays a role in controlling the differentiation and activity of specific T cell subpopulations. It reportedly can influence adaptive immune responses through its effects on both T cells and antigen presenting cells (APCs). Ahr is thought to be involved in development and maintenance of CD4⁺ T regulatory cells (Tregs) as well as FoxP3-IL-10⁺ CD4⁺ Tr1, and induction of Th17 cells. Ahr also alters cytokine expression by Type 3 innate lymphoid cells (ILC3s). These cellular effects include increased production of IL-22. AhR induction by Trp metabolites has been reported to enhance epithelial barrier integrity and ameliorate colitis in in vivo models.

[0189] In some embodiments, bacteria or combination of bacteria disclosed herein can increase the level of a tryptophan metabolite in a subject. In some embodiments, tryptophan metabolite comprises indole, 3-methyl indole, indoleacrylate, or any combination thereof. In certain embodiments, bacteria or combination of bacteria disclosed herein can increase the level of indole and/or 3-methylindole in the subject.

[0190] In some embodiments, the level of a tryptophan metabolite is increased by at least about 1%, at least about 5%, at least about 10%, at least about 15%, at least about 20%, at least about 25%, at least about 30%, at least about 35%, at least about 40%, at least about 45%, at least about 50%, at least about 55%, at least about 60%, at least about 65%, at least about 70%, at least about 75%, at least about 80%, at least about 85%, at least about 90%, at least about 95%, or at least about 100%, compared to a corresponding level in a reference sample. In some embodiments, the reference sample is a biological sample (*e.g.*, fecal sample) obtained from a subject prior to the administration of a bacterial composition disclosed herein. In other embodiments, the reference sample is a biological sample (*e.g.*, fecal sample) obtained from a subject with an active symptom of a disease or disorder, such as those associated with dysbiosis (*e.g.*, ulcerative colitis flare-up).

[0191] In some embodiments, bacteria or combination of bacteria disclosed herein can increase the level of AhR-mediated Cyp1a1 expression in a subject. In some embodiments, the level of AhR-mediated Cyp1a1 expression is increased by at least about 1%, at least about 5%, at least about 10%, at least about 15%, at least about 20%, at least about 25%, at least about 30%, at least about 35%, at least about 40%, at least about 45%, at least about 50%, at least about 55%, at least about 60%, at least about 65%, at least about 70%, at least about 75%, at least about 80%, at least about 85%, at least about 90%, at least about 95%, or at least about 100%, compared to a corresponding level in a reference sample. In some embodiments, the reference sample is a biological sample (*e.g.*, fecal sample) obtained from a subject prior to the administration of a bacterial composition disclosed herein. In other embodiments, the reference sample is a biological sample (*e.g.*, fecal sample) obtained from a subject with an active symptom of a disease or disorder, such as those associated with dysbiosis (*e.g.*, ulcerative colitis flare-up).

[0192] Without being limited to a specific mechanism, in some embodiments, bacteria disclosed herein increase the level of AhR-mediated Cyp1a1 expression through an increase in tryptophan metabolite production. In some embodiments, increase in a tryptophan metabolite (*e.g.*, indole or 3-methylindole) level is correlated with improvement of a disease or disorder disclosed herein (*e.g.*, clinical remission). Accordingly, in some embodiments, increase in the level of AhR-mediated Cyp1a1 expression is correlated with one or more features associated with an improvement in a

subject's condition, *e.g.*, a subject diagnosed with a disease or disorder, such as those associated with dysbiosis (*e.g.*, an IBD, such as ulcerative colitis).

[0193] In some embodiments, reducing the level of a tryptophan metabolite in a subject might be useful in treating a disease or disorder. Accordingly, in certain embodiments, bacteria and combinations of bacteria disclosed herein are capable of reducing the level of a tryptophan metabolite in a subject. In some embodiments, the the level of a tryptophan metabolite is reduced by at least about 1%, at least about 5%, at least about 10%, at least about 15%, at least about 20%, at least about 25%, at least about 30%, at least about 35%, at least about 40%, at least about 45%, at least about 50%, at least about 55%, at least about 60%, at least about 65%, at least about 70%, at least about 75%, at least about 80%, at least about 85%, at least about 90%, at least about 95%, or at least about 100%, compared to a corresponding level in a reference sample. In some embodiments, the reference sample is a biological sample (*e.g.*, fecal sample) obtained from a subject prior to the administration of a bacterial composition disclosed herein. In other embodiments, the reference sample is a biological sample (*e.g.*, fecal sample) obtained from a subject with an active symptom of a disease or disorder, such as those associated with dysbiosis.

Fatty Acids

[0194] Applicant has identified bacteria and combinations of bacteria that are capable of producing certain fatty acids in a subject. In some embodiments, fatty acids comprise short-chain fatty acids. In other embodiments, fatty acids comprise medium-chain fatty acids. As used herein, the term "short-chain fatty acids" refer to fatty acids with less than six carbon atoms. Non-limiting examples of short-chain fatty acids include formate, acetate, propionate, butyrate, isobutyrate, valerate, isovalerate, and combinations thereof. In certain embodiments, short-chain fatty acid comprises acetate, propionate, butyrate, or combinations thereof. As used herein, the term "medium-chain fatty acids" refer to fatty acids with aliphatic tails of 6 to 12 carbon atoms, which can form medium-chain triglycerides. Non-limiting examples of middle-chain fatty acids include hexanoate, octanoate, decanoate, dodecanoate, and combinations thereof. In some embodiments, middle-chain fatty acid comprises hexanoate.

[0195] In some embodiments, bacteria or combination of bacteria disclosed herein increases the level of a short-chain fatty acid in a subject. In certain embodiments, short-chain fatty acid comprises formate, acetate, propionate, butyrate, isobutyrate, valerate,

isovalerate, or any combination thereof. In some embodiments, the short-chain fatty acid comprises propionate, butyrate, acetate, or combinations thereof. In some embodiments, the level of a short-chain fatty acid in the subject is increased by at least about 1%, at least about 5%, at least about 10%, at least about 15%, at least about 20%, at least about 25%, at least about 30%, at least about 35%, at least about 40%, at least about 45%, at least about 50%, at least about 55%, at least about 60%, at least about 65%, at least about 70%, at least about 75%, at least about 80%, at least about 85%, at least about 90%, at least about 95%, or at least about 100%, compared to a corresponding level in a reference sample. In some embodiments, the reference sample is a biological sample (*e.g.*, fecal sample) obtained from a subject prior to the administration of a bacterial composition disclosed herein. In other embodiments, the reference sample is a biological sample (*e.g.*, fecal sample) obtained from a subject with an active symptom of a disease or disorder, such as those associated with dysbiosis (*e.g.*, ulcerative colitis flare-up).

[0196] In some embodiments, bacteria or combination of bacteria disclosed herein increases the level of a middle-chain fatty acid in a subject. In certain embodiments, the middle-chain fatty acid comprises hexanoate. In some embodiments, the level of a middle-chain fatty acid in the subject is increased by at least about 1%, at least about 5%, at least about 10%, at least about 15%, at least about 20%, at least about 25%, at least about 30%, at least about 35%, at least about 40%, at least about 45%, at least about 50%, at least about 55%, at least about 60%, at least about 65%, at least about 70%, at least about 75%, at least about 80%, at least about 85%, at least about 90%, at least about 95%, or at least about 100%, compared to a corresponding level in a reference sample. In some embodiments, the reference sample is a biological sample (*e.g.*, fecal sample) obtained from a subject prior to the administration of a bacterial composition disclosed herein. In other embodiments, the reference sample is a biological sample (*e.g.*, fecal sample) obtained from a subject with an active symptom of a disease or disorder, such as those associated with dysbiosis (*e.g.*, ulcerative colitis flare-up).

Inhibition of Histone Deacetylase (HDAC) Activity

[0197] Histone deacetylases (HDACs) are a family of enzymes that can remove acetyl residues from specific sites in the N-terminal end of histones, which are part of the DNA chromatin structure in eukaryotic cells. The steady state of histone acetylation is a result of the balance of acetylation by histone acetyltransferase (HAT) enzymes and

deacetylation by HDACs. When HDACs are inhibited but HATs activity continues, histones become hyperacetylated, thus disrupting high order chromatin structure and stimulating transcription by RNA polymerase III. The effect of HDAC inhibition in gene expression is not generalized, as only 2% of mammalian genes are affected by HDAC inhibition.

[0198] Some short chain fatty acids (SCFAs) produced by the intestinal human microbiome are HDAC inhibitors. Butyrate in particular has been identified as an HDAC inhibitor *in vitro* and *in vivo*, leading to the accumulation of hyperacetylated histones H3 and H4 (Candido *et al.*, 1978 *Cell* 14:105-113; Boffa *et al.* 1978 *J Biol Chem* 253:3364-3366; Vidali *et al.* 1978 *Proc Natl Acad Sci USA* 75:2239-2243; Davie. 2003 *J Nutrition* 133:2485S-2493S). Other SCFAs, such as propionate, isobutyrate, isovalerate, valerate, lactate, and acetate, can also inhibit histone deacetylation, although reportedly less effectively than butyrate (Sealy and Chalkley. 1978 *Cell* 14:115-121; Latham *et al.* *Nucl Acids Res* 40:4794-4803, Waldecker *et al.* 2008 *J Nutr Biochem* 19:587-593). Certain therapeutic effects of butyrate are reportedly mediated, at least in part, by inhibition of HDACs.

[0199] In some embodiments, bacteria and combinations of bacteria disclosed herein are capable of inhibiting (or reducing) HDAC activity. In some embodiments, bacteria and combinations of bacteria disclosed herein can inhibit (or reduce) HDAC activity in a subject by at least about 1%, at least about 5%, at least about 10%, at least about 15%, at least about 20%, at least about 25%, at least about 30%, at least about 35%, at least about 40%, at least about 45%, at least about 50%, at least about 55%, at least about 60%, at least about 65%, at least about 70%, at least about 75%, at least about 80%, at least about 85%, at least about 90%, at least about 95%, or at least about 100%, compared to a reference sample. In some embodiments, the reference sample is a biological sample obtained from a subject prior to the administration of a bacterial composition disclosed herein. In other embodiments, the reference sample is a biological sample obtained from a subject with an active symptom of a disease or disorder, such as those associated with dysbiosis (*e.g.*, ulcerative colitis flare-up).

[0200] In some embodiments, the bacteria disclosed herein that are capable of inhibiting HDAC activity can be further grouped into one of seven phenotypic clusters (represented as 0-6 in FIG. 13; termed herein "HDAC clusters") based on their ability to inhibit HDAC

activity when grown in different nutrient sources. Non-limiting examples of nutrient sources that can be used include, but are not limited to, peptone/yeast extract medium (PY) alone or supplemented with 0.5% of one of seven C sources (glucose, fucose, sucrose, starch, pectin, FOS/inulin, or mucin). As used herein, "HDAC cluster 0" corresponds to strains that are capable of inhibiting HDAC when grown on fucose (a sugar found as a component of mucin glycoproteins) but not on other substrates. These strains can utilize fucose as a substrate for propionate production, but not amino acids present in the basal media or other simple and complex carbohydrates added in other conditions. "HDAC cluster 1" corresponds to strains that are not capable of inhibiting HDAC when grown in any of the nutrient sources disclosed herein. "HDAC cluster 2" corresponds to strains that are capable of inhibiting HDAC and have reduced inhibition when grown in the presence of sucrose, inulin, glucose, or pectin. "HDAC cluster 3" corresponds to strains that are capable of inhibiting HDAC and have reduced inhibition when grown in the presence of sucrose, inulin, glucose, or pectin. Strains belonging to HDAC cluster 3 are capable of having increased inhibition of HDAC when grown in the presence of mucin. "HDAC cluster 4" corresponds to strains that are capable of inhibiting HDAC in all conditions disclosed herein. Moreover, the addition of sugars, polysaccharides, or mucin does not increase or decrease the HDAC inhibition activity of these strains. "HDAC cluster 5" corresponds to strains that are capable of inhibiting HDAC when grown only in the presence of sucrose, FOS/inulin, glucose, pectin, or starch. "HDAC cluster 6" corresponds to strains that are capable of increasing HDAC inhibition when grown in the presence of sucrose, FOS/inulin, glucose, pectin, or mucin.

Other Functional Features

[0201] As described *supra*, in addition to the specific functions detailed above, in some embodiments, bacteria or combinations of bacteria disclosed herein can further comprise one or more of the following functional features: (i) capable of inducing Wnt activation, (ii) capable of producing B vitamins (*e.g.*, thiamin (B1) and pyridoxamine (B6)), (iii) capable of modulating host metabolism of endocannabinoids, (iv) capable of producing polyamines and/or modulating host metabolism of polyamines, (v) capable of reducing fecal levels of sphingolipids, (vi) capable of modulating host production of kynurenine, (vii) capable of reducing fecal calprotectin level, or (viii) any combination thereof. In further embodiments, bacteria or combinations of bacteria disclosed herein are not

capable of activating a toll-like receptor pathway (*e.g.*, TLR4 or TLR5). In certain embodiments, bacteria or combinations of bacteria disclosed herein are capable of activating a toll-like receptor pathway (*e.g.*, TLR4 or TLR5).

[0202] The levels of any of the biological molecules (*e.g.*, those described above) in a subject suffering from a disease or disorder disclosed herein (can be measured as described in the present disclosure (*see, e.g.*, Examples) or by any other methods known in the art.

[0203] In some embodiments, a bacterial composition of the present disclosure (*e.g.*, designed compositions) comprises one or more bacteria that are capable of forming spores (*i.e.*, spore-forming bacteria). Accordingly, in some embodiments, a bacterial composition comprises a purified population of bacteria, wherein the bacteria are in the form of spores. In some embodiments, all the bacteria are in the form of spores. In other embodiments, some of the bacteria are in the form of spores, while other bacteria are not in the form of spores (*i.e.*, vegetative-state). In some embodiments, the bacterial composition comprises a purified population of spore-forming bacteria, wherein the bacteria are all in the vegetative-state.

[0204] In some embodiments, a bacterial composition comprises a population of bacteria that are sensitive to one or more antibiotics that can be used in a human. In some embodiments, bacteria of the composition are resistant to one or more antibiotics that are used to prophylactically treat patients with a disease or disorder, such as those associated with dysbiosis of the gastrointestinal tract (*e.g.*, an active IBD (*e.g.*, flare of Crohn's disease)). Such antibiotics include, but are not limited to, β -lactams, vancomycin, aminoglycosides, fluoroquinolones, and daptomycin.

[0205] In some embodiments, the strain of an OTU useful for the present disclosure (*e.g.*, an OTU disclosed herein) can be obtained from a public biological resource center such as the ATCC (atcc.org), the DSMZ (dsmz.de), or the Riken BioResource Center (en.brc.riken.jp). Methods for determining sequence identity are known in the art.

[0206] In some embodiments, the composition is a designed composition. DE1 is an example of such a designed composition. Non-limiting examples of additional designed compositions are provided in FIGs. 30, 31, and 32. As used herein, the term "DE1" refers to a synthetic composition consisting of 14 spore-forming bacterial species. *See* FIG. 30. DE1 (as well as the other exemplary DEs disclosed herein) was designed to capture key

functional and phylogenetic attributes that applicant identified as associated with clinical remission (*e.g.*, of a disease or disorder disclosed herein) and/or shown to have properties reflecting anti-inflammatory activity and/or enhancement of epithelial barrier integrity. Accordingly, DE1 integrates clinical insights of functional and phylogenetic correlates of clinical remission together with *in vitro* screening data on strain functional phenotypes. Specifically, DE1 was designed to provide a bacterial composition with the following functional attributes: a) tryptophan metabolic capacity, specifically the ability to produce indole and 3-methylindole, b) HDAC inhibition capacity across diverse nutrient conditions (*e.g.* the ability to produce SCFAs), c) the ability to produce medium-chain fatty acids, specifically valerate and hexanoate, d) production of deoxycholic acid (DCA) and lithocholic acid (LCA) from cholate and chenodeoxycholate, e) the ability to suppress induction of IL-8 in intestinal epithelial cells, f) the ability to induce regulatory T cells, and g) the ability to activate Wnt signaling pathway. While ensuring these functional properties are present in DE1, phylogenetic diversity and coverage of phylogenetic clades associated with remission of UC in FMT studies were represented.

II. Formulations

[0207] Further provided herein are formulations for administration to humans and other subjects in need thereof (*e.g.*, subject suffering from a disease or disorder disclosed herein). Generally, a bacterial composition as described herein is combined with additional active and/or inactive materials to produce a formulation. In some embodiments, a bacterial composition is formulated in a unit dosage form, each dosage form containing, *e.g.*, from about 10^2 to about 10^9 spores, for example, about 10^4 to about 10^8 spores. In other embodiments, a bacterial composition is formulated in a multi-dose format. The formulation disclosed herein can be effective over a wide dosage range and is generally administered in a pharmaceutically effective amount.

[0208] The term "effective dose" or "effective dosage" is defined as an amount sufficient to achieve or at least partially achieve a desired effect. A "therapeutically effective amount" or "therapeutically effective dosage" of a drug or therapeutic agent is any amount of the drug that, when used alone or in combination with another therapeutic agent, promotes disease regression evidenced by a decrease in severity of disease symptoms, an increase in frequency and duration of disease symptom-free periods, or a prevention of impairment or disability due to the disease affliction. A therapeutically

effective amount or dosage of a drug includes a "prophylactically effective amount" or a "prophylactically effective dosage", which is any amount of the drug that, when administered alone or in combination with another therapeutic agent to a subject at risk of developing a disease or of suffering a recurrence of disease, inhibits the development or recurrence of the disease. The ability of a therapeutic agent to promote disease regression or inhibit the development or recurrence of the disease can be evaluated using a variety of methods known to the skilled practitioner, such as in human subjects during clinical trials, in animal model systems predictive of efficacy in humans, or by assaying the activity of the agent in *in vitro* assays.

[0209] As used herein, the term "dosage" can refer to the total number of colony forming units (CFUs) of each individual species or strain; or can refer to the total number of microorganisms in the dose. It is understood in the art that determining the number of organisms in a dosage is not exact and can depend on the method used to determine the number of organisms present. If the composition includes spores, for example, the number of spores in a composition can be determined using a dipicolinic acid assay (Fichtel *et al.*, *FEMS Microbiol Ecol* 61: 522-532 (2007)). Effective doses can be extrapolated from dose-response curves derived from *in vitro* or animal model test systems.

[0210] As used herein, the term "unit dosage forms" refers to physically discrete units suitable as unitary dosages for human subjects and other mammals, each unit containing a predetermined quantity of active component calculated to produce the desired therapeutic effect, in association with a suitable pharmaceutical excipient. In some cases, more than one unit dosage form constitutes a dose. For example, a single dose can be one unit dosage form, two dosage unit forms, three dosage unit forms, four unit dosage forms, five unit dosage forms, or more. In some cases, the number of unit dosage forms constituting a single dose is 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 20, 25, or 30 unit dosage forms. A single dose can be, *e.g.*, about 10^3 to about 10^9 spores, for example, about 10^4 to about 10^8 spores. In some embodiments, a dose is 1, 2, 3, or 4 capsules containing a total of between about 10^2 and about 10^8 spores in the dose. In the case of a single dose having multiple dosage forms, the dosage forms are generally delivered within a prescribed period, *e.g.*, within 1 hour, 2 hours, 5 hours, 10 hours, 15 hours, or 24 hours.

[0211] In some embodiments, a bacterial composition comprises at least one carbohydrate. A "carbohydrate" refers to a sugar or polymer of sugars. The terms "saccharide," "polysaccharide," "carbohydrate," and "oligosaccharide" can be used interchangeably. Most carbohydrates are aldehydes or ketones with many hydroxyl groups, usually one on each carbon atom of the molecule. Carbohydrates generally have the molecular formula $C_nH_{2n}O_n$. A carbohydrate can be a monosaccharide, a disaccharide, trisaccharide, oligosaccharide, or polysaccharide. The most basic carbohydrate is a monosaccharide, such as glucose, sucrose, galactose, mannose, ribose, arabinose, xylose, and fructose. Disaccharides are two joined monosaccharides. Exemplary disaccharides include sucrose, maltose, cellobiose, and lactose. Typically, an oligosaccharide includes between three and six monosaccharide units (*e.g.*, raffinose, stachyose), and polysaccharides include six or more monosaccharide units. Exemplary polysaccharides include starch, glycogen, and cellulose. Carbohydrates can contain modified saccharide units such as 2'-deoxyribose wherein a hydroxyl group is removed, 2'-fluororibose wherein a hydroxyl group is replaced with a fluorine, or N-acetylglucosamine, a nitrogen-containing form of glucose (*e.g.*, 2'-fluororibose, deoxyribose, and hexose). Carbohydrates can exist in many different forms, for example, conformers, cyclic forms, acyclic forms, stereoisomers, tautomers, anomers, and isomers.

[0212] In some embodiments, a bacterial composition comprises at least one lipid. As used herein a "lipid" includes fats, oils, triglycerides, cholesterol, phospholipids, fatty acids in any form including free fatty acids. Fats, oils and fatty acids can be saturated, unsaturated (*cis* or *trans*) or partially unsaturated (*cis* or *trans*). In some embodiments the lipid comprises at least one fatty acid selected from lauric acid (12:0), myristic acid (14:0), palmitic acid (16:0), palmitoleic acid (16:1), margaric acid (17:0), heptadecenoic acid (17:1), stearic acid (18:0), oleic acid (18:1), linoleic acid (18:2), linolenic acid (18:3), octadecatetraenoic acid (18:4), arachidic acid (20:0), eicosenoic acid (20:1), eicosadienoic acid (20:2), eicosatetraenoic acid (20:4), eicosapentaenoic acid (20:5) (EPA), docosanoic acid (22:0), docosenoic acid (22:1), docosapentaenoic acid (22:5), docosahexaenoic acid (22:6) (DHA), and tetracosanoic acid (24:0). In some embodiments, the composition comprises at least one modified lipid, for example a lipid that has been modified by cooking.

- [0213] In some embodiments, a bacterial composition comprises at least one supplemental mineral or mineral source. Examples of minerals include, without limitation: chloride, sodium, calcium, iron, chromium, copper, iodine, zinc, magnesium, manganese, molybdenum, phosphorus, potassium, and selenium. Suitable forms of any of the foregoing minerals include soluble mineral salts, slightly soluble mineral salts, insoluble mineral salts, chelated minerals, mineral complexes, non-reactive minerals such as carbonyl minerals, and reduced minerals, and combinations thereof.
- [0214] In some embodiments, a bacterial composition comprises at least one supplemental vitamin. The at least one vitamin can be fat-soluble or water-soluble vitamins. Suitable vitamins include but are not limited to vitamin C, vitamin A, vitamin E, vitamin B12, vitamin K, riboflavin, niacin, vitamin D, vitamin B6, folic acid, pyridoxine, thiamine, pantothenic acid, and biotin. Suitable forms of any of the foregoing are salts of the vitamin, derivatives of the vitamin, compounds having the same or similar activity of the vitamin, and metabolites of the vitamin.
- [0215] In some embodiments, a bacterial composition comprises an excipient. Non-limiting examples of suitable excipients include a buffering agent, a diluent, a preservative, a stabilizer, a binder, a compaction agent, a lubricant, a dispersion enhancer, a disintegration agent, a flavoring agent, a sweetener, and a coloring agent.
- [0216] In some embodiments, the excipient is a buffering agent. Non-limiting examples of suitable buffering agents include sodium citrate, magnesium carbonate, magnesium bicarbonate, calcium carbonate, and calcium bicarbonate.
- [0217] In some embodiments, the excipient serves as a diluent. In such embodiments, the excipient can be a solid, semi-solid, or liquid material that acts as a vehicle, carrier, or medium for the active component (*e.g.*, bacteria of the composition disclosed herein). Thus, a formulation can be in the form of, *e.g.*, a tablet, pill, powder, lozenge, sachet, cachet, elixir, suspension, emulsion, solution, syrup, aerosol (as a solid or in a liquid medium), ointment containing, for example, up to 10% by weight of the active component, soft capsule, hard capsule, gel-cap, tablet, suppository, solution, or packaged powder. In some cases, maximizing delivery of viable bacteria is enhanced by including gastro-resistant polymers, adhesion enhancers, or controlled release enhancers in a formulation.

- [0218] In some embodiments, the excipient comprises a preservative. Non-limiting examples of suitable preservatives include antioxidants, such as alpha-tocopherol and ascorbate, and antimicrobials, such as parabens, chlorobutanol, and phenol.
- [0219] In some embodiments, a bacterial composition comprises a binder as an excipient. Non-limiting examples of suitable binders include starches, pregelatinized starches, gelatin, polyvinylpyrrolidone, cellulose, methylcellulose, sodium carboxymethylcellulose, ethylcellulose, polyacrylamides, polyvinylloxazolidone, polyvinylalcohols, C12-C18 fatty acid alcohol, polyethylene glycol, polyols, saccharides, oligosaccharides, and combinations thereof.
- [0220] In some embodiments, a bacterial composition comprises a lubricant as an excipient. Non-limiting examples of suitable lubricants include magnesium stearate, calcium stearate, zinc stearate, hydrogenated vegetable oils, sterotex, polyoxyethylene monostearate, talc, polyethyleneglycol, sodium benzoate, sodium lauryl sulfate, magnesium lauryl sulfate, and light mineral oil.
- [0221] In some embodiments, a bacterial composition comprises a dispersion enhancer as an excipient. Non-limiting examples of suitable dispersants include starch, alginic acid, polyvinylpyrrolidones, guar gum, kaolin, bentonite, purified wood cellulose, sodium starch glycolate, isoamorphous silicate, and microcrystalline cellulose as high HLB emulsifier surfactants.
- [0222] In some embodiments, a bacterial composition comprises a disintegrant as an excipient. In some embodiments, the disintegrant is a non-effervescent disintegrant. Non-limiting examples of suitable non-effervescent disintegrants include starches such as corn starch, potato starch, pregelatinized and modified starches thereof, sweeteners, clays, such as bentonite, micro-crystalline cellulose, alginates, sodium starch glycolate, gums such as agar, guar, locust bean, karaya, pectin, and tragacanth. In some embodiments, the disintegrant is an effervescent disintegrant. Non-limiting examples of suitable effervescent disintegrants include sodium bicarbonate in combination with citric acid, and sodium bicarbonate in combination with tartaric acid.
- [0223] In some embodiments, the excipient comprises a flavoring agent. Flavoring agents can be chosen from synthetic flavor oils and flavoring aromatics; natural oils; extracts from plants, leaves, flowers, and fruits; and combinations thereof. In some embodiments, the flavoring agent is selected from cinnamon oils; oil of wintergreen; peppermint oils;

clover oil; hay oil; anise oil; eucalyptus; vanilla; citrus oil such as lemon oil, orange oil, grape and grapefruit oil; and fruit essences including apple, peach, pear, strawberry, raspberry, cherry, plum, pineapple, and apricot.

[0224] In some embodiments, the excipient comprises a sweetener. Non-limiting examples of suitable sweeteners include glucose (corn syrup), dextrose, invert sugar, fructose, and mixtures thereof (when not used as a carrier); saccharin and its various salts such as the sodium salt; dipeptide sweeteners such as aspartame; dihydrochalcone compounds, glycyrrhizin; Stevia Rebaudiana (Stevioside); chloro derivatives of sucrose such as sucralose; and sugar alcohols such as sorbitol, mannitol, xylitol, and the like. Also contemplated are hydrogenated starch hydrolysates and the synthetic sweetener 3,6-dihydro-6-methyl-1,2,3-oxathiazin-4-one-2,2-dioxide, particularly the potassium salt (acesulfame-K), and sodium and calcium salts thereof.

[0225] In some embodiments, a bacterial composition comprises a coloring agent. Non-limiting examples of suitable color agents include food, drug and cosmetic colors (FD&C), drug and cosmetic colors (D&C), and external drug and cosmetic colors (Ext. D&C). The coloring agents can be used as dyes or their corresponding lakes.

[0226] Additional suitable excipients include, for example, saline, phosphate buffered saline (PBS), cocoa butter, polyethylene glycol, polyalcohols (*e.g.*, glycerol, sorbitol, or mannitol) and prebiotic oligosaccharides such as inulin, Crystalean[®] starch, or dextrin. Excipients can also be selected to account, at least in part, for the ability of the OTUs in a particular composition to withstand gastric pH (if being delivered orally or directly to the GI tract) and/or bile acids, or other conditions encountered by the formulation upon delivery to a subject (*e.g.*, an ulcerative colitis patient).

[0227] The weight fraction of the excipient or combination of excipients in the formulation is usually about 99% or less, such as about 95% or less, about 90% or less, about 85% or less, about 80% or less, about 75% or less, about 70% or less, about 65% or less, about 60% or less, about 55% or less, 50% or less, about 45% or less, about 40% or less, about 35% or less, about 30% or less, about 25% or less, about 20% or less, about 15% or less, about 10% or less, about 5% or less, about 2% or less, or about 1% or less of the total weight of the composition.

[0228] In preparing a formulation of the present disclosure, the bacterial composition can be milled to provide the appropriate particle size prior to combining with the other

ingredients, *e.g.*, those described herein. In some embodiments, a bacterial composition is formulated so as to provide quick, sustained, or delayed release of the active component after administration to a subject, for example, for release in the colon, by employing methods and forms known in the art.

[0229] The bacterial compositions disclosed herein can be formulated into a variety of forms and administered by a number of different means. A bacterial composition can be administered orally, rectally, or parenterally, in formulations containing conventionally acceptable carriers, adjuvants, and vehicles as desired. The term "parenteral" as used herein includes subcutaneous, intravenous, intramuscular, or intrasternal injection and infusion techniques. In an exemplary embodiment, the bacterial composition is administered orally.

[0230] Solid dosage forms for oral administration include capsules, tablets, caplets, pills, troches, lozenges, powders, and granules. A capsule typically comprises a core material comprising a bacterial composition and a shell wall that encapsulates the core material. In some embodiments the core material comprises at least one of a solid, a liquid, and an emulsion. In some embodiments the shell wall material comprises at least one of a soft gelatin, a hard gelatin, and a polymer. Suitable polymers include, but are not limited to: cellulosic polymers such as hydroxypropyl cellulose, hydroxyethyl cellulose, hydroxypropyl methyl cellulose (HPMC), methyl cellulose, ethyl cellulose, cellulose acetate, cellulose acetate phthalate, cellulose acetate trimellitate, hydroxypropylmethyl cellulose phthalate, hydroxypropylmethyl cellulose succinate and carboxymethylcellulose sodium; acrylic acid polymers and copolymers, such as those formed from acrylic acid, methacrylic acid, methyl acrylate, ammonio methacrylate, ethyl acrylate, methyl methacrylate and/or ethyl methacrylate (*e.g.*, those copolymers sold under the trade name "Eudragit"); vinyl polymers and copolymers such as polyvinyl pyrrolidone, polyvinyl acetate, polyvinylacetate phthalate, vinylacetate crotonic acid copolymer, and ethylene-vinyl acetate copolymers; and shellac (purified lac). In some embodiments at least one polymer functions as taste-masking agents.

[0231] Tablets, pills, and the like can be compressed, multiply compressed, multiply layered, and/or coated. The coating can be single or multiple. In some embodiments, the coating material comprises at least one of a saccharide, a polysaccharide, and glycoproteins extracted from at least one of a plant, a fungus, and a microbe. Non-

limiting examples include corn starch, wheat starch, potato starch, tapioca starch, cellulose, hemicellulose, dextrans, maltodextrin, cyclodextrins, inulins, pectin, mannans, gum arabic, locust bean gum, mesquite gum, guar gum, gum karaya, gum ghatti, tragacanth gum, funori, carrageenans, agar, alginates, chitosans, or gellan gum. In some embodiments the coating material comprises a protein. In some embodiments the coating material comprises at least one of a fat and an oil. In some embodiments the at least one of a fat and an oil is high temperature melting. In some embodiments the at least one of a fat and an oil is hydrogenated or partially hydrogenated. In some embodiments the at least one of a fat and an oil is derived from a plant. In some embodiments the at least one of a fat and an oil comprises at least one of glycerides, free fatty acids, and fatty acid esters. In some embodiments the coating material comprises at least one edible wax. The edible wax can be derived from animals, insects, or plants. Non-limiting examples include beeswax, lanolin, bayberry wax, carnauba wax, and rice bran wax.

[0232] In some embodiments, a tablet or pill comprises an inner component surrounding the composition and an outer component, the latter serving as an envelope over the former. The two components can be separated by an enteric coating layer that can resist disintegration in the stomach and permits the inner component to pass intact into the duodenum or to be delayed in release.

[0233] Alternatively, powders or granules embodying a bacterial composition disclosed herein can be incorporated into a food product. In some embodiments, the food product is a drink for oral administration. Non-limiting examples of a suitable drink include fruit juice, a fruit drink, an artificially flavored drink, an artificially sweetened drink, a carbonated beverage, a sports drink, a liquid dairy product, a shake, an alcoholic beverage, a caffeinated beverage, infant formula and so forth. Other suitable means for oral administration include aqueous and nonaqueous solutions, emulsions, suspensions and solutions and/or suspensions reconstituted from non-effervescent granules, containing at least one of suitable solvents, preservatives, emulsifying agents, suspending agents, diluents, sweeteners, coloring agents, and flavoring agents.

[0234] In some embodiments, the food product is a solid foodstuff. Suitable examples of a solid foodstuff include without limitation a food bar, a snack bar, a cookie, a brownie, a muffin, a cracker, an ice cream bar, a frozen yogurt bar, and the like.

[0235] In some embodiments, a bacterial composition disclosed herein is incorporated into a therapeutic food. In some embodiments, the therapeutic food is a ready-to-use food that optionally contains some or all essential macronutrients and micronutrients. In some embodiments, a bacterial composition disclosed herein is incorporated into a supplementary food that is designed to be blended into an existing meal. In some embodiments, the supplemental food contains some or all essential macronutrients and micronutrients. In some embodiments, a bacterial composition disclosed herein is blended with or added to an existing food to fortify the food's protein nutrition. Examples include food staples (grain, salt, sugar, cooking oil, margarine), beverages (coffee, tea, soda, beer, liquor, sports drinks), snacks, sweets and other foods.

[0236] In some embodiments, the formulations are filled into gelatin capsules for oral administration. An example of an appropriate capsule is a 250 mg gelatin capsule containing from 10 (up to 100 mg) of lyophilized powder (10^8 to 10^{11} bacteria), 160 mg microcrystalline cellulose, 77.5 mg gelatin, and 2.5 mg magnesium stearate. In other embodiments, from about 10^5 to about 10^{12} bacteria can be used, about 10^5 to about 10^7 , about 10^6 to about 10^7 , or about 10^8 to about 10^{10} , with attendant adjustments of the excipients if necessary. In further embodiments, an enteric-coated capsule or tablet or with a buffering or protective composition can be used. The use of enteric polymers (such as those used to coat a capsule or tablet described herein) can be useful when formulating a bacterial composition disclosed herein for oral administration. In certain embodiments, the enteric polymers allow for more efficient delivery of the bacterial compositions disclosed herein to a subject's gastrointestinal tract. In some embodiments, the enteric-coated capsule or tablet release their contents (*i.e.*, bacteria or combinations of bacteria disclosed herein) when the pH becomes alkaline after the enteric-coated capsule or tablet passes through the stomach. When a pH sensitive composition (*e.g.*, enteric polymers) is used for formulating the bacterial composition, the pH sensitive composition is preferably a polymer whose pH threshold of the decomposition of the composition is 6.8 to 7.5. Such a numeric value range is a range where the pH shifts toward the alkaline side at a distal portion of the stomach, and hence is a suitable range for use in the delivery to the colon.

[0237] Moreover, an approach to improving delivery of a bacterial composition disclosed herein to the colon specifically can include a composition which ensures the delivery to

the gastrointestinal tract by delaying the release of the contents by approximately 3 to 5 hours, which corresponds to the small intestinal transit time. In an example of formulating a pharmaceutical preparation comprising the composition for delaying the release, a hydrogel is used as a shell. The hydrogel is hydrated and swells upon contact with gastrointestinal fluid, so that the contents are effectively released. Furthermore the delayed release dosage units include drug-containing compositions having a material which coats or selectively coats a drug. Examples of such a selective coating material include in vivo degradable polymers, gradually hydrolyzable polymers, gradually water-soluble polymers, and/or enzyme degradable polymers. A preferred coating material for efficiently delaying the release is not particularly limited, and examples thereof include cellulose-based polymers such as hydroxypropyl cellulose, acrylic acid polymers and copolymers such as methacrylic acid polymers and copolymers, and vinyl polymers and copolymers such as polyvinylpyrrolidone.

[0238] Additional compositions that target delivery to the colon include bioadhesive compositions which specifically adhere to the colonic mucosal membrane (for example, a polymer described in the specification of U.S. Pat. No. 6,368,586), and compositions into which a protease inhibitor is incorporated for protecting particularly a bacterial composition disclosed herein in the gastrointestinal tracts from decomposition due to an activity of a protease.

[0239] An additional colon-delivery mechanism is via pressure change, such that the contents are released from the colon by generation of gas in bacterial fermentation at a distal portion of the stomach. Such pressure-change is not particularly limited, and a more specific example thereof is a capsule which has contents dispersed in a suppository base and which is coated with a hydrophobic polymer (for example, ethyl cellulose).

[0240] A further composition for delivery to the colon includes, for example, a bacterial composition disclosed herein comprising a component that is sensitive to an enzyme (for example, a carbohydrate hydrolase or a carbohydrate reductase) present in the colon. Such a composition is not particularly limited, and more specific examples thereof include compositions that use food components such as non-starch polysaccharides, amylose, xanthan gum, and azopolymers.

[0241] In some embodiments, a bacterial composition disclosed herein is formulated with a germinant to enhance engraftment or efficacy. In some embodiments, a bacterial

composition is formulated or administered with a prebiotic substance to enhance engraftment or efficacy.

[0242] In some embodiments, the number of bacteria of each type can be present in the same level or amount or in different levels or amounts. For example, in a bacterial composition with two types of bacteria, the bacteria can be present in from about a 1:10,000 ratio to about a 1:1 ratio, from about a 1:10,000 ratio to about a 1:1,000 ratio, from about a 1:1,000 ratio to about a 1:100 ratio, from about a 1:100 ratio to about a 1:50 ratio, from about a 1:50 ratio to about a 1:20 ratio, from about a 1:20 ratio to about a 1:10 ratio, from about a 1:10 ratio to about a 1:1 ratio. For bacterial compositions comprising at least three types of bacteria, the ratio of type of bacteria can be chosen pairwise from ratios for bacterial compositions with two types of bacteria. For example, in a bacterial composition comprising bacteria A, B, and C, at least one of the ratio between bacteria A and B, the ratio between bacteria B and C, and the ratio between bacteria A and C can be chosen, independently, from the pairwise combinations above.

III. Methods of Treating a Subject

[0243] The compositions and formulations disclosed herein can be used for the treatment and/or prevention of a disease or disorder, such as those associated with dysbiosis of a gastrointestinal tract (*e.g.*, an IBD, for example, ulcerative colitis), *e.g.*, by ameliorating one or more sign or symptom of the disease (*e.g.*, induce clinical remission), and/or to reduce the recurrence of active disease (*e.g.*, maintain clinical remission).

[0244] The terms "treat," "treating," and "treatment," as used herein, refer to any type of intervention or process performed on, or administering an active agent to, the subject with the objective of reversing, alleviating, ameliorating, inhibiting, or slowing down or preventing the progression, development, severity or recurrence of a symptom, complication, condition or biochemical indicia associated with a disease or enhancing overall survival. Treating can include reducing at least one sign or symptom associated with a disease or disorder disclosed herein, *e.g.*, ulcerative colitis. Treatment can be of a subject having a disease or a subject who does not have a disease (*e.g.*, for prophylaxis). It is understood that "preventing" can mean reducing the risk of disease, increasing the length of remission, or reducing the rate of relapse.

[0245] In some embodiments, treatment with a formulation is associated with at least one of the following: (i) an increase in the diversity of the gastrointestinal (GI) microbiome in

a subject, (ii) a reduction in GI inflammation in a subject, (iii) improvement in mucosal and/or epithelial barrier integrity in a subject compared to a reference control (*e.g.*, untreated patients or the subject prior to treatment), (iv) promotion of mucosal healing and (v) other improvements of at least one sign or symptom of a disease or disorder disclosed herein. Such improvements can also include, for example, improvements detected via biomarkers, such as a decrease or increase in the level of certain biological molecules (*e.g.*, fecal calprotectin, secondary bile acids, tryptophan metabolites, short-chain and medium-chain fatty acids, sphingolipids, and kynurenine) following treatment.

[0246] In some embodiments, when treating a subject suffering from an inflammatory disease (*e.g.*, ulcerative colitis), an improvement in the disease, such as mucosal healing, can be assessed by a reduction in endoscopic Mayo score. Mayo scores are known in the art, *e.g.*, see globalrph.com/mayo-clinic-score.htm. A reduction in total Mayo score from a pre-treatment score (*i.e.*, baseline) and/or improvements in rectal bleeding and/or endoscopic subscores are indicative of a therapeutic effect.

[0247] In some embodiments, the improvement rate (*e.g.*, clinical remission rate) after treatment with a formulation disclosed herein is at least about 20%, at least about 25%, at least about 30%, at least about 40%, at least about 50%, at least about 60%, at least about 70%, at least about 75%, at least about 80%, at least about 85%, at least about 90%, at least about 95%, or about 100%. In some embodiments, the improvement rate (*e.g.*, clinical remission rate) is improved compared to placebo, *e.g.*, at least 25% versus 10%, respectively. In some embodiments, clinical remission is a Mayo score of ≤ 2 points, no individual subscore > 1 .

[0248] In some embodiments, the clinical response to treatment with a formulation of the present disclosure is improved versus placebo, *e.g.*, at least 25% compared to 10%, respectively. When treating a subject suffering from an inflammatory disease, *e.g.*, ulcerative colitis, mucosal healing is defined as a 0 or 1 on the endoscopy subscore of the Mayo score. A clinical response is, in some embodiments, a decrease from baseline in the Mayo score by $\geq 30\%$ and/or ≥ 3 points, accompanied by a decrease in the rectal bleeding subscore of ≥ 1 or a rectal bleeding subscore of 0 or 1. In some embodiments, clinical response is defined as a decrease of ≥ 3 points in Total Modified Mayo Score (TMMS) from baseline, along with at least one of a decrease of > 1 point in rectal bleeding subscore or absolute rectal bleeding subscore of 0 or 1. Complete remission is defined as a TMMS

<2 and an endoscopic subscore of 0 with no erythema, no blood, and no evidence of inflammation. Endoscopic improvement is defined as a decrease in the endoscopic subscore of > 1.

[0249] Formulations disclosed herein (*e.g.*, comprising a designed bacterial composition) can be used to treat any disease or disorder associated with a dysbiosis of the gastrointestinal tract. Non-limiting examples of such diseases or disorders are provided throughout the present disclosure.

[0250] Formulations as described herein are useful for administration to a subject, *e.g.*, a mammal, such as a human in need of treatment, *e.g.*, to prevent or treat a disease or disorder disclosed herein or a sign or symptom of a disease or disorder disclosed herein or to prevent recurrence of a disease or disorder disclosed herein. In some embodiments, the mammalian subject is a human subject. In some embodiments, the human subject (*e.g.*, patient) has one or more signs or symptoms of a disease or disorder, such as those associated with a dysbiosis. Non-limiting examples of such signs or symptoms can include, but are not limited to, diarrhea (*e.g.*, containing blood or pus); abdominal pain and cramping; rectal pain; rectal bleeding; urgency to defecate; inability to defecate despite urgency; weight loss; fatigue; fever; failure to grow (in children); severe bleeding; perforated colon; severe dehydration; liver disease; osteoporosis; inflammation of the skin, joints, or eyes; mouth sores; increased risk of colon cancer; toxic megacolon; or increased risk of blood clots in veins and arteries. A therapeutically effective treatment using a formulation provided herein can ameliorate one or more of such signs and symptoms of a disease or disorder disclosed herein. In some embodiments, the patient is in remission and the microbial composition is administered to increase the duration of remission through maintenance therapy.

[0251] Efficacy of a treatment can be determined by evaluating signs and or symptoms and according to whether induction of improvement and/or maintenance of a remission or improved condition is achieved, *e.g.*, for at least about 1 week, at least about two weeks, at least about three weeks, at least about four weeks, at least about 8 weeks, or at least about 12 weeks. For example, in cases of a disease or disorder disclosed herein (*e.g.*, colitis), mucosal healing (as judged endoscopically, histologically, or via imaging techniques) can be used to evaluate the efficacy of a treatment. In certain embodiments, such an approach can be particularly useful for predicting long term clinical

outcome in a subject diagnosed with the disease or disorder. Remission or signs or symptoms can be determined using clinical indices, such as, for Crohn's disease, the Crohn's Disease Activity Index (CDAI), the PCDAI, or the amelioration or one or more elements of the PCDAI or CDAI, *e.g.*, number of liquid or soft stools, abdominal pain, general well-being, presence of complications (such as arthralgia or arthritis, uveitis; inflammation of the iris; presence of erythema nodosum, pyoderma gangrenosum, or aphthous ulcers; anal fissures, fistulae, or abscesses; other fistulae, or fever), taking opiates or diphenoxylate/atropine for diarrhea, presence of an abdominal mass, hematocrit of <0.47 (males) or <0.42 (females); or percentage deviation from standard weight. In some embodiments a subject treated according to a method described herein attains and/or remains at a CDAI below 150. In some embodiments, a positive response to a method is a reduction of a subject's CDAI by at least 70 points.

[0252] For ulcerative colitis, indications of therapeutic efficacy include, for example, normalization of stool frequency, lack of urgency, or absence of blood in stools. Clinical improvement (*e.g.*, clinical remission) is considered achieved if at least one sign or symptom is reduced after completion of the treatment. Mucosal healing is one example of a measure of clinical improvement. Other signs/symptoms can include normalization of C-reactive protein and/or other acute phase indicators, decrease in levels of fecal calprotectin and/or lactoferrin, and subjective indicia such as those related to quality of life. Other examples of indicia can include improvement from moderate to mild using the Montreal Classification, the Mayo Score (with or without endoscopy subscore), or the Pediatric Ulcerative Colitis Index. In general, methods and compositions described herein are useful for treating a subject diagnosed with a colitis.

[0253] Other indicators of efficacy of a therapeutic composition and/or method for treating a disease or disorder, such as those associated with dysbiosis include engraftment of at least one bacterial species or OTU identified in a microbiome composition, for example, at about 2 weeks, about 3 weeks, about 4 weeks, about 5 weeks, about 6 weeks, about 7 weeks, about 8 weeks, about 9 weeks, about 10 weeks, about 11 weeks, about 12 weeks, or longer after initial dosing with the microbiome composition; clinical remission at 0 weeks, about 1 week, about 4 weeks, about 5 weeks, about 6 weeks, about 7 weeks, about 8 weeks, about 9 weeks, about 10 weeks, about 11 weeks, about 12 weeks, or longer after initial dosing with the microbiome composition (*e.g.*, for colitis, a Mayo

score ≤ 2 with no subscore > 1); or endoscopic remission at 0 weeks, about 1 week, about 4 weeks, about 5 weeks, about 6 weeks, about 7 weeks, about 8 weeks, about 9 weeks, about 10 weeks, about 11 weeks, about 12 weeks, or longer after initial dosing with the microbiome composition (e.g., for colitis, Mayo endoscopy score of 0).

[0254] In some embodiments, treatment with a formulation disclosed herein can improve a dysbiosis, including, but not limited to, an improvement in the representation of one or more OTUs identified as reduced in a population of subjects suffering from a disease or disorder associated with dysbiosis (e.g., UC patients with active disease). In some embodiments, treatment with a formulation of the present disclosure can reduce the representation of one or more microbial species that are associated with a disease or disorder disclosed herein.

[0255] In some embodiments, treatment with a formulation disclosed herein can increase the representation of microbial species that are associated with an improvement (e.g., clinical remission) of a disease or disorder disclosed herein.

[0256] In some embodiments, a formulation can increase the prevalence of one or more of the following bacterial species in a subject suffering from a disease or disorder disclosed herein (e.g., in the GI microbiome): *Gemmiger formicilis*, *Roseburia hominis*, *Clostridium bolteae*, *Parasutterella excrementihominis*, *Holdemania filiformis*, *Holdemania massiliensis*, *Bacteroides ovatus*, *Akkemansia muciniphila*, *Clostridium leptum*, *Bilophila wadsworthia*, *Dielma fastidiosa*, *Clostridium symbiosum*, *Eubacterium siraeum*, *Agathobaculum desmolans*, *Agathobaculum butyriciproducens*, or *Bacteroides vulgatus*, or *Flintibacter SC49*. In some embodiments, a formulation disclosed herein can increase the prevalence of one or more bacteria selected from the group consisting of *Gemmiger formicilis*, *Roseburia hominis*, *Clostridium bolteae*, *Holdemania filiformis*, *Holdemania massiliensis*, *Clostridium leptum*, *Dielma fastidiosa*, *Clostridium symbiosum*, *Eubacterium siraeum*, and combinations thereof. In certain embodiments, a formulation comprising a designed composition disclosed herein can increase the prevalence of one or more bacteria selected from those disclosed in Table 4, Table 5, FIG. 13, FIG. 17, FIG. 30, FIG. 31, and/or FIG. 32. In some embodiments, a formulation can increase the prevalence of one or more bacteria comprising a 16S rDNA sequence that is at least about 85%, at least about 90%, at least about 95%, at least about 96%, at least about 97%, at least about 97.5%, at least about 98%, at least about 98.5%, at least about 99%, at least

about 99.5%, or about 100% identical to a 16S rDNA sequence set forth in SEQ ID NOs: 1-14, 16-30, 32-36, 39, 41, 44, 45, 47-51, 59-62, 64-68, 72-76, 102-398, or any of the foregoing species.

[0257] In some embodiments, a formulation disclosed herein can increase, in a treated patient, representation of one or more bacterial phyla, genera, or species such as clade 155, *e.g.*, *Bacteroides faecis*, which are reduced in subjects suffering from a disease or disorder disclosed herein.

[0258] In some embodiments, treatment with a formulation disclosed herein can improve a GI function that is reduced or otherwise aberrant in subjects that have a disease or disorder disclosed herein (*e.g.*, UC). In some embodiments, a formulation disclosed herein can increase or decrease the level of certain biological molecules (*e.g.*, fecal calprotectin, secondary bile acids, tryptophan metabolites, short-chain and medium-chain fatty acids, sphingolipids, and kynurenine) in a treated subject. In some embodiments, the increase or decrease of such biological molecules is correlated with an improvement of the disease (*e.g.*, clinical remission).

[0259] Formulations disclosed herein can be useful in a variety of clinical situations. For example, the formulation can be administered as a complementary treatment to standard treatment regimens for a disease or disorder, such as those disclosed herein. In some embodiments, formulations of the present disclosure can be administered as an alternative to standard treatment regimens. In some embodiments, the formulation disclosed herein has a comparable, if not better, clinical efficacy (*e.g.*, clinical remission rate) compared to standard treatment regimens (*e.g.*, antibiotics or anti-inflammatory drugs, *e.g.*, LIALDA[®], PENTASA[®], UCERIS[®], REMICADE[®], ENTYVIO[®], SIMPONI[®]). In some embodiments, formulations of the present disclosure can be administered simultaneously with standard treatment regimens to enhance their activity. In some embodiments, formulations of the present disclosure can be administered simultaneously with standard treatment regimens without exacerbating their adverse event profile.

[0260] In some embodiments, a subject to be treated with a formulation has mild to moderate disease or disorder, such as those disclosed herein (*e.g.*, ulcerative colitis, *e.g.*, a Mayo score of ≥ 4 and ≤ 10). In some embodiments, the patient is failing standard of care. In some embodiments, the formulation is used to maintain clinical remission or clinical benefit in a patient with moderate to severe disease being treated with an

immunomodulator or immunosuppressant, including anti-TNF, anti-IL23, anti-integrin or other antibody treatments.

[0261] In some embodiments, a subject receives a pretreatment protocol prior to administration of the formulation, wherein the pretreatment protocol prepares the gastrointestinal tract to receive the bacterial composition. In certain embodiments, the pretreatment protocol comprises an oral antibiotic treatment, wherein the antibiotic treatment alters the bacteria in the patient. In specific embodiments, the antibiotic is not absorbed through the gut or minimally bioavailable for systemic distribution. In other embodiments, the pretreatment protocol comprises a colonic cleansing (*e.g.*, enema), wherein the colonic cleansing substantially empties the contents of the patient's colon. As used herein, "substantially emptying the contents of the colon" refers to removal of at least about 75%, at least about 80%, at least about 90%, at least about 95%, or about 100% of the contents of the ordinary volume of colon contents. Antibiotic treatment can precede the colon-cleansing protocol.

[0262] In some embodiments, a pretreatment protocol is administered to a subject at least 1 day, 2 days, 3 days, 5 days, 6 days, 7 days, 10 days, or 15 days prior to administration of a formulation described herein. In some embodiments, the subject receives multiple doses of a formulation. In some embodiments, the subject has at least one sign or symptom of a disease or disorder, such as those disclosed herein prior to administration of the formulation. In other embodiments, the subject does not exhibit a sign or symptom of a disease or disorder, such as those disclosed herein prior to administration of the formulation, *e.g.*, formulation is administered prophylactically to reduce the risk of a sign or symptom of a disease or disorder, such as those disclosed herein.

[0263] In some embodiments, a formulation described herein is administered enterically, in other words, by a route of access to the gastrointestinal tract. This includes oral administration, rectal administration (including enema, suppository, or colonoscopy), by an oral or nasal tube (nasogastric, nasojejunal, oral gastric, or oral jejunal), or any other method known in the art.

[0264] In some embodiments, a formulation is administered to at least one region of the gastrointestinal tract, including the mouth, esophagus, stomach, small intestine, large intestine, and rectum. In other embodiments, a formulation is administered to all regions of the gastrointestinal tract. In certain embodiments, a formulation is administered orally

in the form of medicaments such as powders, capsules, tablets, gels or liquids. The formulation can also be administered in gel or liquid form by the oral route or through a nasogastric tube, or by the rectal route in a gel or liquid form, by enema or instillation through a colonoscope or by a suppository.

[0265] In some embodiments, the bacteria and bacterial compositions are provided in a dosage form. In some embodiments, the dosage form is designed for administration of at least one OTU or combination thereof disclosed herein, wherein the total amount of bacterial composition administered is selected from about 0.1 ng to about 10 g, about 10 ng to about 1 g, about 100 ng to about 0.1 g, about 0.1 mg to about 500 mg, about 1 mg to about 1000 mg, from about 1000 to about 5000 mg, or more.

[0266] In some embodiments, the treatment period is at least about 1 day, at least about 2 days, at least about 3 days, at least about 4 days, at least about 5 days, at least about 6 days, at least about 1 week, at least about 2 weeks, at least about 3 weeks, at least about 4 weeks, at least about 1 month, at least about 2 months, at least about 3 months, at least about 4 months, at least about 5 months, at least about 6 months, or at least about 1 year. In some embodiments, the treatment period is from about 1 day to 1 week, from about 1 week to 4 weeks, from about 1 month, to 3 months, from about 3 months to 6 months, from about 6 months to 1 year, or for over a year.

[0267] In some embodiments, from about 10^5 and about 10^{12} microorganisms total is administered to the patient in a given dosage form. In certain embodiments, an effective amount can be provided in from about 1 to about 500 ml or from about 1 to about 500 grams of the bacterial composition having from about 10^7 to about 10^{11} bacteria per ml or per gram, or a capsule, tablet, or suppository having from about 1 mg to about 1000 mg lyophilized powder having from about 10^7 to about 10^{11} bacteria. In some embodiments, those receiving acute treatment receive higher doses than those who are receiving chronic administration (such as hospital workers or those admitted into long-term care facilities).

[0268] In some embodiments, a formulation described herein is administered once, on a single occasion or on multiple occasions, such as once a day for several days or more than once a day on the day of administration (including twice daily, three times daily, or up to five times daily). In some embodiments, a formulation is administered intermittently according to a set schedule, *e.g.*, once a day, once weekly, or once monthly, or when the patient relapses from clinical improvement (*e.g.*, clinical remission) of a disease or

disorder, such as those disclosed herein, or exhibits a sign or symptoms of a disease or disorder, such as those disclosed herein. In other embodiments, a formulation is administered on a long-term basis to individuals who are at risk for active disease or disorder, such as those disclosed herein or are diagnosed as being at risk for developing a disease or disorder (*e.g.*, have a family history of UC or a history of isotretinoin use by the individual).

[0269] In some embodiments, a bacterial composition of the present disclosure is administered with other agents (*e.g.*, anti-microbial agents or prebiotics) as a combination therapy mode. In certain embodiments, the administration is sequential, over a period of hours or days. In other embodiments, the administration is simultaneous.

[0270] In some embodiments, a bacterial composition is included in combination therapy with one or more anti-microbial agents, which include anti-bacterial agents, anti-fungal agents, anti-viral agents and anti-parasitic agents.

[0271] Anti-bacterial agents include cephalosporin antibiotics (cephalexin, cefuroxime, cefadroxil, cefazolin, cephalothin, cefaclor, cefamandole, cefoxitin, cefprozil, and ceftobiprole); fluoroquinolone antibiotics (cipro, Levaquin, floxin, tequin, avelox, and norflox); tetracycline antibiotics (tetracycline, minocycline, oxytetracycline, and doxycycline); penicillin antibiotics (amoxicillin, ampicillin, penicillin V, dicloxacillin, carbenicillin, vancomycin, and methicillin); and carbapenem antibiotics (ertapenem, doripenem, imipenem/cilastatin, and meropenem).

[0272] Anti-viral agents include Abacavir, Acyclovir, Adefovir, Amprenavir, Atazanavir, Cidofovir, Darunavir, Delavirdine, Didanosine, Docosanol, Efavirenz, Elvitegravir, Emtricitabine, Enfuvirtide, Etravirine, Famciclovir, Foscarnet, Fomivirsen, Ganciclovir, Indinavir, Idoxuridine, Lamivudine, Lopinavir, Maraviroc, MK-2048, Nelfinavir, Nevirapine, Penciclovir, Raltegravir, Rilpivirine, Ritonavir, Saquinavir, Stavudine, Tenofovir, Trifluridine, Valaciclovir, Valganciclovir, Vidarabine, Ibacitabine, Amantadine, Oseltamivir, Rimantidine, Tipranavir, Zalcitabine, Zanamivir and Zidovudine.

[0273] Examples of antifungal compounds include, but are not limited to polyene antifungals such as natamycin, rimocidin, filipin, nystatin, amphotericin B, candicin, and hamycin; imidazole antifungals such as miconazole, ketoconazole, clotrimazole, econazole, omoconazole, bifonazole, butoconazole, fenticonazole, isoconazole,

oxiconazole, sertaconazole, sulconazole, and tioconazole; triazole antifungals such as fluconazole, itraconazole, isavuconazole, ravuconazole, posaconazole, voriconazole, terconazole, and albaconazole; thiazole antifungals such as abafungin; allylamine antifungals such as terbinafine, naftifine, and butenafine; and echinocandin antifungals such as anidulafungin, caspofungin, and micafungin. Other compounds that have antifungal properties include, but are not limited to polygodial, benzoic acid, ciclopirox, tolnaftate, undecylenic acid, flucytosine or 5-fluorocytosine, griseofulvin, and haloprogin.

[0274] In some embodiments, a bacterial composition is included in combination therapy with one or more corticosteroids, mesalazine, mesalamine, sulfasalazine, sulfasalazine derivatives, immunosuppressive drugs, cyclosporin A, mercaptopurine, azathiopurine, prednisone, methotrexate, antihistamines, glucocorticoids, epinephrine, theophylline, cromolyn sodium, anti-leukotrienes, anti-cholinergic drugs for rhinitis, anti-cholinergic decongestants, mast-cell stabilizers, monoclonal anti-IgE antibodies, vaccines, and combinations thereof.

[0275] A prebiotic is a selectively fermented ingredient that allows specific changes, both in the composition and/or activity in the gastrointestinal microbiota that confers benefits upon a treated subject's well-being and health. Prebiotics can include complex carbohydrates, amino acids, peptides, or other essential nutritional components for the survival of the bacterial composition. Prebiotics include, but are not limited to, amino acids, biotin, fructooligosaccharide, galactooligosaccharides, inulin, lactulose, mannan oligosaccharides, oligofructose-enriched inulin, oligofructose, oligodextrose, tagatose, trans-galactooligosaccharide, and xylooligosaccharides.

[0276] To evaluate a subject, signs or symptoms of an adverse event or disease recurrence are evaluated post-treatment ranging from, *e.g.*, about 1 day to about 6 months after administration of a formulation. One method of evaluation involves obtaining fecal material from the subject and assessment of microbes present in the gastrointestinal tract, *e.g.*, using 16S rDNA or metagenomic shotgun sequencing analysis or other analyses known in the art. Population of the gastrointestinal tract by bacterial species present in the formulation as well as augmentation by commensal microbes not present in the formulation can be used to indicate an improvement in the GI dysbiosis associated with *e.g.*, UC, and therefore a decreased risk of an adverse event or a decrease in the severity of an adverse event.

[0277] In addition to treating the different inflammatory diseases disclosed herein (*e.g.*, colitis), Applicant has surprisingly discovered that the designed compositions disclosed herein can be also used to treat diseases or disorders that are generally not associated with pro-inflammatory responses. A non-limiting example of such a disease or disorder is cancer. In some embodiments, the bacterial compositions disclosed herein (*e.g.*, designed compositions) can be used to treat certain cancers, *e.g.*, when administered in combination with other anti-cancer agents. Without being limited to any one particular theory, the compositions disclosed herein are designed to have functional features that target multiple biological pathways. In some embodiments, the functional features are important for the treatment of inflammatory diseases. In other embodiments, the functional features are important for the treatment of cancers. In certain embodiments, the functional features are important for the treatment of both inflammatory diseases and cancers. Non-limiting examples of functional features that can be important for the treatment of both inflammatory diseases and cancers include, but are not limited to, inhibition of HDAC activity, production of short-chain fatty acids, production of tryptophan metabolites, production of IL-18, activation of CD8 T cells by metabolites (*e.g.*, short-chain fatty acids) or macromolecules, activation of antigen presenting cells such as dendritic cells by bacterial antigens, macromolecules and metabolites, or reduced colonic inflammation (*e.g.*, through upregulation of Tregs) enabling recruitment of CD8 T cells to tumors located distally.

[0278] In some embodiments, a designed composition disclosed herein is administered in combination with an additional therapeutic agent used for the treatment of cancers. Such additional therapeutic agents can include, for example, chemotherapy drugs, small molecule drugs or antibodies that stimulate the immune response to a given cancer. In some instances, therapeutic compositions can include an immune checkpoint inhibitor, *e.g.*, an anti-PD-1 antibody, an anti-PD-L1 antibody, or an anti-CTLA-4 antibody. Non-limiting examples of other antibodies that can be used in combination with the designed compositions of the present disclosure include an anti-OX40 (also known as CD134, TNFRSF4, ACT35 and/or TXGP1L) antibody, an anti-CD137 antibody, an anti-LAG-3 antibody, or an anti-GITR antibody.

[0279] In some embodiments, a designed composition disclosed herein, when administered in combination with an anti-cancer agent (*e.g.*, immune checkpoint

inhibitor, *e.g.*, anti-PD-1 antibody or an anti-PD-L1 antibody), can reduce tumor volume in a subject. In certain embodiments, tumor volume is decreased by at least about 10%, at least about 20%, at least about 30%, at least about 40%, at least about 50%, at least about 60%, at least about 70%, at least about 80%, or at least about 90% in the subject, compared to a reference (*e.g.*, tumor volume in the subject prior to the administration or a corresponding subject that did not receive the compositions disclosed herein).

[0280] In some embodiments, a designed composition disclosed herein, when administered in combination with an anti-cancer agent (*e.g.*, immune checkpoint inhibitor, *e.g.*, anti-PD-1 antibody or an anti-PD-L1 antibody), can increase the percentage of CD8 T cells and/or CD4 T cells (tumor infiltrating lymphocytes) in the tumor of a subject. In some embodiments, the percentage of CD8 T cells and/or CD4 T cells in the tumor is increased by at least about 10%, at least about 20%, at least about 30%, at least about 40%, at least about 50%, at least about 60%, at least about 70%, at least about 80%, or at least about 90% in the subject, compared to a reference (*e.g.*, tumor volume in the subject prior to the administration or a corresponding subject that did not receive the compositions disclosed herein). As a result of the increase in the percentage of CD8 T cells, in some embodiments, the ratio of CD8 T cells to regulatory T cells in the tumor is increased, *e.g.*, by at least about 10%, at least about 20%, at least about 30%, at least about 40%, at least about 50%, at least about 60%, at least about 70%, at least about 80%, or at least about 90% in the subject, compared to a reference.

[0281] Non-limiting examples of cancers that can be treated with the present disclosure include squamous cell carcinoma, small-cell lung cancer, non-small cell lung cancer, squamous non-small cell lung cancer (NSCLC), nonsquamous NSCLC, glioma, gastrointestinal cancer, renal cancer (*e.g.*, clear cell carcinoma), ovarian cancer, liver cancer, colorectal cancer, endometrial cancer, kidney cancer (*e.g.*, renal cell carcinoma (RCC)), prostate cancer (*e.g.*, hormone refractory prostate adenocarcinoma), thyroid cancer, neuroblastoma, pancreatic cancer, glioblastoma (glioblastoma multiforme), cervical cancer, stomach cancer, bladder cancer, hepatoma, breast cancer, colon carcinoma, and head and neck cancer (or carcinoma), gastric cancer, germ cell tumor, pediatric sarcoma, sinonasal natural killer, melanoma (*e.g.*, metastatic malignant melanoma, such as cutaneous or intraocular malignant melanoma), bone cancer, skin cancer, uterine cancer, cancer of the anal region, testicular cancer, carcinoma of the

fallopian tubes, carcinoma of the endometrium, carcinoma of the cervix, carcinoma of the vagina, carcinoma of the vulva, cancer of the esophagus, cancer of the small intestine, cancer of the endocrine system, cancer of the parathyroid gland, cancer of the adrenal gland, sarcoma of soft tissue, cancer of the urethra, cancer of the penis, solid tumors of childhood, cancer of the ureter, carcinoma of the renal pelvis, neoplasm of the central nervous system (CNS), primary CNS lymphoma, tumor angiogenesis, spinal axis tumor, brain cancer, brain stem glioma, pituitary adenoma, Kaposi's sarcoma, epidermoid cancer, squamous cell cancer, T-cell lymphoma, environmentally-induced cancers including those induced by asbestos, virus-related cancers or cancers of viral origin (*e.g.*, human papilloma virus (HPV-related or -originating tumors)), and hematologic malignancies derived from either of the two major blood cell lineages, *i.e.*, the myeloid cell line (which produces granulocytes, erythrocytes, thrombocytes, macrophages and mast cells) or lymphoid cell line (which produces B, T, NK and plasma cells), such as all types of leukemias, lymphomas, and myelomas, *e.g.*, acute, chronic, lymphocytic and/or myelogenous leukemias, such as acute leukemia (ALL), acute myelogenous leukemia (AML), chronic lymphocytic leukemia (CLL), and chronic myelogenous leukemia (CML), undifferentiated AML (MO), myeloblastic leukemia (M1), myeloblastic leukemia (M2; with cell maturation), promyelocytic leukemia (M3 or M3 variant [M3V]), myelomonocytic leukemia (M4 or M4 variant with eosinophilia [M4E]), monocytic leukemia (M5), erythroleukemia (M6), megakaryoblastic leukemia (M7), isolated granulocytic sarcoma, and chloroma; lymphomas, such as Hodgkin's lymphoma (HL), non-Hodgkin's lymphoma (NHL), B cell hematologic malignancy, *e.g.*, B-cell lymphomas, T-cell lymphomas, lymphoplasmacytoid lymphoma, monocytoid B-cell lymphoma, mucosa-associated lymphoid tissue (MALT) lymphoma, anaplastic (*e.g.*, Ki 1+) large-cell lymphoma, adult T-cell lymphoma/leukemia, mantle cell lymphoma, angioimmunoblastic T-cell lymphoma, angiocentric lymphoma, intestinal T-cell lymphoma, primary mediastinal B-cell lymphoma, precursor T-lymphoblastic lymphoma, T-lymphoblastic; and lymphoma/leukaemia (T-Lbly/T-ALL), peripheral T- cell lymphoma, lymphoblastic lymphoma, post-transplantation lymphoproliferative disorder, true histiocytic lymphoma, primary central nervous system lymphoma, primary effusion lymphoma, B cell lymphoma, lymphoblastic lymphoma (LBL), hematopoietic tumors of lymphoid lineage, acute lymphoblastic leukemia, diffuse large B-cell lymphoma, Burkitt's

lymphoma, follicular lymphoma, diffuse histiocytic lymphoma (DHL), immunoblastic large cell lymphoma, precursor B -lymphoblastic lymphoma, cutaneous T-cell lymphoma (CTLC) (also called mycosis fungoides or Sezary syndrome), and lymphoplasmacytoid lymphoma (LPL) with Waldenstrom's macroglobulinemia; myelomas, such as IgG myeloma, light chain myeloma, nonsecretory myeloma, smoldering myeloma (also called indolent myeloma), solitary plasmacytoma, and multiple myelomas, chronic lymphocytic leukemia (CLL), hairy cell lymphoma; hematopoietic tumors of myeloid lineage, tumors of mesenchymal origin, including fibrosarcoma and rhabdomyosarcoma; seminoma, teratocarcinoma, tumors of the central and peripheral nervous, including astrocytoma, schwannomas; tumors of mesenchymal origin, including fibrosarcoma, rhabdomyosarcoma, and osteosarcoma; and other tumors, including melanoma, xeroderma pigmentosum, keratoacanthoma, seminoma, thyroid follicular cancer and teratocarcinoma, hematopoietic tumors of lymphoid lineage, for example T-cell and B-cell tumors, including but not limited to T-cell disorders such as T-prolymphocytic leukemia (T-PLL), including of the small cell and cerebriform cell type; large granular lymphocyte leukemia (LGL) of the T-cell type; a/d T-NHL hepatosplenic lymphoma; peripheral/post-thymic T cell lymphoma (pleomorphic and immunoblastic subtypes); angiocentric (nasal) T-cell lymphoma; cancer of the head or neck, renal cancer, rectal cancer, cancer of the thyroid gland; acute myeloid lymphoma, as well as any combinations of said cancers. The methods described herein can also be used for treatment of metastatic cancers, unresectable, refractory cancers (*e.g.*, cancers refractory to previous immunotherapy, *e.g.*, with a blocking CTLA-4 or PD-1 antibody), and/or recurrent cancers.

IV. Methods of Identifying Suitable FMT Donors

[0282] Applicant has discovered that certain microbiome profiles, *e.g.*, families, genera, and/or species, are associated with improved clinical efficacy in a disease or disorder, such as those disclosed herein (*e.g.*, ulcerative colitis patients). Accordingly, in certain aspects, the present disclosure provides a method of selecting donors whose feces are useful for preparing bacterial compositions and formulations disclosed herein. In some embodiments, the method comprises: a) obtaining a microbiome sample from a subject (*i.e.*, potential donor), and b) determining the prevalence of a family, genera, and/or species of bacteria in the microbiome sample.

[0283] In some embodiments, the subject is a suitable donor if the microbiome sample comprises one or more bacteria from the family *Ruminococcaceae*, *Lachnospiraceae*, *Sutterellaceae*, *Clostridiaceae*, *Erysipelotrichaceae*, *Bacteroidaceae*, *Akkermansiaceae*, *Peptostreptococcaceae*, *Eubacteriaceae*, or *Desulfovibrionaceae*. In some embodiments, the subject is a suitable donor if the microbiome sample comprises one or more of the following bacterial species: *Gemmiger formicilis*, *Roseburia hominis*, *Clostridium bolteae*, *Parasutterella excrementihominis*, *Holdemania filiformis*, *Holdemania massiliensis*, *Bacteroides ovatus*, *Akkemansia muciniphila*, *Clostridium leptum*, *Bilophila wadsworthia*, *Dielma fastidiosa*, *Clostridium symbiosum*, *Eubacterium siraeum*, *Agathobaculum desmolans*, *Agathobaculum butyriciproducens*, or *Bacteroides vulgatus*. In some embodiments, the subject is a suitable donor if the microbiome sample comprises one or more of the following bacterial species: *Anaerotruncus colihominis*, *Blautia producta*, *Clostridium bolteae*, *Clostridium disporicum*, *Clostridium ghonii*, *Clostridium glycolicum*, *Clostridium innocuum*, *Clostridium lactatifermentans*, *Clostridium viride*, *Eubacterium sp. WAL 14571*, *Lachnospiraceae bacterium 3 1 57FA*, *Lachnospiraceae bacterium oral taxon F15*, *Lactonifactor longoviformis*, or *Ruminococcus lactaris*. In certain embodiments, the subject is a suitable donor if the microbiome sample comprises one or more bacteria disclosed in Table 4, Table 5, FIG. 13, FIG. 17, FIG. 30, FIG. 31, and/or FIG. 32. In some embodiments, the subject is a suitable donor if the microbiome sample comprises one or more bacteria comprising a 16S rDNA sequence that is at least about 85%, at least about 90%, at least about 95%, at least about 96%, at least about 97%, at least about 97.5%, at least about 98%, at least about 98.5%, at least about 99%, at least about 99.5%, or about 100% identical to a 16S rDNA sequence set forth in SEQ ID NOs: 1-14, 16-30, 32-36, 39, 41, 44, 45, 47-51, 59-62, 64-68, 72-76, 102-398 or any of the foregoing species.

[0284] In some embodiments, a donor is selected that produce relatively higher concentrations of spores in fecal material than other donors. In further embodiments, a donor is selected that provide fecal material from which spores having increased efficacy are purified; this increased efficacy is measured using *in vitro* or in animal studies as described herein or by any other method known in the art. In some embodiments, a donor can be subjected to one or more pre-donation treatments to reduce undesired material in the fecal material, and/or increase desired spore populations.

[0285] It is advantageous to screen the health of a donor subject prior to and optionally, one or more times after, the collection of the fecal material. Such screening identifies donors carrying pathogenic materials such as viruses (HIV, hepatitis, polio) and pathogenic bacteria. Post-collection, donors are screened about one week, two weeks, three weeks, one month, two months, three months, six months, one year or more than one year, and the frequency of such screening can be daily, weekly, bi-weekly, monthly, bi-monthly, semi-yearly or yearly. In some embodiments, donors that are screened and do not test positive, either before or after donation or both, are considered "validated" or suitable donors.

V. Methods of Identifying a Candidate for Treatment with a Designed Composition

[0286] Applicant has discovered that certain microbiome profiles, *e.g.*, families, genera, and/or species, are associated with an exacerbation or non-improvement (*e.g.*, *no clinical remission*) of a disease or disorder, such as those disclosed herein (*e.g.*, ulcerative colitis). Accordingly, in certain aspects, the present disclosure provides a method of identifying a subject with a reduced likelihood of responding to a bacterial composition or formulation disclosed herein. Alternatively, provided herein is a method for identifying a subject who is likely to respond (*e.g.*, clinical remission) to a bacterial composition or formulation disclosed herein. In some embodiments, the method comprises: a) obtaining a microbiome sample from a subject (*e.g.*, ulcerative colitis patient who received a bacterial composition disclosed herein), and b) determining the prevalence of a family, genera, and/or species of bacteria in the microbiome sample.

[0287] In some embodiments, the subject is not likely to respond to a treatment disclosed herein if the microbiome sample comprises one or more of the following bacterial species: *Eubacterium contortum*, *Clostridium hathewayi*, *Erysipelatoclostridium ramosum*, *Bifidobacterium dentium*, *Dialister invisus*, *Prevotella copri*, *Veillonella atypica*, *Veillonella dispar*, *Veillonella parvula*, or *Veillonella ratti*. In some embodiments, the subject is not likely to respond if the microbiome sample comprises one or more bacteria comprising a 16S rDNA sequence that is at least about 85%, at least about 90%, at least about 95%, at least about 96%, at least about 97%, at least about 97.5%, at least about 98%, at least about 98.5%, at least about 99%, at least about 99.5%, or about 100% identical to a 16S rDNA sequence set forth in SEQ ID NO: 15, 31, 37, 38, 40, 42, 43, 46, 52-58, 63, 69-71, and 83-101 or any of the foregoing species.

[0288] In some embodiments, the subject is likely to respond to a treatment disclosed herein if the microbiome sample does not comprise one or more of the following bacterial species: *Eubacterium contortum*, *Clostridium hathewayi*, *Erysipelatoclostridium ramosum*, *Bifidobacterium dentium*, *Dialister invisus*, *Prevotella copri*, *Veillonella atypica*, *Veillonella dispar*, *Veillonella parvula*, or *Veillonella ratti*. In some embodiments, the subject is likely to respond to treatment if the microbiome sample does not comprise one or more bacteria comprising a 16S rDNA sequence that is at least about 85%, at least about 90%, at least about 95%, at least about 96%, at least about 97%, at least about 97.5%, at least about 98%, at least about 98.5%, at least 99%, at least about 99.5%, or about 100% identical to a 16S rDNA sequence set forth in SEQ ID NO: 15, 31, 37, 38, 40, 42, 43, 46, 52-58, 63, 69-71, and 83-101 or any of the foregoing species.

[0289] In some embodiments, the subject, e.g., an individual diagnosed with a disease or disorder, such as those disclosed herein, is a candidate for treatment with a composition disclosed herein if a GI microbiome sample from the subject comprises one or more of the following bacterial species: *Gemmiger formicilis*, *Roseburia hominis*, *Clostridium bolteae*, *Parasutterella excrementihominis*, *Holdemania filiformis*, *Holdemania massiliensis*, *Bacteroides ovatus*, *Akkemansia muciniphila*, *Clostridium leptum*, *Bilophila wadsworthia*, *Dielma fastidiosa*, *Clostridium symbiosum*, *Eubacterium siraeum*, *Agathobaculum desmolans*, *Agathobaculum butyriciproducens*, or *Bacteroides vulgatus*. In some embodiments, the subject is a candidate for treatment with a composition disclosed herein if a GI microbiome sample comprises *Anaerotruncus colihominis*, *Blautia producta*, *Clostridium bolteae*, *Clostridium disporicum*, *Clostridium ghonii*, *Clostridium glycolicum*, *Clostridium innocuum*, *Clostridium lactatifermentans*, *Clostridium viride*, *Eubacterium sp. WAL 14571*, *Lachnospiraceae bacterium 3 1 57FA*, *Lachnospiraceae bacterium oral taxon F15*, *Lactonifactor longoviformis*, or *Ruminococcus lactaris*. In some embodiments, the subject is a suitable donor if the microbiome sample from the subject comprises one or more bacteria disclosed in Table 4, Table 5, FIG. 13, FIG. 17, FIG. 30, FIG. 31, and/or FIG. 32. In some embodiments, the subject is a candidate for treatment with a composition disclosed herein if the microbiome sample comprises one or more bacteria comprising a 16S rDNA sequence that is at least about 85%, at least about 90%, at least about 95%, at least about 96%, at least about 97%, at least about 97.5%, at least about 98%, at least about 98.5%, at least about 99%, at least

about 99.5%, or about 100% identical to a 16S rDNA sequence set forth in SEQ ID NOs: 1-14, 16-30, 32-36, 39, 41, 44, 45, 47-51, 59-62, 64-68, 72-76, 102-398 or any of the foregoing species. A candidate for treatment is a subject likely to respond to treatment with a composition provided herein by improvement in one or more signs or symptoms of a disease or disorder, such as those associated with a dysbiosis.

Additional information

- [0290] Certain terms used in the present application are defined as follows. Additional definitions are set forth throughout the detailed description.
- [0291] It is to be noted that the term "a" or "an" entity refers to one or more of that entity; for example, "a nucleotide sequence," is understood to represent one or more nucleotide sequences. As such, the terms "a" (or "an"), "one or more," and "at least one" can be used interchangeably herein.
- [0292] Furthermore, "and/or" where used herein is to be taken as specific disclosure of each of the two specified features or components with or without the other. Thus, the term "and/or" as used in a phrase such as "A and/or B" herein is intended to include "A and B," "A or B," "A" (alone), and "B" (alone). Likewise, the term "and/or" as used in a phrase such as "A, B, and/or C" is intended to encompass each of the following aspects: A, B, and C; A, B, or C; A or C; A or B; B or C; A and C; A and B; B and C; A (alone); B (alone); and C (alone).
- [0293] It is understood that wherever aspects are described herein with the language "comprising," otherwise analogous aspects described in terms of "consisting of" and/or "consisting essentially of" are also provided.
- [0294] Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this disclosure is related.
- [0295] Units, prefixes, and symbols are denoted in their Système International de Unites (SI) accepted form. Numeric ranges are inclusive of the numbers defining the range. Unless otherwise indicated, nucleotide sequences are written left to right in 5' to 3' orientation. Amino acid sequences are written left to right in amino to carboxy orientation. The headings provided herein are not limitations of the various aspects of the disclosure, which can be had by reference to the specification as a whole. Accordingly,

the terms defined immediately below are more fully defined by reference to the specification in its entirety.

- [0296] The term "about" is used herein to mean approximately, roughly, around, or in the regions of. When the term "about" is used in conjunction with a numerical range, it modifies that range by extending the boundaries above and below the numerical values set forth. In general, the term "about" can modify a numerical value above and below the stated value by a variance of, *e.g.*, 10 percent, 5 percent, 3 percent, 2 percent, or 1 percent; up or down (higher or lower).
- [0297] The term "clade" refers to the OTUs or members of a phylogenetic tree that are downstream of a statistically valid node in a phylogenetic tree. The clade comprises a set of terminal leaves in the phylogenetic tree that is a distinct monophyletic evolutionary unit and that share some extent of sequence similarity.
- [0298] The term "microbiota" refers to the ecological community of microorganisms that occur (sustainably or transiently) in and on an animal subject, typically a mammal such as a human, including eukaryotes, archaea, bacteria, and viruses (including bacterial viruses *i.e.*, phage).
- [0299] The term "microbiome" refers to the microbes that live in and on the human body, both sustainably and transiently, including eukaryotes, archaea, bacteria, and viruses (including bacterial viruses (*i.e.*, phage)). As used herein, "genetic content" includes genomic DNA, RNA such as ribosomal RNA, the epigenome, plasmids, and all other types of genetic information.
- [0300] The term "ecological niche" or "niche" refers to the ecological space in which an organism or group of organisms occupies. Niche describes how an organism or population or organisms responds to the distribution of resources, physical parameters (*e.g.*, host tissue space) and competitors (*e.g.*, by growing when resources are abundant, and when predators, parasites and pathogens are scarce) and how it in turn alters those same factors (*e.g.*, limiting access to resources by other organisms, acting as a food source for predators and a consumer of prey).
- [0301] The term "dysbiosis" refers to a state of the microbiota of the GI tract or other body area in a subject, including mucosal or skin surfaces in which the normal diversity and/or function of the ecological network is disrupted. This unhealthy state can be due to a decrease in diversity, the overgrowth of one or more pathogens or pathobionts,

symbiotic organisms able to cause disease only when certain genetic and/or environmental conditions are present in a subject, or the shift to an ecological microbial network that no longer provides an essential function to the host subject, and therefore no longer promotes health.

[0302] As used herein, the term "operational taxonomic units" or "OTU" (or plural, "OTUs") refers to a terminal leaf in a phylogenetic tree and is defined by a nucleic acid sequence, *e.g.*, the entire genome, or a specific genetic sequence, and all sequences that share sequence identity to this nucleic acid sequence at the level of species. In some embodiments the specific genetic sequence can be the 16S rDNA sequence or a portion of the 16S rDNA sequence. In other embodiments, the entire genomes of two entities are sequenced and compared. In another embodiment, select regions such as multilocus sequence tags (MLST), specific genes, or sets of genes can be genetically compared. In 16S embodiments, OTUs that share $\geq 97\%$ average nucleotide identity across the entire 16S or a variable region of the 16S rDNA, *e.g.*, a V4 region, are considered the same OTU (*see, e.g.*, Claesson M J, Wang Q, O'Sullivan O, Greene-Diniz R, Cole J R, Ros R P, and O'Toole P W. 2010. Comparison of two next-generation sequencing technologies for resolving highly complex microbiome composition using tandem variable 16S rRNA gene regions. *Nucleic Acids Res* 38: e200. Konstantinidis K T, Ramette A, and Tiedje J M. 2006. The bacterial species definition in the genomic era. *Philos Trans R Soc Lond B Biol Sci* 361: 1929-1940). In embodiments involving the complete genome, MLSTs, specific genes, or sets of genes OTUs that share $\geq 95\%$ average nucleotide identity are considered the same OTU (*see, e.g.*, Achtman M, and Wagner M. 2008. Microbial diversity and the genetic nature of microbial species. *Nat. Rev. Microbiol.* 6: 431-440. Konstantinidis K T, Ramette A, and Tiedje J M. 2006. The bacterial species definition in the genomic era. *Philos Trans R Soc Lond B Biol Sci* 361: 1929-1940.). OTUs are frequently defined by comparing sequences between organisms. Generally, sequences with less than 95% sequence identity are not considered to form part of the same OTU. In some cases, an OTU is characterized by a combination of nucleotide markers, genes, and/or single nucleotide variants (SNVs). In some cases, the referenced genes are highly conserved genes (*e.g.*, "house-keeping" genes). The features defining an OTU can be a combination of the foregoing. Such characterization employs, *e.g.*, WGS data or a whole genome sequence.

- [0303] As used herein, the term "phylogenetic tree" refers to a graphical representation of the evolutionary relationships of one genetic sequence to another that is generated using a defined set of phylogenetic reconstruction algorithms (*e.g.*, parsimony, maximum likelihood, or Bayesian). Nodes in the tree represent distinct ancestral sequences and the confidence of any node is provided by a bootstrap or Bayesian posterior probability, which measures branch uncertainty.
- [0304] The specification is most thoroughly understood in light of the teachings of the references cited within the specification. The embodiments within the specification provide an illustration of embodiments and should not be construed to limit the scope. The skilled artisan readily recognizes that many other embodiments are encompassed. All publications and patents cited in this disclosure are incorporated by reference in their entirety. To the extent the material incorporated by reference contradicts or is inconsistent with this specification, the specification will supersede any such material. The citation of any references herein is not an admission that such references are prior art.
- [0305] As used herein, the term "subject" refers to any animal subject including humans, laboratory animals (*e.g.*, primates, rats, mice), livestock (*e.g.*, cows, sheep, goats, pigs, turkeys, and chickens), and household pets (*e.g.*, dogs, cats, and rodents). The subject can be suffering from a dysbiosis, including, but not limited to, an infection due to a gastrointestinal pathogen or can be at risk of developing or transmitting to others an infection due to a gastrointestinal pathogen. In some embodiments, the subject is suffering from an ulcerative colitis.
- [0306] Ulcerative colitis (UC) is a disease of the large intestine (colon) characterized by chronic diarrhea with cramping abdominal pain, rectal bleeding, and loose discharges of blood, pus and mucus. The manifestations of ulcerative colitis vary widely. A pattern of exacerbations and improvements typifies the clinical course of most UC patients (70%), although continuous symptoms without improvement are present in some patients with UC. Local and systemic complications of UC include arthritis, eye inflammation such as uveitis, skin ulcers and liver disease. In addition, ulcerative colitis and especially long-standing, extensive disease is associated with an increased risk of colon carcinoma. Bacterial compositions provided herein can be used to ameliorate one or more characteristics of ulcerative colitis or other IBD.

[0307] Several pathologic features characterize UC in distinction to other inflammatory bowel diseases. Ulcerative colitis is a diffuse disease that usually extends from the most distal part of the rectum for a variable distance proximally. The term left-sided colitis describes an inflammation that involves the distal portion of the colon, extending as far as the splenic flexure. Sparing of the rectum or involvement of the right side (proximal portion) of the colon alone is unusual in ulcerative colitis. The inflammatory process of ulcerative colitis is limited to the colon and does not involve, for example, the small intestine, stomach or esophagus. In addition, ulcerative colitis is distinguished by a superficial inflammation of the mucosa that generally spares the deeper layers of the bowel wall. Crypt abscesses, in which degenerated intestinal crypts are filled with neutrophils, also are typical of ulcerative colitis (Rubin and Farber, *supra*, 1994).

[0308] Ulcerative colitis can be further categorized as "mild," "moderate," "severe," or "fulminant" (very severe). In some embodiments, the ulcerative colitis to be treated is mild to moderate, *e.g.*, a Mayo score of ≥ 4 and ≤ 10 . In some embodiments a patient to be treated with a microbiome composition has been diagnosed with moderately to severely active UC. In some embodiments, the patient diagnosed with UC has had an inadequate response to, loss of response, or is intolerant to conventional or biologic therapy. In some embodiments, a subject treated with a microbiome composition exhibits one or more of the following improvements: clinical response based on a Mayo score, *e.g.*, modified Mayo score (MMS), endoscopic remission based on the MMS Endoscopic Subscore (ES), symptomatic remission based on MMS Stool Frequency (SF) and Rectal Bleeding (RB) subscores, symptomatic response based on MMS SF and RB subscores, mucosal healing based on a histologic disease activity index (Geboes score or Robards Histology Index), endoscopic response based on the MMS ES, UC symptoms based on NRS scores, Health Related Quality of Life based on IBDQ score, and change from baseline to Week 7, 8, or 12 in fecal calprotectin levels.

[0309] In addition to ulcerative colitis, the bacterial compositions disclosed herein can also be useful for the treatment of other diseases or disorders, including those associated with a dysbiosis of the gastrointestinal tract. Without being bound by any one theory, bacterial compositions disclosed herein can treat such diseases or disorders by engrafting and repopulating the gastrointestinal tract of a subject, and thereby shift the subject's microbiome from one of dysbiosis to one that more resembles a healthy state. In some

embodiments, bacterial compositions disclosed herein can prevent the growth of a pathogen associated with a disease or disorder disclosed herein (*e.g.*, by outcompeting for growth nutrients). In some embodiments, a bacterial composition disclosed herein can be designed to produce various factors that can, *e.g.*, reduce and/or inhibit a pro-inflammatory immune response (*e.g.*, by producing factors, such as tryptophan metabolites, fatty acids, secondary bile acid, or by inhibiting HDAC activation).

[0310] Non-limiting examples of such diseases or disorders include immune-mediated gastrointestinal disorders, including, but not limited to, Crohn's disease, lymphocytic colitis; microscopic colitis; collagenous colitis; autoimmune enteropathy, including autoimmune enteritis and autoimmune enterocolitis; allergic gastrointestinal disease; and eosinophilic gastrointestinal disease, including eosinophilic gastroenteritis and eosinophilic enteropathy. Non-limiting examples of other immune-mediated disorders that may be treated with a composition described herein include: arthritis (acute and chronic, rheumatoid arthritis including juvenile-onset rheumatoid arthritis and stages such as rheumatoid synovitis, gout or gouty arthritis, acute immunological arthritis, chronic inflammatory arthritis, degenerative arthritis, type II collagen-induced arthritis, infectious arthritis, Lyme arthritis, proliferative arthritis, psoriatic arthritis, Still's disease, vertebral arthritis, osteoarthritis, arthritis chronica progrediente, arthritis deformans, polyarthritis chronica primaria, reactive arthritis, menopausal arthritis, estrogen-depletion arthritis, and ankylosing spondylitis/rheumatoid spondylitis), autoimmune lymphoproliferative disease, inflammatory hyperproliferative skin diseases, psoriasis such as plaque psoriasis, guttate psoriasis, pustular psoriasis, and psoriasis of the nails, atopy including atopic diseases such as hay fever and Job's syndrome, dermatitis including contact dermatitis, chronic contact dermatitis, exfoliative dermatitis, allergic dermatitis, allergic contact dermatitis, hives, dermatitis herpetiformis, nummular dermatitis, seborrheic dermatitis, non-specific dermatitis, primary irritant contact dermatitis, and atopic dermatitis, x-linked hyper IgM syndrome, allergic intraocular inflammatory diseases, urticaria such as chronic allergic urticaria and chronic idiopathic urticaria, including chronic autoimmune urticaria, myositis, polymyositis/dermatomyositis, juvenile dermatomyositis, toxic epidermal necrolysis, scleroderma (including systemic scleroderma), sclerosis such as systemic sclerosis, multiple sclerosis (MS) such as spino-optical MS, primary progressive MS (PPMS), and relapsing remitting MS (RRMS), progressive systemic sclerosis,

atherosclerosis, arteriosclerosis, sclerosis disseminata, ataxic sclerosis, neuromyelitis optica (NMO), inflammatory bowel disease (IBD) (for example, Crohn's disease, autoimmune-mediated gastrointestinal diseases, gastrointestinal inflammation, colitis such as ulcerative colitis, colitis ulcerosa, microscopic colitis, collagenous colitis, colitis polyposa, necrotizing enterocolitis, and transmural colitis, and autoimmune inflammatory bowel disease), bowel inflammation, pyoderma gangrenosum, erythema nodosum, primary sclerosing cholangitis, respiratory distress syndrome, including adult or acute respiratory distress syndrome (ARDS), meningitis, inflammation of all or part of the uvea, iritis, choroiditis, an autoimmune hematological disorder, graft-versus-host disease, angioedema such as hereditary angioedema, cranial nerve damage as in meningitis, herpes gestationis, pemphigoid gestationis, pruritis scroti, autoimmune premature ovarian failure, sudden hearing loss due to an autoimmune condition, IgE-mediated diseases such as anaphylaxis and allergic and atopic rhinitis, encephalitis such as Rasmussen's encephalitis and limbic and/or brainstem encephalitis, uveitis, such as anterior uveitis, acute anterior uveitis, granulomatous uveitis, nongranulomatous uveitis, phacoantigenic uveitis, posterior uveitis, or autoimmune uveitis, glomerulonephritis (GN) with and without nephrotic syndrome such as chronic or acute glomerulonephritis such as primary GN, immune-mediated GN, membranous GN (membranous nephropathy), idiopathic membranous GN or idiopathic membranous nephropathy, membrano- or membranous proliferative GN (MPGN), including Type I and Type II, and rapidly progressive GN (RPGN), proliferative nephritis, autoimmune polyglandular endocrine failure, balanitis including balanitis circumscripta plasmacellularis, balanoposthitis, erythema annulare centrifugum, erythema dyschromicum perstans, erythema multiform, granuloma annulare, lichen nitidus, lichen sclerosus et atrophicus, lichen simplex chronicus, lichen spinulosus, lichen planus, lamellar ichthyosis, epidermolytic hyperkeratosis, premalignant keratosis, pyoderma gangrenosum, allergic conditions and responses, food allergies, drug allergies, insect allergies, rare allergic disorders such as mastocytosis, allergic reaction, eczema including allergic or atopic eczema, asteatotic eczema, dyshidrotic eczema, and vesicular palmoplanar eczema, asthma such as asthma bronchiale, bronchial asthma, and autoimmune asthma, conditions involving infiltration of T cells and chronic inflammatory responses, immune reactions against foreign antigens such as fetal A-B-0 blood groups during pregnancy, chronic pulmonary inflammatory disease, autoimmune myocarditis,

leukocyte adhesion deficiency, lupus, including lupus nephritis, lupus cerebritis, pediatric lupus, non-renal lupus, extra-renal lupus, discoid lupus and discoid lupus erythematosus, alopecia lupus, SLE, such as cutaneous SLE or subacute cutaneous SLE, neonatal lupus syndrome (NLE), and lupus erythematosus disseminatus, juvenile onset (Type I) diabetes mellitus, including pediatric IDDM, adult onset diabetes mellitus (Type II diabetes), autoimmune diabetes, idiopathic diabetes insipidus, diabetic retinopathy, diabetic nephropathy, diabetic colitis, diabetic large-artery disorder, immune responses associated with acute and delayed hypersensitivity mediated by cytokines and T-lymphocytes, tuberculosis, sarcoidosis, granulomatosis including lymphomatoid granulomatosis, agranulocytosis, vasculitides (including large-vessel vasculitis such as polymyalgia rheumatica and giant-cell (Takayasu's) arteritis, medium-vessel vasculitis such as Kawasaki's disease and polyarteritis nodosa/periarteritis nodosa, immunovascularitis, CNS vasculitis, cutaneous vasculitis, hypersensitivity vasculitis, necrotizing vasculitis such as fibrinoid necrotizing vasculitis and systemic necrotizing vasculitis, ANCA- negative vasculitis, and ANCA-associated vasculitis such as Churg-Strauss syndrome (CSS), Wegener's granulomatosis, and microscopic polyangiitis), temporal arteritis, aplastic anemia, autoimmune aplastic anemia, Coombs positive anemia, Diamond Blackfan anemia, hemolytic anemia or immune hemolytic anemia including autoimmune hemolytic anemia (AIHA), pernicious anemia (anemia perniciosa), Addison's disease, pure red cell anemia or aplasia (PRCA), Factor VIII deficiency, hemophilia A, autoimmune neutropenia(s), cytopenias such as pancytopenia, leukopenia, diseases involving leukocyte diapedesis, CNS inflammatory disorders, Alzheimer's disease, Parkinson's disease, multiple organ injury syndrome such as those secondary to septicemia, trauma or hemorrhage, antigen-antibody complex- mediated diseases, anti- glomerular basement membrane disease, anti-phospholipid antibody syndrome, motoneuritis, allergic neuritis, Behcet's disease/syndrome, Castleman's syndrome, Goodpasture's syndrome, Reynaud's syndrome, Sjogren's syndrome, Stevens-Johnson syndrome, pemphigoid or pemphigus such as pemphigoid bullous, cicatricial (mucous membrane) pemphigoid, skin pemphigoid, pemphigus vulgaris, paraneoplastic pemphigus, pemphigus foliaceus, pemphigus mucus-membrane pemphigoid, and pemphigus erythematosus, epidermolysis bullosa acquisita, ocular inflammation, including allergic ocular inflammation such as allergic conjunctivitis, linear IgA bullous disease, autoimmune- induced conjunctival

inflammation, autoimmune polyendocrinopathies, Reiter's disease or syndrome, thermal injury due to an autoimmune condition, preeclampsia, an immune complex disorder such as immune complex nephritis, antibody-mediated nephritis, neuroinflammatory disorders, polyneuropathies, chronic neuropathy such as IgM polyneuropathies or IgM-mediated neuropathy, thrombocytopenia (as developed by myocardial infarction patients, for example), including thrombotic thrombocytopenic purpura (TTP), post-transfusion purpura (PTP), heparin-induced thrombocytopenia, and autoimmune or immune-mediated thrombocytopenia including, for example, idiopathic thrombocytopenic purpura (ITP) including chronic or acute ITP, scleritis such as idiopathic cerato-scleritis, episcleritis, autoimmune disease of the testis and ovary including autoimmune orchitis and oophoritis, primary hypothyroidism, hypoparathyroidism, autoimmune endocrine diseases including thyroiditis such as autoimmune thyroiditis, Hashimoto's disease, chronic thyroiditis (Hashimoto's thyroiditis), or subacute thyroiditis, autoimmune thyroid disease, idiopathic hypothyroidism, Grave's disease, Grave's eye disease (ophthalmopathy or thyroid-associated ophthalmopathy), polyglandular syndromes such as autoimmune polyglandular syndromes, for example, type I (or polyglandular endocrinopathy syndromes), paraneoplastic syndromes, including neurologic paraneoplastic syndromes such as Lambert-Eaton myasthenic syndrome or Eaton- Lambert syndrome, stiff-man or stiff-person syndrome, encephalomyelitis such as allergic encephalomyelitis or encephalomyelitis allergica and experimental allergic encephalomyelitis (EAE), myasthenia gravis such as thymoma- associated myasthenia gravis, cerebellar degeneration, neuromyotonia, opsoclonus or opsoclonus myoclonus syndrome (OMS), and sensory neuropathy, multifocal motor neuropathy, Sheehan's syndrome, autoimmune hepatitis, chronic hepatitis, lupoid hepatitis, giant-cell hepatitis, chronic active hepatitis or autoimmune chronic active hepatitis, pneumonitis such as lymphoid interstitial pneumonitis (LIP), bronchiolitis obliterans (non- transplant) vs. NSIP, Guillain-Barre syndrome, Berger's disease (IgA nephropathy), idiopathic IgA nephropathy, linear IgA dermatosis, acute febrile neutrophilic dermatosis, subcorneal pustular dermatosis, transient acantholytic dermatosis, cirrhosis such as primary biliary cirrhosis and pneumonocirrhosis, autoimmune enteropathy syndrome, Celiac or Coeliac disease, celiac sprue (gluten enteropathy), refractory sprue, idiopathic sprue, cryoglobulinemia such as mixed cryoglobulinemia, amyotrophic lateral sclerosis (ALS; Lou Gehrig's disease),

coronary artery disease, autoimmune ear disease such as autoimmune inner ear disease (AIED), autoimmune hearing loss, polychondritis such as refractory or relapsed or relapsing polychondritis, pulmonary alveolar proteinosis, keratitis such as Cogan's syndrome/nonsyphilitic interstitial keratitis, Bell's palsy, Sweet's disease/syndrome, rosacea autoimmune, zoster-associated pain, amyloidosis, a non-cancerous lymphocytosis, a primary lymphocytosis, which includes monoclonal B cell lymphocytosis (*e.g.*, benign monoclonal gammopathy and monoclonal gammopathy of undetermined significance, MGUS), peripheral neuropathy, paraneoplastic syndrome, channelopathies such as epilepsy, migraine, arrhythmia, muscular disorders, deafness, blindness, periodic paralysis, and channelopathies of the CNS, autism, inflammatory myopathy, focal or segmental or focal segmental glomerulosclerosis (FSGS), endocrine ophthalmopathy, uveoretinitis, chorioretinitis, autoimmune hepatological disorder, fibromyalgia, multiple endocrine failure, Schmidt's syndrome, adrenalitis, gastric atrophy, presenile dementia, demyelinating diseases such as autoimmune demyelinating diseases and chronic inflammatory demyelinating polyneuropathy, Dressler's syndrome, alopecia areata, alopecia totalis, CREST syndrome (calcinosis, Raynaud's phenomenon, esophageal dysmotility, sclerodactyly, and telangiectasia), male and female autoimmune infertility, *e.g.*, due to anti-spermatozoan antibodies, mixed connective tissue disease, Chagas' disease, rheumatic fever, recurrent abortion, farmer's lung, erythema multiforme, post-cardiotomy syndrome, Cushing's syndrome, bird-fancier's lung, allergic granulomatous angiitis, benign lymphocytic angiitis, Alport's syndrome, alveolitis such as allergic alveolitis and fibrosing alveolitis, interstitial lung disease, transfusion reaction, leprosy, malaria, parasitic diseases such as leishmaniasis, kypansomiasis, schistosomiasis, ascariasis, aspergillosis, Sampter's syndrome, Caplan's syndrome, dengue, endocarditis, endomyocardial fibrosis, diffuse interstitial pulmonary fibrosis, interstitial lung fibrosis, fibrosing mediastinitis, pulmonary fibrosis, idiopathic pulmonary fibrosis, cystic fibrosis, endophthalmitis, erythema elevatum et diutinum, erythroblastosis fetalis, eosinophilic facitis, Shulman's syndrome, Felty's syndrome, flariasis, cyclitis such as chronic cyclitis, heterochronic cyclitis, iridocyclitis (acute or chronic), or Fuch's cyclitis, Henoch-Schonlein purpura, human immunodeficiency virus (HIV) infection, SCID, acquired immune deficiency syndrome (AIDS), echovirus infection, sepsis (systemic inflammatory response syndrome (SIRS)), endotoxemia, pancreatitis,

thyroxicosis, parvovirus infection, rubella virus infection, post-vaccination syndromes, congenital rubella infection, Epstein-Barr virus infection, mumps, Evan's syndrome, autoimmune gonadal failure, Sydenham's chorea, post-streptococcal nephritis, thromboangitis obliterans, thyrotoxicosis, tabes dorsalis, chorioiditis, giant-cell polymyalgia, chronic hypersensitivity pneumonitis, conjunctivitis, such as vernal catarrh, keratoconjunctivitis sicca, and epidemic keratoconjunctivitis, idiopathic nephritic syndrome, minimal change nephropathy, benign familial and ischemia-reperfusion injury, transplant organ reperfusion, retinal autoimmunity, joint inflammation, bronchitis, chronic obstructive airway/pulmonary disease, silicosis, aphthae, aphthous stomatitis, arteriosclerotic disorders (cerebral vascular insufficiency) such as arteriosclerotic encephalopathy and arteriosclerotic retinopathy, aspermiogenesis, autoimmune hemolysis, Boeck's disease, cryoglobulinemia, Dupuytren's contracture, endophthalmitis, phacoanaphylactica, enteritis allergica, erythema nodosum leprosum, idiopathic facial paralysis, chronic fatigue syndrome, febris rheumatica, Hamman-Rich's disease, sensorineural hearing loss, haemoglobinuria paroxysmatica, hypogonadism, ileitis regionalis, leucopenia, mononucleosis infectiosa, transverse myelitis, primary idiopathic myxedema, nephrosis, ophthalmia sympathica (sympathetic ophthalmitis), neonatal ophthalmitis, optic neuritis, orchitis granulomatosa, pancreatitis, polyradiculitis acuta, pyoderma gangrenosum, Quervain's thyroiditis, acquired splenic atrophy, non-malignant thymoma, lymphofollicular thymitis, vitiligo, toxic-shock syndrome, food poisoning, conditions involving infiltration of T cells, leukocyte-adhesion deficiency, immune responses associated with acute and delayed hypersensitivity mediated by cytokines and T-lymphocytes, diseases involving leukocyte diapedesis, multiple organ injury syndrome, antigen-antibody complex-mediated diseases, antiglomerular basement membrane disease, autoimmune polyendocrinopathies, oophoritis, primary myxedema, autoimmune atrophic gastritis, rheumatic diseases, mixed connective tissue disease, nephrotic syndrome, insulinitis, polyendocrine failure, autoimmune polyglandular syndromes, including polyglandular syndrome type I, adult-onset idiopathic hypoparathyroidism (AOIH), cardiomyopathy such as dilated cardiomyopathy, epidermolysis bullosa acquisita (EBA), hemochromatosis, myocarditis, nephrotic syndrome, primary sclerosing cholangitis, purulent or nonpurulent sinusitis, acute or chronic sinusitis, ethmoid, frontal, maxillary, or sphenoid sinusitis, allergic sinusitis, an eosinophil-related disorder such as

eosinophilia, pulmonary infiltration eosinophilia, eosinophilia-myalgia syndrome, Löffler's syndrome, chronic eosinophilic pneumonia, tropical pulmonary eosinophilia, bronchopneumonic aspergillosis, aspergilloma, or granulomas containing eosinophils, anaphylaxis, spondyloarthropathies, seronegative spondyloarthritides, polyendocrine autoimmune disease, sclerosing cholangitis, sclera, episclera, chronic mucocutaneous candidiasis, Bruton's syndrome, transient hypogammaglobulinemia of infancy, Wiskott-Aldrich syndrome, ataxia telangiectasia syndrome, angiectasis, autoimmune disorders associated with collagen disease, rheumatism such as chronic arthrorheumatism, lymphadenitis, reduction in blood pressure response, vascular dysfunction, tissue injury, cardiovascular ischemia, hyperalgesia, renal ischemia, cerebral ischemia, and disease accompanying vascularization, allergic hypersensitivity disorders, glomerulonephritides, reperfusion injury, ischemic re-perfusion disorder, reperfusion injury of myocardial or other tissues, lymphomatous tracheobronchitis, inflammatory dermatoses, dermatoses with acute inflammatory components, multiple organ failure, bullous diseases, renal cortical necrosis, acute purulent meningitis or other central nervous system inflammatory disorders, ocular and orbital inflammatory disorders, granulocyte transfusion-associated syndromes, cytokine-induced toxicity, narcolepsy, acute serious inflammation, chronic intractable inflammation, pyelitis, endarterial hyperplasia, peptic ulcer, valvulitis, and endometriosis

[0311] The "colonization" of a host organism includes the non-transitory residence of a bacterium or other microscopic organism. In the case of treatment, the host is generally referred to herein as a "subject", typically a human or other mammal. As used herein, "reducing colonization" of a host subject's gastrointestinal tract (or any other microbiotal niche) by a pathogenic bacterium includes a reduction in the residence time of the pathogen in the gastrointestinal tract as well as a reduction in the number (or concentration) of the pathogen in the gastrointestinal tract or adhered to the luminal surface of the gastrointestinal tract. Measuring reductions of adherent pathogens can be demonstrated, *e.g.*, by a biopsy sample, or reductions can be measured indirectly, *e.g.*, by measuring the pathogenic burden in the stool of a mammalian host.

[0312] A "combination" of two or more bacteria includes the physical co-existence of the two bacteria, either in the same material or product or in physically connected products, as well as the temporal co-administration or co-localization of the two bacteria.

- [0313] A "cytotoxic" activity or bacterium includes the ability to kill a bacterial cell, such as a pathogenic bacterial cell. A "cytostatic" activity or bacterium includes the ability to inhibit, partially or fully, growth, metabolism, and/or proliferation of a bacterial cell, such as a pathogenic bacterial cell.
- [0314] To be free of "non-comestible products" means that a bacterial composition or other material provided herein does not have a substantial amount of a non-comestible product, *e.g.*, a product or material that is inedible, harmful or otherwise undesired in a product suitable for administration, *e.g.*, oral administration, to a human subject. Non-comestible products are often found in preparations of bacteria from the prior art.
- [0315] A "biologically pure culture" is a culture a culture of bacteria in a medium in which only selected viable species are present and no other viable species of microorganisms are detected.
- [0316] For nucleic acids, the term "substantial homology" indicates that two nucleic acids, or designated sequences thereof, when optimally aligned and compared, are identical, with appropriate nucleotide insertions or deletions, in at least about 80% of the nucleotides, at least about 90% to 95%, or at least about 98% to 99.5% of the nucleotides. Alternatively, substantial homology exists when the segments will hybridize under selective hybridization conditions, to the complement of the strand.
- [0317] For polypeptides, the term "substantial homology" indicates that two polypeptides, or designated sequences thereof, when optimally aligned and compared, are identical, with appropriate amino acid insertions or deletions, in at least about 80% of the amino acids, at least about 90% to 95%, or at least about 98% to 99.5% of the amino acids.
- [0318] The percent identity between two sequences is a function of the number of identical positions shared by the sequences (*i.e.*, % homology = # of identical positions/total # of positions x 100), taking into account the number of gaps, and the length of each gap, which need to be introduced for optimal alignment of the two sequences. The comparison of sequences and determination of percent identity between two sequences can be accomplished using a mathematical algorithm, as described in the non-limiting examples below.
- [0319] The percent identity between two nucleotide sequences can be determined using the GAP program in the GCG software package (available at worldwideweb.gcg.com), using a NWSgapdna.CMP matrix and a gap weight of 40, 50, 60, 70, or 80 and a length

weight of 1, 2, 3, 4, 5, or 6. The percent identity between two nucleotide or amino acid sequences can also be determined using the algorithm of E. Meyers and W. Miller (*CABIOS*, 4: 11-17 (1989)) which has been incorporated into the ALIGN program (version 2.0), using a PAM120 weight residue table, a gap length penalty of 12 and a gap penalty of 4. In addition, the percent identity between two amino acid sequences can be determined using the Needleman and Wunsch (*J. Mol. Biol.* (48):444-453 (1970)) algorithm which has been incorporated into the GAP program in the GCG software package (available at worldwideweb.gcg.com), using either a Blossum 62 matrix or a PAM250 matrix, and a gap weight of 16, 14, 12, 10, 8, 6, or 4 and a length weight of 1, 2, 3, 4, 5, or 6.

[0320] The nucleic acid and protein sequences described herein can further be used as a "query sequence" to perform a search against public databases to, for example, identify related sequences. Such searches can be performed using the NBLAST and XBLAST programs (version 2.0) of Altschul, *et al.* (1990) *J. Mol. Biol.* 215:403-10. BLAST nucleotide searches can be performed with the NBLAST program, score = 100, wordlength = 12 to obtain nucleotide sequences homologous to the nucleic acid molecules described herein. BLAST protein searches can be performed with the XBLAST program, score = 50, wordlength = 3 to obtain amino acid sequences homologous to the protein molecules described herein. To obtain gapped alignments for comparison purposes, Gapped BLAST can be utilized as described in Altschul *et al.*, (1997) *Nucleic Acids Res.* 25(17):3389-3402. When utilizing BLAST and Gapped BLAST programs, the default parameters of the respective programs (*e.g.*, XBLAST and NBLAST) can be used. *See* worldwideweb.ncbi.nlm.nih.gov. Other methods of determining identity that are known in the art can be used.

[0321] The term "patient" includes human and other mammalian subjects that receive either prophylactic or therapeutic treatment.

[0322] As used herein, the term "subject" includes any human or non-human animal. For example, the methods and compositions described herein can be used to treat a subject having cancer. The term "non-human animal" includes all vertebrates, *e.g.*, mammals and non-mammals, such as non-human primates, sheep, dog, cow, chickens, amphibians, reptiles, etc.

- [0323] As used herein, the terms "ug" and "uM" are used interchangeably with "µg" and "µM," respectively.
- [0324] Various aspects described herein are described in further detail throughout the specification.
- [0325] Unless otherwise indicated, all numbers expressing quantities of ingredients, reaction conditions, and so forth used in the specification, including claims, are to be understood as being modified in all instances by the term "about." Accordingly, unless otherwise indicated to the contrary, the numerical parameters are approximations and can vary depending upon the desired properties sought to be obtained. At the very least, and not as an attempt to limit the application of the doctrine of equivalents to the scope of the claims, each numerical parameter should be construed in light of the number of significant digits and ordinary rounding approaches.
- [0326] The following examples are offered by way of illustration and not by way of limitation. The contents of all references cited throughout this application are expressly incorporated herein by reference.

EXAMPLES

Example 1: Effect of Administration of a Spore Preparation (an HHSP) on Clinical Efficacy in Ulcerative Colitis Patients

- [0327] A Phase 1b multicenter, randomized, double-blind, placebo-controlled multiple dose study (ClinicalTrials.gov Identifier: NCT02618187) was conducted to evaluate the safety and tolerability of a composition comprising purified spore population derived from the feces of healthy human donors (HHSP) for the treatment of mild to moderate ulcerative colitis in patients who had failed standard-of-care. Specific inclusion/exclusion criteria are available at worldwideweb.clinicaltrials.gov/ct2/show/NCT02618187?term=SERES-101&rank=1.
- [0328] Briefly, 58 mild to moderate UC subjects (Mayo score 4-10) were randomly assigned to one of four 8-week induction treatment arms preceded by a 6-day pretreatment phase as follows: Arm A) placebo/placebo (n=11); Arm B) placebo/weekly HHSP (n=15); Arm C) vancomycin (vanco)/ HHSP weekly (qwk) (n=17); or Arm D) vanco/ HHSP daily (qD) (n=15). Clinical efficacy (*i.e.*, improvement of ulcerative colitis) was determined based on one or more of the following criteria: (i) clinical remission

(Total Modified Mayo (TMM) score of ≤ 2 plus endoscopic subscore of ≤ 1); and (ii) endoscopic improvement (decrease in endoscopic score of ≥ 1).

[0329] The patient characteristics at baseline is provided in Table 1, below.

Table 1. Baseline Characteristics

	Arm A (Placebo/Placebo) (n = 11)	Arm B (Placebo/HHSP Weekly) (n = 15)	Arm C (Vanco/HHSP Weekly) (n = 17)	Arm D (Vanco/HHSP Daily) (n = 15)
Average Mayo Score (Baseline)	7.3	6.8	6.4	6.99
Mild (n)	3 (27%)	6 (40%)	10 (59%)	6 (40%)
Moderate (n)	8 (73%)	9 (60%)	7 (41%)	9 (60%)
Endoscopy Score at Baseline				
Score = 1	1 (9%)	3 (20%)	5 (29%)	3 (20%)
Score = 2	5 (45%)	7 (47%)	7 (41%)	9 (60%)
Score = 3	5 (45%)	5 (33%)	5 (29%)	3 (20%)

Clinical Remission and Endoscopic Healing

[0330] All treatment arms compared to Placebo (Arm A) resulted in increased clinical remission in patients, demonstrating that an HHSP can be used to treat ulcerative colitis. The greatest impact on remission was observed in Arm D (FIG 1, left graph, vanco/HHSP daily) with approximately 40% of the patients going into remission. In Arm B (*i.e.*, placebo/HHSP weekly) and Arm C (*i.e.*, vanco/HHSP weekly), approximately 13.3% and 17.7% of the patients went into remission, respectively. Similarly, all treatment arms resulted in endoscopic improvement above the rate observed in Placebo; a higher percentage of patients that received the daily administration of HHSP (Arm D, 40%) exhibited endoscopic improvement compared to patients that received placebo alone (Arm A, 9.1%) or weekly administration of an HHSP (Arms B and C, 33.3% and 23.5%, respectively). (FIG. 1, right graph).

[0331] These data demonstrate that a spore composition derived from the feces of a healthy human can be used to ameliorate ulcerative colitis and that the parameters of clinical remission and endoscopic improvement can be used to evaluate the efficacy of a microbiome composition for treating ulcerative colitis. These data also demonstrate that a

'complete' microbiome as provided by FMT, is not necessary to effectively ameliorate UC.

Long-Term Clinical Remission

[0332] To determine the long-term clinical efficacy of HHSP administration on ulcerative colitis, patients who were in remission at the end of the 8-week induction treatment period, treated patients in remission were followed for an additional 26 weeks and the number of remitters with a flare-up of disease was determined. The continuity of remission after inducing remission in a subject is termed "maintenance."

[0333] As shown in Table 2 below, none of the remitters had a UC flare-up during the 26-week period. This was true regardless of whether the patients had received HHSP weekly (Arms B and C) or daily (Arm D).

[0334] These data demonstrate that a microbiome composition, *e.g.*, an HHSP, can evoke a durable effect on remission.

Table 2. Number of Remitting Subjects with UC Flare-Up

	Arm A (Placebo/Placebo) (n = 0)	Arm B (Placebo/HHSP Weekly) (n = 2)	Arm C (Vanco/HHSP Weekly) (n = 3)	Arm D (Vanco/HHSP Daily) (n = 6)
Number of Remitters with Flare-Up	N/A	0	0	0

Adverse Events

[0335] As part of the clinical trial protocol, adverse events were recorded and assessed at the end of the 8 week induction period. In general, patients treated with an HHSP had fewer gastrointestinal-related adverse events compared to the placebo control. The most significant difference was observed in patients that received HHSP daily (Arm D), which is consistent with a dosage-dependent effect of an HHSP.

[0336] The low level of adverse events associated with treatment with a microbiome composition demonstrated that a microbiome composition comprising a purified spore population derived from the feces of healthy human donors can safely be used to treat ulcerative colitis, including mild to moderate UC. The greatest difference in the adverse

events between placebo and treated subjects was in the category of GI disorders (45.5% in placebo arm vs. 13.3% in daily treatment arm). This difference was most prominent in patients who received daily administration of the purified spore population (45.5% in placebo vs. 13.3% in Arm D).

Example 2: Engraftment and/or Augmentation in Ulcerative Colitis Patients Treated with a Spore Preparation (HHSP)

- [0337] As described in Example 1, treatment of an HHSP was able to provide a durable treatment effect in UC patients. One potential advantage of a microbiome composition for treating disease is that the microbiome composition may provide a durable effect because at least some beneficial species of the microbiome composition can engraft in the treated subject, thereby providing an ongoing source of beneficial functions and may facilitate the proliferation of advantageous bacteria not in the composition (augmentation). Not only is the lack of a durable effect an issue with pharmaceuticals that must be dosed regularly to achieve therapeutic levels, it has been noted that many probiotics must be taken with high frequency to maintain a therapeutic effect (Walter J., *et al.*, *Curr Opin Biotechnol* 49: 129-139, 2018). The ability to engraft is therefore a desirable feature for bacteria in a microbiome composition, enabling, among other features, less frequent dosing than may be required with a pharmaceutical or non-engrafting probiotic. A second novel feature of certain microbiome compositions is enhancement of beneficial bacterial species not detectable or present in low levels in a patient prior to treatment with a microbiome composition.
- [0338] Applicants have identified specific OTUs or species that engraft or augment and are also associated with remission. Such OTUs or species are useful in designed compositions for treating and IBD, *e.g.*, ulcerative colitis.
- [0339] To determine whether a microbiome composition can engraft and/or augment, complementary genomic methods were used to characterize the microbiota of ulcerative colitis patients at pretreatment (baseline) and up to 12 weeks post initial treatment with an HHSP (*i.e.*, up to four weeks after the last treatment with an HHSP). The fecal microbiomes of UC subjects and HHSP doses were characterized using Whole Genome Shotgun Sequencing (WGS). WGS is a high-resolution method widely used and reported in the literature (*e.g.*, Lloyd-Price *et al.*, *Nature* 550:61-66, 2017) that enables species-level taxonomic identifications (Truong *et al.*, *Nature Meth* 12:203-209, 2015). The

relative abundance of species present in the fecal samples and the HHSP was obtained using the open-source software MetaPhlAn2 (ver 2.6.0) coupled with a proprietary internal database update. For analyses of engraftment, the set of species identified by MetaPhlAn2 in UC patients and HHSP was filtered against a proprietary, curated database of spore-forming species.

[0340] As shown in FIG. 2A, an analysis of the number of engrafting species identified in an HHSP showed that engraftment of HHSP species occurred as early as 1 week after the initial dose of an HHSP in all treatment arms (*i.e.*, Arms B, C, and D) compared to the placebo control (Arm A). Determinations of engraftment were made based on assessing the presence or absence of spore forming bacterial species in the HHSP in a subject's stool after the initiation of treatment. Engraftment was greater in patients that were pretreated with vancomycin (*e.g.*, Arm B v. Arm C). The highest engraftment was observed in patients that were pre-treated with vancomycin and then, received HHSP daily. Engraftment was also durable for at least 4 weeks after the final HHSP administration (see 56 days and 84 days in FIG. 2A). Interestingly, as shown in FIGs. 2B and 2C, the engrafting species could be further divided into those that were long-term engrafters (FIG. 2B) and those that were transient engrafters (FIG. 2C). The classification of a species into long-term versus transient engrafters was determined based on the identification of two distinct clusters of co-occurring engrafting species across patient samples. Transient engrafters (TE) peaked in engraftment 1-2 weeks after the start of dosing with HHSP, and show similar engraftment profiles in Arm C and Arm D. Long-term engrafters (LTE) showed a dose-dependent response at early timepoints and remained durably in patients at least 4 weeks beyond administration of the last dose (Visit 13). Table 5 provides a list of different bacterial species that were identified to be either a long-term engrafter or a transient engrafter. Importantly, many species that were present in HHSP did not engraft at detectable levels, showing that engraftment is not a universal property of species in HHSP.

[0341] This engraftment data reflects the requirements to disrupt a stable yet dysbiotic microbiome in UC patients. Across many ecological systems, communities are stable except when they experience a strong disruption. Here, vancomycin pretreatment is required to disrupt the existing UC microbiome and open a niche for engraftment of HHSP bacteria. After disruption of an ecological system, a succession of communities

often appear before a final stable climax community is reached. Intermediate communities, referred to as seral communities (or seres), are often necessary to change the environment enabling establishment of subsequent communities. After the disruption of the UC microbiome with vancomycin, TE species form a seral community that is followed by establishment of LTE species, which form the stable climax community. Thus, durable therapeutic intervention can require administration of both TE and LTE species (after disrupting the existing community with vancomycin); TE and LTE species can play distinct roles that are both required to alter the environment of the gastrointestinal tract in UC.

[0342] Supporting the distinct role of TE and LTE species, comparative genomic analysis of these two groups of species showed that they were functionally distinct. For example, pathways for oxygen and reactive oxygen species metabolism were enriched in TE species, including catalase, superoxide dismutase, osmoprotectant transport systems, and superoxide reductase. As reactive oxygen species are produced by the host during inflammation, this can be an important feature for early engraftment of TE species in an inflamed gut. Removal of reactive oxygen species by TE species can enable subsequent engraftment of LTE species.

Example 3: Effect of Treatment on Microbiome of Ulcerative Colitis Patients

[0343] To determine whether the increased engraftment had any effect on the microbiome of the ulcerative colitis patients, the spore former composition of the treated patients' microbiomes was compared to baseline (*i.e.*, pre-HHSP administration) at various time points after the initial HHSP administration. Specifically, the binary-Jaccard distances between the spore-forming fraction of subject microbiomes and pooled HHSP dose species content were calculated for all arms at all time points sampled. The Binary Jaccard distance ranges between -1 and 1, with 0 indicating samples sharing the exact same set of species, and 1 indicating samples that have no species in common. The abundance of species is not considered in calculations of the metric. A higher value for the similarity metric indicates greater similarity between subject microbiomes and HHSP.

[0344] As shown in FIG. 3, at the end of the 8-week induction therapy treatment, the spore former portion of the microbiome of patients from Arms C (vancomycin pre-treatment/HHSP weekly) and D (vancomycin pre-treatment/HHSP daily) were more similar to that of the HHSP composition than to the baseline. As observed with clinical

efficacy (see Example 1), the effect was more profound in patients that were pre-treated with vancomycin and daily dose of an HHSP (Arm D), compared to the other treatment arms.

Example 4: Association of Microbiome Change with Clinical Outcome

[0345] Treatment with an HHSP composition changed both the spore former and non-spore former portion of the microbiome in remitters and non-remitters. Further analyses were conducted to determine whether specific species of bacteria were associated with clinical remission observed in the clinical trial subjects. Taxonomic profiles of subject fecal microbiomes and HHSP obtained with a MetaPhlAn database (as described *supra*) were used to identify species associated with clinical outcome in Arm D, using bootstrapped lasso logistic regression.

[0346] Applicants found that as early as 7 days after the initial HHSP dosing, there was a clear distinction in the prevalence of certain bacterial species present in patients in remission (remitters) and patients that were not in remission (non-remitters). This distinction persisted for at least 4 weeks after the end of the treatment period, consistent with the observation of durability of treatment effect (maintenance) associated with HHSP treatment.

[0347] In total, 31 different bacterial species were identified as predictive of clinical outcome. The identified species included species that were present in at least some HHSP compositions, as well as those that were augmented by treatment (*i.e.*, either were not present in the HHSP composition or were present at concentrations below the limit of detection). Twenty of the species were associated with remission and 11 were associated with non-remission. Table 3 provides the SEQ ID NOs for a 16S rDNA sequence of the 31 identified bacterial species, along with the name of a reference species having a 16S rDNA sequence with at least 99% sequence identity.

Table 3. Bacterial Species Associated with Clinical Outcome

Species	Associated Clinical Outcome	Engrafter or Augmenter	Reference Strain with $\geq 99\%$ 16S rDNA full length match	SEQ ID NO for 16S rDNA sequence
<i>Parasutterella excrementihominis</i>	Remitter	Augment (non-spore former)	<i>Parasutterella excrementihominis</i>	68

Species	Associated Clinical Outcome	Engrafter or Augmenter	Reference Strain with $\geq 99\%$ 16S rDNA full length match	SEQ ID NO for 16S rDNA sequence
			<i>strain YIT 11859</i>	
<i>Coprobacillus unclassified</i>	Remitter	Engrafter	None	47
<i>Holdemania unclassified</i>	Remitter	Engrafter	<i>Holdemania filiformis</i> strain J1-31B-1, <i>Holdemania massiliensis</i> strain AP2	66, 67
<i>Bacteroides ovatus</i>	Remitter	Augment (non-spore former)	<i>Bacteroides ovatus</i> strain JCM 5824	19-22
<i>Akkermansia muciniphila</i>	Remitter	Augment (non-spore former)	<i>Akkermansia muciniphila</i> strain ATCC BAA-835	16-18
<i>Clostridium leptum</i>	Remitter	Engrafter	<i>Clostridium leptum</i> strain DSM 753	44, 45
<i>Roseburia unclassified</i>	Remitter	Engrafter	None	76
<i>Lachnospiraceae unclassified</i>	Remitter	Engrafter	None	49
<i>Bilophila unclassified</i>	Remitter	Augment (non-spore former)	<i>Bilophila wadsworthia</i> 3 1 6	32-36
<i>Lachnospiraceae unclassified</i>	Remitter	Engrafter	None	50
<i>Dielma fastidiosa</i>	Remitter	Engrafter	<i>Dielma fastidiosa</i> strain JC13	39
<i>Roseburia hominis</i>	Remitter	Engrafter	<i>Roseburia hominis</i> strain A2-183	72-75
<i>Clostridium symbiosum</i>	Remitter	Engrafter	<i>Clostridium symbiosum</i> strain ATCC 14940	51
<i>Eubacterium siraeum</i>	Remitter	Engrafter	<i>Eubacterium siraeum</i> strain ATCC 29066	59-62
<i>Butyricicoccus unclassified</i>	Remitter	Engrafter	None	48
<i>Bacteroides vulgatus</i>	Remitter	Augment (non-spore former)	<i>Bacteroides vulgatus</i> strain JCM 5826	23-30
<i>Clostridium bolteae</i>	Remitter	Engrafter	<i>Clostridium bolteae</i> strain JCM 12243	41
<i>Ruminococcaceae unclassified</i>	Remitter	Engrafter	None	64
<i>Subdoligranulum unclassified</i>	Remitter	Engrafter	None	65

Species	Associated Clinical Outcome	Engrafter or Augmenter	Reference Strain with $\geq 99\%$ 16S rDNA full length match	SEQ ID NO for 16S rDNA sequence
<i>Clostridium innocuum</i>	Remitter	Engrafter	<i>Clostridium innocuum</i> B-3 ATCC 14501	
<i>Lachnospiraceae unclassified</i>	Non-Remitter	Engrafter	None	15
<i>Lachnospiraceae unclassified</i>	Non-Remitter	Engrafter	None	83
<i>Prevotella copri</i>	Non-Remitter	Augment (non-spore former)	<i>Prevotella copri</i> strain JCM 13464	69-71
<i>Faecalicatena contorta</i>	Non-Remitter	Engrafter	<i>Eubacterium contortum</i> strain DSM 3982	55-58
<i>Dialister invisus</i>	Non-Remitter	Augment (non-spore former)	<i>Dialister invisus</i> strain E7.25	52-54
<i>Clostridiales unclassified</i>	Non-Remitter	Engrafter	None	37, 38
<i>Ruminococcus gnavus</i>	Non-Remitter	Engrafter	<i>Ruminococcus gnavus</i> strain ATCC 29149	77-82
<i>Erysipelatoclostridium ramosum</i>	Non-Remitter	Engrafter	<i>Erysipelatoclostridium ramosum</i> strain JCM 1298	46
<i>Veillonella unclassified</i>	Non-Remitter	Augment (non-spore former)	<i>Veillonella atypica</i> strain KON; <i>Veillonella dispar</i> strain ATCC 17748; <i>Veillonella parvula</i> strain ATCC 10790; <i>Veillonella ratti</i> strain JCM 6512; <i>Veillonella criceti</i> strain JCM 6511	84-101
<i>Hungatella effluvii</i>	Non-Remitter	Engrafter	<i>Clostridium hathewayi</i> strain 1313	42, 43
<i>Bifidobacterium dentium</i>	Non-Remitter	Augment (non-spore former)	<i>Bifidobacterium dentium</i> strain B764	31

[0348] Bacterial species in Table 3 that are associated with remission are useful in DEs. Accordingly, in some embodiments of the invention, a microbiome composition comprises at least one of the remitter-associated species identified in Table 3 or a species that has a 16S rDNA that has at least 97% identity to a remitter-associated species. In

some cases, the microbiome composition is an HHSP. In other cases, the microbiome composition is a DE. In general, if the composition is a DE, it does not include a bacterium associated with non-remission.

[0349] In some embodiments, an HHSP or material used in the manufacture of a spore composition is tested for one or more species associated with non-remission. Presence of such species may be used as a criterion for excluding the HHSP or material in a microbiome composition. In some embodiments, an HHSP or material used in the manufacture of a spore composition is tested for the presence of bacterial species associated with remission and the presence of one or more of such species is a criterion for using the HHSP or material in microbiome composition.

Example 5: Metabolomic Analyses

[0350] It is known in the art that multiple bacterial species may be able to carry out similar functions. Applicants posited that by identifying key functions of bacteria associated with remission, compositions can be designed that include bacteria having such functions using bacteria identified as associated with remission in Table 3 and/or bacterial species not identified in Table 3 but otherwise demonstrated to have one or more identified functions. Accordingly, Applicants further characterized the metabolic signatures of bacteria associated with clinical remission and non-remission in patients from all the treatment Arms. Their correlations with the identified bacterial species was determined as described below.

[0351] All methods utilized a Waters ACQUITY Ultra Performance liquid chromatography (UPLC®) and a Thermo Scientific Q-Exactive™ high resolution/accurate mass spectrometer interfaced with a heated electrospray ionization (HESI-II) source and Orbitrap mass analyzer operated at 35,000 mass resolution. Four different combinations of ionic and chromatographically optimized conditions were used to capture a variety of hydrophilic and hydrophobic compounds.

[0352] The MS analysis alternated between MS and data-dependent MS_n scans using dynamic exclusion. The scan range varied slightly between methods but covered 70-1000 m/z.

[0353] Metabolites were identified by comparison to library entries of purified standards based on the retention time/index (RI), mass to charge ratio (m/z), and chromatographic data (including MS/MS spectral data). While there can be similarities between these

molecules based on one of these factors, the use of all three data points can be utilized to distinguish and differentiate biochemicals. Peaks were quantified using area-under-the-curve.

[0354] The results of these analyses demonstrated a strong correlation between species associated with clinical outcome and certain metabolites. For instance, as shown in FIG. 4, ulcerative colitis patients (regardless of treatment arm) who went into remission had significantly higher levels of 7- α -dehydroxylated secondary bile acids in their fecal sample, compared to those patients who did not go into clinical remission. Two such secondary bile acids (deoxycholic acid and lithocholic acid) were able to not only decrease TNF- α production but also increase IL-10 production by the LPS-stimulated PBMCs. *See* FIGs. 5A and 5B, respectively. Other non-limiting examples of metabolites associated with clinical outcome included the following: (i) tryptophan-derived metabolites (*e.g.*, indole and 3-methylindole), (ii) medium-chain fatty acids, (iii) endocannabinoids, (iv) sphingolipids, and (v) kynurenine. Surprisingly, certain SCFAs were negatively associated with remission. The strong correlation appeared to suggest that these species may mediate the activity of key metabolites that are associated with clinical outcome. The metabolomics signature of clinical remission included many diverse functional pathways, with many implicated in inflammatory bowel disease, *e.g.*, ulcerative colitis.

Correlation of Metabolites with Clinical Outcome

[0355] To confirm the above identified correlation between species and certain metabolites, the level of selected identified metabolites (*i.e.*, selected tryptophan metabolites (indole and 3-methylindole)) were compared between remitters and non-responders from all treatment arms of the clinical trial (Arms B, C, and D) at the end of the 8-week treatment period.

[0356] Standard analysis of paired taxonomic and metabolomic profiles generally involves pairwise correlation (*e.g.*, Spearman or Pearson correlation) between species and metabolite abundance to identify those species whose abundance is correlated with the abundance of metabolites. This type of correlational analysis typically results in large groups of species being correlated with large groups of metabolites, as has been seen in both cohort and interventional studies. This means that this type of standard correlational

analysis does not adequately identify those species truly mechanistically involved in a selected metabolic function.

[0357] To address the inadequacy of standard correlational analyses, Applicants used a novel approach to identify specific species-metabolite relationships in paired taxonomic and metabolomic profiles. Computational analyses were performed analyzing the relationship between (i) the presence and level of different metabolites and (ii) the presence of individual bacterial species and combinations of bacterial species. In addition, analyses were performed assessing the relative abundance of a bacterial species and a metabolite.

[0358] As shown in FIGs. 6A and 6B, ulcerative colitis patients who went into remission after HHSP administration had higher levels of both indole and 3-methylindole, suggesting a positive correlation between increased levels of these tryptophan metabolites and clinical remission. FIG. 6C explains the large variability seen for 3-methylindole (FIG. 6B). Increased tryptophan metabolite levels were associated with two bacterial species identified in HHSP compositions: *Ruminococcus bromii* and *Eubacterium siraeum*. Therefore, the variability in 3-methylindole levels seen in FIG. 6B may be due to some ulcerative colitis patients having zero, one, or both of these two bacterial species in their GI microbiome. For example, as shown in FIG. 6C, patients who had both bacterial species in their microbiome had a higher 3-methylindole level and higher rates of clinical remission compared to those who did not harbor these species. These data also indicate that in some embodiments, inclusion of *R. bromii* and/or *E. siraeum* in a microbiome composition is advantageous *e.g.*, for inducing and/or maintaining remission. Further, inclusion of one or both species is useful for increasing production of 3-methylindole in a treated subject.

[0359] AhR activation is reportedly associated with strengthening of the intestinal epithelial barrier and mucosal homeostasis in the intestine by inducing broad changes in gene expression. As shown in FIG. 7A, indole and 3-methylindole, which were associated with clinical efficacy of a microbiome composition in ulcerative colitis patients as well as other related metabolites (*e.g.*, 3-indole acetic acid and indoleacrylate) induced AhR-mediated *cyp1a1* expression in intestinal epithelial organoids. An increase in *Cyp1a1* expression is considered to be a specific measure of AhR-mediated gene expression. The increase in *cyp1a1* expression also occurred when the epithelial organoids were treated

with supernatants of bacteria known to produce the above metabolites. *See* FIG. 7B. In addition to tryptophan metabolites, the bacterial supernatants also contained a variety of SCFAs, MCFAs, and BCFAs and SCFAs are reported to enhance expression of AhR-responsive genes indicating that the combination of both classes of metabolites could enhance the protective effects of bacterial strains (Jin U.H., *et al.*, *Sci Rep* 7(10):10163 (2017)).

[0360] Accordingly, these results indicate that one mechanism by which the bacteria associated with HHSP effect an improvement in UC is by restoring epithelial barrier integrity through the modulation of metabolites that induce AhR-mediated cyp1a1 expression.

[0361] These data indicate that a composition comprising bacteria that can increase levels of certain tryptophan metabolites, *e.g.*, including but not limited to indole and/or 3-methylindole, are useful for treating UC.

Example 6: Barrier Integrity Analysis

[0362] As reported above, certain bacteria associated with remission of UC can produce particular tryptophan metabolites and those metabolites are associated with a more robust intestinal epithelial barrier and mucosal homeostasis. Disruption of normal barrier function due to destruction of tight junctions between epithelial cells and apoptosis induced by chronic inflammation is an important factor in the pathogenesis of inflammatory bowel disease. Mucosal healing and re-establishment of barrier integrity are associated with an improvement of ulcerative colitis (*e.g.*, clinical remission), as well as with an improved patient outcome (Lee S.H., *Intest Res* 13:11-18, 2015). This effect was further investigated using several bacterial species and additional metabolites in assays assessing restoration of barrier integrity.

[0363] The assays were performed using a primary epithelial cell monolayer barrier integrity assay. As illustrated in FIG. 8A and FIG. 8B, the assay apparatus has an apical side and a basal side that are separated by a monolayer of epithelial cells on a permeable membrane. The addition of interferon-gamma (IFN- γ) disrupts the tight junctions of the epithelial monolayer and induces apoptosis of epithelial cells. The leakiness of the membrane can be assessed by adding FITC-dextran to the apical side of the apparatus and measuring how rapidly it can pass to the basolateral compartment. A leaky monolayer

will allow FITC-dextran to the basal side of the apparatus more quickly than a monolayer with an intact monolayer.

[0364] Briefly, the barrier integrity assay was conducted as follows. Primary human colon organoid cultures established from isolated colon crypts were grown and expanded in Matrigel® (Corning) and 50% L-cell conditioned medium containing Wnt3a, R-spondin 3 and Noggin (L-WRN) as described by VanDussen *et al.* containing 10uM Y-27632 and 10uM SB43152 (*Gut* 64:911-920, 2015). Colon organoids were harvested and trypsinized into a suspension containing few cell clusters and seeded onto Matrigel coated transwell inserts (Corning) at a density of 100,000 cells per insert in 50% L-WRN medium supplemented with 10 μ M Y-27632 (Millipore Sigma). Epithelial cell monolayers formed over 4-5 days in 50% L-WRN medium. These primarily stem cell population was differentiated into colonocytes by switching the culture medium to 5% L-WRN for 48 hours. After 24 hours of differentiation, specific SCFA or 5% bacterial culture supernatant treatments were added to apical interface in 100 μ L of 5% L-WRN medium and 5-25 ng/ml INF γ (Peprotech), depending on the experiment, was added in 175 μ L of 5% L-WRN medium to the basolateral interface and incubated for 48 hours at 37°C. After the 48 hour incubation, colonic epithelial monolayer permeability was assessed by adding 10 μ L of 10 ng/ml FITC-Dextran (4kDa, Sigma) to the apical interface, the organoids were incubated for 1 hour and then 100 μ L of medium was collected from the basolateral compartment of each transwell and transferred to a 96 well plate for fluorescence detection.

[0365] As shown in FIG. 9A, starting at a concentration of about 5mM, the addition of short-chain fatty acids (butyrate and propionate) or a tryptophan metabolite (3-indolepropionic acid; IPA) restored barrier integrity under these conditions. FIG. 9B demonstrates that the addition of certain bacterial species reportedly associated with clinical remission (*e.g.*, *Collinsella intestinalis*) can also restore barrier integrity. FIG. 9B also shows that certain bacteria (*e.g.*, *Escherichia coli* and *Acidaminococcus sp.* D21) can have a deleterious effect on epithelial barrier integrity. This demonstrates that selection of bacteria for treating an IBD can be based on functional features.

[0366] In general, these data demonstrate that bacteria associated with restoration of barrier integrity and/or produce certain metabolites associated with restoration of barrier integrity can be useful for the treatment of ulcerative colitis. Accordingly, such bacteria

are useful in bacterial compositions for treating conditions associated with impaired GI barrier integrity such as an IBD. These data also indicate that certain bacteria, *Escherichia sp.* and *Acidaminococcus sp.*, may not be desirable for inclusion in a microbiome composition for use in treating a condition for which impaired barrier integrity is a feature.

Example 7: Assessment of Anti-Inflammatory Effects in an Animal Model of Ulcerative Colitis

[0367] To further assess the effects of a microbiome composition, including a designed composition, on clinical remission, an animal model of ulcerative colitis was used. Briefly, naïve T cells (CD4⁺CD45RB^{high}) obtained from the spleens C57Bl/6 mice (Using RAG IBD Cell Separation Protocol), were adoptively transferred into RAGn12 mice. Ten days later, the mice were treated with antibiotics orally for five days to deplete their natural intestinal microflora. Starting at day 14 post T cell transfer, some of the mice received a total of 21 doses of a spore composition (SP) or a designed composition (DE1) using oral gavage. DE1 is a synthetic composition consisting of 14 bacterial species: *Anaerotruncus colihominis*, *Blautia producta*, *Clostridium bolteae*, *Clostridium disporicum*, *Clostridium ghonii*, *Clostridium glycolicum*, *Clostridium innocuum*, *Clostridium lactatifermentans*, *Clostridium viride*, *Eubacterium sp. WAL 14571*, *Lachnospiraceae bacterium 3 1 57FA*, *Lachnospiraceae bacterium oral taxon F15*, *Lactonifactor longoviformis*, and *Ruminococcus lactaris*. In all, the different experimental groups included the following: (i) naïve animals (no disease, *i.e.*, no T cell transfer; n=5); (ii) untreated disease control (T cell transfer only; n=15); (iii) antibiotic-treated disease control (T cell transfer + antibiotic treatment only; n=15); (iv) HHSP treated (T cell transfer + antibiotic treatment + HHSP treatment; n=15); and (v) DE1 treated (T cell transfer + antibiotic treatment + SP treatment; n=15). FIG. 10 provides a schematic of the protocol.

[0368] As shown in FIG. 11, animals that received either an HHSP or DE1 had a significantly reduced pathology score compared to the untreated disease control animals and antibiotic only treated disease control animals. The pathology score was based on the summation of 4 individual parameters; inflammation, gland loss, erosion, and hyperplasia (scored 0-5, 0=normal, 5=severe). Nanostring gene expression data were generated using the nCounter Mouse Immunology Panel with isolated total RNA from mouse colon. RNA

was isolated from colon tissue stored in RNAlater (ThermoFisher) at -80°C using a Qiagen RNeasy Plus Mini Kit per the manufacturers protocol. cDNA was then generated from mouse total-RNA using Invitrogen™ SuperScript™ III First-Strand Synthesis System for subsequent RT-qPCR analysis.

[0369] These data demonstrate that a composition comprising spore-forming bacteria derived from feces of a healthy donor or a subset of spore-former species can be effective for treating UC.

[0370] The NanoString gene expression profiles of colon samples from the mice indicated differences in the expression of several genes among the different groups. The following genes were downregulated in animals treated with an HHSP compared to the disease control animals: (i) T cell activation (*e.g.*, *Ctla4*, *Il18r1*, *Cxcl10/11*, *Lilrb3/4*, *Ifng*, *Nos2*), (ii) proinflammatory cytokines (*e.g.*, *Tnf*, *Il1b*, *Ifng*), and (iii) innate immune cell recruitment or activation (*e.g.*, *Cxcl1*, *Cxcl3*, *Ccl2*, *Cxcr6*, *Ltb*, *Cybb*). The following genes were upregulated in animals treated with the HHSP compared to the disease control animals: (i) inhibition of inflammation (*e.g.*, *C4bp*, *Zeb1*, *Cd109*), and (ii) adhesion molecules (*e.g.*, *Ncam1*, *Cd34/36*, *Fn1*, *Cdh5*, *Tjp1*, *Tjp2*, and *Ocln*). The decrease in the expression level of the proinflammatory cytokine genes *Il1b* (FIG. 12A), *Tnfa* (FIG. 12B), and the increase in the expression of the adhesion molecule genes *Tjp1* (FIG. 12C), *Tjp2* (FIG. 12D), and *Ocln* (FIG. 12E) were further confirmed by qPCR and/or ELISA. RT-qPCR based gene expression data was generated using Applied Biosystems™ TaqMan™ Fast Advanced Master Mix on Applied Biosystems QuantStudio 7 Flex System.

[0371] Without committing to any specific theory, the above data suggest that such bacteria can treat ulcerative colitis through multiple pathways, such as by altering the patient's microbiota, modulating the production of various biological molecules (*e.g.*, fecal calprotectin, secondary bile acids, tryptophan metabolites, short-chain and medium-chain fatty acids, sphingolipids, and kynurenine). These metabolites and other products of bacterial metabolism can globally regulate the expression of different immune genes in the colon, *e.g.*, in the GI lamina propria, reducing inflammation and its associated histopathology.

Example 8: Assessment of SCFA production by HDAC Inhibition Assay

- [0372] Short-chain fatty acids (SCFAs) have been described as playing a role in regulating host immunity. Studies have described altered patterns of SCFA in patients of different gastrointestinal diseases, *e.g.*, colitis, and administration of butyrate and propionate have been reported to have therapeutic effects in a colitis animal model. Both in vitro and in vivo, SCFAs have been shown to inhibit histone deacetylase (HDAC) activity, which can then, in turn, regulate many aspects of an immune response (*e.g.*, induction of FoxP3⁺ regulatory T cells). Therefore, bacteria that can produce SCFAs can be useful for the treatment of IBD (*e.g.*, UC) patients.
- [0373] Given that the type and level of SCFA production in fermentations with fecal slurries depends on the carbon source used (Yang *et al.*, *Anaerobe* 23:74-81 (2013)), HDAC inhibition was evaluated in supernatants of bacterial strains grown in a variety of carbon (C) sources including mono-, di-, polysaccharides, and porcine mucine. For these experiments, 600 μ L cultures in peptone/yeast extract medium (PY) alone or supplemented with 0.5% of one of seven C sources (glucose, fucose, sucrose, starch, pectin, FOS/inulin, or mucin) were inoculated in 96 deep-well plates and grown anaerobically for 4 days. Microbial cells were pelleted by centrifugation, and supernatants were used for the HDAC inhibition assay (HDAC-Glo I/II assay kit, Promega) and HeLa nuclear extract (Promega) as the source of HDAC enzymes. Assays were performed with 15 μ L supernatant, 10 μ L 1M Tris pH 8, 75 μ L of assay buffer containing diluted HeLa nuclear extract which were preincubated for 15 minutes prior to the addition of developing reagent. Luminescence was measured after 20 minutes. Under these conditions, a sterile supernatant spiked with 15 mM butyrate resulted in 65-75% HDAC inhibition.
- [0374] As shown in FIG. 13, a number of bacterial strains were associated with the ability to inhibit HDAC activity. The bacteria were grouped into one of seven phenotypic clusters (represented as 0-6 in FIG. 13) based on their ability to inhibit HDAC activity when grown in different nutrient sources (termed herein "HDAC clusters"). For example, Cluster 0 corresponds to strains that were able to inhibit HDAC when grown on fucose (a sugar found as a component of mucin glycoproteins) but not on other substrates. These strains utilized fucose as a substrate for propionate production, but not amino acids present in the basal media or other simple and complex carbohydrates added in other

conditions. Phenotypic Cluster 5 corresponds to strains that inhibited HDAC when grown only in the presence of simple sugars or starch. Phenotypic Cluster 4 corresponds to strains that inhibited HDAC in all conditions but their activity did not increase by the addition of sugars or polysaccharides. Thus, while many bacterial strains had the capacity for HDAC inhibition, they were able to express that capacity only in the presence of certain substrates (*e.g.*, fucose, mucin, or starch).

[0375] The above data indicate that to maximize the SCFA production *in vivo*, it can be useful to include in a bacterial composition for the treatment of an inflammatory disease (*e.g.*, ulcerative colitis) at least one representative bacteria from each of the phenotypic clusters. The DE1 composition described above in Example 7 is an example of such a composition (*i.e.*, includes at least one representative per HDAC cluster.) In some embodiments, the bacteria of a microbiome composition are, collectively, capable of utilizing at least 2, 3, 4, 5, 6, or 7 of these C sources.

Example 9: Anti-inflammatory activity with intestinal epithelial cells

[0376] IL-8 level is generally elevated in the inflamed intestinal mucosa of UC patients. Accordingly, the ability to suppress IL-8 induction in intestinal epithelial cells is a relevant readout for identifying bacterial species that can modulate the anti-inflammatory innate immune response in UC patients. Briefly, HT29 cells (an epithelial cell line derived from a colorectal carcinoma), cultured in McCoy's Medium supplemented with 10% FBS, GlutaMAX and Pen/Strep were plated at a density of 50k cells/well in 96-well format and allowed to grow for 5 days until fully confluent. Culture medium was changed every two days. On day 5, cells were pre-treated for 1 hour with a bacterial metabolite (butyrate, propionate, or acetate; FIG. 14A) or with bacterial supernatants (10% in cell culture medium; FIG. 14B) before exposure to 1.25 ng/ml recombinant human TNF- α (Peprotech). Cells were incubated for 4 hours. Culture supernatants were collected and assayed for human IL-8 protein by ELISA (R&D systems) or AlphaLISA (Perkin Elmer). IL-8 levels of test samples were normalized to inflammatory controls that were 10% blank bacterial culture medium pre-treated samples that were exposed to the 1.25 ng/ml TNF- α . To measure the pro-inflammatory capacity of individual bacterial strains, human IL-8 concentrations were measured in cell culture supernatants treated with 10% bacterial supernatant in the absence of TNF- α stimulation.

- [0377] As shown in FIG. 14A, treating the IECs with any of the short-chain fatty acids tested (*i.e.*, butyrate, propionate, or acetate) resulted in reduced levels of TNF- α -dependent IL-8 secretion. Importantly, supernatants of an HHSP grown *in vitro* were also able to inhibit IL-8 secretion by IECs in a dose-dependent manner (*see* FIG. 14B), demonstrating the ability of a microbiome composition to reduce inflammation, *e.g.*, in an IBD such as ulcerative colitis.
- [0378] Because bacteria can also induce IL-8 directly through toll-like receptor (TLR) activation, a pro-inflammatory assay was designed to identify bacterial strains having this ability (*i.e.*, bacteria capable of TNF- α -independent IL-8 activation). Such strains could be pro-inflammatory *in vivo*, therefore exacerbating inflammation in UC patients. Accordingly, it can be undesirable to include in a microbiome composition a bacterial strain that can exhibit this activity.
- [0379] As shown in FIGs. 15A and 15B, many of the supernatants (each circle represents an individual supernatant) exhibited the ability to modulate (*e.g.*, decrease) TNF- α -dependent IL-8 secretion (y-axis), and the anti-inflammatory activity generally correlated with inhibition of HDAC activity of the supernatants (x-axis). However, some of the supernatants had no anti-inflammatory activity in IECs despite having HDAC inhibitory activity, or even resulted in additional IL-8 production over that induced by TNF- α (*i.e.*, these were points, where IL-8 anti-inflammatory activity, on the y-axis, did not correlate with HDAC inhibition, on the x-axis). The majority of these outliers were supernatants with activity in the pro-inflammatory assay (light gray); that is, these strains resulted in IL-8 secretion, which can lessen or even outweigh the anti-inflammatory effects of their inhibition of HDAC activity. In addition, strain-level variability was observed in the pro-inflammatory properties of closely related strains, indicating that bile acid activities and pro-inflammatory properties are not always conserved among different strains of the same species (at least among the *Lachnospiraceae* species) (FIG. 17). Similar results were observed for Wnt activity (FIG. 16).
- [0380] These results underscore the fact that anti-inflammatory activity is not an inherent property of bacterial strains that produce SCFAs and inhibit HDAC, but rather that strains need to be tested, *e.g.*, directly in cell-based assays to identify those with pro-inflammatory activity of their own. These data demonstrate that when constructing a microbiome composition, although closely related bacteria (*e.g.*, species or OTUs) may

typically share functional features leading to, for example, pro-inflammatory or anti-inflammatory activities, it can be advantageous to assay the specific strain to be used in a composition as well as the entire composition to define the appropriate set of functions for immune modulation.

Example 10: Determination of SCFA and tryptophan metabolite profiles in single strain supernatants

- [0381] As described *supra*, certain tryptophan (Trp) metabolites were associated with remission in patients treated with an HHSP. Accordingly, Applicant tested various bacterial species for the presence of SCFA or tryptophan metabolites in their supernatants. The presence of the tryptophan metabolites was determined using a colorimetric assay for detection of indolic compounds (Indole Reagent, Anaerob Systems). Indole produces a light blue color in this assay, while other Trp metabolites produce purple color. The presence of SCFAs were tested using the HDAC assay (described *supra*). Supernatants of selected strains that were identified as producers of Trp metabolites by the colorimetric indole assay, and/or producers of SCFAs by the HDAC assay were further analyzed by GC-MS to identify the specific metabolites produced.
- [0382] The results of the SCFA analysis are shown in FIG. 18 and the results of the Trp metabolites are shown in FIG. 19. Many bacterial supernatants contained one or more of the SCFAs generally associated in the literature with anti-inflammatory activity (butyrate and propionate) (*see* FIG. 18).
- [0383] In addition, several bacterial species produced branched chain fatty acids, 2-methyl-propanoate, 3-methyl-butanoate, and 3-methyl-pentanoate, which are produced by bacterial fermentation of branched amino acids and have been shown to have HDAC inhibitory activity.
- [0384] Several species were identified as producers of medium chain fatty acids (MCFAs), *e.g.*, valerate and hexanoate, both of which were surprisingly correlated with efficacy in the metabolomic clinical data and are therefore species producing these are candidates for use in UC treatment. Valerate producing species included *Anaerotruncus colihominis*, *Clostridium sporogenes*, *Flavonifractor plautii*, *Peptostreptococcus anaerobius*, and *Peptostreptococcus stomatis*. Hexanoate producing strains include *Anaerotruncus colihominis*, *Clostridium sporogenes*, *Flavonifractor plautii*, *Clostridium glycolicum*, *Clostridium innocuum*, and *Roseburia intestinalis*.

[0385] Collectively, the above data indicate that the functional attributes of bacteria can be utilized to identify bacterial species that can be used to treat a disease and target multiple host pathways, such as ulcerative colitis. Summary of the phenotypic profile of different bacterial strains disclosed herein are provided in Table 4, below.

Example 11: Catalase Activity

[0386] The inflammatory conditions associated with a disease or disorder disclosed herein (*e.g.*, IBD) result in a high abundance of reactive oxygen species (ROS) that are toxic for many commensal organisms. For example, intestinal epithelial cells of UC and Crohn's disease patients can express high levels of DouxA which releases hydrogen peroxide into the lumen. Additional ROS can be released by activated macrophages. Some bacteria have ROS detoxifying enzymes such as catalase and superoxide dismutase that allow them to survive under inflammatory conditions and thus, could be particularly well adapted to engraft in UC patients.

[0387] Cultures of a large number of bacterial symbionts were screened for catalase activity by addition of 5 ul of 30% solution of hydrogen peroxide. Catalase activity was detected by the appearance of oxygen bubbles in the cultures. Only 19 strains out of ~400 strains tested were positive for catalase activity indicating that this is a rare function among the screened species. Non-limiting examples of catalase positive species included *Bacteroides sp. 1 1 6*, *Bacteroides sp. 1 1 30*, *Bacteroides ovatus*, *Bacteroides intestinalis*, *Bacteroides faecis*, *Bacteroides salyersiae*, *Bacteroides eggerthii*, *Eggerthella lenta*, *Lachnospiraceae bacterium 5 1 57FAA*, *Clostridium lavalense*, *Ruminococcus gnavus*, and *Clostridium hathewayi*. Inclusion of one or more of these species in a bacterial composition (*e.g.*, those disclosed herein) could be beneficial for the survival of the administered bacterial composition in a patient suffering from a disease or disorder disclosed herein (*e.g.*, UC and Crohn's disease).

Example 12: Wnt Pathway Activation by Bacterial Supernatants

[0388] The cells of the intestinal epithelium are constantly replenished in order to maintain tissue homeostasis. Tissue renewal is driven by an active intestinal stem cell compartment that is dependent on Wnt pathway activation. Intestinal stem cells are exquisitely sensitive to Wnt due to the specific expression of Lgr5. Lgr5 forms a Receptor co-receptor complex with ZNRF3, a membrane E3 ubiquitin ligase and Wnt

pathway negative-feedback regulator that targets the Wnt receptor for removal from the cell surface. In the presence of R-spondin, Lgr5⁺ intestinal stem cells maintain elevated levels of the Wnt receptor, Frizzled, on the cell surface enabling sustained pathway activation (Clevers *et al. Science*. 2014). R-Spondin has been shown to protect the intestinal epithelium after injury by promoting intestinal stem cell driven tissue recovery (Takashima *et al., The Journal of Experimental Medicine*. 2011).

[0389] To assess whether amplification of Wnt pathway activation in intestinal stem cells by commensal bacteria could contribute to fortifying the epithelial barrier and tissue homeostasis, a Wnt pathway reporter cell line (HEK 293 STF (ATCC CRL-3249)) was utilized. The cell line was used evaluate the ability of bacterial culture supernatants and metabolites to activate the reporter in a similar manner to R-spondin. Addition of Wnt pathway stimulator compounds, such as Wnt3a protein or R-Spondin, to cultured HEK 293 STF cells leads to the production of luciferase that can be measured by luminescence detection. To measure the ability of bacterial supernatants to enhance Wnt pathway activation, HEK 293 STF cells cultured in DMEM medium supplemented with 10% FBS, GlutaMAX and Pen/Strep were plated at a density of 50k cells per well in 96 well format and allowed to grow for 3 days until fully confluent. Culture medium was changed every other day. On day 3, cells were treated with 10% bacterial supernatant in Wnt3a conditioned medium (produced from L-Wnt3a cells ATCC CRL-2647) and incubated overnight. Wnt3a conditioned medium supplement with 250 ng/ml recombinant human R-spondin (R&D systems Cat#4645) was used as a positive control for enhanced Wnt pathway activation. After treatment incubation, Bright-Glo luciferase detection reagent (Promega) was added to all wells and incubated for 20 minutes at room temperature. Luminescence was measured using a Perkin Elmer Envision multi-mode plate reader. Supernatants from DEs grown in vitro differentially activate the HEK 293 STF reporter when added to Wnt3a conditioned medium. As seen in FIG. 16, bacterial supernatants were able to enhance Wnt pathway expression and there was a positive correlation between HDAC inhibition and Wnt activation. These results demonstrate that the inclusion of bacterial species capable of enhancing Wnt pathway activation in designing a bacterial composition could be beneficial in treating diseases characterized by epithelial damage, such as those disclosed herein (*e.g.*, UC and graft-versus-host disease).

Example 13: Designing Bacterial Compositions and Screening for Functional Properties

[0390] In designing the bacterial compositions of the present disclosure, the compositions were constructed to have one or more of the following features: (1) capable of engrafting (long-term and/or transient) one or more species when administered to a subject; (2) capable of having anti-inflammatory activity (*e.g.*, inhibiting TNF- α -driven IL-8 secretion in epithelial cells *in vitro*, and/or ability to downmodulate expression of inflammatory genes (*e.g.*, CXCL1, CXCL2, CXCL3, CXCL11, ICAM1)); (3) not capable of inducing pro-inflammatory activity (*e.g.*, does not induce IL-8 production by IECs); (4) capable of producing secondary bile acids (*e.g.*, 7 α -dehydroxylase and bile salt hydrolase activity); (5) not capable of producing ursodeoxycholic acid (*e.g.*, 7 β -hydroxysteroid dehydrogenase activity) (6) capable of producing tryptophan metabolites (*e.g.*, indole, 3-methyl indole, indolepropionic acid); (7) capable of producing medium-chain (*e.g.*, valerate and hexanoate) and/or short-chain fatty acids (*e.g.*, butyrate and propionate); (8) capable of inhibiting HDAC activity when grown with at least one carbon source; (9) including species belonging to one or more HDAC clusters; (10) capable of restoring epithelial integrity, as determined by a primary epithelial cell monolayer barrier integrity assay; (11) having bacterial species that are capable of being associated with clinical remission of an inflammatory bowel disease; (12) lacking bacterial species that are capable of being associated with non-remission of an inflammatory bowel disease; (13) capable of expressing catalase activity; (14) capable of having alpha-fucosidase activity; (15) capable of inducing Wnt activation; and (16) not capable of activating a toll-like receptor pathway, *e.g.*, toll-like receptor 5 (TLR5) and/or toll-like receptor 4 (TLR4). This was accomplished by including one or more bacterial species with the above features in the different designed compositions.

[0391] In total, thirty-eight (38) different designed compositions were constructed (DE1-DE38) and screened for functional properties exhibited when grown as a bacterial community *in vitro* as follows. The designed bacterial compositions were mixed in equal ratios at $\sim 1\text{-}5 \times 10^7$ colony forming units (CFU)/ml of vegetative bacteria and $\sim 1 \times 10^4\text{-}1 \times 10^5$ CFU/ml of spore forming bacteria (when relevant) and frozen in 15% glycerol. For cultivation, the bacterial compositions were thawed, the glycerol was removed and the mix germinated in 0.5% BHI/Oxgall for 1 hour at room temperature when they contained spore preparations. Compositions containing vegetative bacteria did not undergo

germination. The germinant was then washed and the cultures diluted to a final concentration of 5×10^7 cfu/ml and plated as biological replicates in a synthetically derived, fecal culture medium 4 (FCM4), that supports growth of many anaerobic gut bacteria. In experiments where secondary bile acid production by bacterial communities was assayed, FCM4 was supplemented with conjugated bile acids (glycocholic acid, taurocholic acid, glycochenodeoxycholic acid and taurochenodeoxycholic acid) at a final concentration of 50 μ M. Bacterial cultures were incubated anaerobically at 37°C for 7 days, after which their biomass was measured by absorbance of 100 μ L culture at 600nm. The remaining culture was centrifuged at 4000rpm, the supernatants passed through a 0.2 μ M filter and used in biochemical and cell-based assays. HDAC inhibition assays, pro-inflammatory assay in IECs, anti-inflammatory assay in IECs, epithelial integrity assay, and Wnt activation assay, determination of SCFAs, MCFAs, and tryptophan metabolites were performed as described in the previous examples. For determination of bile acid metabolites, 100 μ L of bacterial cell-free supernatant was then extracted with an equal volume of acetonitrile and filtered through a 0.2 μ m filter, generating samples for LC-MS analysis. Bile acids were separated using an Agilent 1260 HPLC equipped with a Microsolv bidentate C18 column preceded by a 0.2 μ m pre-column filter. Separation was achieved using a water and acetonitrile gradient with 0.1% formic acid at a flow rate of 0.4 ml/minute. Samples were injected at a volume of 5 μ L. The HPLC system was coupled to a Bruker Compass™ qTOF mass spectrometer calibrated to a mass range of 50 to 1700 m/z using the Agilent low-mass tuning mix. Each run was additionally calibrated to a reference mass solution injected at the beginning of each run. Bile acids were detected in negative mode and identified by unique m/z and retention times compared to known pure standards. Area under the peak was determined using Bruker data analysis software. Metabolites were quantified using calibration curves generated from pure standards, ranging in concentration from 0.001 μ M to 100 μ M.

[0392] Supernatants from the DEs were also assayed for their ability to activate TLR4 and TLR5 pathways. Toll-like receptors (TLRs) are pattern recognition receptors (PRR) that bind to pathogen-associated molecular patterns (PAMP) such as bacterial cell wall components, i.e. peptidoglycans, lipopolysaccharides, surface proteins, etc. TLR4 and TLR5 receptors are known to bind to antigens and induce a pro-inflammatory response. TLR4 binds to lipopolysaccharide (LPS) which is present in gram-negative bacteria while

TLR5 binds to flagellin (FLA), found in motile bacteria. We predict that designed bacterial compositions that exclude gram-negative and IL-8 inducing bacterial strains should not activate TLR4 or TLR5. We utilized a TLR receptor reporter cell lines, HEK-Blue hTLR4 (Invivogen, cat#hkb-htlr4), hTLR5 (Invivogen, cat#hkb-htlr5) to evaluate the ability of bacterial culture supernatants and metabolites to activate the TLR4 and TLR5 reporters. HEK-Blue Null1 (Invivogen, cat#hkb-null1) cells were included as a control reporter cell line for TLR receptor endogenously expressed in the parental cell line HEK 293 that allowed measurement of background HEK-Blue signal. HEK-Blue TLR reporter cell lines are co-transfected with a plasmid designed to overexpress a given TLR receptor and a Secreted Alkaline Phosphatase (SEAP) gene under the control of NF- κ B and AP-1 promoters (Invivogen). Activation of the given TLR reporter in leads to secretion of SEAP in solution which is measured by absorbance (655 nm). To measure TLR4 and TLR5 activation by the bacterial supernatants, HEK-Blue hTLR4, hTLR5 and HEK-Blue Null1 cells cultured in DMEM medium supplemented with 10% FBS, GlutaMAX and Pen/Strep were plated at a density of 50,000 cells/well in 96 well format and allowed to reach 100% confluency after 5-7 days in culture. Culture medium was replaced every other day. Once the wells were 100% confluent, the cells were treated with 10% bacterial supernatant in cell culture medium and incubated overnight. For HEK-Blue hTLR4 reporter assay positive control we used cell culture medium supplemented with 100 ng/ml LPS-EK (Invivogen cat#tlrl-pekips) and 10% FCM4+ media. For HEK-Blue hTLR5 reporter assay positive control we used cell culture medium supplemented with 60 ng/ml of FLA-BS (invivogen cat#tlrl-pbsfla) and 10% FCM4+ media. Each TLR reporter cell line had a Null plate with same treatment and respective positive control. After treatment incubation overnight, HEK-Blue Detection Media (Invivogen, cat#hb-det3) was added to all wells and incubated for 2 hours at 37°C, 5% CO₂. SEAP secretion was measured as absorbance (655 nm) using a Spectramax plate reader.

[0393] Bacterial compoition supernatants were also evaluated for their capacity to modulate gene expression in primary human colonic organoids as follows. Primary human colon organoid cultures established from isolated colon crypts were grown and expanded in Matrigel® (Corning) and 50% L-cell conditioned medium containing Wnt3a, R-spondin 3 and Noggin (L-WRN) as described by VanDussen *et al.* (*Gut* 64:911-920, 2015). Colon organoids were grown in 24-well plates for 5 days in 50% L-WRN

medium. After 5 days of mini-gut structure formation in 50% L-WRN medium, organoid culture medium was switched to 5% L-WRN medium to induce differentiation of the organoids. After 24 hours in 5% L-WRN medium, organoids were treated with 10% DE supernatants in fresh 5% L-WRN medium supplemented with the inflammatory cytokine 12.5 ng/ml human TNFa (Peperotech). Control conditions include organoids treated with 5% L-WRN +10% bacterial culture medium and 5% L-WRN +10% bacterial culture medium +12.ng/ml human TNFa. Organoids were incubated in treatment conditions overnight and then collected in Qiagen RLT buffer for RNA analysis. Sample lysates were either purified into RNA using Qiagen RNeasy mini prep kit or lysates were assayed directly on the Nanostring nCounter platform.

[0394] Table 6 summarizes the number of strains possessing several of these properties in the exemplary designed compositions disclosed herein. Table 6 describes the number of strains present in consortia: a) with HDAC inhibition phenotypes (rows HDAC cluster 0, HDAC cluster 1, HDAC cluster 2, HDAC cluster 3, HDAC cluster 4, HDAC cluster 5, HDAC cluster 6), b) that produce short-chain and medium-chain fatty acids (rows Propanoic acid, Butanoic acid, Pentanoic acid, Hexanoic acid), c) that produce tryptophan metabolites (rows Indole, 3-methyl indole, 3-indolacrylic acid), d) that have bile acid metabolic activity (rows BSH gCA [for bile salt hydrolase activity on glycocholic acid], BSH tCA [for bile salt hydrolase activity on taurocholic acid], BSH gCDCA [for bile salt hydrolase activity on glycochenodeoxycholic acid], BSH tCDCA [for bile salt hydrolase activity on taurochenodeoxycholic acid], 7aD CA [for 7 α -dehydroxylase activity on cholic acid], 7aD CDCA [for 7 α -dehydroxylase activity on chenodeoxycholic acid], 7bHSDH UDCA [for 7 β -hydroxysteroid dehydrogenase activity on CDCA]), e) that express catalase activity (row Catalase), f) that have fucosidase activity (row a-L-Fucosidase), g) that induce IL-8 (row IL8 Inflammatory), h) that are long-term engrafters (row LTE) or transient engrafters (row TE); i) that are associated with clinical remission (row Remission Associated) or non-remission (row Non-remission Associated).

[0395] FIGs. 30, 31, and 32 identify the bacterial species included in the different designed compositions. Depending on their bacterial species make-up, the designed bacterial compositions exhibited varying functional activity – *see, e.g.*, FIGs. 20B, 21B, and 24B (inhibition of HDAC activity); FIGs. 20C, 21C, and 22C (anti-inflammatory activity); FIGs. 20D, 21E, and 22D (pro-inflammatory activity); FIGs. 20E, 21D, and 22E

(restoration of epithelial integrity); FIGs. 20I-20L, 21H-21K, and 22F-22H (short-chain and medium-chain fatty acid production); FIGs. 20M, 21L, 21M, 22I, and 22J (tryptophan metabolite production); FIGs. 21N-21P and 22K-M (secondary bile acid production); FIGs. 20N-20Q, 22N, and 22P (regulation of genes associated with inflammatory response); FIGs. 20R-20T (regulation of genes associated with Wnt activation); and FIGs. 20G, 20H, 21F, 21G, 22Q, and 22R (activation of a toll-like receptor pathway). And, as shown in FIGs. 25A and 25B, many of the designed compositions disclosed herein were similar or better at producing indole and butanoic acid (metabolites associated with anti-inflammatory responses) compared to FMT and even certain healthy human spore product (DXE).

[0396] From the thirty-eight (38) different designed compositions were constructed (DE1-DE38), 36 were designed to have beneficial properties for UC, while two (DE9 and DE38) were designed to include deleterious properties, such as the inclusion of strains with strong pro-inflammatory activity in the IEC assay to test the importance of excluding such strains from therapeutic compositions. The results presented here clearly showed that the two negative control compositions (DE9 and DE38), despite having HDAC inhibitory activity, failed to suppress TNF α -driven IL8 production, stimulated IL8 on their own, and failed to suppress the disruption of epithelial primary monolayers caused by interferon gamma. In addition, the negative control compositions were positive in the TLR4 and TLR5 activation assay (FIGs. 20G and 20H), failed to suppress TNF α -driven expression of pro-inflammatory genes in colonic organoids (FIG. 20C). In contrast, all the other 36 compositions tested did not exhibit any of these deleterious functions, demonstrating the importance of excluding IL8-inducing strains from compositions as described in this example.

[0397] Moreover, while all the bacterial compositions were designed to include species with HDAC inhibitory activity, compositions with lower number of such strains, or less coverage of the different HDAC clusters described herein, (*e.g.*, DE984662.1 (DE3) and DE698478.1 (DE10)) resulted in decreased overall HDAC inhibitory activity, even after cultures had reached saturation. This result highlights the importance of including high representation of HDAC inhibitory strains and clusters to allow for maximum utilization of nutrients for production of SCFAs and HDAC inhibition.

[0398] The 36 therapeutic compositions were designed for anti-inflammatory activity based on the single strain activity in the IEC assay but the effect of supernatants was also evaluated in a primary colonic organoid described above to explore the width of the anti-inflammatory activity and evaluate the modulation of additional disease-relevant pathways. Transcriptional analysis of colon organoids treated with TNF α revealed that pro-inflammatory cytokines relevant to ulcerative colitis (more highly expressed in UC in HMP2). such as CXCL1, CXCL2, CXCL3, and CXCL11 were also induced *in vitro*. Moreover, these levels of these transcripts in TNF α treated colon organoids were reduced in the presence of DEs with the highest levels of HDAC inhibition (FIG 20H, 20I, 20J, and 20K) underscoring the importance of designing compositions for maximum HDAC inhibition capacity as described here. Interestingly, DE8, which was designed to be an ineffective DE, did not lead to any decrease in abundance of TNF α induced transcripts, validating the exclusion of IL8-inducing strains from designed compositions. In addition, Wnt pathway target genes, CD44 and LRP6, were shown to have increased expression in response to DEs that most strongly activated the HEK 293 STF Wnt pathway reporter cell assay (FIG. 20L, FIG. 20 M and FIG. 20N). These data suggest that Wnt activating consortia can contribute to supporting Wnt pathway driven intestinal epithelium homeostasis to facilitate repair of mucosal injuries associated with diseases or disorders disclosed herein (*e.g.*, IBD).

[0399] Additionally, expression of genes under the control of the Ahr pathway which is involved in barrier protection and immunomodulation were also evaluated in the human organoid system. As seen in, *e.g.*, FIG. 20O, designed compositions were able to induce expression of Cyp1A1 gene which encodes an enzyme of the cytochrome P450 superfamily in the AhR pathway. Importantly, the ability to induce Cyp1A1 was directly correlated to the abundance of indole, and described AhR agonist, in the supernatants and, in contrast with Wnt and anti-inflammatory activities, is not proportional to SCFAs and HDAC inhibition indicating that the design compositions successfully affect host responses by more than one mechanism of action.

[0400] Finally, as can be seen in FIGs. 25A to 25C, 26A, and 26B, design compositions described herein had similar (if not better) properties as an FMT and spore fraction (HHSP) of a healthy donor: HDAC inhibition, anti-inflammatory activity and SCFA production. Importantly, the analysis of gene expression in colonic organoids showed that

there was very significant overlap between the gene expression signature of a TNFalpha treated organoid and the gene expression in biopsies of UC subjects, and that both the HHSP and composition supernatants can reverse a significant part of that signature including several inflammation related genes, such as Cxcl1, Cxcl2 and ICAM1. These results indicate that compositions designed by the criteria describe here recapitulate many features of complex natural products and have the potential to modulate host gene expression to restore intestinal health.

[0401] These results demonstrate that bacterial compositions can be designed to have specific functional features. Such ability suggests that depending on the pathways involved, different compositions can be designed to treat a wide range of diseases and/or disorders. The results also show that compared to much more complex products (*e.g.*, FMT and spore-prep compositions), the designed compositions disclosed herein are superior at producing certain metabolites that can be important in treating certain inflammatory diseases.

[0402] Collectively, the results disclosed herein show that combining data on functional features of strains and bacterial consortia with data on which species will engraft in human subjects (Table 5) ensures that the consortia will express these functional features when administered to human subjects. Importantly, the results further demonstrate that while many strains could be selected that may possess one or more of the the desired functional features disclosed herein, such species will not necessarily engraft when administered to human subjects. Therefore, such species would not likely be of therapeutic value since they would not be able to express these functional features and have the desired effect when administered to patients. The bacterial compositions disclosed herein comprise one or more bacteria that not only allow the composition to exert the different functional features disclosed herein, but are also capable of engrafting when administered to human subjects.

[0403] Furthermore, combining data on functional features of strains with their association with clinical remission in human subjects (Table 3) ensures that the consortia will express functional features with therapeutic benefit while not promoting non-remission through other mechanisms.

[0404] Data across these consortia furthermore show that, for example: 1) consortia containing multiple (*e.g.*, 5, 7, 10, 15, 18) HDAC inhibiting strains, sometimes coming

from distinct HDAC clusters, have stronger HDAC inhibition than those with few HDAC inhibiting strains (e.g., 2, 3, 4, 5), 2) unlike HDAC, consortia affect certain other functional targets equally despite if there is only one or a few strains possessing that function, 3) exclusion of pro-inflammatory strains results in better repair of the intestinal epithelial barrier, 4) these designed compositions have the same effect as donor-derived HHSP or fecal microbial transplant on the host expression of a wide range of genes associated with ulcerative colitis, 5) compositions designed to affect the levels of several distinct molecules (e.g. short-chain fatty acids and tryptophan metabolites) can modulate diverse disease-relevant pathways and have multiple mechanisms of action (reduction of pro-inflammatory cytokine expression and increase in Wnt pathway expression, or increase expression of AhR pathway, respectively).

Example 14: Analysis of the Effect of Designed Compositions on Anti-Tumor Responses to Immune Checkpoint Inhibitors

[0405] To assess whether the designed compositions disclosed herein could also be useful in treating cancers, a MC38 tumor model was used. Briefly, approximately three weeks prior to tumor inoculation, the DE286037.1 (DE1) composition was administered to the animals. DE1 was administered once, on week -3, at a dose of 10^7 per strain; 3 weeks of colonization were allowed before tumor cell inoculation on day 0. Then, the MC38 tumor cells were transplanted into the animals (via subcutaneous administration). Anti-PD-1 antibody was administered to the animals at days 7, 10, 13, and 16 post tumor inoculation. Control animals received a control isotype antibody instead. Tumor volume was measured at days 8, 10, 13, 15, and 17 post tumor inoculation. At day 17, the animals were sacrificed and the percentages of tumor infiltrating CD8 T cells and regulatory T cells were determined in the tumors of the animals.

[0406] Surprisingly, as shown in FIG. 27B, animals that received both the DE1 composition and the anti-PD-1 antibody had greater reduction in tumor volume, compared to the control animals. The increased reduction in tumor volume was apparent as early as days 8-10 post tumor inoculation. The improved effect on tumor volume was associated with increased percentage of CD8 T cells in the tumors, resulting in increased CD8 T cell:Treg ratio (FIG. 27C). Similar results were observed with the DE2 composition in combination with anti-PD-1 antibody (FIGs. 28A, 28B, and 28C).

[0407] Next, to confirm the anti-tumor effects of the DE1 composition described above, a BP tumor model was used. The tumor was a melanoma derived from a Braf/pTEN knockout mouse. Briefly, the DE1 composition was administered to the animals, and then, approximately three weeks later, the animals were subcutaneously inoculated with the BP tumor cells. Anti-PD-L1 antibody or a control isotype antibody was administered to the animals at days 5, 8, 11, and 14 post tumor inoculation. Tumor volume was measured at days 8, 10, 12, and 15 post tumor inoculation. At day 15, animals were sacrificed, and the tumors analyzed.

[0408] In agreement with the earlier data, animals that received the anti-PD-L1 antibody in combination with the DE286037.1 (DE1) composition had increased reduction in tumor volume, compared to the control group (FIG. 29B). Again, the animals treated with the combination of anti-PD-L1 antibody and DE1 had greater percentage of CD8 T cells in their tumors, resulting in increased CD8 T cell:Treg ratio (FIGs. 29C and 29D). The tumors also had greater percentage of CD4 T cells, compared to the control animals (FIG. 29E).

[0409] Collectively, the above data demonstrate that when administered in combination with an immune checkpoint inhibitor, the DE286037.1 (DE1) composition can be useful in treating certain cancers. As described *supra*, cancers are generally not thought to be associated with pro-inflammatory responses, and cancer immunotherapy generally aims to increase host pro-inflammatory responses targeting cancer cells. Therefore, it was not reasonably expected that a bacterial composition designed to have anti-inflammatory properties (*i.e.*, DE1 and DE2) would be effective for enhancing anti-tumor response. result further highlights that a bacterial composition can be designed to target multiple immune pathways, and thereby, treat wide range of diseases, including both inflammatory diseases and cancers.

Table. 4. Phenotypic Summary

Species	HDAC Inhibition in any C source (25/18% cutoff)	HDAC cluster assignment	Trp metabolite positive in any C source	Anti- inflammatory in any C source (>50% reduction on IL8 compared to TNFa control)	Pro- Inflammatory in any C- source (>25% increase in IL8 relative to medium control)
<i>Akkermansia muciniphila</i>	0	1	0	0	0
<i>Alistipes finegoldii</i>	0	1	1	0	0

Species	HDAC Inhibition in any C source (25/18% cutoff)	HDAC cluster assignment	Trp metabolite positive in any C source	Anti- inflammatory in any C source (>50% reduction on IL8 compared to TNFa control)	Pro- Inflammatory in any C- source (>25% increase in IL8 relative to medium control)
<i>Alistipes onderdonkii</i>	1	1	1	1	0
<i>Alistipes shahii</i>	1	1	0	0	0
<i>Anaerotruncus colihominis</i>	0	1	0	0	0
<i>Anaerotruncus colihominis</i>	1	4	1	0	0
<i>Bacteroides caccae str.1</i>	0	1	0	0	0
<i>Bacteroides caccae str.2</i>	1	1	0	0	0
<i>Bacteroides caccae str.3</i>	0	1	0	0	0
<i>Bacteroides dorei</i>	0	1	0	0	0
<i>Bacteroides eggerthii str.1</i>	0	1	1	0	0
<i>Bacteroides eggerthii str.2</i>	0	1	1	0	0
<i>Bacteroides eggerthii str.3</i>	1	3	1	0	0
<i>Bacteroides faecis</i>	1	3	1	0	0
<i>Bacteroides intestinalis</i>	1	3	1	0	0
<i>Bacteroides nordii</i>	0	1	0	0	0
<i>Bacteroides ovatus str.1</i>	1	3	1	0	0
<i>Bacteroides ovatus str.2</i>	0	1	0	1	0
<i>Bacteroides salyersiae str.1</i>	0	1	1	0	0
<i>Bacteroides salyersiae str.2</i>	1	3	1	0	0
<i>Bacteroides sp 1 1 30</i>	1	0	0	0	0
<i>Bacteroides sp 1 1 6</i>	1	1	1	0	0
<i>Bacteroides sp 2 1 22</i>	0	1	1	0	0
<i>Bacteroides sp 3 1 23 str.1</i>	0	1	1	0	0
<i>Bacteroides sp 3 1 23 str.2</i>	0	1	1	0	0
<i>Bacteroides sp 4 1 36</i>	1	2	1	0	0
<i>Bacteroides sp D20 str.1</i>	1	3	1	0	0
<i>Bacteroides sp D20 str.2</i>	1	0	1	1	0
<i>Bacteroides sp D22</i>	1	3	1	0	0
<i>Bacteroides stercoris</i>	1	4	1	0	0
<i>Bacteroides uniformis str.1</i>	1	3	1	1	0
<i>Bacteroides uniformis str.2</i>	1	2	1	1	0
<i>Bacteroides vulgatus str.1</i>	1	2	0	0	0
<i>Bacteroides vulgatus str.2</i>	1	2	0	0	0
<i>Bifidobacterium adolescentis</i>	0	1	0	0	0
<i>Bifidobacterium catenulatum</i>	0	1	0	n.d.	n.d.
<i>Bifidobacterium longum str.1</i>	0	1	0	1	0
<i>Bifidobacterium longum str.2</i>	0	1	0	0	0
<i>Bifidobacterium longum str.4</i>	0	1	0	n.d.	n.d.
<i>Bifidobacterium longum str.5</i>	0	1	0	0	0
<i>Bifidobacterium pseudocatenulatum str.1</i>	0	1	0	0	0
<i>Bifidobacterium pseudocatenulatum str.2</i>	0	1	0	n.d.	n.d.
<i>Blautia coccoides str.1</i>	0	1	0	0	0
<i>Blautia coccoides str.2</i>	1	3	0	1	0
<i>Blautia glucerasei</i>	0	1	0	0	0
<i>Blautia producta str.1</i>	1	1	0	1	0
<i>Blautia producta str.2</i>	0	1	0	0	1
<i>Blautia producta str.3</i>	0	1	0	n.d.	n.d.

Species	HDAC Inhibition in any C source (25/18% cutoff)	HDAC cluster assignment	Trp metabolite positive in any C source	Anti- inflammatory in any C source (>50% reduction on IL8 compared to TNFa control)	Pro- Inflammatory in any C- source (>25% increase in IL8 relative to medium control)
<i>Blautia producta str.4</i>	0	1	0	0	1
<i>Blautia producta str.5</i>	0	1	0	1	0
<i>Blautia producta str.6</i>	0	1	0	0	0
<i>Blautia schinkii str.1</i>	0	1	0	0	0
<i>Blautia schinkii str.2</i>	0	1	0	0	0
<i>Blautia sp M25</i>	1	0	0	0	0
<i>Blautia wexlerae</i>	1	0	0	0	0
<i>Butyrivibrio crossotus</i>	1	4	0	1	0
<i>Clostridiaceae bacterium END 2</i>	0	1	0	1	0
<i>Clostridiales sp SSC 2</i>	1	4	0	1	0
<i>Clostridium aldenense</i>	1	1	1	1	0
<i>Clostridium asparagiforme</i>	0	1	1	0	0
<i>Clostridium bartlettii str.1</i>	1	2	1	1	0
<i>Clostridium bartlettii str.2</i>	0	1	1	1	0
<i>Clostridium bolteae str.1</i>	1	3	0	n.d.	n.d.
<i>Clostridium bolteae str.2</i>	1	1	0	0	1
<i>Clostridium bolteae str.3</i>	0	1	0	0	0
<i>Clostridium butyricum str.1</i>	1	4	0	0	1
<i>Clostridium butyricum str.2</i>	1	4	0	1	1
<i>Clostridium butyricum str.2</i>	1	4	0	1	1
<i>Clostridium citroniae</i>	1	4	1	1	1
<i>Clostridium clostridioforme</i>	1	6	0	0	1
<i>Clostridium disporicum</i>	1	0	0	n.d.	n.d.
<i>Clostridium ghonii</i>	1	4	1	1	0
<i>Clostridium glycolicum str.1</i>	1	2	1	n.d.	n.d.
<i>Clostridium glycolicum str.2</i>	1	2	0	0	0
<i>Clostridium hathewayi str.1</i>	0	1	0	0	0
<i>Clostridium hathewayi str.2</i>	0	1	0	0	0
<i>Clostridium hathewayi str.3</i>	0	1	0	0	0
<i>Clostridium hylemonae</i>	0	1	0	n.d.	n.d.
<i>Clostridium innocuum</i>	1	6	0	n.d.	n.d.
<i>Clostridium lactatifermentans</i>	0	1	0	0	0
<i>Clostridium lavalense</i>	0	1	1	0	0
<i>Clostridium leptum</i>	0	1	0	0	0
<i>Clostridium mayombeii</i>	1	2	1	0	0
<i>Clostridium nexile</i>	0	1	0	0	0
<i>Clostridium oroticum str.1</i>	1	0	0	0	0
<i>Clostridium oroticum str.2</i>	1	0	0	n.d.	n.d.
<i>Clostridium scindens</i>	0	1	0	0	0
<i>Clostridium sp 7 2 43FAA</i>	1	5	0	0	1
<i>Clostridium sp NML 04A032</i>	1	4	1	1	0
<i>Clostridium spiroforme str.1</i>	0	1	0	0	0
<i>Clostridium spiroforme str.2</i>	0	1	0	0	0
<i>Clostridium sporogenes str.1</i>	1	4	1	1	0
<i>Clostridium sporogenes str.2</i>	1	4	1	1	0
<i>Clostridium straminisolvens</i>	0	1	0	0	0
<i>Clostridium subterminale</i>	1	4	1	1	0

Species	HDAC Inhibition in any C source (25/18% cutoff)	HDAC cluster assignment	Trp metabolite positive in any C source	Anti- inflammatory in any C source (>50% reduction on IL8 compared to TNFa control)	Pro- Inflammatory in any C- source (>25% increase in IL8 relative to medium control)
<i>Clostridium symbiosum str.1</i>	1	4	0	1	0
<i>Clostridium symbiosum str.2</i>	1	4	0	0	0
<i>Clostridium tertium</i>	1	5	0	0	1
<i>Clostridium tyrobutyricum</i>	1	6	0	1	1
<i>Clostridium viride str.1</i>	1	4	0	1	0
<i>Clostridium viride str.2</i>	1	4	0	1	0
<i>Coprobacillus sp D7 str.1</i>	0	1	0	0	0
<i>Coprobacillus sp D7 str.2</i>	0	1	0	0	0
<i>Coprococcus comes</i>	1	4	0	1	0
<i>Coprococcus eutactus str.1</i>	1	1	0	0	0
<i>Coprococcus eutactus str.2</i>	1	6	0	1	0
<i>Coriobacteriaceae sp 7 10 1 b</i>	0	1	0	0	0
<i>Dorea formicigenerans str.1</i>	0	1	0	0	0
<i>Dorea formicigenerans str.2</i>	0	1	0	0	0
<i>Dorea formicigenerans str.3</i>	0	1	0	0	0
<i>Dorea formicigenerans str.4</i>	0	1	0	0	0
<i>Dorea longicatena str.1</i>	0	1	0	0	0
<i>Dorea longicatena str.2</i>	0	1	0	0	0
<i>Dorea longicatena str.3</i>	0	1	0	0	0
<i>Eggerthella lenta str.1</i>	0	1	0	0	0
<i>Eggerthella lenta str.2</i>	0	1	0	0	0
<i>Eggerthella lenta str.3</i>	0	1	0	0	0
<i>Eggerthella sp 1 3 56FAA</i>	0	1	0	0	0
<i>Erysipelotrichaceae bacterium 3 1 53 str.1</i>	1	4	0	1	0
<i>Erysipelotrichaceae bacterium 3 1 53 str.2</i>	0	1	0	0	0
<i>Erysipelotrichaceae bacterium 5 2 54FAA</i>	1	6	0	0	0
<i>Eubacterium contortum str.1</i>	1	0	0	0	0
<i>Eubacterium contortum str.2</i>	1	0	0	n.d.	n.d.
<i>Eubacterium desmolans</i>	1	5	0	1	0
<i>Eubacterium dolichum</i>	1	6	0	0	0
<i>Eubacterium hallii</i>	1	0	0	0	0
<i>Eubacterium limosum</i>	1	6	0	1	0
<i>Eubacterium rectale str.1</i>	1	5	0	0	1
<i>Eubacterium rectale str.2</i>	1	5	0	0	1
<i>Eubacterium siraeum</i>	0	1	0	0	0
<i>Eubacterium sp WAL 14571 str.1</i>	1	4	0	1	0
<i>Eubacterium sp WAL 14571 str.1</i>	1	4	0	1	0
<i>Eubacterium tenue</i>	1	3	1	0	0
<i>Eubacterium ventriosum</i>	0	1	0	0	0
<i>Faecalibacterium prausnitzii str.1</i>	1	6	0	0	0
<i>Faecalibacterium prausnitzii str.2</i>	1	3	0	0	0

Species	HDAC Inhibition in any C source (25/18% cutoff)	HDAC cluster assignment	Trp metabolite positive in any C source	Anti- inflammatory in any C source (>50% reduction on IL8 compared to TNFa control)	Pro- Inflammatory in any C- source (>25% increase in IL8 relative to medium control)
<i>Faecalibacterium prausnitzii</i> str.3	1	3	0	1	0
<i>Faecalibacterium prausnitzii</i> str.4	1	3	0	0	0
<i>Faecalibacterium prausnitzii</i> str.5	0	1	0	0	0
<i>Faecalibacterium prausnitzii</i> str.6	1	6	0	0	1
<i>Faecalibacterium prausnitzii</i> str.7	1	1	0	0	0
<i>Flavonifractor plautii</i> str.1	1	4	1	1	1
<i>Flavonifractor plautii</i> str.2	1	4	1	n.d.	n.d.
<i>Gemmiger formicilis</i> str.1	1	6	0	1	0
<i>Gemmiger formicilis</i> str.2	1	6	0	0	0
<i>Gemmiger formicilis</i> str.3	1	6	0	1	0
<i>Hydrogenoanaerobacterium saccharovorans</i>	0	1	0	0	0
<i>Lachnospira pectinoschiza</i>	0	1	0	0	0
<i>Lachnospiraceae bacterium 1 4 56FAA</i>	0	1	0	0	0
<i>Lachnospiraceae bacterium 2 1 58FAA</i>	1	0	0	1	0
<i>Lachnospiraceae bacterium 3 1 57FAA str.1</i>	1	4	0	1	0
<i>Lachnospiraceae bacterium 3 1 57FAA str.2</i>	1	4	0	1	0
<i>Lachnospiraceae bacterium 5 1 57FAA str.1</i>	0	1	0	0	1
<i>Lachnospiraceae bacterium 5 1 57FAA str.2</i>	0	1	0	0	1
<i>Lachnospiraceae bacterium 5 1 57FAA str.3</i>	0	1	0	0	0
<i>Lachnospiraceae bacterium 5 1 57FAA str.4</i>	0	1	0	0	1
<i>Lachnospiraceae bacterium 5 1 57FAA str.5</i>	0	1	0	0	1
<i>Lachnospiraceae bacterium 6 1 63FAA</i>	0	1	0	0	0
<i>Lachnospiraceae bacterium oral taxon F15 str.1</i>	0	1	0	0	0
<i>Lachnospiraceae bacterium oral taxon F15 str.2</i>	1	0	0	0	0
<i>Lachnospiraceae sp 10972</i>	1	0	0	n.d.	n.d.
<i>Lachnospiraceae sp 11041</i>	0	1	0	n.d.	n.d.
<i>Lactobacillus gasseri</i>	0	1	0	0	0
<i>Lactonifactor longoviformis</i>	0	1	0	0	0
<i>Odoribacter splanchnicus</i>	1	4	1	1	0
<i>Oscillibacter valericigenes</i>	1	4	0	1	0
<i>Parabacteroides distasonis</i>	1	3	0	1	0

Species	HDAC Inhibition in any C source (25/18% cutoff)	HDAC cluster assignment	Trp metabolite positive in any C source	Anti- inflammatory in any C source (>50% reduction on IL8 compared to TNFa control)	Pro- Inflammatory in any C- source (>25% increase in IL8 relative to medium control)
<i>Roseburia faecalis</i>	1	1	0	0	0
<i>Roseburia hominis str.1</i>	1	5	0	1	1
<i>Roseburia hominis str.2</i>	1	6	0	1	0
<i>Roseburia intestinalis str.1</i>	1	5	0	0	0
<i>Roseburia intestinalis str.2</i>	1	5	0	0	1
<i>Roseburia intestinalis str.3</i>	1	5	0	1	1
<i>Roseburia intestinalis str.4</i>	1	5	0	1	0
<i>Roseburia inulinivorans</i>	1	1	0	0	1
<i>Ruminococcaceae bacterium D16</i>	1	4	0	0	0
<i>Ruminococcus albus</i>	0	1	0	0	0
<i>Ruminococcus bromii str.1</i>	0	1	0	0	0
<i>Ruminococcus bromii str.2</i>	0	1	0	0	0
<i>Ruminococcus bromii str.3</i>	0	1	0	0	0
<i>Ruminococcus gnavus</i>	0	1	1	0	0
<i>Ruminococcus hansenii</i>	0	1	0	0	0
<i>Ruminococcus lactaris str.1</i>	0	1	0	0	0
<i>Ruminococcus lactaris str.2</i>	0	1	0	1	0
<i>Ruminococcus obeum str.1</i>	1	0	0	0	0
<i>Ruminococcus obeum str.2</i>	1	0	0	1	0
<i>Ruminococcus obeum str.3</i>	1	0	0	1	0
<i>Ruminococcus obeum str.4</i>	1	0	0	0	0
<i>Ruminococcus obeum str.5</i>	1	0	0	1	0
<i>Ruminococcus sp 5 1 39BFAA</i>	1	0	0	1	0
<i>Ruminococcus sp K-1</i>	1	0	0	0	0
<i>Ruminococcus torques str.1</i>	0	1	0	0	0
<i>Ruminococcus torques str.2</i>	0	1	0	0	0
<i>Subdoligranulum variable</i>	1	6	0	1	0
<i>Turicibacter sanguinis str.1</i>	0	1	0	n.d.	n.d.
<i>Turicibacter sanguinis str.2</i>	0	1	0	0	0

Table 5. Engraftment Summary

Species	SEQ ID NO for 16S Sequence	Long-Term Engrafter (LTE) or Transient Engrafter (TE)
Acetivibrio unclassified	258	LTE
Anaerostipes hadrus	363	LTE
Anaerostipes unclassified	229	LTE
Anaerotruncus colihominis str. 1	230	TE
Anaerotruncus colihominis str. 2	232	TE
Anaerotruncus unclassified	231	TE
Blautia hydrogenotrophica	238	LTE
Blautia obeum str. 1	389	LTE
Blautia obeum str. 2	390	LTE

Species	SEQ ID NO for 16S Sequence	Long-Term Engrafter (LTE) or Transient Engrafter (TE)
<i>Blautia producta</i>	239	TE
<i>Blautia unclassified str. 1</i>	233	LTE
<i>Blautia unclassified str. 2</i>	236	LTE
<i>Blautia unclassified str. 3</i>	391	LTE
<i>Blautia wexlerae str. 1</i>	240	LTE
<i>Blautia wexlerae str. 2</i>	241	LTE
<i>Blautia wexlerae str. 3</i>	242	LTE
<i>Blautia wexlerae str. 4</i>	243	LTE
<i>Blautia wexlerae str. 5</i>	244	LTE
<i>Blautia wexlerae str. 6</i>	245	LTE
<i>Blautia wexlerae str. 7</i>	246	LTE
<i>Blautia wexlerae str. 8</i>	247	LTE
<i>Butyricicoccus unclassified str. 1</i>	251	LTE
<i>Butyricicoccus unclassified str. 2</i>	259	LTE
<i>Butyricicoccus unclassified str. 3</i>	313	TE
<i>Clostridiales unclassified str. 1</i>	234	LTE
<i>Clostridiales unclassified str. 2</i>	235	LTE
<i>Clostridiales unclassified str. 3</i>	302	TE
<i>Clostridium aldenense</i>	263	TE
<i>Clostridium bolteae str. 1</i>	270	TE
<i>Clostridium bolteae str. 2</i>	272	TE
<i>Clostridium bolteae str. 3</i>	273	TE
<i>Clostridium bolteae str. 4</i>	274	TE
<i>Clostridium citroniae</i>	271	TE
<i>Clostridium innocuum str. 1</i>	278	TE
<i>Clostridium innocuum str. 2</i>	279	TE
<i>Clostridium innocuum str. 3</i>	280	TE
<i>Clostridium innocuum str. 4</i>	281	TE
<i>Clostridium innocuum str. 5</i>	282	TE
<i>Clostridium innocuum str. 6</i>	308	TE
<i>Clostridium innocuum str. 7</i>	310	TE
<i>Clostridium innocuum str. 8</i>	311	TE
<i>Clostridium innocuum str. 9</i>	312	TE
<i>Clostridium lavalense str. 1</i>	264	TE
<i>Clostridium lavalense str. 2</i>	283	TE
<i>Clostridium leptum str. 1</i>	284	LTE
<i>Clostridium leptum str. 2</i>	285	LTE
<i>Clostridium paraputrificum</i>	286	TE
<i>Clostridium perfringens</i>	287	TE
<i>Clostridium saudiense</i>	275	LTE
<i>Clostridium scindens</i>	362	TE
<i>Clostridium subterminale</i>	290	TE
<i>Clostridium symbiosum</i>	291	TE
<i>Clostridium unclassified</i>	237	LTE

Species	SEQ ID NO for 16S Sequence	Long-Term Engrafter (LTE) or Transient Engrafter (TE)
Coprobacillus unclassified	250	LTE
Coprococcus comes	293	LTE
Coprococcus unclassified	292	LTE
Dielma fastidiosa	248	LTE
Dorea formicigenerans str. 1	294	LTE
Dorea formicigenerans str. 2	295	LTE
Dorea formicigenerans str. 3	296	LTE
Dorea formicigenerans str. 4	297	LTE
Dorea formicigenerans str. 5	298	LTE
Dorea formicigenerans str. 6	299	LTE
Dorea longicatena str. 1	300	LTE
Dorea longicatena str. 2	301	LTE
Eisenbergiella tayi str. 1	359	LTE
Eisenbergiella tayi str. 2	360	LTE
Eisenbergiella tayi str. 3	361	LTE
Erysipelatoclostridium ramosum	288	TE
Eubacterium eligens str. 1	318	LTE
Eubacterium eligens str. 2	319	LTE
Eubacterium eligens str. 3	320	LTE
Eubacterium eligens str. 4	321	LTE
Eubacterium eligens str. 5	322	LTE
Eubacterium hallii	323	LTE
Eubacterium rectale str. 1	325	LTE
Eubacterium rectale str. 2	326	LTE
Eubacterium rectale str. 3	327	LTE
Eubacterium rectale str. 4	328	LTE
Eubacterium rectale str. 5	329	LTE
Eubacterium siraeum str. 1	330	LTE
Eubacterium siraeum str. 2	331	LTE
Eubacterium siraeum str. 3	332	LTE
Eubacterium siraeum str. 4	333	LTE
Eubacterium ventriosum	339	LTE
Faecalibacterium prausnitzii str. 1	340	LTE
Faecalibacterium prausnitzii str. 2	341	LTE
Faecalibacterium prausnitzii str. 3	342	LTE
Faecalibacterium prausnitzii str. 4	343	LTE
Faecalibacterium prausnitzii str. 5	344	LTE
Faecalibacterium prausnitzii str. 6	345	LTE
Faecalicatena contorta str. 1	314	TE
Faecalicatena contorta str. 2	315	TE
Faecalicatena contorta str. 3	316	TE
Faecalicatena contorta str. 4	317	TE
Firmicutes unclassified str. 1	303	TE
Firmicutes unclassified str. 2	304	TE

Species	SEQ ID NO for 16S Sequence	Long-Term Engrafter (LTE) or Transient Engrafter (TE)
Firmicutes unclassified str. 3	305	TE
Firmicutes unclassified str. 4	306	TE
Firmicutes unclassified str. 5	307	TE
Firmicutes unclassified str. 6	309	TE
Flavonifractor plautii str. 1	348	LTE
Flavonifractor plautii str. 2	364	LTE
Fusicatenibacter saccharivorans	349	LTE
Gemmiger formicilis	350	LTE
Holdemania filiformis	352	LTE
Hungatella effluvii str. 1	276	TE
Hungatella effluvii str. 2	277	TE
Intestinibacter bartlettii str. 1	265	LTE
Intestinibacter bartlettii str. 2	266	LTE
Intestinibacter bartlettii str. 3	267	LTE
Intestinibacter bartlettii str. 4	268	LTE
Intestinibacter bartlettii str. 5	269	LTE
Intestinimonas butyriciproducens	353	LTE
Lachnoclostridium pacaense	249	TE
Lachnospiraceae unclassified str. 1	228	LTE
Lachnospiraceae unclassified str. 2	252	LTE
Lachnospiraceae unclassified str. 3	253	LTE
Lachnospiraceae unclassified str. 4	254	LTE
Lachnospiraceae unclassified str. 5	255	LTE
Lachnospiraceae unclassified str. 6	256	LTE
Lachnospiraceae unclassified str. 7	260	LTE
Lachnospiraceae unclassified str. 8	289	LTE
Lachnospiraceae unclassified str. 9	354	LTE
Lachnospiraceae unclassified str. 10	381	LTE
Lactobacillus rogosae	355	LTE
Lactonifactor unclassified	366	TE
Longicatena caecimuris str. 1	334	LTE
Longicatena caecimuris str. 2	335	LTE
Longicatena caecimuris str. 3	336	LTE
Longicatena caecimuris str. 4	337	LTE
Longicatena caecimuris str. 5	338	LTE
Oscillibacter unclassified	367	LTE
Robinsoniella unclassified	257	LTE
Roseburia faecis	368	LTE
Roseburia hominis str. 1	369	LTE
Roseburia hominis str. 2	370	LTE
Roseburia hominis str. 3	371	LTE
Roseburia hominis str. 4	372	LTE
Roseburia inulinivorans	374	LTE
Roseburia unclassified str. 1	324	LTE

[illegible]

Table 7. Designed Bacterial Compositions (DE13-DE19 and DE21-DE23) Properties

[illegible]

Catalase	1	2	1	2	2	2	1	1	2	2
a-L-Fucosidase	1	1	1	2	2	3	1	1	2	2
IL8 Inflammatory	0	0	0	0	0	0	0	0	0	0
LTE	4	4	4	5	6	5	7	7	8	8
TE	8	10	2	5	9	5	7	3	6	5
Remission Associated	0	2	4	4	4	4	7	5	5	4
NonRemission Associated	2	2	0	1	2	1	0	0	1	1

Table 8. Designed Bacterial Compositions (DE20, DE24-DE30, DE32, and DE33) Properties

DE	DE313 669.1 (DE20)	DE0708 75.1 (DE24)	DE3434 82.1 (DE26)	DE6167 87.1 (DE25)	DE0688 51.1 (DE30)	DE0555 48.1 (DE28)	DE0338 49.1 (DE27)	DE8651 06.1 (DE29)	DE7792 49.1 (DE32)	DE4335 98.1 (DE33)
Alias	t1 eff s287 isolate plusCore maxHD ACDiv	15mer wRedu ndancy distant	15mer wRedu ndancy max3ve g maxSpo re	15mer wRedu ndancy max3ve g maxPro pionate	15mer wRedu ndancy maxT1E ff	15mer wRedu ndancy max5ve g maxSka tol	15mer wRedu ndancy max3ve g maxT1E ff	15mer wRedu ndancy max5ve g maxT1E ff	18mer wRedu ndancy maxT1E ff	18mer wRedu ndancy max5ve g maxT1Ef f
HDAC cluster 0	2	2	2	2	2	2	2	2	2	2
HDAC cluster 1	4	3	2	3	5	4	2	4	5	5
HDAC cluster 2	1	1	1	1	0	1	1	0	1	0
HDAC cluster 3	1	1	1	1	1	0	1	1	1	1
HDAC cluster 4	3	6	7	6	4	6	6	5	6	7
HDAC cluster 5	2	0	0	0	0	0	0	0	0	0
HDAC cluster 6	2	2	2	2	3	2	3	3	3	3
HDAC inhibition	12	12	14	13	11	13	14	12	13	14

Table 9. Designed Bacterial Compositions (DE2, DE9, DE31, and DE34-DE38) Properties

DE	DE502105.1 (DE31)	DE26638 6.1 (DE34)	DE27844 2.1 (DE35)	DE82195 6.1 (DE9)	DE53317 5.1 (DE38)	DE34689 7.1 (DE36)	DE93504 5.1 (DE37)	DE92422 1.1 (DE2)
Alias	18mer wRedundancy distant	common 20mer	mega 24mer	lousy de	lousier de	23mer swaps	18mer swaps	de2
HDAC cluster 0	2	2	2	1	1	2	2	2
HDAC cluster 1	6	4	9	3	3	7	4	2
HDAC cluster 2	1	1	1	0	0	1	0	2
HDAC cluster 3	1	1	1	0	0	1	1	3
HDAC cluster 4	6	6	8	1	1	8	7	3
HDAC cluster 5	0	0	0	1	2	0	0	0
HDAC cluster 6	2	3	3	0	1	4	4	1
HDAC inhibition	14	14	17	3	5	18	15	12
Propanoic acid	7	6	7	0	0	7	6	6
Butanoic acid	9	8	11	0	0	12	9	3
Pentanoic acid	2	2	2	0	0	1	1	1
Hexanoic acid	2	2	2	0	0	1	1	1
Indole	5	4	5	0	0	5	5	9
3-methyl indole	8	6	10	0	0	10	6	1
3-indoleacrylic acid	0	0	0	0	0	0	0	0
BSH gCA	15	15	21	1	1	20	16	7
BSH tCA	12	12	17	1	1	14	10	5
BSH gCDCA	12	12	17	1	1	15	11	6
BSH tCDCA	12	12	17	1	1	15	11	6
7aD CA	1	1	1	0	0	1	1	0
7aD CDCA	1	1	1	0	0	1	1	0
7bHSDH UDCA	0	0	0	0	0	0	0	1
Catalase	1	1	2	0	0	2	1	1
a-L-Fucosidase	0	1	2	0	0	1	1	3
IL8 Inflammatory	0	0	0	3	5	0	0	0
LTE	9	10	14	1	1	14	11	2
TE	9	7	10	1	2	9	7	2

Remission Associated	6	7	9	1	1	9	7	0
NonRemissi on Associated	0	0	0	0	0	0	0	1

[0410] This PCT application claims the priority benefit of U.S. Provisional Application No. 62/676,236, filed May 24, 2018, which is incorporated herein by reference in its entirety.

WHAT IS CLAIMED:

1. A composition comprising a first purified bacterial population and a second purified bacterial population,

wherein the first purified bacterial population comprises one or more bacteria having a 16S rDNA sequence that is at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence set forth in SEQ ID NO: 215, SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116, SEQ ID NO: 188, SEQ ID NO: 212, SEQ ID NO: 160, SEQ ID NO: 186, SEQ ID NO: 203, SEQ ID NO: 104, SEQ ID NO: 208, SEQ ID NO: 189, SEQ ID NO: 187, SEQ ID NO: 207, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 209, SEQ ID NO: 110, SEQ ID NO: 150, SEQ ID NO: 175, SEQ ID NO: 158, SEQ ID NO: 210, or SEQ ID NO: 106, and

wherein the second purified bacterial population comprises one or more bacteria having one or more features selected from the group consisting of: (i) capable of engrafting when administered to a subject, (ii) capable of having anti-inflammatory activity, (iii) not capable of inducing pro-inflammatory activity, (iv) capable of producing a secondary bile acid, (v) capable of producing a tryptophan metabolite, (vi) capable of restoring epithelial integrity as determined by a primary epithelial cell monolayer barrier integrity assay, (vii) capable of being associated with remission of an inflammatory bowel disease, (viii) capable of producing a short-chain fatty acid, (ix) capable of inhibiting a HDAC activity, (x) capable of producing a middle-chain fatty acid, (xi) capable of expressing catalase activity, (xii) capable of having alpha-fucosidase activity, (xiii) capable of inducing Wnt activation, (xiv) capable of producing a B vitamin, (xv) capable of modulating host metabolism of endocannabinoid, (xvi) capable of producing a polyamine and/or modulating a host metabolism of a polyamine, (xvii) capable of reducing fecal levels of a sphingolipid, (xviii) capable of modulating host production of kynurenine, (xix) capable of reducing fecal calprotectin level, (xx) not capable of activating a toll-like receptor pathway (*e.g.*, TLR2 or TLR5), (xxi) capable of activating a toll-like receptor pathway (*e.g.*, TLR2 or TLR5), and (xxii) any combination thereof.

2. A composition comprising a first purified bacterial population and a second purified bacterial population,

wherein the first bacterial population comprises one or more bacteria having a 16S rDNA sequence that is at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence set forth in SEQ ID NO: 118, SEQ ID NO:

166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, or SEQ ID NO: 137, and

wherein the second purified bacterial population comprises one or more bacteria having one or more features selected from the group consisting of: (i) capable of engrafting when administered to a subject, (ii) capable of having anti-inflammatory activity, (iii) not capable of inducing pro-inflammatory activity, (iv) capable of producing a secondary bile acid, (v) capable of producing a tryptophan metabolite, (vi) capable of restoring epithelial integrity as determined by a primary epithelial cell monolayer barrier integrity assay, (vii) capable of being associated with remission of an inflammatory bowel disease, (viii) capable of producing a short-chain fatty acid, (ix) capable of inhibiting a HDAC activity, (x) capable of producing a middle-chain fatty acid, (xi) capable of expressing catalase activity, (xii) capable of having alpha-fucosidase activity, (xiii) capable of inducing Wnt activation, (xiv) capable of producing a B vitamin, (xv) capable of modulating host metabolism of endocannabinoid, (xvi) capable of producing a polyamine and/or modulating a host metabolism of a polyamine, (xvii) capable of reducing fecal levels of a sphingolipid, (xviii) capable of modulating host production of kynurenine, (xix) capable of reducing fecal calprotectin level, (xx) not capable of activating a toll-like receptor pathway (*e.g.*, TLR4 or TLR5), (xxi) capable of activating a toll-like receptor pathway (*e.g.*, TLR2), and (xxii) any combination thereof.

3. A composition comprising a first purified bacterial population and a second purified bacterial population,

wherein the first bacterial population comprises one or more bacteria having a 16S rDNA sequence that is at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence set forth in SEQ ID NO: 117, SEQ ID NO: 137, SEQ ID NO: 111, or SEQ ID NO: 103, and

wherein the second purified bacterial population comprises one or more bacteria having one or more features selected from the group consisting of: (i) capable of engrafting when administered to a subject, (ii) capable of having anti-inflammatory activity, (iii) not capable of inducing pro-inflammatory activity, (iv) capable of producing a secondary bile acid, (v) capable of producing a tryptophan metabolite, (vi) capable of restoring epithelial integrity as determined by a primary epithelial cell monolayer barrier integrity assay, (vii) capable of being associated with remission of an inflammatory bowel disease, (viii) capable of producing a short-chain fatty acid, (ix) capable of inhibiting a HDAC activity, (x) capable of producing a middle-chain fatty

acid, (xi) capable of expressing catalase activity, (xii) capable of having alpha-fucosidase activity, (xiii) capable of inducing Wnt activation, (xiv) capable of producing a B vitamin, (xv) capable of modulating host metabolism of endocannabinoid, (xvi) capable of producing a polyamine and/or modulating host metabolism of a polyamine, (xvii) capable of producing a sphingolipid, (xviii) capable of modulating host production of kynurenine, (xix) capable of reducing fecal calprotectin level, (xx) not capable of activating a toll-like receptor pathway (*e.g.*, TLR2 or TLR5), (xxi) capable of activating a toll-like receptor pathway (*e.g.*, TLR2 or TLR5), and (xxii) any combination thereof.

4. The composition of any one of claims 1 to 3, wherein the one or more features are selected from (i) capable of engrafting when administered to a subject; (ii) capable of having anti-inflammatory activity, (iii) not capable of inducing pro-inflammatory activity, (iv) capable of producing a secondary bile acid, (v) capable of producing a tryptophan metabolite, (vi) capable of restoring epithelial integrity as determined by a primary epithelial cell monolayer barrier integrity assay, (vii) capable of being associated with remission of an inflammatory bowel disease, (viii) capable of producing a short-chain fatty acid, (ix) capable of inhibiting a HDAC activity, (x) capable of producing a middle-chain fatty acid, or (xi) any combination thereof.

5. The composition of any one of claims 1 to 4, wherein the second purified bacterial population comprises a long-term engrafter and/or a transient engrafter.

6. The composition of claim 5, wherein the second purified bacterial population comprises two, three, four, five, six, seven or more long-term engrafters.

7. The composition of claim 5 or 6, wherein the second purified bacterial population comprises two, three or more transient engrafters.

8. The composition of any one of claims 5 to 7, wherein a combination of the first purified bacterial population and the second purified bacterial population comprises three or more transient engrafters and/or seven or more long-term engrafters.

9. The composition of any one of claims 1 to 8, wherein the second purified bacterial population comprises one or more bacteria that are capable of producing a tryptophan metabolite.

10. The composition of any one of claims 1 to 9, wherein the second purified bacterial population comprises one or more bacteria that are capable of producing a secondary bile acid.

11. The composition of any one of claims 1 to 10, wherein the second purified bacterial population comprises one or more bacteria that are capable of having anti-inflammatory activity.

12. The composition of any one of claims 1 to 11, wherein the second purified bacterial population comprises one or more bacteria that are not capable of inducing pro-inflammatory activity.

13. The composition of any one of claims 1 to 12, wherein the second purified bacterial population comprises one or more bacteria that are capable of producing a short-chain fatty acid.

14. The composition of any one of claims 1 to 13, wherein the second purified bacterial population comprises one or more bacteria that are capable of producing a medium-chain fatty acid.

15. The composition of any one of claims 1 to 14, wherein the second purified bacterial population comprises one or more bacteria that are capable of inhibiting HDAC activity.

16. A composition comprising a purified bacterial population, wherein the purified bacterial population comprises two or more features selected from the group consisting of: (i) capable of engrafting when administered to a subject, (ii) capable of having anti-inflammatory activity, (iii) not capable of inducing pro-inflammatory activity, (iv) capable of producing a secondary bile acid, (v) capable of producing a tryptophan metabolite, (vi) capable of restoring epithelial integrity as determined by a primary epithelial cell monolayer barrier integrity assay, (vii) capable of being associated with remission of an inflammatory bowel disease, (viii) capable of producing a short-chain fatty acid, (ix) capable of inhibiting a HDAC activity, (x) capable of producing a middle-chain fatty acid, (xi) capable of expressing catalase activity, (xii) capable of having alpha-fucosidase activity, (xiii) capable of inducing Wnt activation, (xiv) capable of producing a B vitamin, (xv) capable of modulating host metabolism of endocannabinoid, (xvi) capable of producing a polyamine and/or modulating a host metabolism of a polyamine, (xvii) capable of reducing fecal levels of a sphingolipid, (xviii) capable of modulating host production of kynurenine, (xix) capable of reducing fecal calprotectin level, (xx) not capable of activating a toll-like receptor pathway (*e.g.*, TLR2 or TLR5), (xxi) capable of activating a toll-like receptor pathway (*e.g.*, TLR2 or TLR5), and (xxii) any combination thereof.

17. The composition of claim 16, wherein the two or more features are selected from (i) capable of engrafting when administered to a subject; (ii) capable of having anti-inflammatory activity, (iii) not capable of inducing pro-inflammatory activity, (iv) capable of producing a secondary bile acid, (v) capable of producing a tryptophan metabolite, (vi) capable of restoring epithelial integrity as determined by a primary epithelial cell monolayer barrier integrity assay,

(vii) capable of being associated with remission of an inflammatory bowel disease, (viii) capable of producing a short-chain fatty acid, (ix) capable of inhibiting a HDAC activity, (x) capable of producing a middle-chain fatty acid, or (xi) any combination thereof.

18. The composition of claim 16 or 17, wherein the purified bacterial population comprises one or more bacteria having a 16S rDNA sequence that is at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence set forth in SEQ ID NO: 215, SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116, SEQ ID NO: 188, SEQ ID NO: 212, SEQ ID NO: 160, SEQ ID NO: 186, SEQ ID NO: 203, SEQ ID NO: 104, SEQ ID NO: 208, SEQ ID NO: 189, SEQ ID NO: 187, SEQ ID NO: 207, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 209, SEQ ID NO: 110, SEQ ID NO: 159, SEQ ID NO: 175, SEQ ID NO: 158, SEQ ID NO: 210, or SEQ ID NO: 106.

19. The composition of any one of claims 16 to 18, wherein the purified bacterial population comprises one or more bacteria having a 16S rDNA sequence that is at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence set forth in SEQ ID NO: 185, SEQ ID NO: 183, SEQ ID NO: 161, SEQ ID NO: 206, SEQ ID NO: 102, SEQ ID NO: 214, SEQ ID NO: 184, SEQ ID NO: 204, SEQ ID NO: 216, SEQ ID NO: 217, SEQ ID NO: 218, SEQ ID NO: 219, SEQ ID NO: 220, SEQ ID NO: 221, SEQ ID NO: 222, SEQ ID NO: 223, SEQ ID NO: 224, SEQ ID NO: 225, SEQ ID NO: 226, SEQ ID NO: 227, SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 109, SEQ ID NO: 138, SEQ ID NO: 139, SEQ ID NO: 140, SEQ ID NO: 141, SEQ ID NO: 142, SEQ ID NO: 143, SEQ ID NO: 144, SEQ ID NO: 145, SEQ ID NO: 146, SEQ ID NO: 147, SEQ ID NO: 192, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 107, SEQ ID NO: 137, SEQ ID NO: 198, SEQ ID NO: 199, SEQ ID NO: 200, SEQ ID NO: 201, SEQ ID NO: 202, SEQ ID NO: 133, SEQ ID NO: 193, SEQ ID NO: 194, SEQ ID NO: 195, SEQ ID NO: 196, SEQ ID NO: 197, SEQ ID NO: 126, SEQ ID NO: 127, SEQ ID NO: 103, SEQ ID NO: 108, SEQ ID NO: 124, SEQ ID NO: 165, SEQ ID NO: 136, SEQ ID NO: 125, SEQ ID NO: 111, SEQ ID NO: 164, SEQ ID NO: 205, SEQ ID NO: 128, SEQ ID NO: 129, SEQ ID NO: 130, SEQ ID NO: 131, SEQ ID NO: 132, SEQ ID NO: 162, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 105, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 170, SEQ ID NO: 171, SEQ ID NO: 172, SEQ ID NO: 173, SEQ ID NO: 174, SEQ ID

NO: 163, SEQ ID NO: 182, SEQ ID NO: 135, SEQ ID NO: 134, SEQ ID NO: 179, SEQ ID NO: 180, SEQ ID NO: 181, or SEQ ID NO: 213.

20. A composition comprising a purified bacterial population, comprising two or more bacteria, wherein the two or more bacteria comprises a long-term engrafter and a transient engrafter.

21. The composition of claim 20, wherein the purified bacterial population further comprises one or more bacteria, which has one or more features selected from the group consisting of: (i) capable of engrafting when administered to a subject, (ii) capable of having anti-inflammatory activity, (iii) not capable of inducing pro-inflammatory activity, (iv) capable of producing a secondary bile acid, (v) capable of producing a tryptophan metabolite, (vi) capable of restoring epithelial integrity as determined by a primary epithelial cell monolayer barrier integrity assay, (vii) capable of being associated with remission of an inflammatory bowel disease, (viii) capable of producing a short-chain fatty acid, (ix) capable of inhibiting a HDAC activity, (x) capable of producing a middle-chain fatty acid, (xi) capable of expressing catalase activity, (xii) capable of having alpha-fucosidase activity, (xiii) capable of inducing Wnt activation, (xiv) capable of producing a B vitamin, (xv) capable of modulating host metabolism of endocannabinoid, (xvi) capable of producing a polyamine and/or modulating host metabolism of polyamines, (xvii) capable of reducing fecal levels of a sphingolipid, (xviii) capable of modulating host production of kynurenine, (xix) capable of reducing fecal calprotectin level, (xx) not capable of activating a toll-like receptor pathway (*e.g.*, TLR2 or TLR5), (xxi) capable of activating a toll-like receptor pathway (*e.g.*, TLR2 or TLR5), and (xxii) any combination thereof.

22. The composition of claim 21, wherein the one or more features are selected from (i) capable of engrafting when administered to a subject; (ii) capable of having anti-inflammatory activity, (iii) not capable of inducing pro-inflammatory activity, (iv) capable of producing a secondary bile acid, (v) capable of producing a tryptophan metabolite, (vi) capable of restoring epithelial integrity as determined by a primary epithelial cell monolayer barrier integrity assay, (vii) capable of being associated with remission of an inflammatory bowel disease, (viii) capable of producing a short-chain fatty acid, (ix) capable of inhibiting a HDAC activity, (x) capable of producing a middle-chain fatty acid, or (xi) any combination thereof.

23. The composition of any one of claims 16 to 22, wherein the purified bacterial population comprises two, three, four, five, six, seven or more long-term engrafters.

24. The composition of any one of claims 16 to 23, wherein the purified bacterial population comprises two, three, four, five, six, seven or more transient engrafters.

25. The composition of any one of claims 16 to 24, wherein the purified bacterial population comprises three or more transient engrafters and/or seven or more long-term engrafters.

26. The composition of any one of claims 16 to 25, wherein the purified bacterial population comprises one or more bacteria that are capable of producing a tryptophan metabolite.

27. The composition of any one of claims 16 to 26, wherein the purified bacterial population comprises one or more bacteria that are capable of producing a secondary bile acid.

28. The composition of any one of claims 16 to 27, wherein the purified bacterial population comprises one or more bacteria that are capable of having anti-inflammatory activity.

29. The composition of any one of claims 16 to 28, wherein the purified bacterial population comprises one or more bacteria that are not capable of inducing pro-inflammatory activity.

30. The composition of any one of claims 16 to 29, wherein the purified bacterial population comprises one or more bacteria that are capable of producing a short-chain fatty acid.

31. The composition of any one of claims 16 to 30, wherein the purified bacterial population comprises one or more bacteria that are capable of producing a medium-chain fatty acid.

32. The composition of any one of claims 16 to 31, wherein the purified bacterial population comprises one or more bacteria that are capable of inhibiting HDAC activity.

33. The composition of any one of claims 1 to 19 and 21 to 32, wherein the tryptophan metabolite comprises indole, 3-methyl indole, indoleacrylate, or any combination thereof.

34. The composition of claim 33, wherein the tryptophan metabolite is indole.

35. The composition of claim 33 or 34, wherein the tryptophan metabolite is 3-methyl indole.

36. The composition of claim 1 to 19 and 21 to 35, wherein the bacteria capable of producing a secondary bile acid has 7 α -dehydroxylase activity.

37. The composition of claim 1 to 19 and 21 to 36, wherein the bacteria capable of producing a secondary bile acid has bile salt hydrolase (BSH) activity.

38. The composition of any one of claims 1 to 15, wherein the first purified bacterial population and/or the second purified bacterial population does not comprise a bacterium having 7 β -hydroxysteroid dehydrogenase (7 β -HSDH) activity.

39. The composition of any one of claims 16 to 38, wherein the purified bacterial population does not comprise a bacterium having 7 β -hydroxysteroid dehydrogenase (7 β -HSDH) activity.

40. The composition of any one of claims 1 to 19 and 21 to 39, wherein the secondary bile acid comprises deoxycholic acid (DCA), 3 α 12-oxo-deoxycholic acid, 3 β 12 α -deoxycholic acid (3-isodeoxycholic acid), 7 α 3-oxo-chenodeoxycholic acid, lithocholic acid (LCA), 3-oxo LCA, or any combination thereof.

41. The composition of any one of claims 1 to 19 and 21 to 40, wherein the bacteria capable of having anti-inflammatory activity comprises (i) bacteria capable of producing a short-chain fatty acid, (ii) bacteria capable of inhibiting histone deacetylase (HDAC) activity, (iii) bacteria capable of inhibiting TNF- α -driven IL-8 secretion in epithelial cells *in vitro*, or (iv) any combination thereof.

42. The composition of any one of claims 1 to 19 and 21 to 41, wherein the one or more bacteria not capable of inducing pro-inflammatory activity comprises (i) bacteria not capable of inducing IL-8 secretion in epithelial cells *in vitro* and/or (ii) bacteria not capable of activating Toll-like receptor 4 (TLR4) and/or Toll-like receptor 5 (TLR5) *in vitro*.

43. The composition of any one of claims 1 to 19 and 21 to 42, wherein the short-chain fatty acid is selected from formate, acetate, propionate, butyrate, isobutyrate, valerate, isovalerate, or any combination thereof.

44. The composition of claim 43, wherein the short-chain fatty acid is propionate.

45. The composition of claim 43 or 44, wherein the short-chain fatty acid is butyrate.

46. The composition of any one of claims 1 to 19 and 21 to 45, wherein the medium-chain fatty acid comprises hexanoate, octanoate, decanoate, dodecanoate, or any combination thereof.

47. The composition of claim 46, wherein the medium-chain fatty acid is hexanoate or pentanoate.

48. The composition of any one of claims 5 to 15 and 20 to 47, wherein the long-term engrafter has a 16S rDNA sequence that is at least 97%, at least 97.5%, at least 98%, at least

98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence of a long-term engrafter provided in Table 5.

49. The composition of any one of claims 5 to 15 and 20 to 48, wherein the long-term engrafter has a 16S rDNA sequence that is at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence set forth in SEQ ID NO: 161, SEQ ID NO: 211, SEQ ID NO: 185, SEQ ID NO: 208, SEQ ID NO: 203, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 206, SEQ ID NO: 159, SEQ ID NO: 182, SEQ ID NO: 183, SEQ ID NO: 135, SEQ ID NO: 165, SEQ ID NO: 209, SEQ ID NO: 179, SEQ ID NO: 180, SEQ ID NO: 181 or SEQ ID NO: 189.

50. The composition of any one of claims 5 to 15 and 20 to 49, wherein the transient engrafter has a 16S rDNA sequence that is at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence of a transient engrafter provided in Table 5.

51. The composition of any one of claims 5 to 15 and 20 to 50, wherein the transient engrafter has a 16S rDNA sequence that is at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence set forth in SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 103, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 118, SEQ ID NO: 163, SEQ ID NO: 133, SEQ ID NO: 192, SEQ ID NO: 134, SEQ ID NO: 137, SEQ ID NO: 128, SEQ ID NO: 129, SEQ ID NO: 130, SEQ ID NO: 131, SEQ ID NO: 132, or SEQ ID NO: 175.

52. A composition comprising a purified bacterial population, which comprises one or more bacteria having a 16S rDNA sequence that is at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence set forth in SEQ ID NO: 215, SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116, SEQ ID NO: 188, SEQ ID NO: 212, SEQ ID NO: 160, SEQ ID NO: 186, SEQ ID NO: 203, SEQ ID NO: 104, SEQ ID NO: 208, SEQ ID NO: 189, SEQ ID NO: 187, SEQ ID NO: 207, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 209, SEQ ID NO: 110, SEQ ID NO: 159, SEQ ID NO: 175, SEQ ID NO: 158, SEQ ID NO: 210, or SEQ ID NO: 106.

53. The composition of claim 52, wherein the purified bacterial population further comprises one or more bacteria having a 16S rDNA sequence that is at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence set forth in SEQ ID NO: 185, SEQ ID NO: 183, SEQ ID NO: 161, SEQ ID NO: 206,

SEQ ID NO: 102, SEQ ID NO: 214, SEQ ID NO: 184, SEQ ID NO: 204, SEQ ID NO: 216, SEQ ID NO: 217, SEQ ID NO: 218, SEQ ID NO: 219, SEQ ID NO: 220, SEQ ID NO: 221, SEQ ID NO: 222, SEQ ID NO: 223, SEQ ID NO: 224, SEQ ID NO: 225, SEQ ID NO: 226, SEQ ID NO: 227, SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 109, SEQ ID NO: 138, SEQ ID NO: 139, SEQ ID NO: 140, SEQ ID NO: 141, SEQ ID NO: 142, SEQ ID NO: 143, SEQ ID NO: 144, SEQ ID NO: 145, SEQ ID NO: 146, SEQ ID NO: 147, SEQ ID NO: 192, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 107, SEQ ID NO: 137, SEQ ID NO: 198, SEQ ID NO: 199, SEQ ID NO: 200, SEQ ID NO: 201, SEQ ID NO: 202, SEQ ID NO: 133, SEQ ID NO: 193, SEQ ID NO: 194, SEQ ID NO: 195, SEQ ID NO: 196, SEQ ID NO: 197, SEQ ID NO: 126, SEQ ID NO: 127, SEQ ID NO: 103, SEQ ID NO: 108, SEQ ID NO: 124, SEQ ID NO: 165, SEQ ID NO: 136, SEQ ID NO: 125, SEQ ID NO: 111, SEQ ID NO: 164, SEQ ID NO: 205, SEQ ID NO: 128, SEQ ID NO: 129, SEQ ID NO: 130, SEQ ID NO: 131, SEQ ID NO: 132, SEQ ID NO: 162, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 105, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 170, SEQ ID NO: 171, SEQ ID NO: 172, SEQ ID NO: 173, SEQ ID NO: 174, SEQ ID NO: 163, SEQ ID NO: 182, SEQ ID NO: 135, SEQ ID NO: 134, SEQ ID NO: 179, SEQ ID NO: 180, SEQ ID NO: 181, or SEQ ID NO: 213.

54. A composition comprising a purified bacterial population comprising 16S rDNA sequences that are at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence selected from the group consisting of:

(1) SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116, SEQ ID NO: 188, SEQ ID NO: 186, SEQ ID NO: 104, SEQ ID NO: 187;

(2) SEQ ID NO: 186;

(3) SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116, SEQ ID NO: 188, SEQ ID NO: 186, SEQ ID NO: 104, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 175;

(4) SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116, SEQ ID NO: 188, SEQ ID NO: 186, SEQ ID NO: 203, SEQ ID NO: 104;

(5) SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116, SEQ ID NO: 186, SEQ ID NO: 203, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 175;

- (6) SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116 or SEQ ID NO: 104;
- (7) SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116, SEQ ID NO: 104, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 175;
- (8) SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116, SEQ ID NO: 203, SEQ ID NO: 104;
- (9) SEQ ID NO: 112, SEQ ID NO: 113, SEQ ID NO: 114, SEQ ID NO: 115, SEQ ID NO: 116, SEQ ID NO: 203, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 175;
- (10) SEQ ID NO: 159; SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211;
- (11) SEQ ID NO: 212, SEQ ID NO: 203, SEQ ID NO: 189, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 159, SEQ ID NO: 175, SEQ ID NO: 210;
- (12) SEQ ID NO: 212, SEQ ID NO: 203, SEQ ID NO: 189, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 159, SEQ ID NO: 175;
- (13) SEQ ID NO: 212, SEQ ID NO: 203, SEQ ID NO: 189, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 159;
- (14) SEQ ID NO: 212, SEQ ID NO: 203, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 159;
- (15) SEQ ID NO: 203, SEQ ID NO: 189, SEQ ID NO: 211, SEQ ID NO: 175;
- (16) SEQ ID NO: 203, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 175;
- (17) SEQ ID NO: 203, SEQ ID NO: 189, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 175;
- (18) SEQ ID NO: 203, SEQ ID NO: 208, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 159, SEQ ID NO: 175;
- (19) SEQ ID NO: 203, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 159, SEQ ID NO: 175;
- (20) SEQ ID NO: 203, SEQ ID NO: 208, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 159, SEQ ID NO: 175;
- (21) SEQ ID NO: 203, SEQ ID NO: 208, SEQ ID NO: 189, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 159, SEQ ID NO: 175;
- (22) SEQ ID NO: 203, SEQ ID NO: 208, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 209, SEQ ID NO: 159;

(23) SEQ ID NO: 203, SEQ ID NO: 190, SEQ ID NO: 191, SEQ ID NO: 211, SEQ ID NO: 209, SEQ ID NO: 159;

(24) SEQ ID NO: 215, SEQ ID NO: 160, SEQ ID NO: 158, SEQ ID NO: 106; and

(25) any combination thereof.

55. The composition of of claim 54, wherein the purified bacterial population further comprises 16S rDNA sequences that are at least 97%, at least 97.5%, at least 98%, at least 98.5%, at least 99%, at least 99.5%, or 100% identical to a 16S rDNA sequence selected from the group consisting of:

(1) SEQ ID NO: 184, SEQ ID NO: 204, SEQ ID NO: 216, SEQ ID NO: 217, SEQ ID NO: 218, SEQ ID NO: 219, SEQ ID NO: 220, SEQ ID NO: 221, SEQ ID NO: 222, SEQ ID NO: 223, SEQ ID NO: 224, SEQ ID NO: 225, SEQ ID NO: 226, SEQ ID NO: 227, SEQ ID NO: 198, SEQ ID NO: 199, SEQ ID NO: 200, SEQ ID NO: 201, SEQ ID NO: 202, SEQ ID NO: 126, SEQ ID NO: 127, SEQ ID NO: 103, SEQ ID NO: 128, SEQ ID NO: 129, SEQ ID NO: 130, SEQ ID NO: 131, SEQ ID NO: 132, SEQ ID NO: 162, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123;

(2) SEQ ID NO: 204, SEQ ID NO: 103;

(3) SEQ ID NO: 204, SEQ ID NO: 103, SEQ ID NO: 205;

(4) SEQ ID NO: 185, SEQ ID NO: 204, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 117;

(5) SEQ ID NO: 184, SEQ ID NO: 204, SEQ ID NO: 198, SEQ ID NO: 199, SEQ ID NO: 200, SEQ ID NO: 201, SEQ ID NO: 202, SEQ ID NO: 103, SEQ ID NO: 162, SEQ ID NO: 134;

(6) SEQ ID NO: 184, SEQ ID NO: 204, SEQ ID NO: 198, SEQ ID NO: 199, SEQ ID NO: 200, SEQ ID NO: 201, SEQ ID NO: 202, SEQ ID NO: 103, SEQ ID NO: 165, SEQ ID NO: 162, SEQ ID NO: 182;

(7) SEQ ID NO: 184, SEQ ID NO: 204, SEQ ID NO: 103, SEQ ID NO: 165, SEQ ID NO: 162, SEQ ID NO: 182, SEQ ID NO: 134;

(8) SEQ ID NO: 184, SEQ ID NO: 204, SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 128, SEQ ID NO: 129, SEQ ID NO: 130, SEQ ID NO: 131, SEQ ID NO: 132, SEQ ID NO: 162, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123;

(9) SEQ ID NO: 184, SEQ ID NO: 204, SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 162, SEQ ID NO: 118, SEQ ID NO: 134;

(10) SEQ ID NO: 184, SEQ ID NO: 204, SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 162, SEQ ID NO: 118, SEQ ID NO: 182

(11) SEQ ID NO: 184, SEQ ID NO: 204, SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 162, SEQ ID NO: 118, SEQ ID NO: 182, SEQ ID NO: 134;

(12) SEQ ID NO: 111, SEQ ID NO: 135, SEQ ID NO: 134;

(13) SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 137, SEQ ID NO: 111, SEQ ID NO: 135, SEQ ID NO: 134;

(14) SEQ ID NO: 183, SEQ ID NO: 204, SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 137, SEQ ID NO: 133, SEQ ID NO: 103, SEQ ID NO: 111, SEQ ID NO: 118, SEQ ID NO: 163, SEQ ID NO: 135, SEQ ID NO: 134;

(15) SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 137, SEQ ID NO: 193, SEQ ID NO: 194, SEQ ID NO: 195, SEQ ID NO: 196, SEQ ID NO: 197, SEQ ID NO: 111, SEQ ID NO: 118, SEQ ID NO: 170, SEQ ID NO: 171, SEQ ID NO: 172, SEQ ID NO: 173, SEQ ID NO: 174, SEQ ID NO: 135, SEQ ID NO: 134;

(16) SEQ ID NO: 133, SEQ ID NO: 111, SEQ ID NO: 128, SEQ ID NO: 129, SEQ ID NO: 130, SEQ ID NO: 131, SEQ ID NO: 132, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 182, SEQ ID NO: 135, SEQ ID NO: 134;

(17) SEQ ID NO: 111, SEQ ID NO: 182, SEQ ID NO: 135, SEQ ID NO: 134;

(18) SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 137, SEQ ID NO: 111, SEQ ID NO: 118, SEQ ID NO: 182, SEQ ID NO: 135, SEQ ID NO: 134;

(19) SEQ ID NO: 184, SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 137, SEQ ID NO: 111, SEQ ID NO: 118, SEQ ID NO: 135, SEQ ID NO: 134;

(20) SEQ ID NO: 183, SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 176, SEQ ID NO: 177, SEQ ID NO: 178, SEQ ID NO: 137, SEQ ID NO: 136, SEQ ID NO: 111, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 135, SEQ ID NO: 134;

(21) SEQ ID NO: 185, SEQ ID NO: 183, SEQ ID NO: 161, SEQ ID NO: 206, SEQ ID NO: 137, SEQ ID NO: 133, SEQ ID NO: 103, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163

(22) SEQ ID NO: 183, SEQ ID NO: 161, SEQ ID NO: 206, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163, SEQ ID NO: 134;

(23) SEQ ID NO: 185, SEQ ID NO: 183, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163, SEQ ID NO: 134;

(24) SEQ ID NO: 206, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 182, SEQ ID NO: 135;

(25) SEQ ID NO: 185, SEQ ID NO: 183, SEQ ID NO: 206, SEQ ID NO: 192, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 165, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 163;

(26) SEQ ID NO: 185, SEQ ID NO: 183, SEQ ID NO: 206, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163, SEQ ID NO: 182;

(27) SEQ ID NO: 206, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 165, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163, SEQ ID NO: 182;

(28) SEQ ID NO: 185, SEQ ID NO: 183, SEQ ID NO: 206, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 165, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163, SEQ ID NO: 182, SEQ ID NO: 135;

(29) SEQ ID NO: 185, SEQ ID NO: 161, SEQ ID NO: 206, SEQ ID NO: 137, SEQ ID NO: 133, SEQ ID NO: 103, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO:

119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163, SEQ ID NO: 182, SEQ ID NO: 135;

(30) SEQ ID NO: 185, SEQ ID NO: 183, SEQ ID NO: 206, SEQ ID NO: 192, SEQ ID NO: 137, SEQ ID NO: 133, SEQ ID NO: 103, SEQ ID NO: 165, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163;

(31) SEQ ID NO: 185, SEQ ID NO: 183, SEQ ID NO: 206, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163, SEQ ID NO: 182, SEQ ID NO: 135;

(32) SEQ ID NO: 185, SEQ ID NO: 183, SEQ ID NO: 161, SEQ ID NO: 206, SEQ ID NO: 192, SEQ ID NO: 137, SEQ ID NO: 133, SEQ ID NO: 103, SEQ ID NO: 165, SEQ ID NO: 111, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163, SEQ ID NO: 182, SEQ ID NO: 135, SEQ ID NO: 134;

(33) SEQ ID NO: 185, SEQ ID NO: 183, SEQ ID NO: 161, SEQ ID NO: 206, SEQ ID NO: 192, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 165, SEQ ID NO: 111, SEQ ID NO: 128, SEQ ID NO: 129, SEQ ID NO: 130, SEQ ID NO: 131, SEQ ID NO: 132, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163, SEQ ID NO: 182, SEQ ID NO: 134, SEQ ID NO: 179, SEQ ID NO: 180, SEQ ID NO: 181;

(34) SEQ ID NO: 185, SEQ ID NO: 161, SEQ ID NO: 206, SEQ ID NO: 137, SEQ ID NO: 103, SEQ ID NO: 111, SEQ ID NO: 128, SEQ ID NO: 129, SEQ ID NO: 130, SEQ ID NO: 131, SEQ ID NO: 132, SEQ ID NO: 117, SEQ ID NO: 118, SEQ ID NO: 119, SEQ ID NO: 120, SEQ ID NO: 121, SEQ ID NO: 122, SEQ ID NO: 123, SEQ ID NO: 163, SEQ ID NO: 182, SEQ ID NO: 179, SEQ ID NO: 180, SEQ ID NO: 181;

(35) SEQ ID NO: 102, SEQ ID NO: 216, SEQ ID NO: 217, SEQ ID NO: 218, SEQ ID NO: 219, SEQ ID NO: 220, SEQ ID NO: 221, SEQ ID NO: 222, SEQ ID NO: 223, SEQ ID NO: 224, SEQ ID NO: 225, SEQ ID NO: 226, SEQ ID NO: 227, SEQ ID NO: 166, SEQ ID NO: 167, SEQ ID NO: 168, SEQ ID NO: 169, SEQ ID NO: 109, SEQ ID NO: 107, SEQ ID NO: 103, SEQ ID NO: 108, SEQ ID NO: 117, SEQ ID NO: 105, SEQ ID NO: 179, SEQ ID NO: 180, SEQ ID NO: 181; and

(36) any combination thereof.

56. The composition of any one of claims 1 to 55, further comprising one or more enteric polymers.

57. A pharmaceutical formulation comprising the composition of any one of claims 1 to 56, and a pharmaceutically acceptable excipient.

58. The pharmaceutical formulation of claim 57, wherein the excipient is glycerol.

59. The pharmaceutical formulation of claim 57, wherein the composition is lyophilized.

60. The pharmaceutical formulation of claim 57, wherein the composition is formulated for oral delivery.

61. A method of treating an inflammatory disease in a subject in need thereof, comprising administering to the subject an effective amount of a composition of any one of claims 1 to 60.

62. The method of claim 61, wherein administering the effective amount of the composition ameliorates one or more signs or symptoms of the inflammatory disease or maintains a remission of the inflammatory disease.

63. The method of claim 61 or 62, wherein the inflammatory disease comprises an inflammatory bowel disease.

64. The method of claim 63, wherein the inflammatory bowel disease comprises Crohn's disease, autoimmune-mediated gastrointestinal diseases, gastrointestinal inflammation, or colitis, such as ulcerative colitis, colitis ulcerosa, microscopic colitis, collagenous colitis, colitis polyposa, necrotizing enterocolitis, transmural colitis, or any combination thereof.

65. Use of a composition of any one of claims 1 to 60 in the manufacture of a medicament for treating an inflammatory disease in a subject in need thereof.

66. A composition of any one of claims 1 to 60 for use in a method of treating an inflammatory disease, comprising administering the composition to the subject.

67. A method of modulating the level of a biological molecule in a subject in need thereof, comprising administering to the subject an effective amount of a composition of any one of claims 1 to 60.

68. The method of claim 67, wherein the biological molecule comprises a fecal calprotectin, a secondary bile acid, a tryptophan metabolite, a short-chain fatty acid, a medium-chain fatty acid, a sphingolipid, a kynurenine, or any combination thereof.

69. The method of claim 68, wherein the level of fecal calprotectin is reduced by at least about 10%, at least about 20%, at least about 30%, at least about 40%, at least about 50%, at least about 60%, at least about 70%, at least about 80%, or at least about 90% in the subject compared to a corresponding level in a reference.

70. The method of claim 68 or 69, wherein the level of a secondary bile acid is increased by at least about 10%, at least about 20%, at least about 30%, at least about 40%, at least about 50%, at least about 60%, at least about 70%, at least about 80%, or at least about 90% in the subject compared to a corresponding level in a reference.

71. The method of claim 70, wherein the secondary bile acid comprises deoxycholic acid (DCA), 3 α 12-oxo-deoxycholic acid, 3 β 12 α -deoxycholic acid (3-isodeoxycholic acid), 7 α 3-oxo-chenodeoxycholic acid, lithocholic acid (LCA), 3-oxo LCA, or any combination thereof.

72. The method of any one of claims 68 to 71, wherein the level of a tryptophan metabolite is increased by at least about 10%, at least about 20%, at least about 30%, at least about 40%, at least about 50%, at least about 60%, at least about 70%, at least about 80%, or at least about 90% in the subject compared to a corresponding level in a reference.

73. The method of claim 72, wherein the tryptophan metabolite is selected from the group consisting of indole, 3-methylindole, and combinations thereof.

74. The method of any one of claims 68 to 73, wherein the level of a short-chain fatty acid is increased by at least about 10%, at least about 20%, at least about 30%, at least about 40%, at least about 50%, at least about 60%, at least about 70%, at least about 80%, or at least about 90% in the subject compared to a corresponding level in a reference.

75. The method of claim 74, wherein the short-chain fatty acid is selected from formate, acetate, propionate, butyrate, isobutyrate, valerate, isovalerate, or any combination thereof.

76. The method of any one of claims 68 to 75, wherein the reference is a predetermined level or a level in the subject prior to the administration.

77. The method of any one of claims 68 to 76, wherein the modulation of the biological molecule is associated with remission of an inflammatory disease.

78. A method of treating a cancer in a subject in need thereof, comprising administering to the subject an effective amount of a composition of any one of claims 1 to 60.

79. Use of a composition of any one of claims 1 to 60 in the manufacture of a medicament for treating a cancer in a subject in need thereof.

80. A composition of any one of claims 1 to 60 for use in a method of treating a cancer, comprising administering the composition to the subject.

81. A method for inhibiting a growth of a tumor or reducing the size of a tumor in a subject in need thereof, comprising administering to the subject an effective amount of a composition of any one of claims 1 to 60.

82. Use of a composition of any one of claims 1 to 60 in the manufacture of a medicament for inhibiting a growth of a tumor or reducing the size of a tumor in a subject in need thereof.

83. A composition of any one of claims 1 to 60 for use in a method of treating a cancer, comprising administering the composition to the subject.

84. A method of enhancing an immune response in a subject in need thereof, comprising administering to the subject an effective amount of a composition of any one of claims 1 to 60.

85. Use of a composition of any one of claims 1 to 60 in the manufacture of a medicament for enhancing an immune response in a subject in need thereof.

86. A composition of any one of claims 1 to 60 for use in a method of enhancing an immune response in a subject in need thereof.

87. The method, the use, or the composition for use of any one of claims 81 to 83, wherein the subject has a cancer.

88. The method, the use, or the composition for use of any one of claims 78 to 83 or 87, further comprising administering an additional therapeutic agent to the subject.

89. The method, the use, or the composition for use of claim 88, wherein the additional therapeutic agent comprises an immune checkpoint inhibitor.

90. The method, the use, or the composition for use of claim 89, wherein the immune checkpoint inhibitor is selected from an anti-PD-1 antibody, an anti-PD-L1 antibody, an anti-CTLA-4 antibody, or a combination thereof.

91. The method, the use, or the composition for use of any one of claims 78 to 83 or 87 to 90, wherein the cancer comprises a bladder cancer, breast cancer, uterine/cervical cancer, ovarian cancer, prostate cancer, testicular cancer, esophageal cancer, gastrointestinal cancer, pancreatic cancer, colorectal cancer, colon cancer, kidney cancer, head and neck cancer, lung cancer, stomach cancer, germ cell cancer, bone cancer, liver cancer, thyroid cancer, skin cancer,

neoplasm of the central nervous system, lymphoma, leukemia, myeloma, sarcoma, virus-related cancer, or any combination thereof.

92. The method, the use, or the composition for use of claim 78 to 83 and 87 to 91 wherein the administering results in increased number of tumor infiltrating lymphocytes in a tumor of the subject.

93. The method, the use, or the composition for use of claim 92, wherein the number of tumor infiltrating lymphocytes in the tumor is increased by at least about 5%, at least about 10%, at least about 20%, at least about 30%, at least about 40%, at least about 50%, at least about 60%, at least about 70%, at least about 80%, or at least about 90% or more compared to a reference.

94. The method, the use, or the composition for use of claim 93, wherein the reference comprises the number of tumor infiltrating lymphocytes in a tumor of a subject that did not receive the composition .

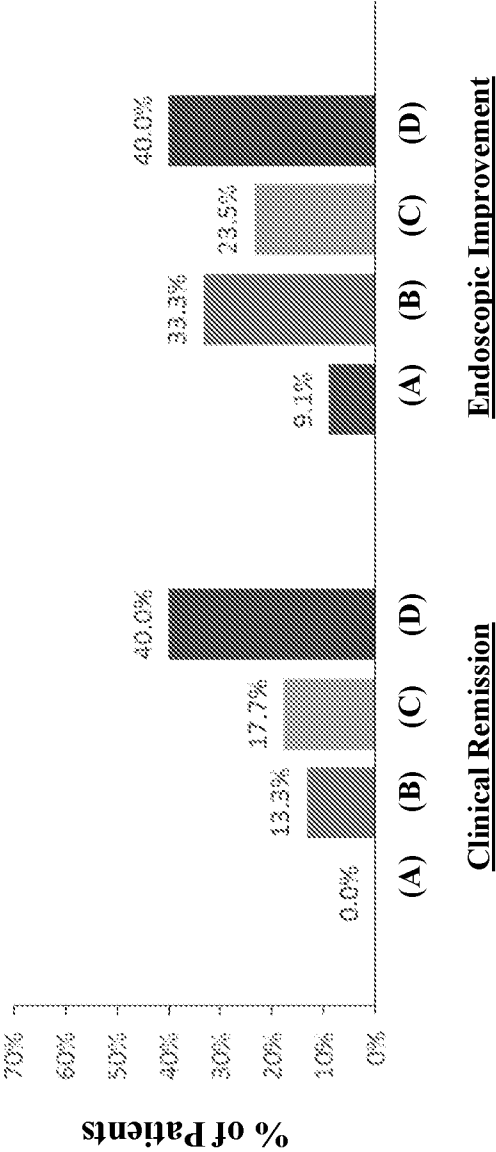


FIG. 1

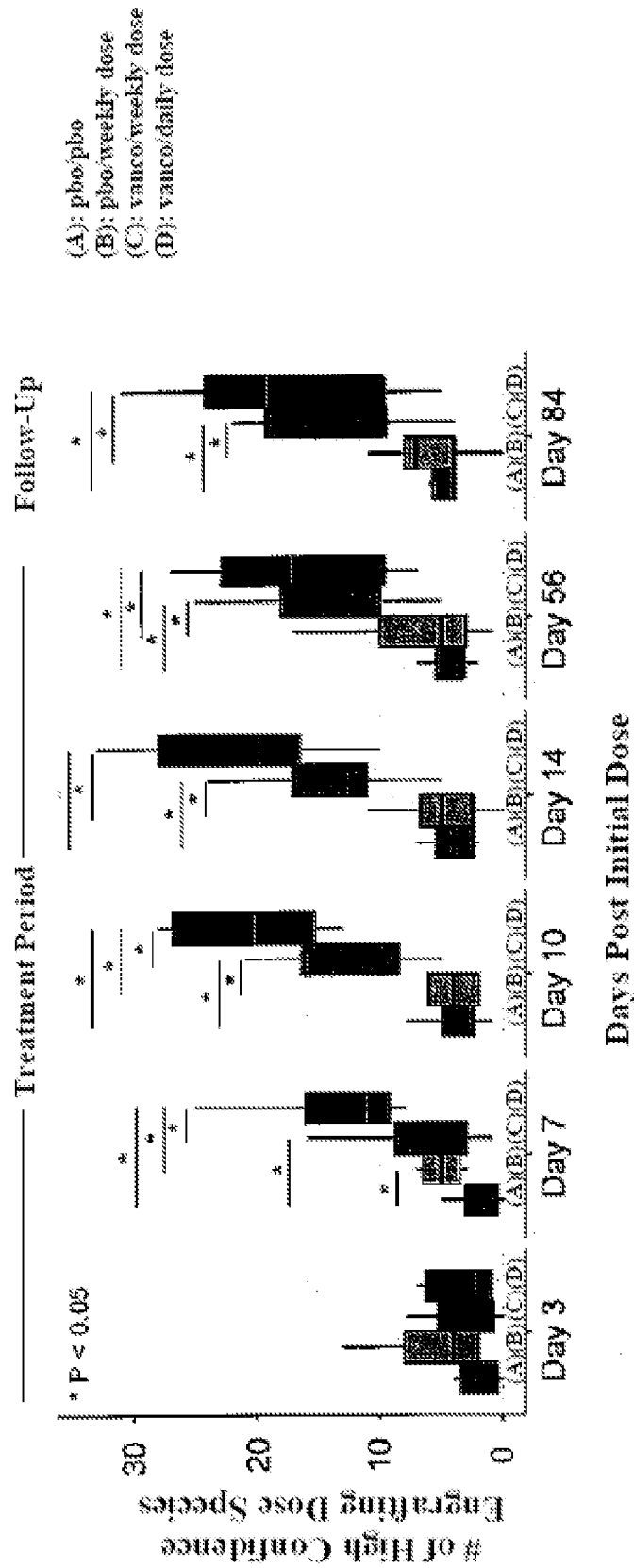


FIG. 2A

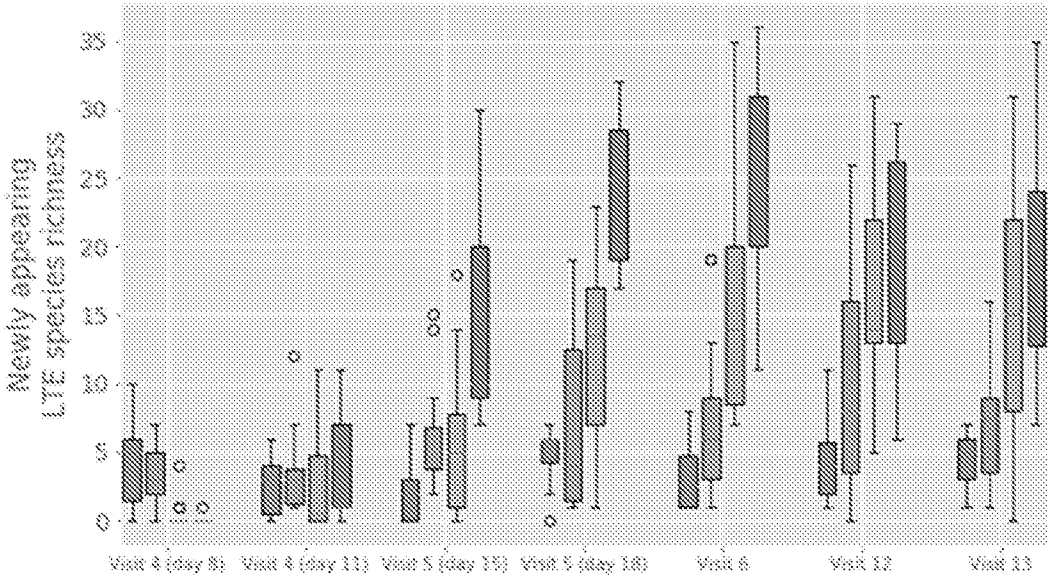


FIG. 2B

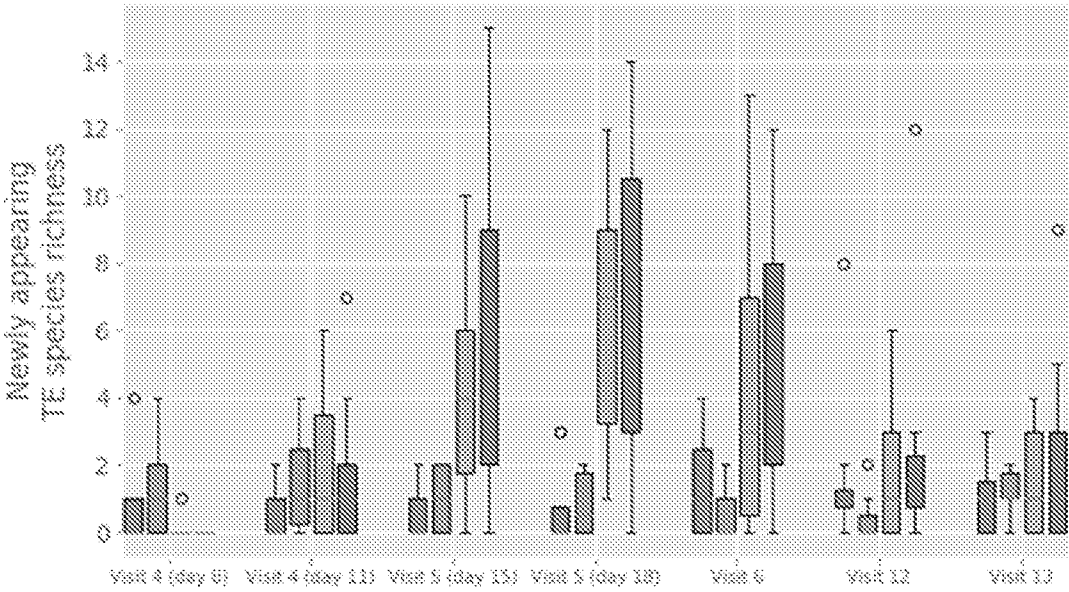
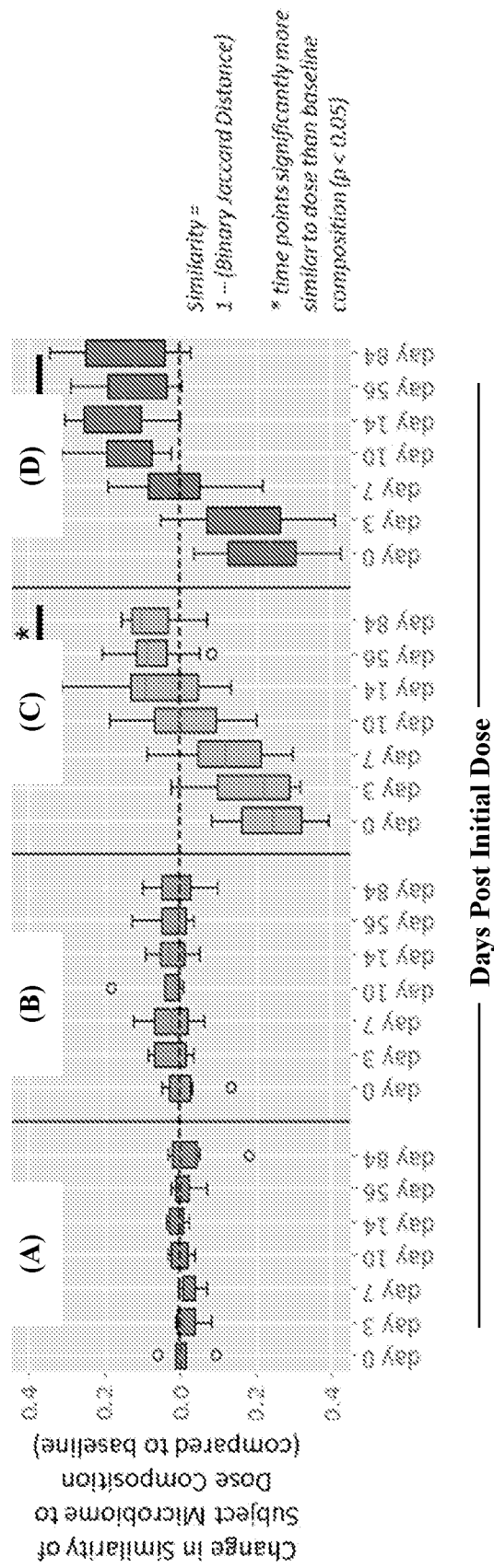


FIG. 2C



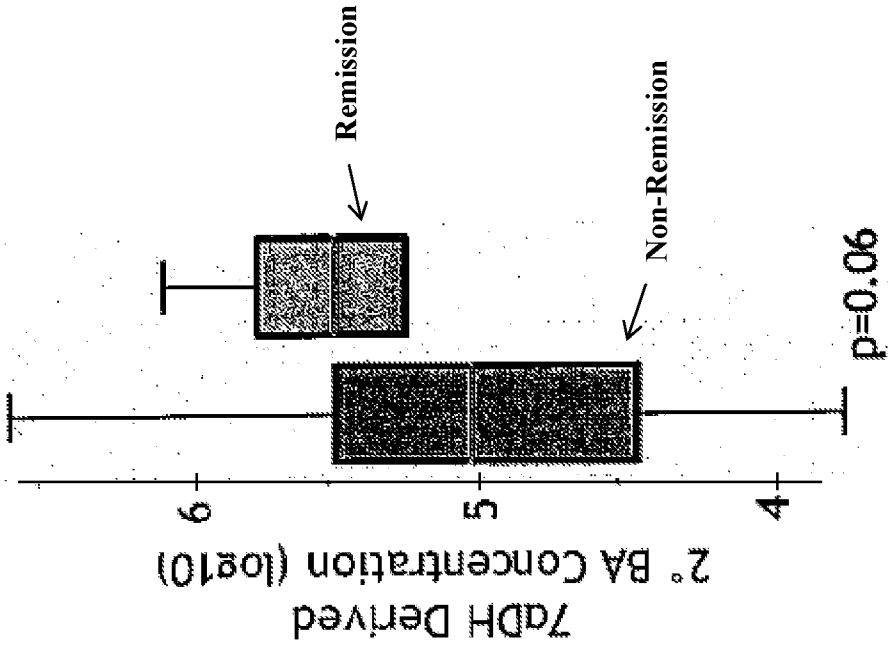


FIG. 4

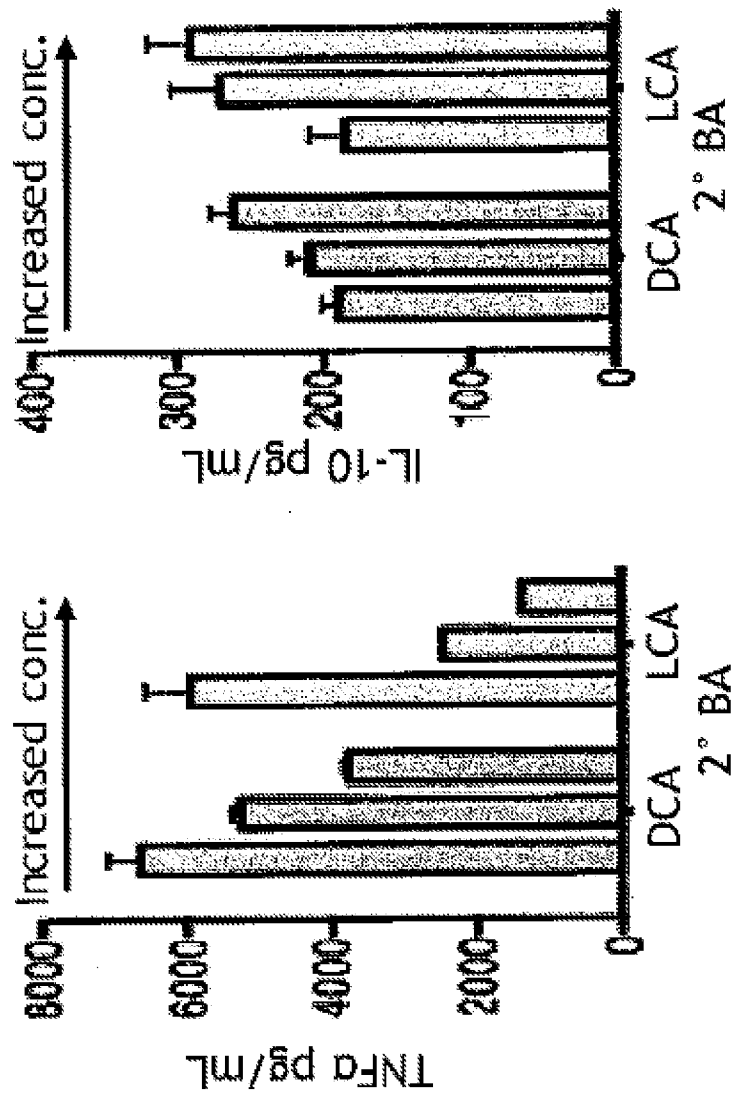


FIG. 5A

FIG. 5B

FIG. 6C

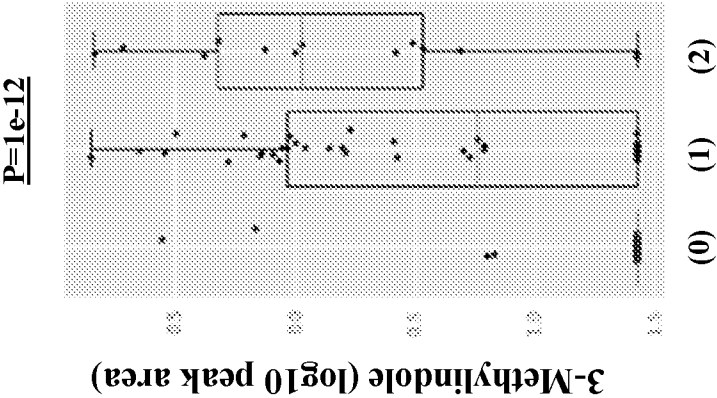


FIG. 6B

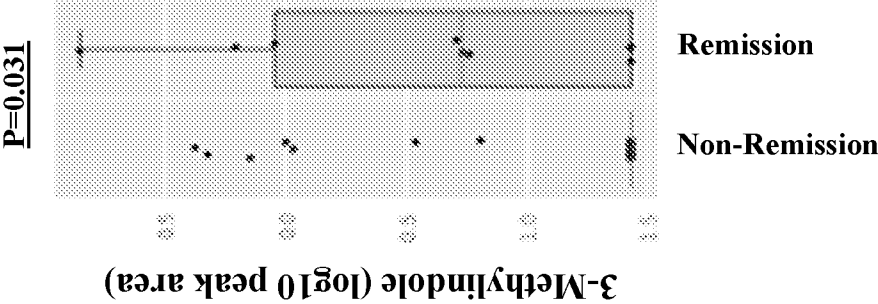
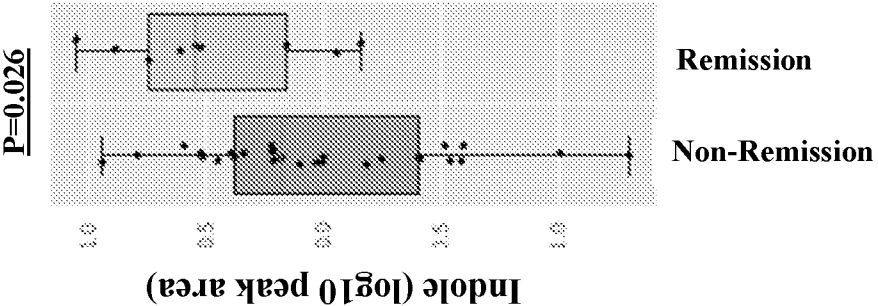


FIG. 6A



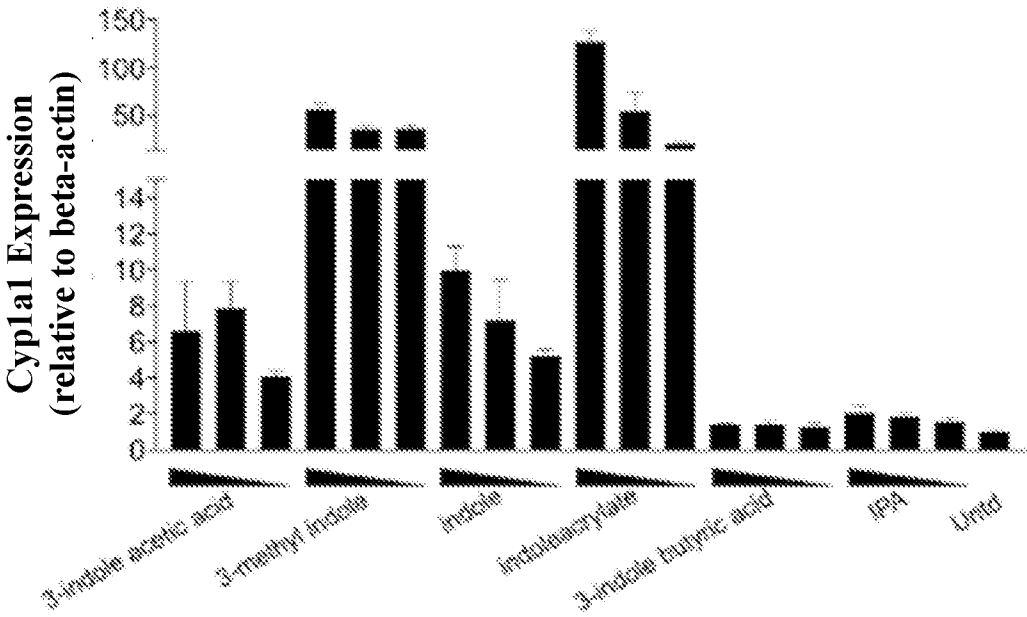


FIG. 7A

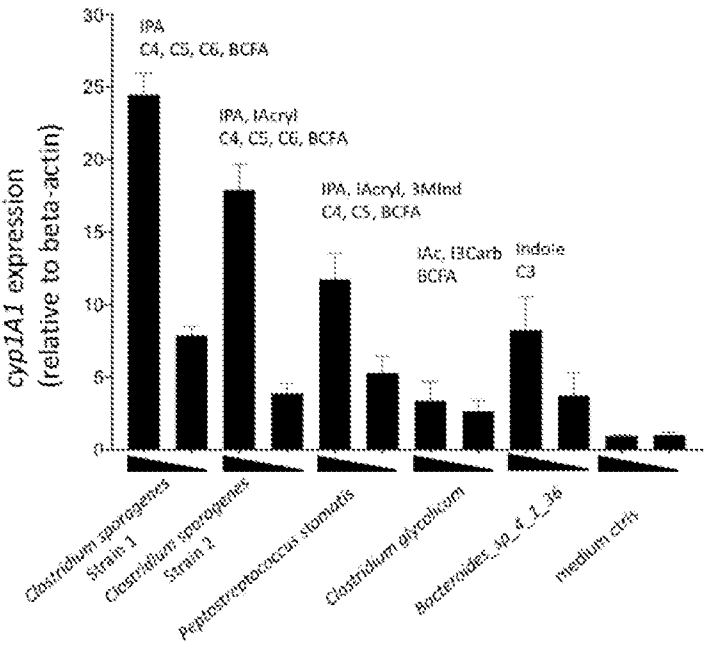


FIG. 7B

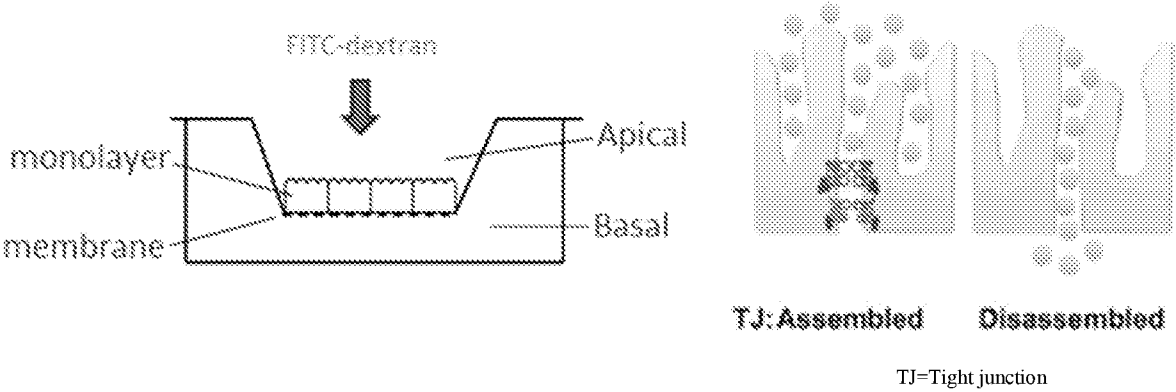


FIG. 8A

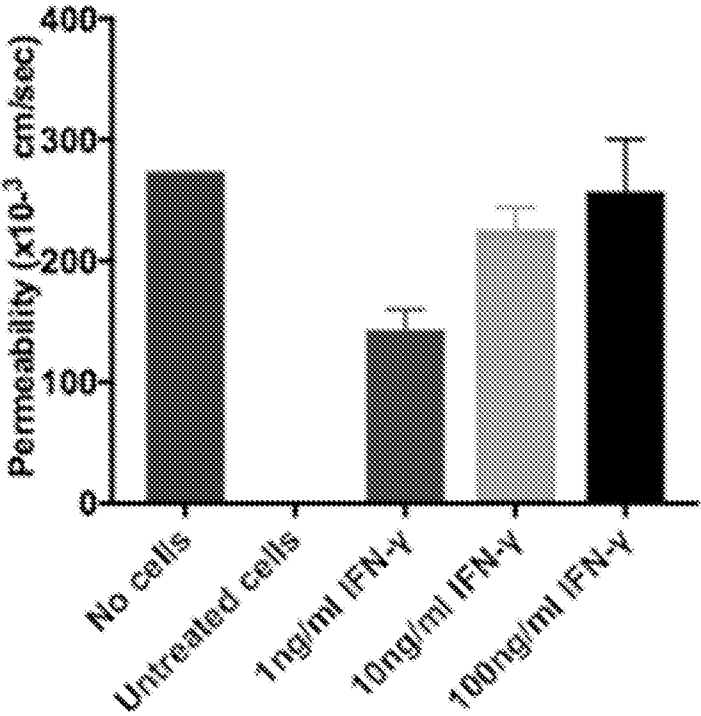


FIG. 8B

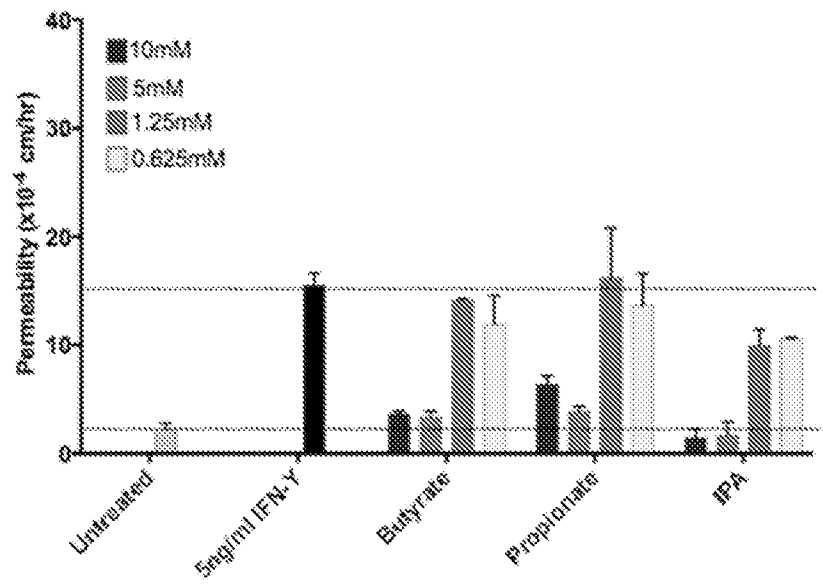


FIG. 9A

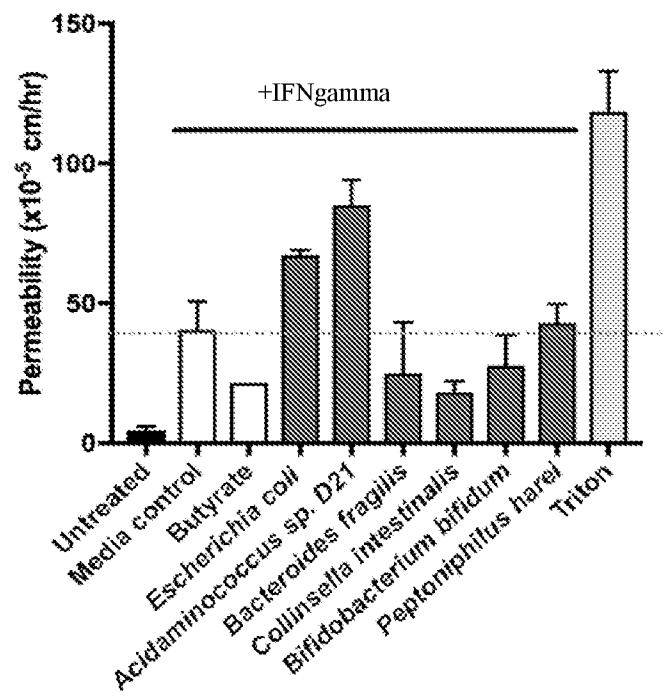


FIG. 9B

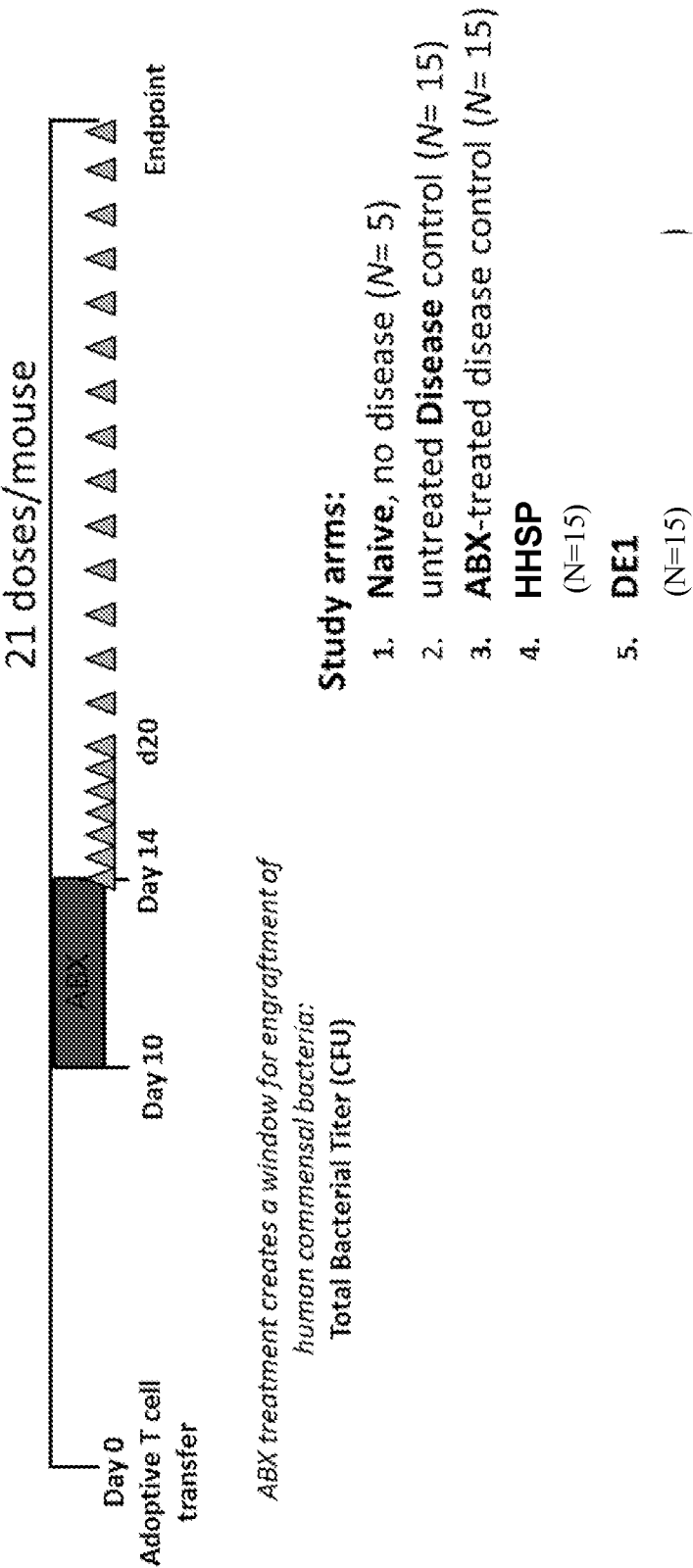


FIG. 10

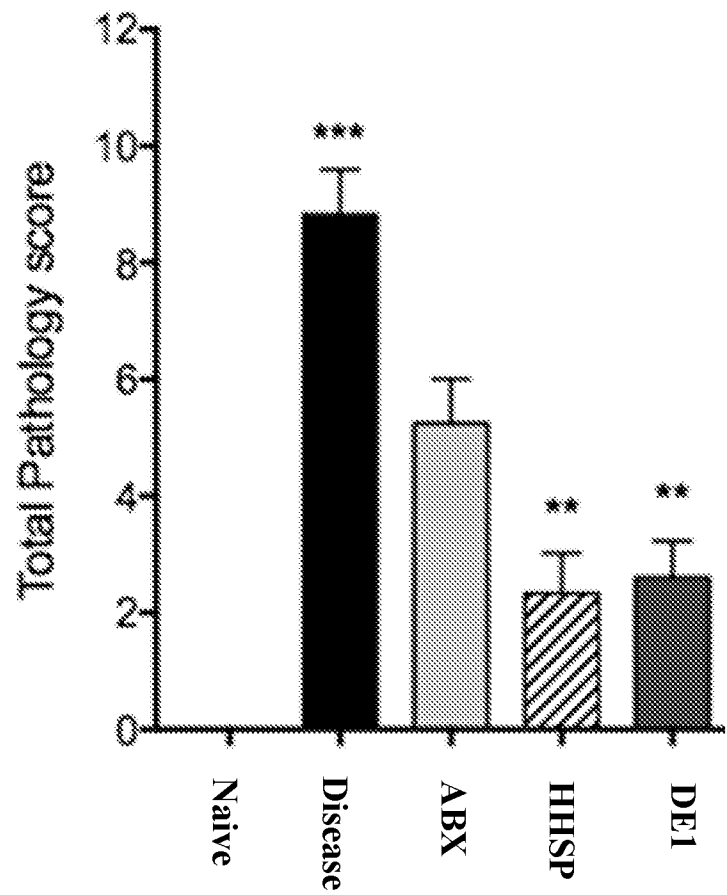


FIG. 11

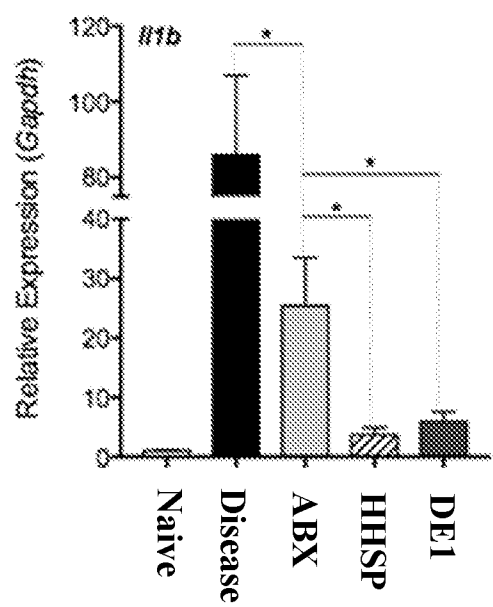


FIG. 12A

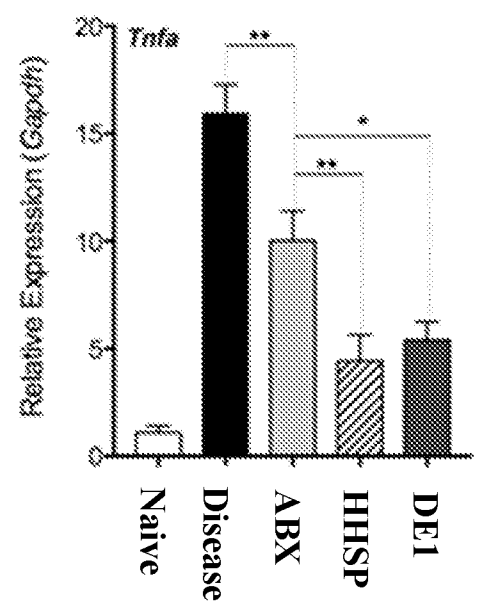


FIG. 12B

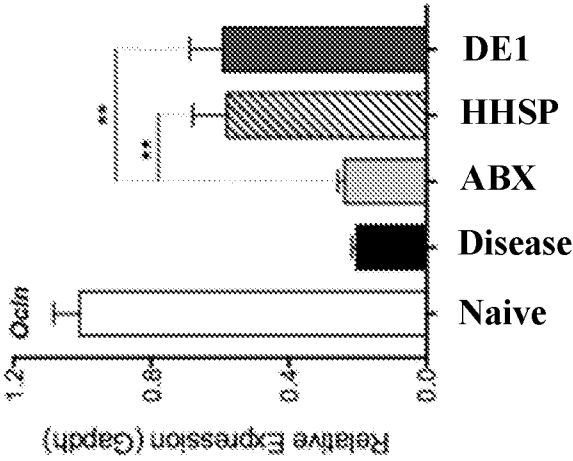


FIG. 12E

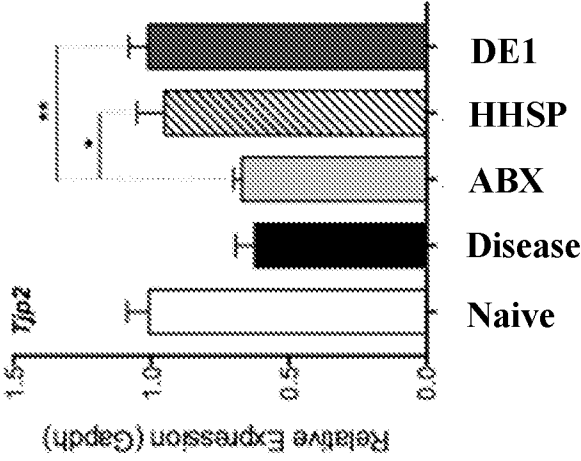


FIG. 12D

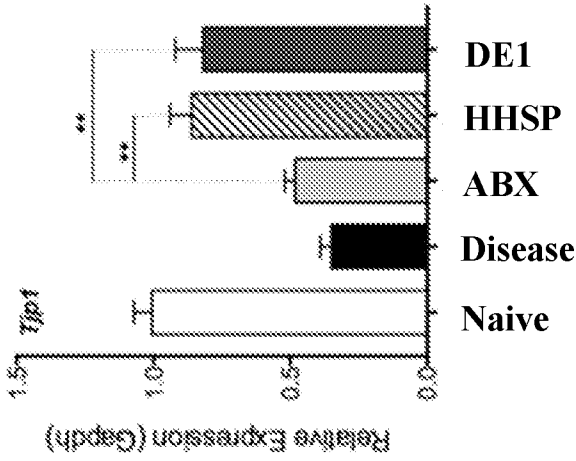


FIG. 12C

FIG. 13

Species	HDAC Inhibition basal	HDAC Inhibition gluc	HDAC Inhibition fucose	HDAC Inhibition sucrose	HDAC Inhibition pectin	HDAC Inhibition fos/inulin	HDAC Inhibition starch	HDAC Inhibition mucin	HDAC Inhibition in any C source (25/18%cut off)	HDAC cluster
Bacteroides_sp_1_1_30	0.24	0.21	0.27	0.15	0.14	0.20	0.22	0.10	1	0
Bacteroides_sp_D20 str.2	0.27	0.08	0.35	0.11	0.09	0.12	0.19	0.17	1	0
Blautia_sp_M25	0.03	0.09	0.23	0.06	0.06	0.01	0.00	0.01	1	0
Blautia_wexlerae	0.07	0.06	0.21	0.02	0.07	0.07	0.07	-0.01	1	0
Clostridium_disporicum	0.12	0.08	0.37	0.21	0.14	0.19	0.11	0.17	1	0
Clostridium_ortoticum str.1	0.08	0.09	0.31	0.11	0.09	0.09	0.07	0.06	1	0
Clostridium_ortoticum str.2	0.06	0.07	0.19	0.09	0.11	0.08	0.05	0.08	1	0
Eubacterium_contortum str.1	0.04	0.14	0.30	0.12	0.09	0.07	0.06	0.06	1	0
Eubacterium_contortum str.2	0.08	0.15	0.32	0.15	0.13	0.09	0.06	0.09	1	0
Eubacterium_hallii	0.00	0.08	0.38	0.05	0.11	0.02	-0.01	0.01	1	0
Lachnospiraceae_bacteri um_2_1_58FAA	0.01	0.10	0.40	0.04	0.15	0.04	0.00	0.02	1	0
Lachnospiraceae_bacteri um_oral_taxon_F15_str.2	0.06	0.20	0.34	0.12	0.09	0.09	0.06	0.07	1	0
Lachnospiraceae_sp_109 72	0.07	0.13	0.23	0.07	0.11	0.08	0.10	0.13	1	0
Ruminococcus_obeum str.1	0.01	0.12	0.26	0.14	0.11	0.10	0.00	0.01	1	0
Ruminococcus_obeum str.2	0.01	0.10	0.25	0.12	0.09	0.08	0.01	0.01	1	0
Ruminococcus_obeum str.3	0.02	0.09	0.37	0.13	0.04	0.02	0.03	0.02	1	0
Ruminococcus_obeum str.4	0.00	0.13	0.35	0.15	0.08	0.06	-0.01	0.02	1	0
Ruminococcus_obeum str.5	0.05	0.15	0.36	0.08	0.09	0.06	0.05	0.05	1	0
Ruminococcus_sp_5_1_ 39BFAA	0.03	0.02	0.28	0.04	0.06	0.03	0.12	0.01	1	0

FIG. 13 (cont.)

Species	HDAC Inhibition basal	HDAC Inhibition gluc	HDAC Inhibition fucose	HDAC Inhibition sucrose	HDAC Inhibition pectin	HDAC Inhibition fos/inulin	HDAC Inhibition starch	HDAC Inhibition mucin	HDAC Inhibition in any C source (25/18%cut off)	HDAC cluster
Ruminococcus sp K-1	0.06	0.06	0.28	0.05	0.04	0.04	0.05	-0.10	1	0
Bacteroides sp 4 I 36	0.44	0.12	0.48	0.11	0.15	0.07	0.39	0.62	1	2
Bacteroides uniformis str.2	0.42	0.18	0.44	0.19	0.25	0.21	0.32	0.54	1	2
Bacteroides_vulgatus str.1	0.47	0.19	0.48	0.18	0.27	0.20	0.42	0.44	1	2
Bacteroides_vulgatus str.2	0.48	0.19	0.48	0.20	0.25	0.19	0.39	0.53	1	2
Clostridium_bartlettii str.1	0.49	0.23	0.49	0.18	0.34	0.22	0.48	0.55	1	2
Clostridium_glycolicum str.1	0.42	0.08	0.42	0.42	0.15	0.10	0.43	0.54	1	2
Clostridium_glycolicum str.2	0.48	0.15	0.48	0.49	0.12	0.47	0.49	0.55	1	2
Clostridium mayombi	0.46	0.15	0.45	0.47	0.12	0.44	0.47	0.53	1	2
Bacteroides sp 4 I 36	0.44	0.12	0.48	0.11	0.15	0.07	0.39	0.62	1	2
Bacteroides uniformis str.2	0.42	0.18	0.44	0.19	0.25	0.21	0.32	0.54	1	2
Bacteroides_eggerthii str.3	0.26	0.13	0.23	0.23	0.17	0.24	0.17	0.40	1	3
Bacteroides_faecis	0.33	0.17	0.29	0.20	0.25	0.14	0.19	0.41	1	3
Bacteroides_intestinalis	0.37	0.16	0.27	0.13	0.03	0.08	0.17	0.31	1	3
Bacteroides_ovatus str.1	0.26	0.20	0.25	0.23	0.15	0.16	0.20	0.39	1	3
Bacteroides_salysariae str.2	0.28	0.12	0.25	0.13	0.13	0.10	0.17	0.41	1	3
Bacteroides_sp D20 str.1	0.28	0.09	0.26	0.11	0.12	0.11	0.17	0.32	1	3
Bacteroides_sp D22	0.22	0.20	0.26	0.21	0.23	0.12	0.18	0.28	1	3
Bacteroides uniformis str.1	0.33	0.10	0.34	0.13	0.13	0.11	0.21	0.37	1	3
Blautia_coccoides str.2	0.19	0.20	0.22	0.17	0.11	0.12	0.20	0.29	1	3
Clostridium_bolteae str.1	0.20	0.12	0.29	0.16	0.22	0.13	0.25	0.30	1	3
Eubacterium tenue	0.12	-0.06	0.32	-0.07	-0.04	-0.03	0.29	0.47	1	3
Facalibacterium_prausni itzii str.2	0.00	0.00	-0.01	-0.01	0.00	-0.01	0.35	0.45	1	3

FIG. 13 (cont.)

Species	HDAC Inhibition basal	HDAC Inhibition gluc	HDAC Inhibition fucose	HDAC Inhibition sucrose	HDAC Inhibition pectin	HDAC Inhibition fos/inulin	HDAC Inhibition starch	HDAC Inhibition mucin	HDAC Inhibition in any C source (25/18%cut off)	HDAC cluster
Faecalibacterium_prausnitzii str.3	-0.01	-0.01	0.00	0.02	-0.02	-0.01	0.27	0.33	1	3
Faecalibacterium_prausnitzii str.4	0.03	0.01	0.05	-0.01	0.25	0.01	0.26	0.40	1	3
Parabacteroides_distasonis	0.29	0.14	0.29	0.12	0.10	0.08	0.30	0.35	1	3
Anaerotruncus_colihominis	0.41	0.75	0.41	0.39	0.64	0.60	0.39	0.50	1	4
Bacteroides_stercoris	0.50	0.32	0.48	0.52	0.15	0.47	0.40	0.45	1	4
Butyrivibrio_crossotus	0.67	0.80	0.66	0.66	0.75	0.67	0.66	0.72	1	4
Clostridiales_sp_SSC_2	0.36	0.61	0.54	0.80	0.76	0.68	0.75	0.44	1	4
Clostridium_butyricum str.1	0.48	0.78	0.57	0.81	0.74	0.81	0.78	0.63	1	4
Clostridium_butyricum str.2	0.45	0.61	0.44	0.57	0.59	0.60	0.69	0.55	1	4
Clostridium_butyricum str.2	0.45	0.62	0.46	0.57	0.63	0.68	0.71	0.54	1	4
Clostridium_citroniae	0.47	0.43	0.42	0.41	0.33	0.62	0.45	0.60	1	4
Clostridium_ghonii	0.48	0.51	0.48	0.52	0.52	0.51	0.51	0.55	1	4
Clostridium_sp_NML_04A032	0.67	0.72	0.66	0.67	0.70	0.66	0.66	0.71	1	4
Clostridium_sporogenes str.1	0.64	0.76	0.58	0.82	0.71	0.74	0.66	0.68	1	4
Clostridium_sporogenes str.2	0.60	0.72	0.56	0.58	0.61	0.63	0.56	0.57	1	4
Clostridium_subterminalis	0.63	0.65	0.62	0.66	0.72	0.63	0.66	0.72	1	4
Clostridium_symbiosum str.1	0.62	0.76	0.61	0.62	0.71	0.62	0.62	0.67	1	4
Clostridium_symbiosum str.2	0.68	0.75	0.68	0.67	0.73	0.72	0.66	0.71	1	4
Clostridium_viride str.1	0.57	0.62	0.58	0.57	0.65	0.61	0.56	0.64	1	4
Clostridium_viride str.2	0.57	0.62	0.58	0.60	0.62	0.58	0.59	0.65	1	4
Coprococcus_comes	0.41	0.78	0.42	0.81	0.71	0.71	0.40	0.44	1	4
Erysipelotrichaceae_bact	0.42	0.70	0.43	0.50	0.57	0.77	0.42	0.50	1	4

FIG. 13 (cont.)

Species	HDAC Inhibition basal	HDAC Inhibition gluc	HDAC Inhibition fucose	HDAC Inhibition sucrose	HDAC Inhibition pectin	HDAC Inhibition fos/inulin	HDAC Inhibition starch	HDAC Inhibition mucin	HDAC Inhibition in any C source (25/18%cut off)	HDAC cluster
erium 3 1 53 str.1										
Eubacterium_sp_WAL_14571 str.1	0.73	0.72	0.79	0.72	0.82	0.77	0.72	0.50	1	4
Eubacterium_sp_WAL_14571 str.1	0.69	0.69	0.70	0.69	0.73	0.69	0.68	0.34	1	4
Flavonifractor_plautii str.1	0.74	0.84	0.73	0.77	0.64	0.75	0.83	0.80	1	4
Flavonifractor_plautii str.2	0.51	0.55	0.50	0.51	0.55	0.57	0.66	0.63	1	4
Lachnospiraceae_bacterium 3 1 57FAA str.1	0.27	0.48	0.51	0.42	0.52	0.51	0.48	0.33	1	4
Lachnospiraceae_bacterium 3 1 57FAA str.2	0.41	0.63	0.68	0.64	0.59	0.66	0.40	0.49	1	4
Odoribacter_splanchnicus	0.70	0.53	0.70	0.71	0.69	0.74	0.69	0.74	1	4
Oscillibacter_valericigenes	0.37	0.38	0.33	0.35	0.37	0.21	0.40	0.47	1	4
Pseudoflavonifractor_cappillosus	0.38	0.48	0.39	0.39	0.42	0.52	0.36	0.43	1	4
Ruminococcaceae_bacterium D16	0.62	0.66	0.61	0.68	0.77	0.68	0.70	0.76	1	4
Clostridium_sp_7_2_43_FAA	0.21	0.21	0.17	0.49	0.17	0.34	0.47	0.35	1	5
Clostridium_tertium	0.21	0.29	0.22	0.39	0.26	0.28	0.74	0.60	1	5
Eubacterium_desmolans	0.09	0.50	0.11	0.51	0.41	0.55	0.33	-0.14	1	5
Eubacterium_rectale str.1	0.06	0.49	0.09	0.54	0.46	0.39	0.59	0.18	1	5
Eubacterium_rectale str.2	0.03	0.43	0.06	0.47	0.45	0.42	0.49	0.09	1	5
Roseburia_hominis str.1	0.24	0.72	0.24	0.38	0.62	0.28	0.69	0.15	1	5
Roseburia_intestinalis str.1	0.26	0.57	0.03	0.77	0.65	0.36	0.71	0.31	1	5
Roseburia_intestinalis str.2	0.16	0.72	0.21	0.64	0.40	0.57	0.66	0.07	1	5

FIG. 13 (cont.)

Species	HDAC Inhibition basal	HDAC Inhibition gluc	HDAC Inhibition fucose	HDAC Inhibition sucrose	HDAC Inhibition pectin	HDAC Inhibition fos/inulin	HDAC Inhibition starch	HDAC Inhibition mucin	HDAC Inhibition in any C source (25/18%cut off)	HDAC cluster
Roseburia_intestinalis str.3	0.22	0.76	0.04	0.53	0.02	0.39	0.78	0.10	1	5
Roseburia_intestinalis str.4	0.15	0.64	0.11	0.25	0.65	0.29	0.62	0.00	1	5
Clostridium_clostridiofo rme	0.15	0.25	0.17	0.25	0.30	0.30	0.20	0.23	1	6
Clostridium_innocuum	0.27	0.54	0.28	0.38	0.54	0.48	0.28	0.34	1	6
Clostridium_tyrobutyric um	0.24	0.71	0.22	0.19	0.58	0.28	0.20	0.31	1	6
Coprococcus_eutactus str.2	0.08	0.41	0.08	0.10	0.37	0.17	0.20	0.08	1	6
Erysipelotrichaceae_bact erium 5 2 54FAA	0.20	0.25	0.20	0.28	0.26	0.27	0.20	0.27	1	6
Eubacterium_dolichum	0.26	0.28	0.24	0.28	0.29	0.27	0.33	0.57	1	6
Eubacterium_limosum	0.30	0.69	0.27	0.32	0.47	0.37	0.22	0.30	1	6
Faecalibacterium_prausn itzii str.1	0.23	0.37	0.24	0.30	0.40	0.38	0.26	0.35	1	6
Faecalibacterium_prausn itzii str.6	0.29	0.74	0.28	0.27	0.60	0.36	0.26	0.37	1	6
Gemmiger_formicilis str.1	0.19	0.46	0.18	0.45	0.42	0.46	0.21	0.46	1	6
Gemmiger_formicilis str.2	0.19	0.40	0.17	0.37	0.39	0.34	0.20	0.45	1	6
Gemmiger_formicilis str.3	0.19	0.58	0.21	0.28	0.52	0.50	0.20	0.26	1	6
Roseburia_hominis str.2	0.16	0.57	0.27	0.39	0.40	0.59	0.00	0.41	1	6
Subdoligranulum_variab ile	0.11	0.46	0.13	0.28	0.31	0.29	0.09	0.31	1	6
Akkermansia_muciniphil a	0.00	0.03	0.01	0.08	0.09	0.06	0.07	0.13	0	1
Alistipes_finegoldii	0.06	0.04	0.03	0.07	0.02	0.04	0.08	0.09	0	1
Alistipes_anderdonkii	0.08	0.08	0.02	0.10	0.15	0.22	0.16	0.27	1	1
Alistipes_shahii	0.05	0.05	0.05	0.14	0.10	0.14	0.14	0.27	1	1
Anaerotruncus_colihomi nis	0.07	0.25	0.15	0.10	0.08	0.15	0.10	0.17	0	1

FIG. 13 (cont.)

Species	HDAC Inhibition basal	HDAC Inhibition gluc	HDAC Inhibition fucose	HDAC Inhibition sucrose	HDAC Inhibition pectin	HDAC Inhibition fos/inulin	HDAC Inhibition starch	HDAC Inhibition mucin	HDAC Inhibition in any C source (25/18%/cut off)	HDAC cluster
Bacteroides cacciae str.1	0.10	0.08	0.07	0.09	0.06	0.06	0.11	0.14	0	1
Bacteroides cacciae str.2	0.12	0.13	0.12	0.13	0.08	0.12	0.23	0.27	1	1
Bacteroides cacciae str.3	0.24	0.09	0.15	0.15	0.11	0.11	0.24	0.17	0	1
Bacteroides dorei	0.21	0.08	0.11	0.11	0.09	0.11	0.19	0.25	0	1
Bacteroides eggerthii str.1	0.10	0.09	0.08	0.11	0.08	0.09	0.10	0.14	0	1
Bacteroides eggerthii str.2	0.13	0.07	0.13	0.14	0.08	0.13	0.11	0.16	0	1
Bacteroides nordii	0.06	0.12	0.15	0.19	0.19	0.13	0.06	0.01	0	1
Bacteroides ovatus str.2	0.07	0.05	0.07	0.07	0.05	0.07	0.07	0.12	0	1
Bacteroides salyersiae str.1	0.10	0.07	0.12	0.08	0.05	0.07	0.07	0.15	0	1
Bacteroides_sp_1_1_6	0.26	0.15	0.21	0.12	0.15	0.17	0.18	0.11	1	1
Bacteroides_sp_2_1_22	0.16	0.17	0.17	0.15	0.06	0.14	0.15	0.06	0	1
Bacteroides_sp_3_1_23 str.1	0.09	0.07	0.13	0.09	0.04	0.07	0.05	0.13	0	1
Bacteroides_sp_3_1_23 str.2	0.09	0.08	0.09	0.07	0.07	0.08	0.09	0.13	0	1
Bifidobacterium_adolesc entis	-0.03	0.08	-0.01	0.10	0.05	0.08	0.13	0.01	0	1
Bifidobacterium_catenu latum	0.03	0.09	0.03	0.10	0.09	0.09	0.05	0.07	0	1
Bifidobacterium_longum str.1	-0.01	0.04	-0.02	0.05	0.03	0.04	-0.02	-0.06	0	1
Bifidobacterium_longum str.2	-0.04	0.03	-0.03	0.05	0.01	0.04	-0.03	-0.05	0	1
Bifidobacterium_longum str.4	0.01	0.05	0.00	0.09	-0.03	0.05	0.01	-0.11	0	1
Bifidobacterium_longum str.5	0.01	0.09	0.01	0.10	0.10	0.13	0.03	-0.16	0	1
Bifidobacterium_pseudo catenulatum str.1	0.08	0.18	0.10	0.15	0.14	0.19	0.21	-0.09	0	1
Bifidobacterium_pseudo catenulatum str.2	0.04	0.08	0.04	0.08	-0.03	0.07	0.09	-0.05	0	1
Blautia coccoides str.1	0.14	0.13	0.15	0.13	0.13	0.09	0.13	0.20	0	1

FIG. 13 (cont.)

Species	HDAC Inhibition basal	HDAC Inhibition gluc	HDAC Inhibition fucose	HDAC Inhibition sucrose	HDAC Inhibition pectin	HDAC Inhibition fos/inulin	HDAC Inhibition starch	HDAC Inhibition mucin	HDAC Inhibition in any C source (25/18%cut off)	HDAC cluster
<i>Blautia glucerasei</i>	0.04	0.02	0.11	0.04	0.09	0.07	0.02	0.00	0	1
<i>Blautia producta</i> str.1	0.14	0.14	0.19	0.07	0.08	-0.06	0.18	0.24	1	1
<i>Blautia producta</i> str.2	0.13	0.09	0.16	0.15	0.11	0.09	0.14	0.18	0	1
<i>Blautia producta</i> str.3	0.11	0.06	0.14	0.06	0.10	0.07	0.11	0.20	0	1
<i>Blautia producta</i> str.4	0.10	0.10	0.16	0.13	0.10	0.12	0.12	0.17	0	1
<i>Blautia producta</i> str.5	0.12	0.16	0.17	0.18	0.09	0.13	0.13	0.21	0	1
<i>Blautia producta</i> str.6	0.12	0.09	0.14	0.11	0.13	0.12	0.15	0.18	0	1
<i>Blautia schinkii</i> str.1	0.00	0.06	0.00	0.11	0.08	0.09	0.05	0.07	0	1
<i>Blautia schinkii</i> str.2	0.08	0.10	0.15	0.11	0.02	0.12	0.07	-0.01	0	1
<i>Clostridiaceae_bacterium</i> END 2	0.01	0.01	0.00	0.03	0.01	-0.02	0.00	-0.02	0	1
<i>Clostridium aldenense</i>	0.10	0.13	0.20	0.09	0.14	0.16	0.10	0.10	1	1
<i>Clostridium asparagiforme</i>	0.07	0.13	0.08	0.11	0.10	0.03	0.06	0.08	0	1
<i>Clostridium bartlettii</i> str.2	0.07	0.06	0.08	0.13	0.10	0.17	0.17	0.22	0	1
<i>Clostridium bolteae</i> str.2	0.20	0.18	0.18	0.13	0.18	0.23	0.28	0.23	1	1
<i>Clostridium bolteae</i> str.3	0.11	0.21	0.12	0.16	0.23	0.17	0.13	0.15	0	1
<i>Clostridium hathewayi</i> str.1	0.02	0.06	0.12	0.12	0.06	0.04	0.06	0.07	0	1
<i>Clostridium hathewayi</i> str.2	0.04	0.11	0.12	0.10	0.07	0.03	0.04	0.03	0	1
<i>Clostridium hathewayi</i> str.3	0.02	0.11	0.09	0.10	0.11	0.05	0.03	0.08	0	1
<i>Clostridium hylemonae</i>	0.10	0.06	0.06	0.09	0.16	0.07	0.09	0.11	0	1
<i>Clostridium lactatifermentans</i>	0.04	0.07	0.11	0.03	0.04	-0.01	0.05	0.07	0	1
<i>Clostridium lavalense</i>	0.04	0.14	0.04	0.10	0.10	0.05	0.10	0.10	0	1
<i>Clostridium leptum</i>	0.00	-0.02	0.02	0.00	-0.01	-0.02	0.01	0.00	0	1
<i>Clostridium nexile</i>	0.13	0.24	0.06	0.10	-0.07	0.20	0.19	0.18	0	1
<i>Clostridium scindens</i>	0.10	0.15	0.13	0.09	0.13	0.16	0.12	0.12	0	1
<i>Clostridium spiroforme</i> str.1	0.04	0.05	0.01	0.05	0.04	0.02	0.02	0.02	0	1
<i>Clostridium spiroforme</i> str.2	0.01	0.02	-0.01	0.02	0.01	0.03	0.00	0.02	0	1

FIG. 13 (cont.)

Species	HDAC Inhibition basal	HDAC Inhibition gluc	HDAC Inhibition fucose	HDAC Inhibition sucrose	HDAC Inhibition pectin	HDAC Inhibition fos/inulin	HDAC Inhibition starch	HDAC Inhibition mucin	HDAC Inhibition in any C source (25/18%cut off)	HDAC cluster
<i>Clostridium straminisol</i> <i>vens</i>	-0.04	-0.03	-0.04	-0.04	0.01	-0.06	-0.02	-0.04	0	1
<i>Coprobacillus</i> sp_D7 str.1	0.01	0.02	0.01	0.02	0.01	0.05	0.00	0.04	0	1
<i>Coprobacillus</i> sp_D7 str.2	-0.04	-0.01	-0.01	0.00	-0.02	0.00	-0.03	0.00	0	1
<i>Coprococcus eutactus</i> str.1	-0.01	0.22	0.00	-0.01	0.00	-0.01	0.27	0.14	1	1
<i>Coriobacteriaceae</i> sp_7_ 10_1_b	0.06	0.07	0.06	0.07	0.10	0.06	0.06	0.07	0	1
<i>Dorea formicigenerans</i> str.1	-0.02	0.06	0.00	0.08	0.04	0.03	0.01	0.00	0	1
<i>Dorea formicigenerans</i> str.2	0.07	0.13	0.05	0.07	0.10	0.10	0.07	0.10	0	1
<i>Dorea formicigenerans</i> str.3	0.09	0.16	0.07	0.07	0.11	0.12	0.08	0.11	0	1
<i>Dorea formicigenerans</i> str.4	0.00	0.09	0.08	0.04	0.10	0.03	0.06	0.00	0	1
<i>Dorea longicatena</i> str.1	0.10	0.12	0.11	0.13	0.10	0.14	0.10	0.15	0	1
<i>Dorea longicatena</i> str.2	0.09	0.11	0.08	0.09	0.11	0.11	0.09	0.12	0	1
<i>Dorea longicatena</i> str.3	0.08	0.09	0.06	0.06	0.04	0.08	0.07	0.01	0	1
<i>Eggerthella lenta</i> str.1	0.06	0.06	0.12	0.13	0.07	0.07	0.18	0.09	0	1
<i>Eggerthella lenta</i> str.2	-0.03	-0.01	-0.04	0.01	-0.01	-0.02	-0.03	-0.02	0	1
<i>Eggerthella lenta</i> str.3	0.06	0.06	0.06	0.07	0.09	0.04	0.03	0.05	0	1
<i>Eggerthella</i> sp_1_3_56F AA	0.06	0.06	0.06	0.09	0.05	0.06	0.03	0.05	0	1
<i>Erysipelotrichaceae</i> bact erium 3_1_53 str.2	0.06	0.07	0.05	0.06	0.06	0.04	0.05	0.07	0	1
<i>Eubacterium siraeum</i>	-0.04	-0.01	-0.01	-0.01	0.04	-0.02	0.04	-0.02	0	1
<i>Eubacterium ventriosum</i>	-0.04	0.22	-0.04	-0.02	-0.04	-0.03	0.25	0.14	0	1
<i>Faecalibacterium prausn</i> <i>itzii</i> str.5	0.01	0.00	0.04	-0.01	-0.01	0.00	-0.01	0.04	0	1
<i>Faecalibacterium prausn</i> <i>itzii</i> str.7	0.01	0.00	-0.01	-0.02	0.04	0.01	0.09	0.26	1	1
<i>Hydrogenoanaerobacteri</i>	0.08	0.15	0.09	0.05	0.14	0.09	0.07	0.18	0	1

FIG. 13 (cont.)

Species	HDAC Inhibition basal	HDAC Inhibition gluc	HDAC Inhibition fucose	HDAC Inhibition sucrose	HDAC Inhibition pectin	HDAC Inhibition fos/inulin	HDAC Inhibition starch	HDAC Inhibition mucin	HDAC Inhibition in any C source (25/18%cut off)	HDAC cluster
um saccharovorans										
Lachnospira_pectinoschi za	-0.02	-0.02	-0.02	0.00	0.03	-0.02	0.01	-0.03	0	1
Lachnospiraceae_bacteri um_1_4_56FAA	-0.02	-0.03	0.01	-0.03	0.01	-0.01	-0.01	0.00	0	1
Lachnospiraceae_bacteri um_5_1_57FAA str.1	0.13	0.12	0.12	0.10	0.19	0.12	0.14	0.13	0	1
Lachnospiraceae_bacteri um_5_1_57FAA str.2	0.12	0.12	0.12	0.11	0.16	0.11	0.12	0.17	0	1
Lachnospiraceae_bacteri um_5_1_57FAA str.3	0.08	0.11	0.08	0.10	0.11	0.12	0.08	0.11	0	1
Lachnospiraceae_bacteri um_5_1_57FAA str.4	0.15	0.17	0.15	0.14	0.19	0.13	0.16	0.20	0	1
Lachnospiraceae_bacteri um_5_1_57FAA str.5	0.15	0.15	0.12	0.11	0.16	0.10	0.12	0.17	0	1
Lachnospiraceae_bacteri um_6_1_63FAA	0.00	0.05	0.01	0.04	0.06	0.04	0.02	0.07	0	1
Lachnospiraceae_bacteri um oral taxon_F15 str.1	0.01	0.04	0.14	0.04	0.17	0.05	0.02	0.02	0	1
Lachnospiraceae_sp_110 41	0.00	0.00	0.00	-0.02	0.07	0.01	0.01	0.06	0	1
Lactobacillus_gasseri	-0.02	-0.02	-0.01	-0.04	-0.02	-0.04	-0.04	-0.16	0	1
Lactonifactor_longovifor mis	-0.03	-0.03	0.00	-0.03	0.00	0.00	-0.02	-0.02	0	1
Roseburia faecalis	-0.03	0.01	-0.02	0.02	0.01	0.04	0.65	0.03	1	1
Roseburia inulinivorans	0.13	0.29	0.13	0.24	0.25	0.26	0.25	0.15	1	1
Ruminococcus albus	0.00	-0.04	-0.02	0.02	0.00	0.00	0.00	-0.01	0	1
Ruminococcus bromii str.1	-0.02	0.00	-0.01	-0.03	0.00	-0.01	0.01	-0.05	0	1
Ruminococcus bromii str.2	-0.01	-0.07	-0.02	0.00	0.02	-0.01	0.01	-0.02	0	1
Ruminococcus bromii str.3	-0.02	0.00	-0.01	-0.02	-0.01	-0.01	-0.03	-0.02	0	1
Ruminococcus gnnavus	0.05	0.11	0.15	0.14	0.15	0.15	0.03	0.02	0	1
Ruminococcus hansenii	0.00	0.07	0.00	0.03	0.04	0.06	0.00	0.06	0	1

FIG. 13 (cont.)

Species	HDAC Inhibition basal	HDAC Inhibition gluc	HDAC Inhibition fucose	HDAC Inhibition sucrose	HDAC Inhibition pectin	HDAC Inhibition fos/inulin	HDAC Inhibition starch	HDAC Inhibition mucin	HDAC Inhibition in any C source (25/18%cut off)	HDAC cluster
<i>Ruminococcus_lactaris</i> str.1	-0.03	0.02	-0.02	-0.02	-0.01	-0.01	-0.02	0.10	0	1
<i>Ruminococcus_lactaris</i> str.2	0.03	0.08	0.10	0.04	0.00	-0.04	0.05	0.06	0	1
<i>Ruminococcus_torques</i> str.1	-0.03	0.00	-0.02	-0.03	-0.02	-0.04	-0.06	-0.31	0	1
<i>Ruminococcus_torques</i> str.2	-0.05	0.05	-0.01	0.00	0.02	0.00	-0.01	0.08	0	1
<i>Tannerella_sp_6_1_58F</i> AA_CTI	0.03	0.01	0.05	0.03	0.01	0.05	0.05	0.04	0	1
<i>Turicibacter_sanguinis</i> str.1	0.04	0.06	0.05	0.05	0.06	0.04	0.04	0.07	0	1
<i>Turicibacter_sanguinis</i> str.2	-0.01	0.05	0.00	0.01	0.00	-0.02	-0.01	-0.04	0	1

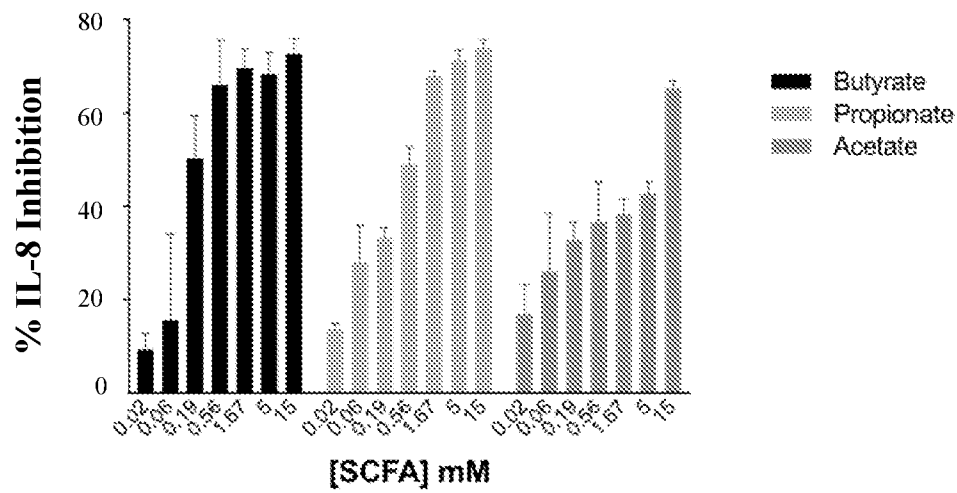


FIG. 14A

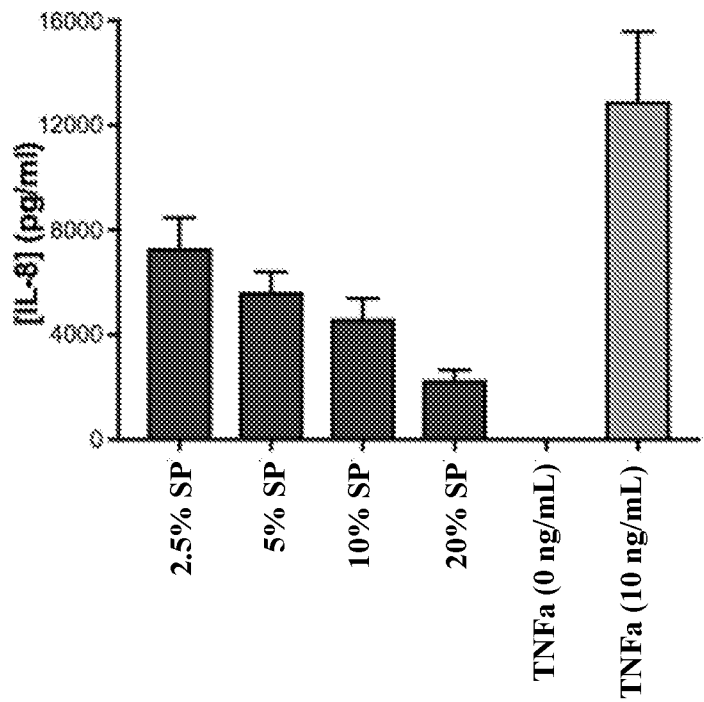


FIG. 14B

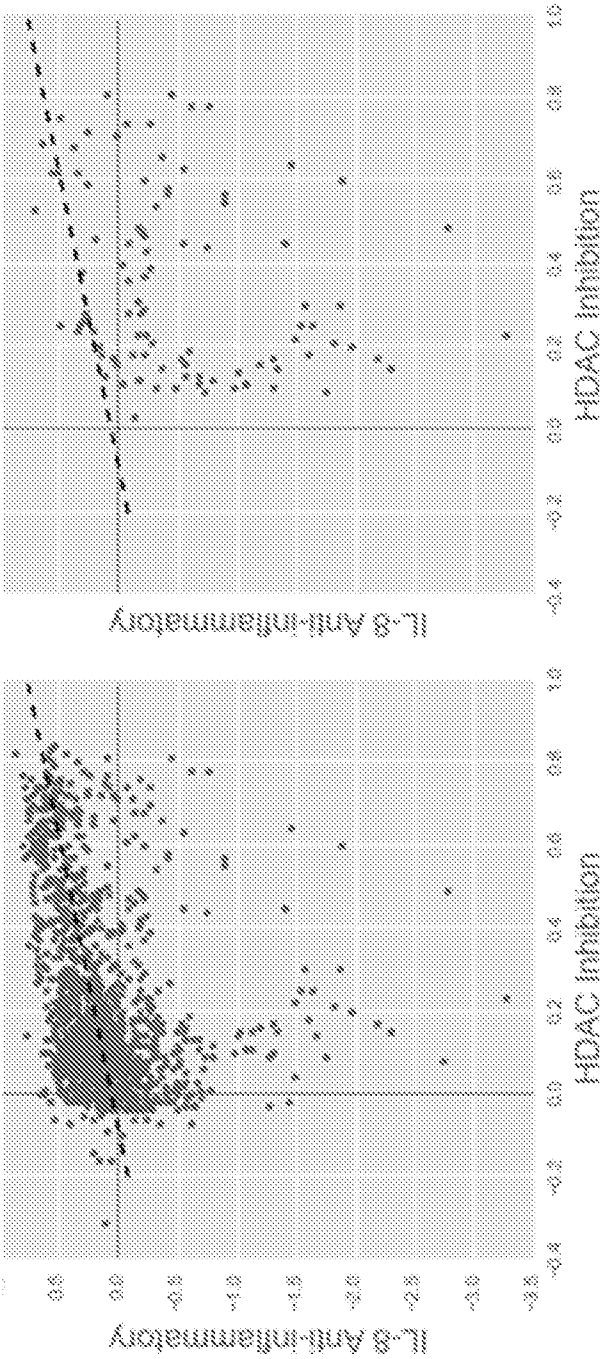


FIG. 15B

FIG. 15A

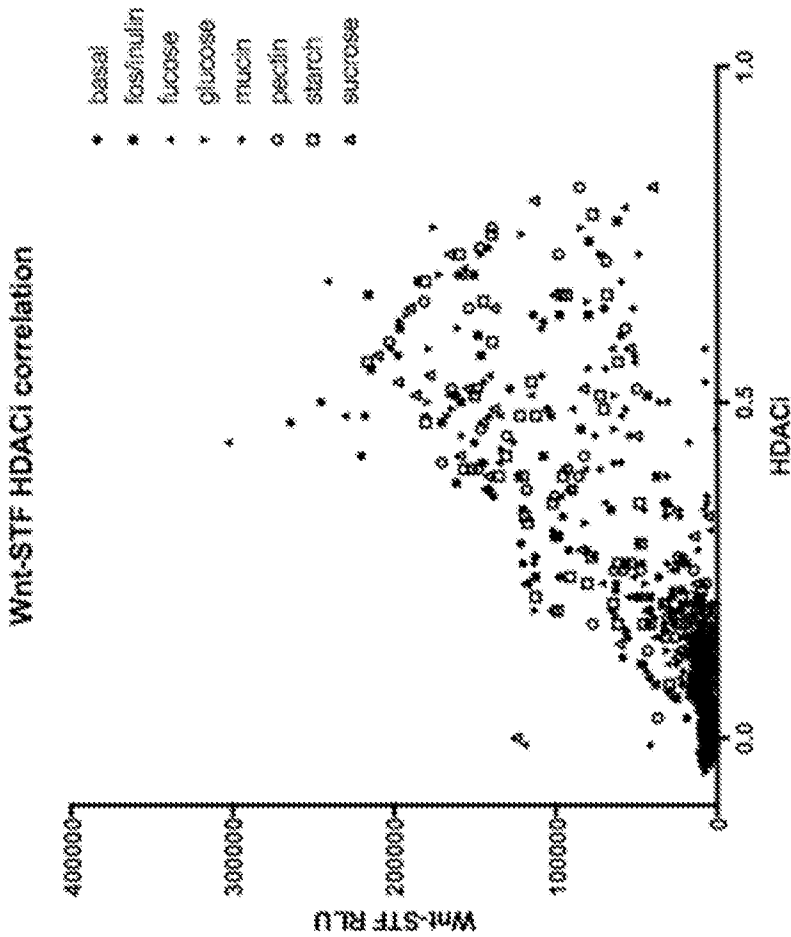


FIG. 16

Strains	BSH					HSDH			7 α -Dehydr		Pro-inflam
	8CA	8CDA	tCA	tCDA	tMCA	7 α	3 α	12 α	CA	CDA	
<i>Clostridium scindens</i> strain 1											-
<i>Clostridium scindens</i> strain 1											nd
<i>Lachnospiraceae</i> 5_1_57FAA strain 1											nd
<i>Lachnospiraceae</i> 5_1_57FAA strain 2											-
<i>Lachnospiraceae</i> 5_1_57FAA strain 3											+
<i>Lachnospiraceae</i> 5_1_57FAA strain 4											+
<i>Lachnospiraceae</i> 5_1_57FAA strain 5											+
<i>Lachnospiraceae</i> 5_1_57FAA strain 6											+

FIG. 17

FIG. 18

	Acetic Acid (mM)	Propanoic acid (mM)	2-methyl- propanoic acid (mM)	Butanoic acid (mM)	3-methyl- butanoic acid (mM)	Pentanoic acid (mM)	4-methyl- pentanoic acid (mM)	Hexanoic acid (mM)	Heptanoic acid (mM)
Limit of Detection (LOD)	0.158	0.104	0.046	0.048	0.011	0.011	0.025	0.008	0.024
Medium 1 blank	10.481	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
<i>Alistipes finegoldii</i>	11.292	2.211	0.179	<LOD	0.375	<LOD	<LOD	<LOD	<LOD
<i>Alistipes shahii</i>	14.261	1.844	0.269	<LOD	0.710	<LOD	<LOD	<LOD	<LOD
<i>Anaerotruncus colihominis</i>	12.732	0.253	<LOD	2.161	0.015	0.031	0.032	<LOD	<LOD
<i>Bacteroides eggerthii strain 1</i>	13.469	0.653	0.225	<LOD	0.690	<LOD	<LOD	<LOD	<LOD
<i>Bacteroides eggerthii strain 2</i>	13.015	0.776	0.360	<LOD	1.202	<LOD	<LOD	<LOD	<LOD
<i>Bacteroides sp 3 1 23</i>	17.535	0.334	0.345	<LOD	0.941	<LOD	<LOD	<LOD	<LOD
<i>Bacteroides sp D20 strain 1</i>	13.822	6.936	0.395	0.048	0.989	<LOD	0.050	<LOD	<LOD
<i>Bacteroides sp D20 strain 2</i>	14.535	9.222	0.577	<LOD	1.418	<LOD	<LOD	<LOD	<LOD
<i>Bacteroides uniformis</i>	15.267	2.394	0.329	0.066	0.798	<LOD	0.031	<LOD	<LOD
<i>Bacteroides faecis</i>	18.542	0.598	0.254	0.050	0.682	<LOD	0.031	<LOD	<LOD
<i>Bacteroides sp. 1 1 6</i>	20.249	0.569	0.228	<LOD	0.717	<LOD	<LOD	<LOD	<LOD
<i>Clostridium asparagiforme</i>	18.340	0.191	0.052	0.059	0.015	<LOD	<LOD	<LOD	<LOD
<i>Clostridium bartlettii</i>	26.909	1.877	<LOD	0.048	0.011	<LOD	<LOD	<LOD	<LOD
<i>Clostridium glycolicum strain 1</i>	53.528	2.397	2.862	<LOD	3.589	<LOD	<LOD	<LOD	<LOD
<i>Clostridium mayombi</i>	61.576	2.703	2.916	0.072	3.796	<LOD	<LOD	<LOD	<LOD
<i>Clostridium aldenense</i>	16.334	<LOD	<LOD	0.139	<LOD	<LOD	0.029	<LOD	<LOD
<i>Clostridium bartlettii</i>	40.492	2.119	2.007	<LOD	2.672	<LOD	<LOD	<LOD	<LOD
<i>Clostridium ghonii</i>	21.147	1.436	2.710	0.087	0.936	<LOD	2.744	<LOD	<LOD
<i>Clostridium</i>	27.946	<LOD	0.479	4.187	0.873	<LOD	<LOD	<LOD	<LOD

FIG. 18 (cont.)

	Acetic Acid (mM)	Propanoic acid (mM)	2-methyl- propanoic acid (mM)	Butanoic acid (mM)	3-methyl- butanoic acid (mM)	Pentanoic acid (mM)	4-methyl- pentanoic acid (mM)	Hexanoic acid (mM)	Heptanoic acid (mM)
<i>subterminale</i>									
<i>Eubacterium desmolans</i>	6.943	0.347	0.108	4.205	0.053	<LOD	0.098	<LOD	<LOD
<i>Lachnospira pectinoshiza</i>	11.434	0.139	0.065	0.075	0.026	<LOD	0.050	<LOD	<LOD
<i>Odoribacter splanchnicus</i>	14.587	2.389	1.211	5.794	2.135	<LOD	<LOD	<LOD	<LOD
<i>Bacteroides</i> sp. 3 1 23	19.916	0.443	0.283	<LOD	0.743	<LOD	<LOD	<LOD	<LOD
<i>Bacteroides salversoniae</i> strain 1	18.542	0.474	0.303	<LOD	0.866	<LOD	<LOD	<LOD	<LOD
<i>Clostridium</i> sp. NML 044032	13.021	0.415	0.170	4.300	0.064	<LOD	<LOD	<LOD	<LOD
<i>Clostridium citroniae</i>	17.688	0.453	0.051	0.060	0.013	<LOD	0.050	<LOD	<LOD
<i>Flavonifractor plautii</i> strain 1	23.187	2.101	1.513	4.272	0.746	0.089	1.702	0.007	<LOD
<i>Ruminococcus gnavus</i> strain 1	19.309	0.795	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
<i>Ruminococcus gnavus</i> strain 2	17.929	1.011	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
<i>Clostridium cadavaris</i>	25.147	0.538	0.473	5.641	0.274	<LOD	0.028	<LOD	<LOD
<i>Peptostreptococcus anaerobius</i>	17.445	0.361	1.439	0.330	0.231	0.018	2.652	<LOD	<LOD
Medium 2 blank	0.481	<LOD	<LOD	0.079	<LOD	<LOD	0.057	<LOD	<LOD
<i>Alistipes onderdonkii</i>	1.103	0.226	<LOD	0.080	<LOD	<LOD	<LOD	<LOD	<LOD
<i>Eubacterium tenue</i>	14.125	0.957	0.264	0.084	0.234	<LOD	<LOD	<LOD	<LOD
<i>Bacteroides eggerthii</i> strain 3	3.845	1.194	0.243	0.081	0.844	<LOD	0.040	<LOD	<LOD
<i>Bacteroides intestinalis</i>	3.887	4.601	0.321	0.053	1.261	<LOD	0.032	<LOD	<LOD
<i>Bacteroides ovatus</i>	4.186	0.415	0.166	0.054	0.631	<LOD	<LOD	<LOD	<LOD
<i>Bacteroides salversoniae</i> strain 2	4.327	0.505	0.186	0.065	0.759	<LOD	<LOD	<LOD	<LOD
<i>Bacteroides</i> sp. 2 1 22	4.783	0.146	0.123	<LOD	0.567	<LOD	<LOD	<LOD	<LOD

FIG. 18 (cont.)

	Acetic Acid (mM)	Propanoic acid (mM)	2-methyl- propanoic acid (mM)	Butanoic acid (mM)	3-methyl- butanoic acid (mM)	Pentanoic acid (mM)	4-methyl- pentanoic acid (mM)	Hexanoic acid (mM)	Heptanoic acid (mM)
<i>Bacteroides</i> sp. 4 1 36	5.097	9.940	0.585	0.062	1.743	<LOD	<LOD	<LOD	<LOD
<i>Bacteroides</i> sp. D22	5.184	<LOD	0.148	0.052	0.587	<LOD	<LOD	<LOD	<LOD
<i>Bacteroides</i> <i>stercoris</i>	3.755	5.613	0.533	0.062	2.022	<LOD	<LOD	<LOD	<LOD
<i>Bacteroides</i> <i>uniformis</i>	4.513	7.919	0.485	<LOD	1.602	<LOD	<LOD	<LOD	<LOD
<i>Clostridium</i> <i>glycolicum</i> strain 2	26.135	2.261	2.864	0.071	4.504	<LOD	0.080	<LOD	<LOD
<i>Clostridium</i> <i>sporogenes</i> strain 1	17.177	1.490	3.758	0.987	2.542	0.127	2.991	0.011	<LOD
<i>Clostridium</i> <i>sporogenes</i> strain 2	23.755	5.924	5.077	1.840	1.640	0.137	3.718	0.012	<LOD
<i>Flavonifractor</i> <i>plautii</i> strain 2	8.375	0.380	0.070	5.737	0.038	<LOD	0.122	<LOD	<LOD
<i>Ruminococcus</i> <i>gnavus</i> strain 3	2.830	<LOD	<LOD	0.070	<LOD	<LOD	0.030	<LOD	<LOD
<i>Peptostreptococcus</i> <i>stomatitis</i>	5.551	0.318	2.330	1.043	0.549	0.155	3.076	<LOD	<LOD

FIG. 19

	Indole (mM)	3- methylindole (mM)	Indole-3- propanoic acid (mM)	Indole-3- butyric acid (mM)	3- Indoleacryl ic acid (mM)	Tryptamine (mM)	Indole-3- acetic acid (mM)	3-indole- glycoxylic acid (mM)	2-picolinic acid (mM)	5- hydroxytry ptamine (mM)
Limit of Detection (LOD)	0.005	0.001	0.002	0.007	0.004	0.002	0.001	0.001	0.006	0.27
Medium 1 blank	<LOD	0.008	<LOD	0.007	<LOD	0.006	<LOD	0.011	0.012	<LOD
<i>Alistipes finegoldii</i>	0.016	0.027	<LOD	<LOD	0.005	0.005	0.001	0.015	0.022	<LOD
<i>Alistipes shahii</i>	0.015	0.023	<LOD	0.007	0.005	0.004	<LOD	0.010	0.016	<LOD
<i>Anaerotruncus colihominis</i>	0.038	0.015	<LOD	0.007	0.006	0.006	<LOD	0.020	0.013	<LOD
<i>Bacteroides eggertii strain 1</i>	0.012	0.023	<LOD	0.007	0.006	0.004	0.001	0.014	0.015	<LOD
<i>Bacteroides eggertii strain 2</i>	0.016	0.025	<LOD	<LOD	0.006	0.005	0.002	0.014	0.017	<LOD
<i>Bacteroides sp 3 1 23</i>	0.011	0.023	0.003	0.007	0.005	0.003	0.002	0.009	0.022	<LOD
<i>Bacteroides sp D20 strain 1</i>	0.012	0.025	<LOD	<LOD	0.006	0.004	0.001	0.011	0.015	<LOD
<i>Bacteroides sp D20 strain 2</i>	0.018	0.028	<LOD	0.007	0.006	0.004	0.002	0.013	0.018	<LOD
<i>Bacteroides uniformis</i>	0.012	0.022	<LOD	<LOD	0.006	0.004	0.001	0.012	0.014	<LOD
<i>Bacteroides faecis sp.1 1 6</i>	0.009	0.021	<LOD	0.007	0.005	0.004	0.001	0.012	0.018	<LOD
<i>Bacteroides sp.1 1 6</i>	0.008	0.025	<LOD	<LOD	0.005	0.005	0.002	0.012	0.020	<LOD
<i>Clostridium asparagiforme</i>	0.012	0.015	<LOD	<LOD	0.005	0.005	0.001	0.012	0.011	<LOD
<i>Clostridium barlettii</i>	0.006	0.018	<LOD	<LOD	0.005	0.004	<LOD	0.011	0.011	<LOD
<i>Clostridium glycolicum strain 1</i>	0.006	0.001	0.003	0.008	0.005	<LOD	0.207	0.007	0.010	<LOD
<i>Clostridium mayombe</i>	0.007	0.001	0.003	0.007	0.005	<LOD	0.171	0.006	0.019	<LOD
<i>Clostridium aldense</i>	0.048	0.019	<LOD	<LOD	<LOD	0.003	<LOD	0.011	0.015	<LOD
<i>Clostridium</i>	0.006	0.013	0.003	0.008	<LOD	0.003	0.163	0.010	0.010	<LOD

FIG. 19 (cont.)

	Indole (mM)	3- methylindole (mM)	Indole-3- propanoic acid (mM)	Indole-3- butyric acid (mM)	3- Indoleacryl ic acid (mM)	Tryptamine (mM)	Indole-3- acetic acid (mM)	3-indole- glyoxylic acid (mM)	2-picolinic acid (mM)	5- hydroxytry ptamine (mM)
<i>bartlettii</i>										
<i>Clostridium ghonii</i>	0.052	0.005	0.003	0.007	0.005	<LOD	0.008	0.004	0.280	<LOD
<i>Clostridium subterminale</i>	0.008	0.025	<LOD	0.007	0.005	0.003	0.039	0.010	0.028	<LOD
<i>Eubacterium desmolans</i>	0.006	0.010	<LOD	0.008	0.005	0.005	0.001	0.014	0.013	<LOD
<i>Lachnospira pectinoschiza</i>	0.006	0.009	<LOD	<LOD	<LOD	0.010	0.001	0.020	0.014	<LOD
<i>Odoribacter splanchnicus</i>	0.021	0.021	<LOD	0.008	0.007	0.003	0.003	0.007	0.010	<LOD
<i>Bacteroides sp. 3 1 23</i>	0.011	0.019	<LOD	<LOD	0.006	0.006	0.002	0.012	0.011	<LOD
<i>Bacteroides salyersiae strain 1</i>	0.009	0.020	<LOD	<LOD	0.006	0.004	0.002	0.011	0.013	<LOD
<i>Clostridium sp. NML 044032</i>	0.008	0.011	<LOD	0.007	<LOD	0.005	0.001	0.011	<LOD	<LOD
<i>Clostridium citroniae</i>	0.029	0.016	<LOD	<LOD	0.005	0.004	0.001	0.013	0.011	<LOD
<i>Flavonifractor plautii strain 1</i>	0.058	0.005	<LOD	0.007	0.005	<LOD	0.001	0.005	0.166	<LOD
<i>Ruminococcus gnavus strain 1</i>	0.007	0.015	<LOD	0.007	<LOD	0.183	<LOD	0.011	0.012	<LOD
<i>Ruminococcus gnavus strain 2</i>	0.006	0.016	0.004	0.007	<LOD	0.173	<LOD	0.012	0.013	<LOD
<i>Clostridium cadavaris</i>	0.035	0.008	<LOD	0.008	0.005	0.006	0.001	0.012	0.015	<LOD
<i>Peptostreptococcus anaerobius</i>	<LOD	0.003	0.171	0.008	0.014	0.003	0.001	0.007	0.386	<LOD
Medium 2 blank	<LOD	0.013	0.005	0.007	0.006	0.013	0.001	0.034	<LOD	<LOD
<i>Alistipes onderdonkii</i>	0.009	0.017	0.004	0.008	0.008	0.016	0.002	0.043	<LOD	<LOD
<i>Eubacterium tenue</i>	0.028	0.008	0.006	0.008	0.008	0.011	0.002	0.040	0.008	<LOD
<i>Bacteroides eggerthii strain 3</i>	0.084	0.033	<LOD	0.008	0.005	0.022	0.001	0.040	0.010	<LOD
<i>Bacteroides</i>	0.097	0.030	<LOD	0.008	0.004	0.012	<LOD	0.026	0.013	<LOD

FIG. 19 (cont.)

	Indole (mM)	3- methylindole (mM)	Indole-3- propanoic acid (mM)	Indole-3- butyric acid (mM)	3- Indoleacryl ic acid (mM)	Tryptamine (mM)	Indole-3- acetic acid (mM)	3-indole- glyoxylic acid (mM)	2-picolinic acid (mM)	5- hydroxytry ptamine (mM)
<i>intestinalis</i>										
<i>Bacteroides ovatus</i>	0.060	0.023	0.006	0.008	0.005	0.024	0.002	0.046	0.007	0.280
<i>Bacteroides salysiae strain 2</i>	0.036	0.019	<LOD	0.008	0.005	0.015	<LOD	0.026	0.014	<LOD
<i>Bacteroides sp. 2 I 22</i>	0.034	0.022	0.004	0.008	0.005	0.024	0.002	0.044	0.010	<LOD
<i>Bacteroides sp. 4 I 36</i>	0.060	0.048	<LOD	0.008	0.005	0.021	0.001	0.035	0.007	<LOD
<i>Bacteroides sp. D22</i>	0.034	0.020	<LOD	0.008	0.005	0.018	<LOD	0.031	0.014	<LOD
<i>Bacteroides stercoris</i>	0.096	0.046	<LOD	0.008	0.005	0.021	0.002	0.033	0.019	0.326
<i>Bacteroides uniformis</i>	0.051	0.038	<LOD	0.007	0.004	0.010	0.001	0.016	0.014	<LOD
<i>Clostridium glycolicum strain 2</i>	<LOD	0.002	<LOD	0.008	0.006	0.005	0.370	0.010	0.015	<LOD
<i>Clostridium sporogenes strain 1</i>	0.019	0.003	0.665	0.008	0.026	0.178	0.001	0.007	0.478	<LOD
<i>Clostridium sporogenes strain 2</i>	0.057	0.003	0.191	0.008	0.012	0.337	0.003	0.009	0.500	<LOD
<i>Flavonifractor plautii strain 2</i>	1.340	0.013	<LOD	<LOD	0.005	0.013	0.001	0.031	<LOD	<LOD
<i>Ruminococcus gnavus strain 3</i>	<LOD	0.010	<LOD	0.007	0.005	0.355	0.002	0.030	<LOD	<LOD
<i>Peptostreptococcus stomatis</i>	0.009	0.010	0.233	0.008	0.031	0.018	0.002	0.045	0.404	<LOD

FIG. 20A

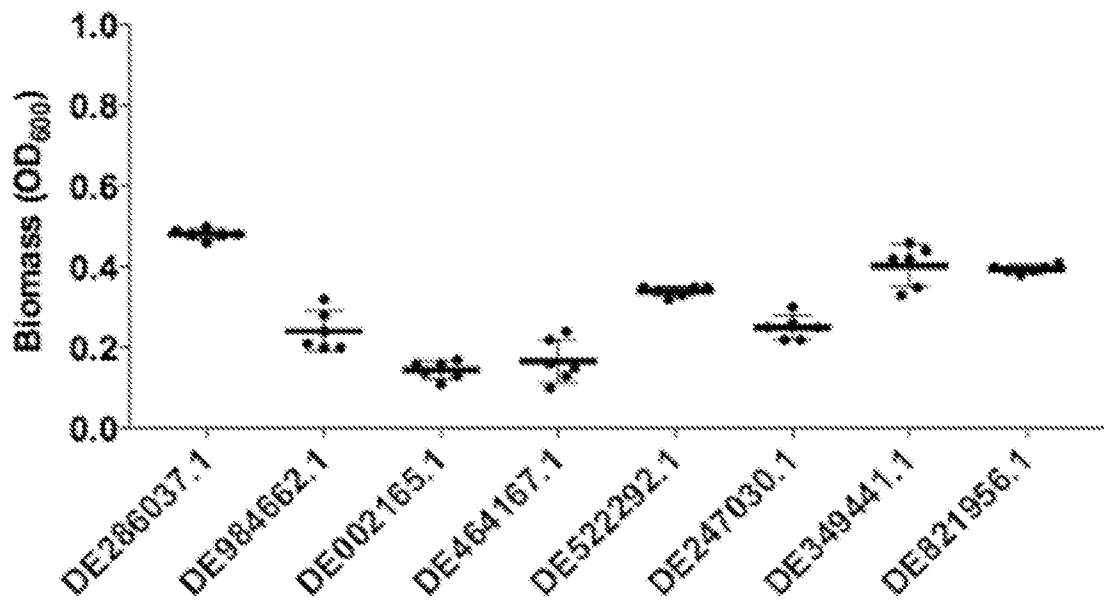


FIG. 20B

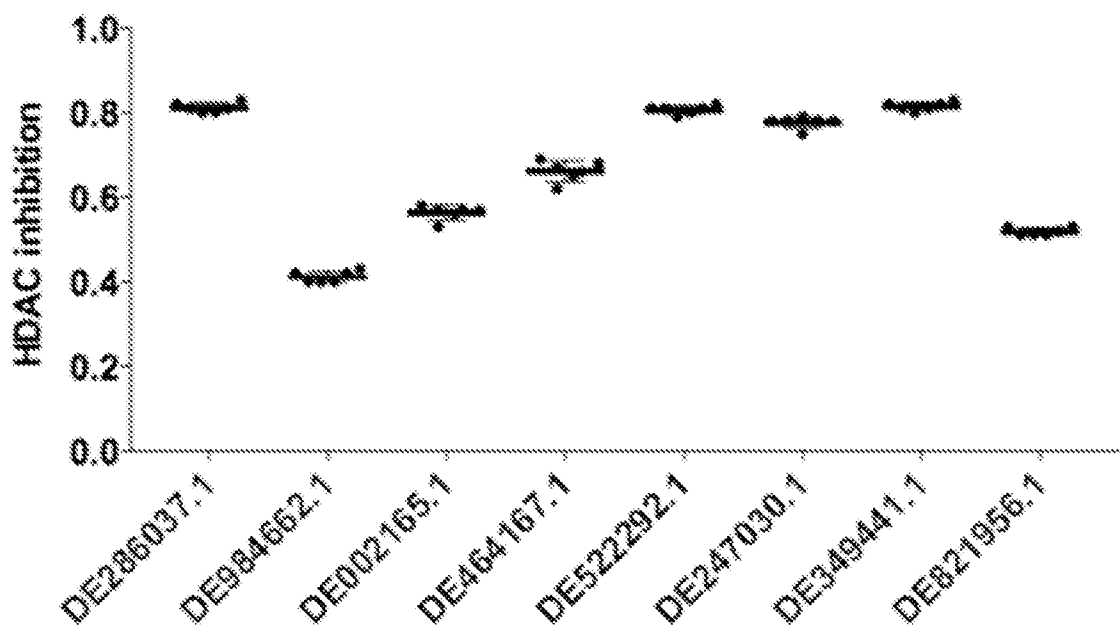


FIG. 20C

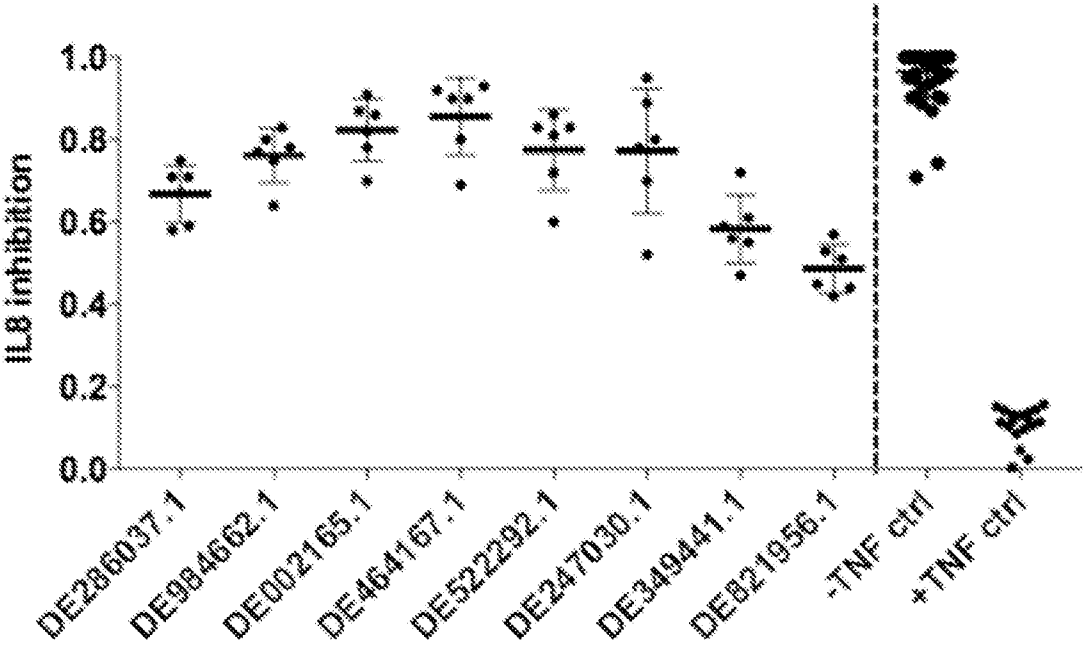


FIG. 20D

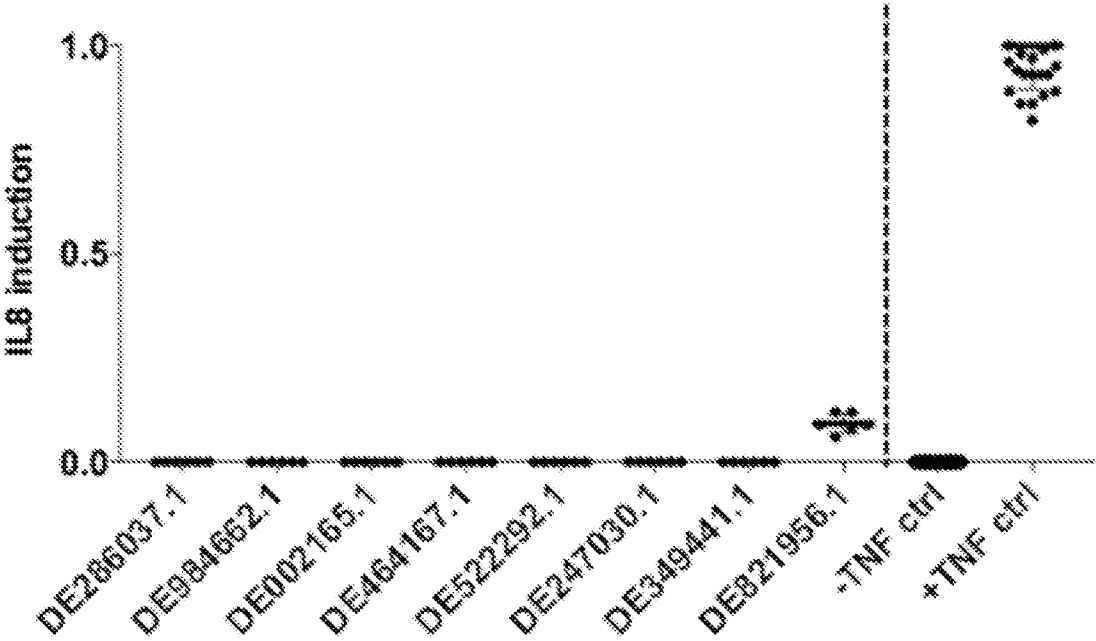


FIG. 20E

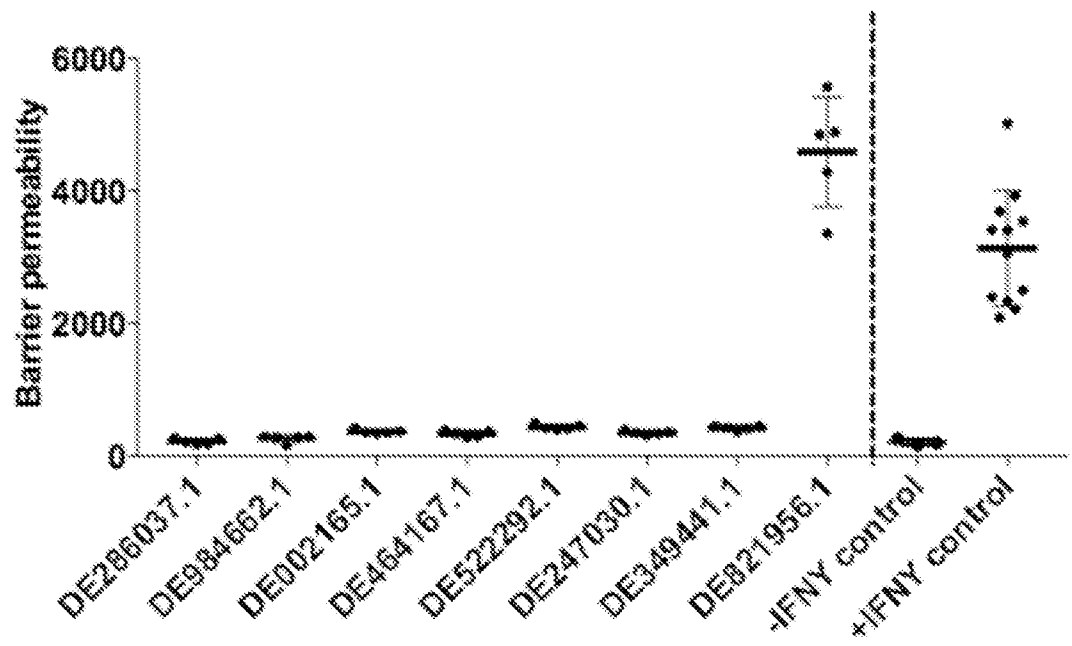


FIG. 20F

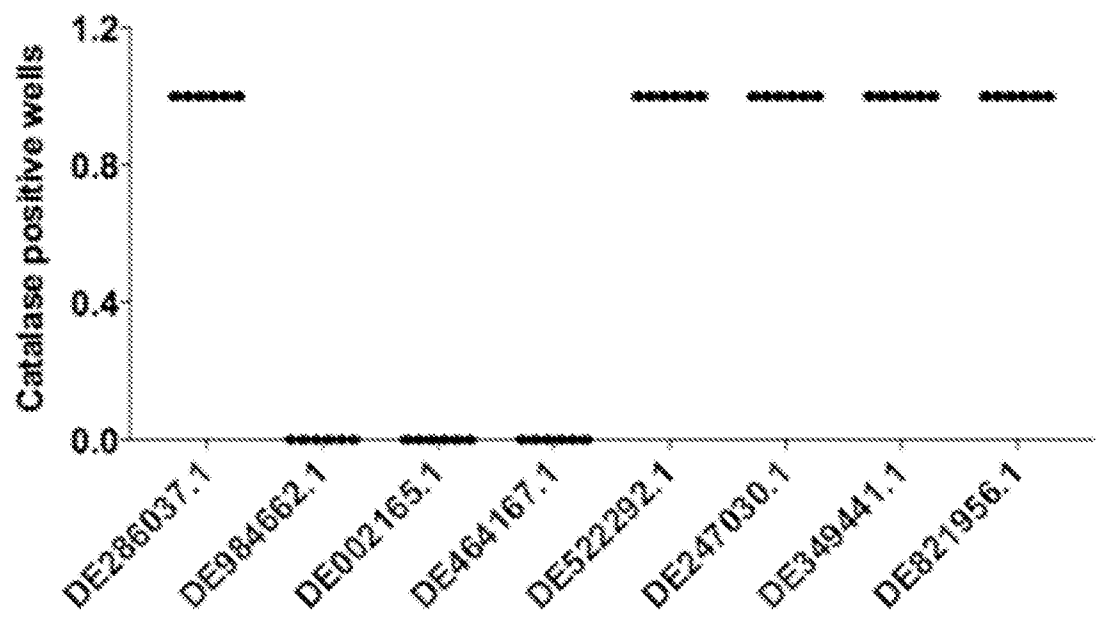


FIG. 20G

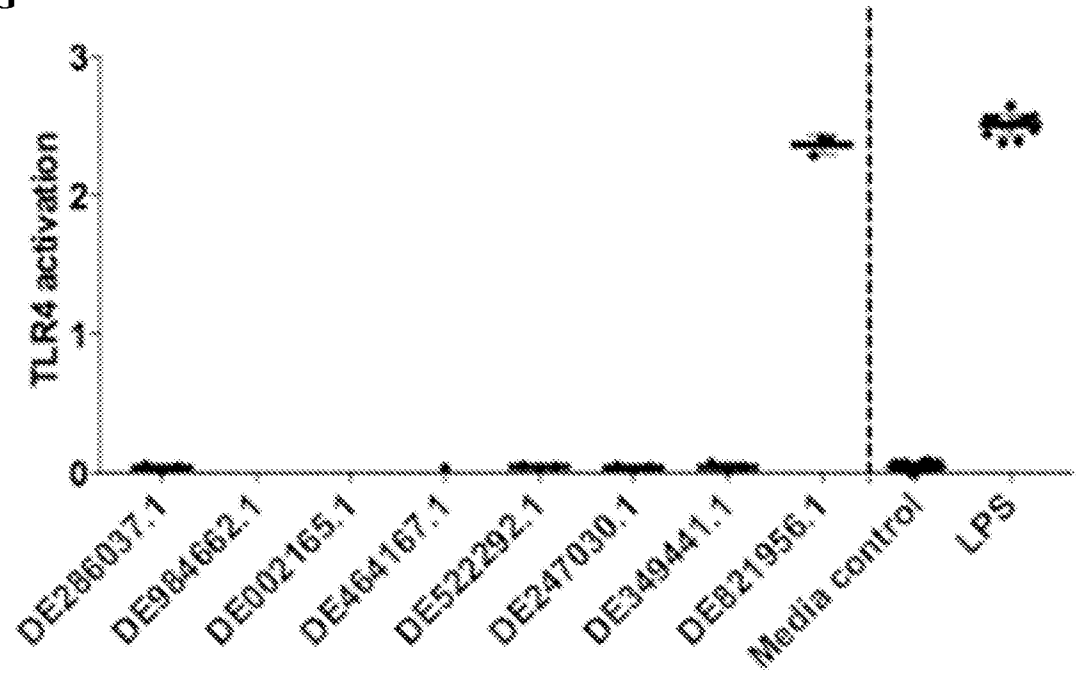


FIG. 20H

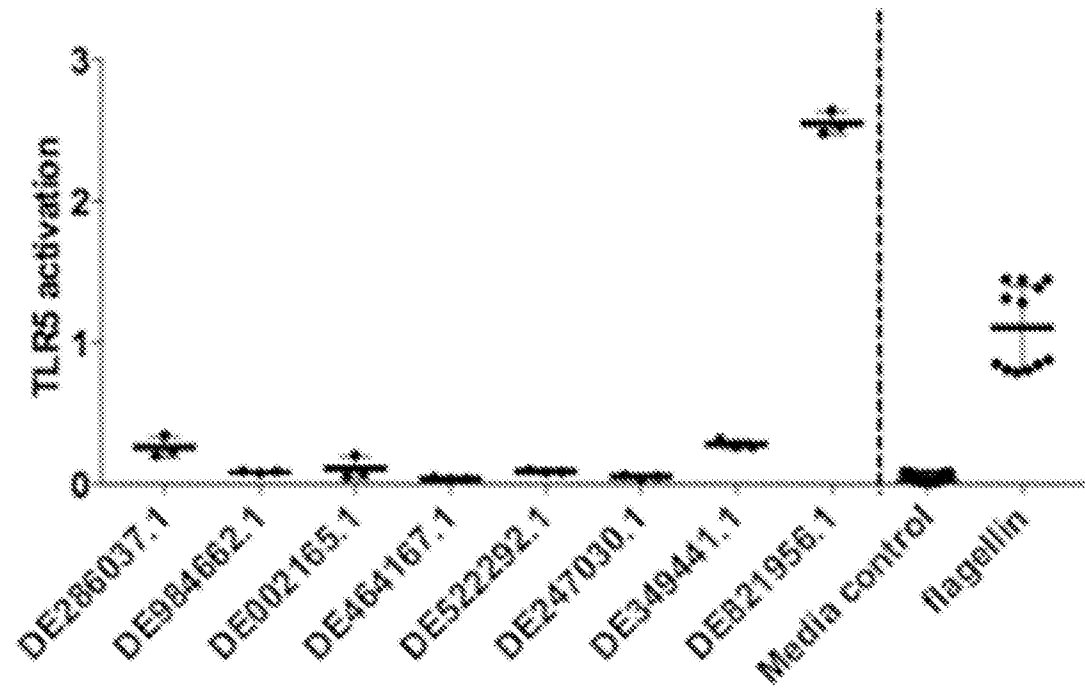


FIG. 20I

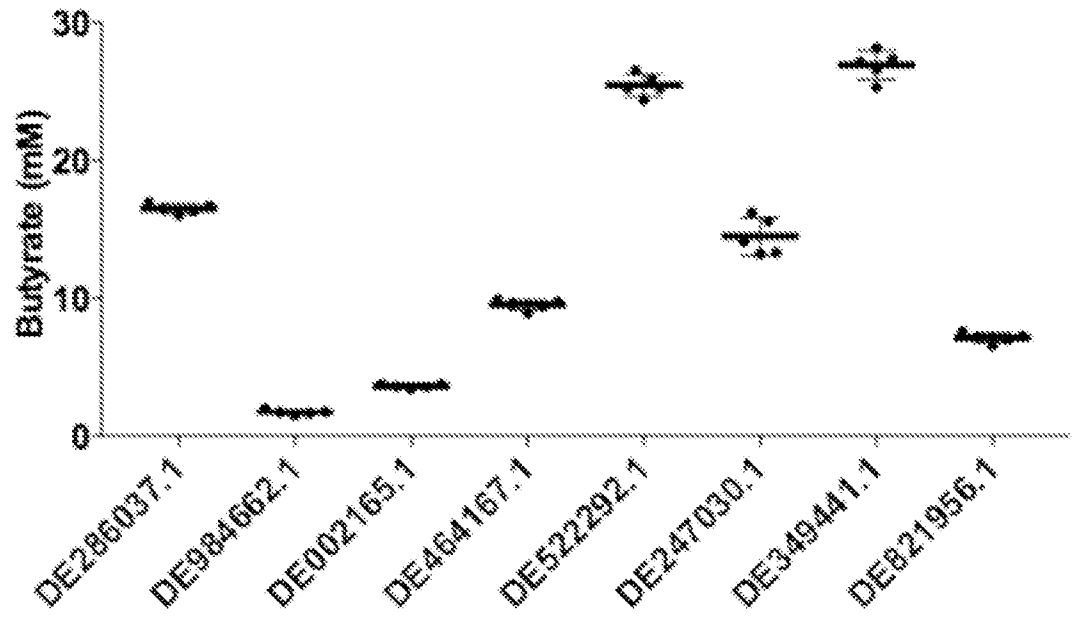


FIG. 20J

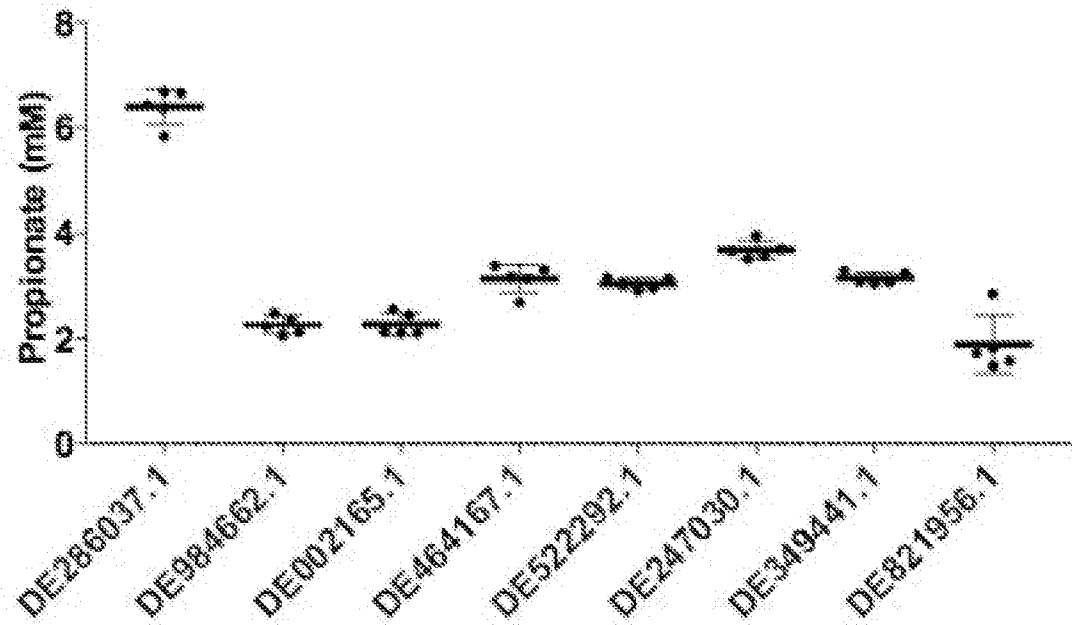


FIG. 20K

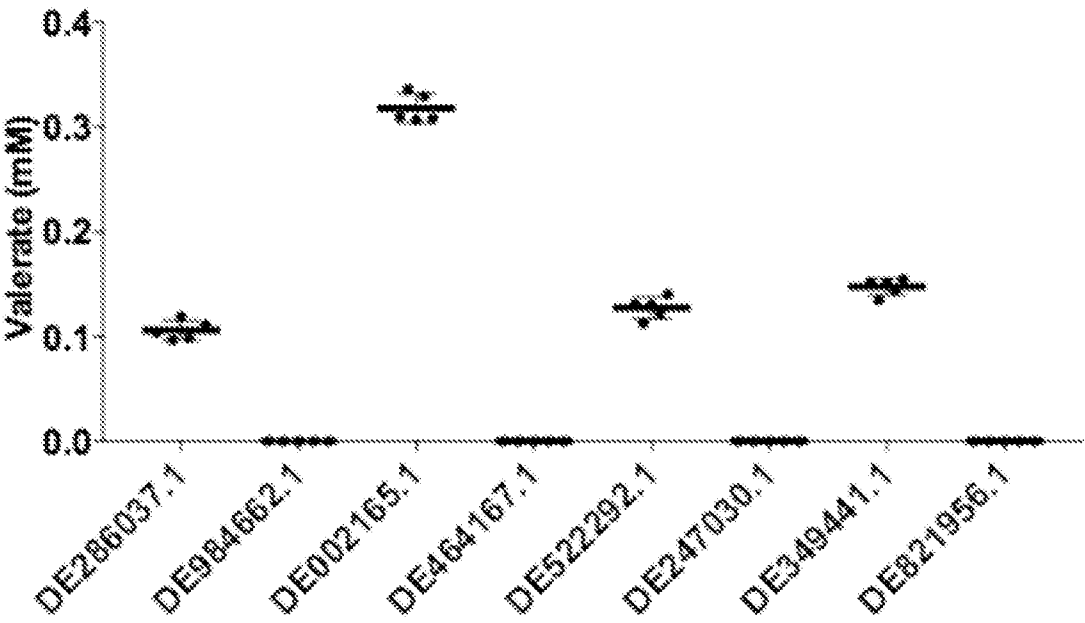


FIG. 20L

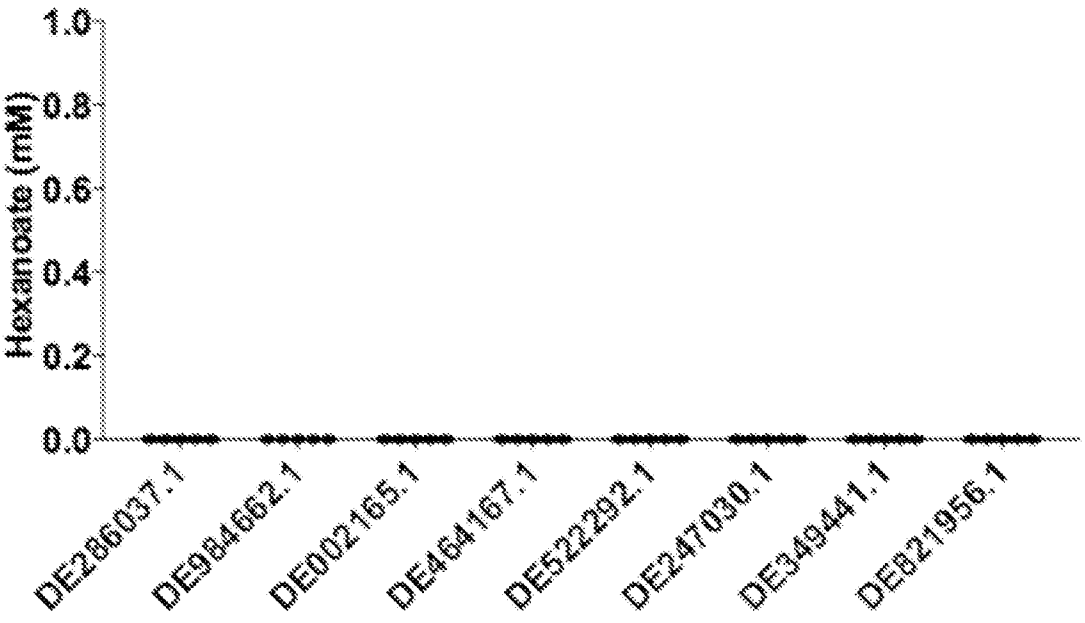


FIG. 20M

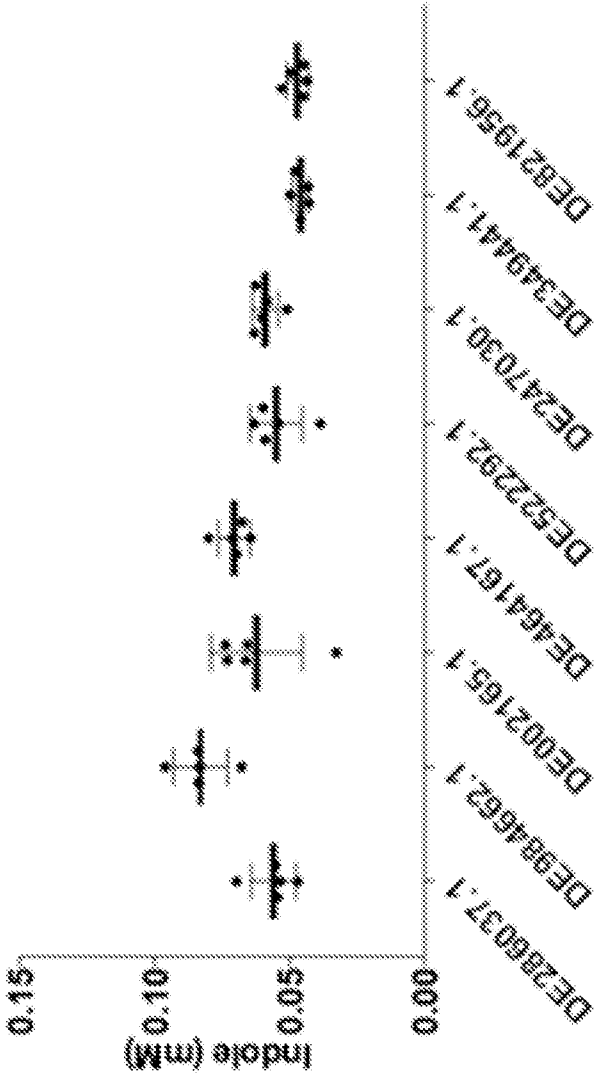


FIG. 20N

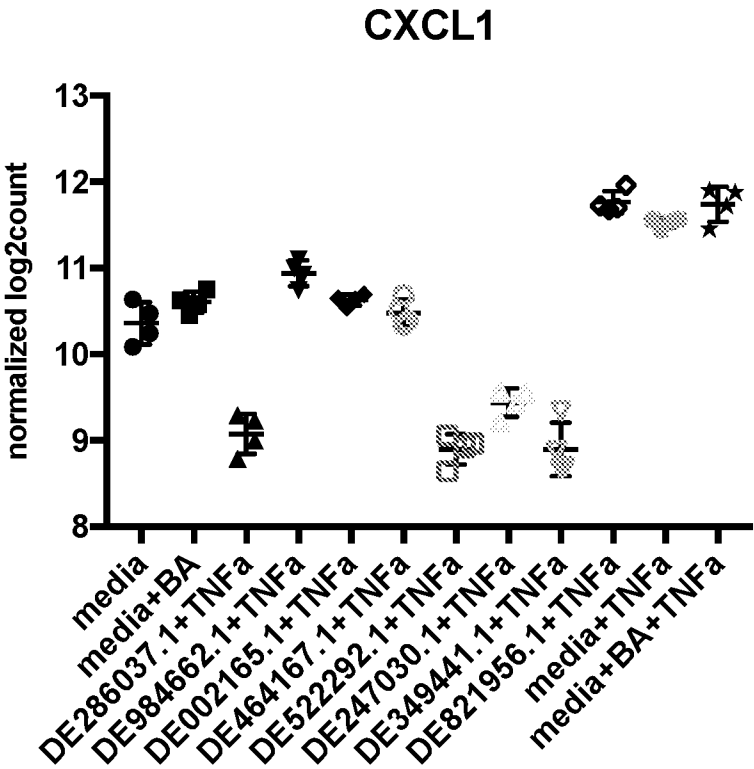


FIG. 20O

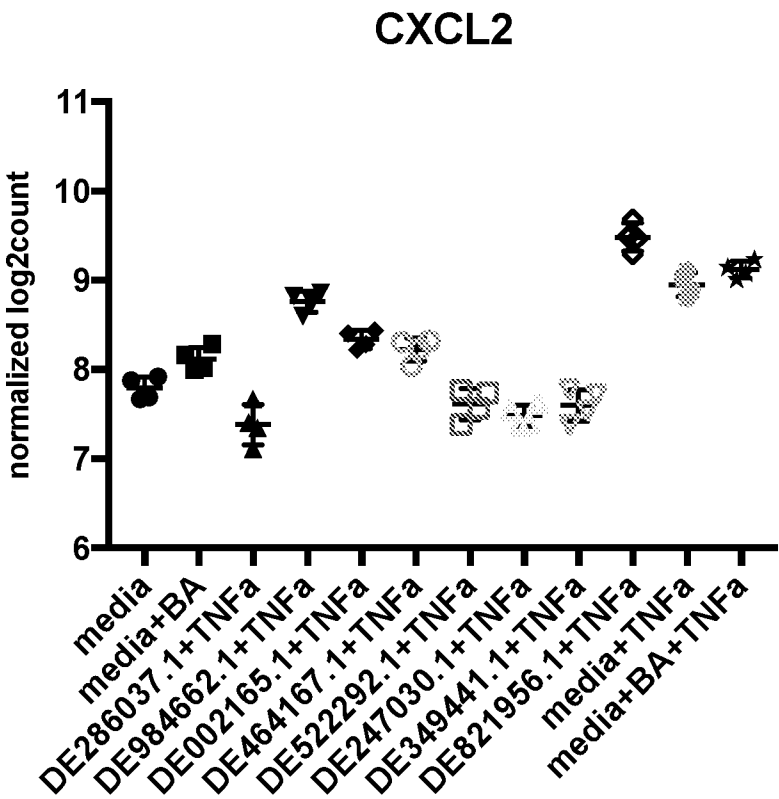


FIG. 20P

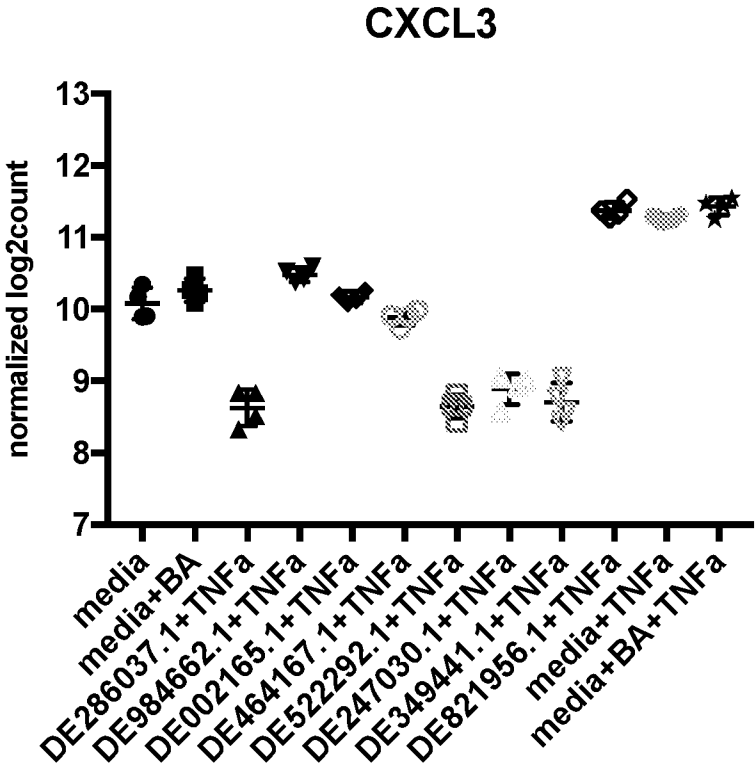


FIG. 20Q

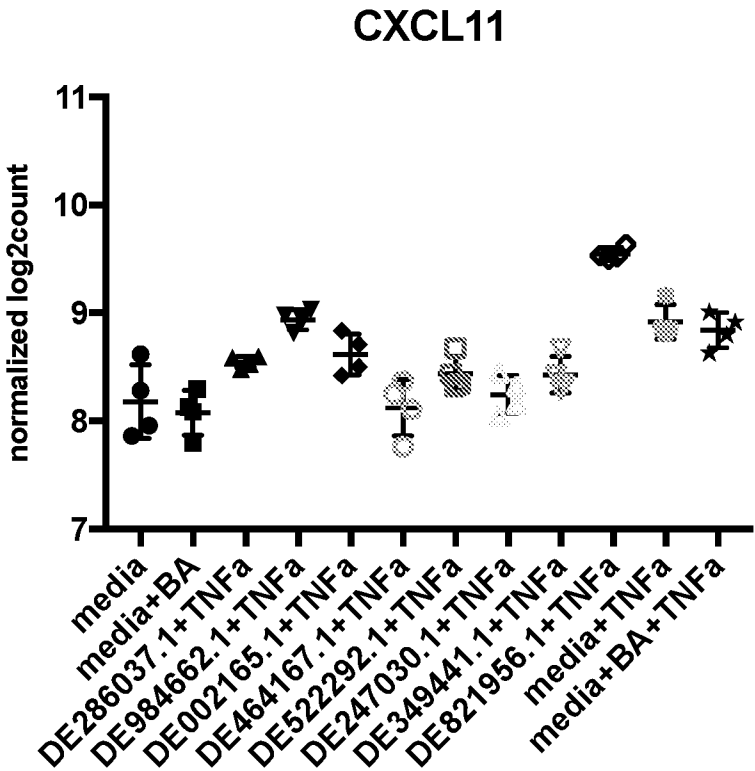


FIG. 20R

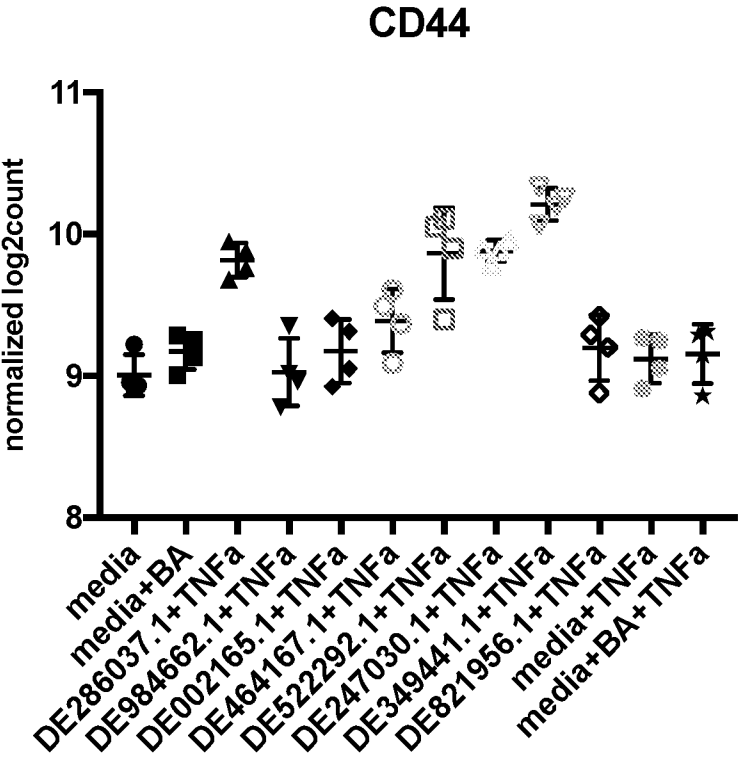


FIG. 20S

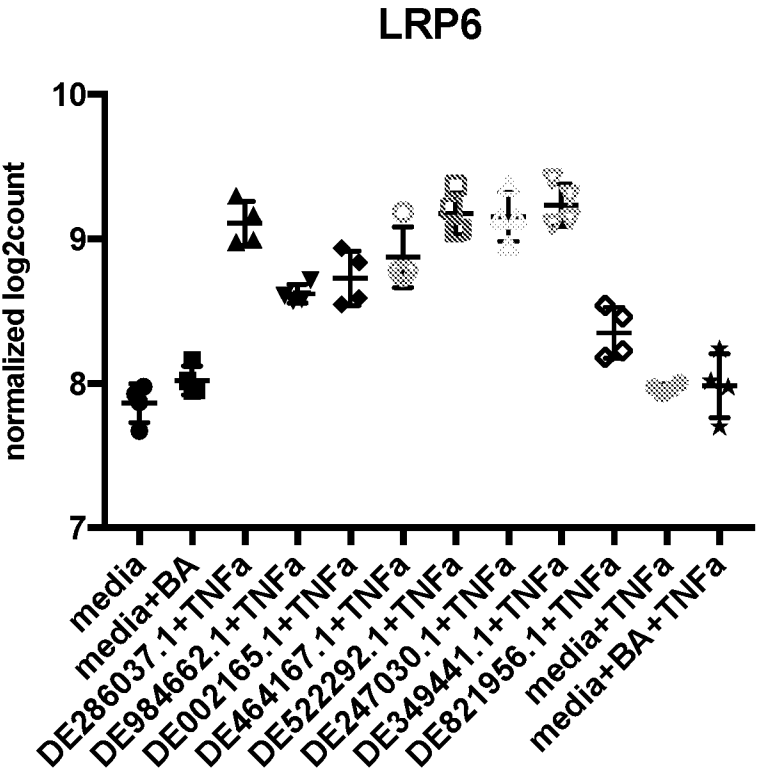


FIG. 20T

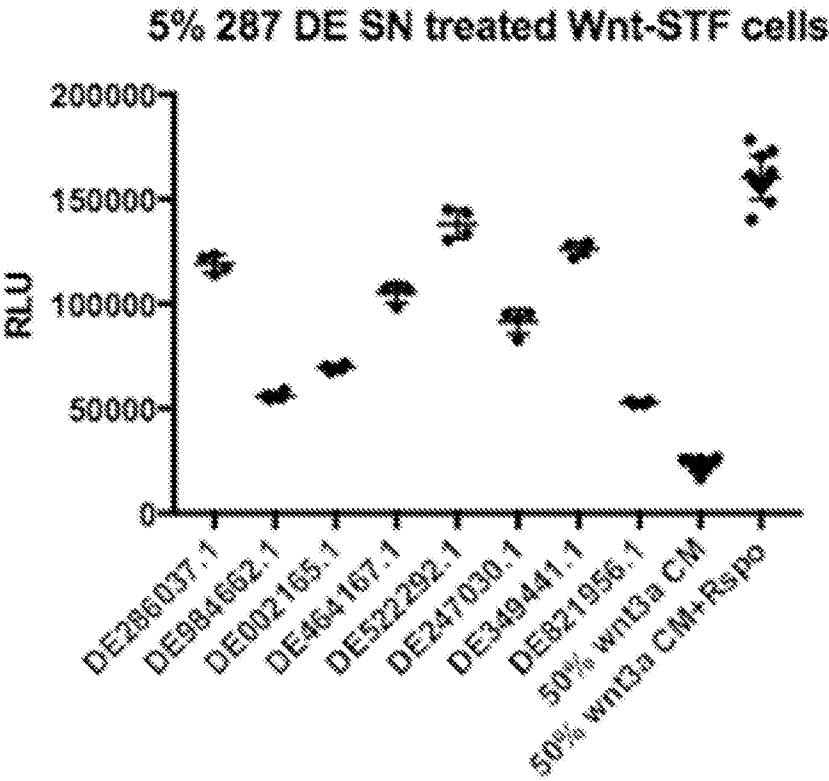


FIG. 21A

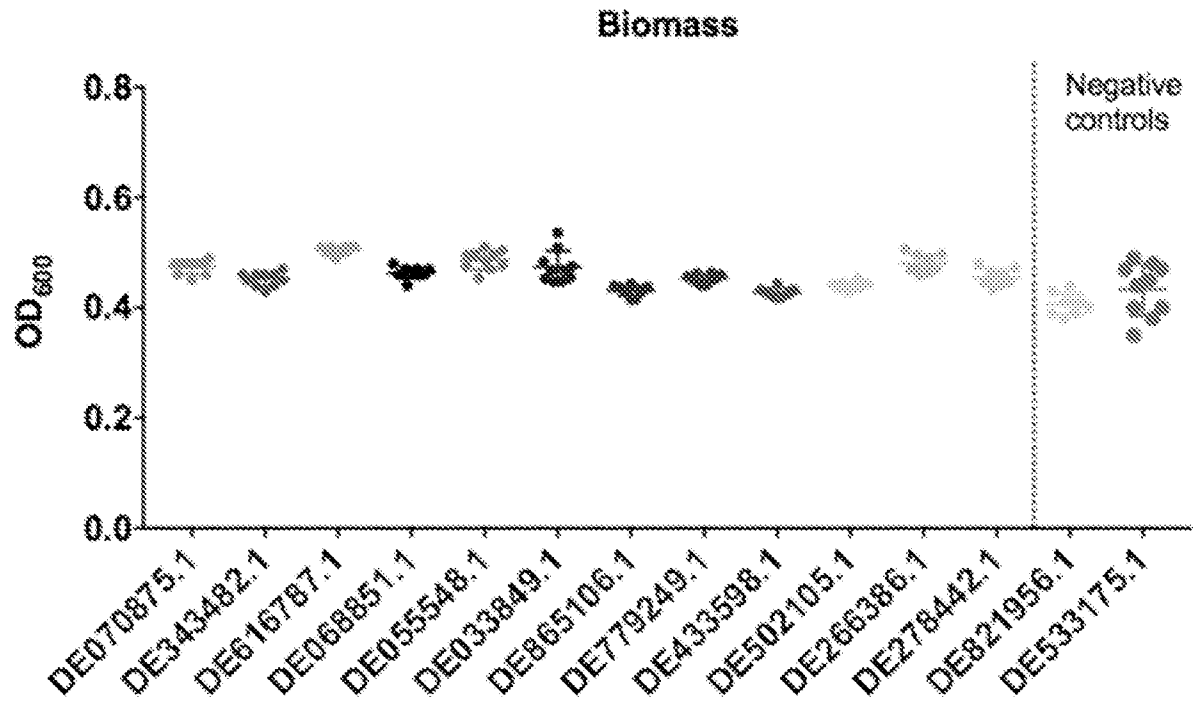


FIG. 21B

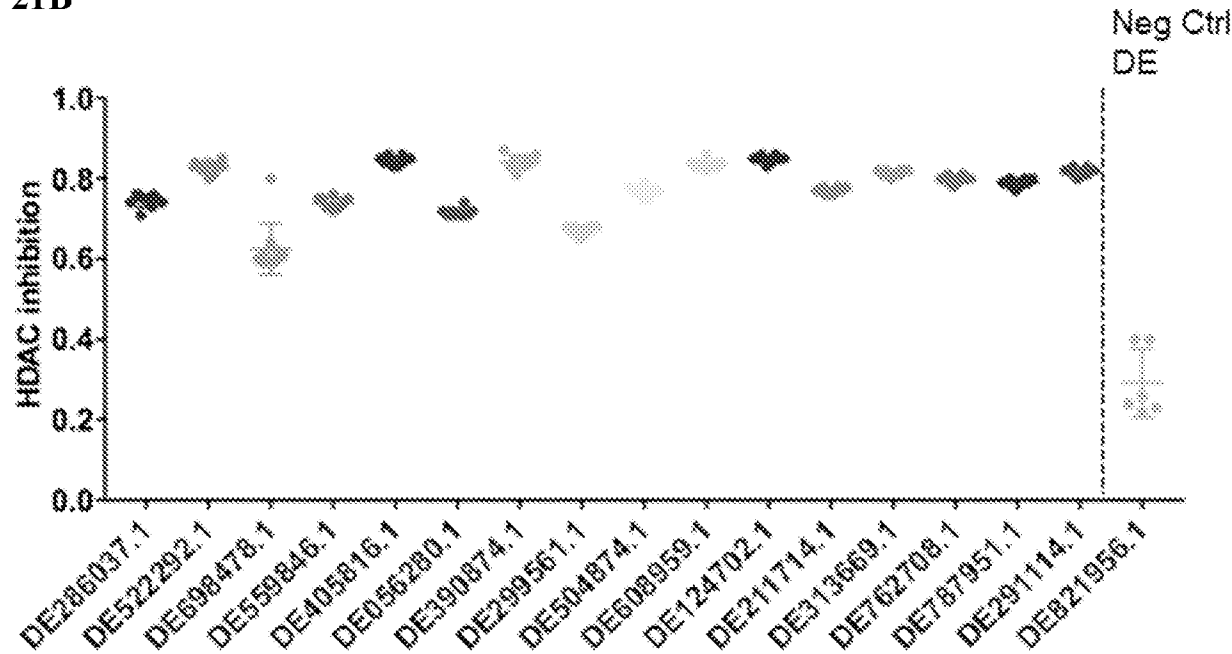


FIG. 21C

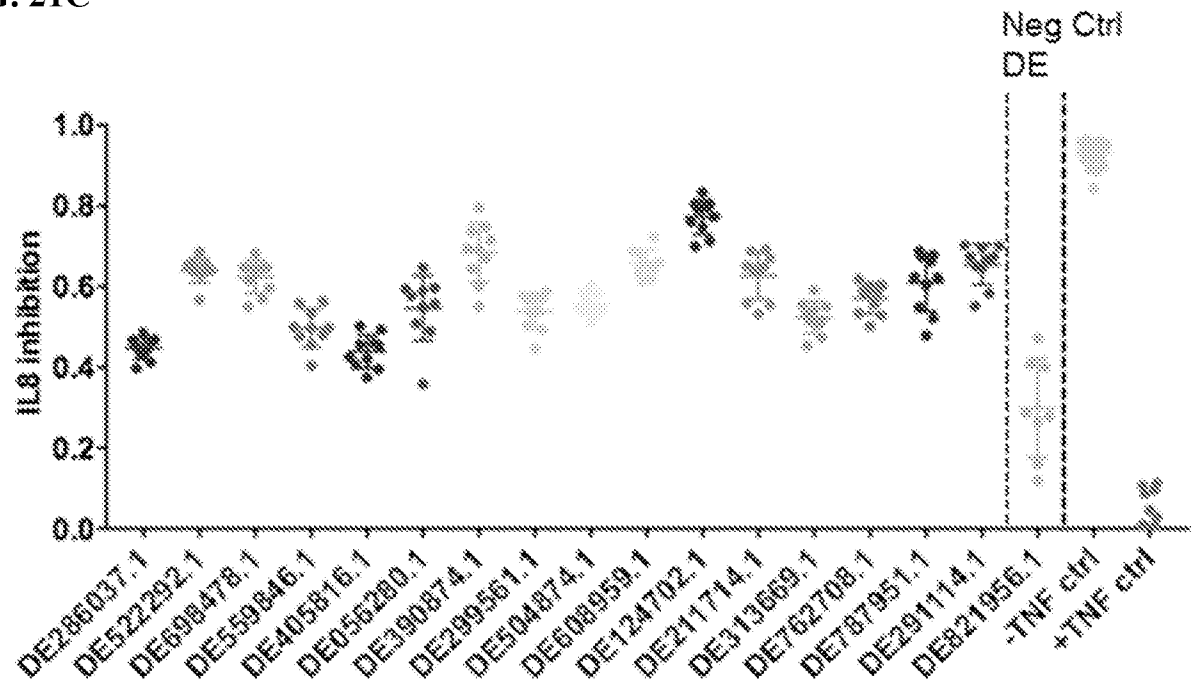


FIG. 21D

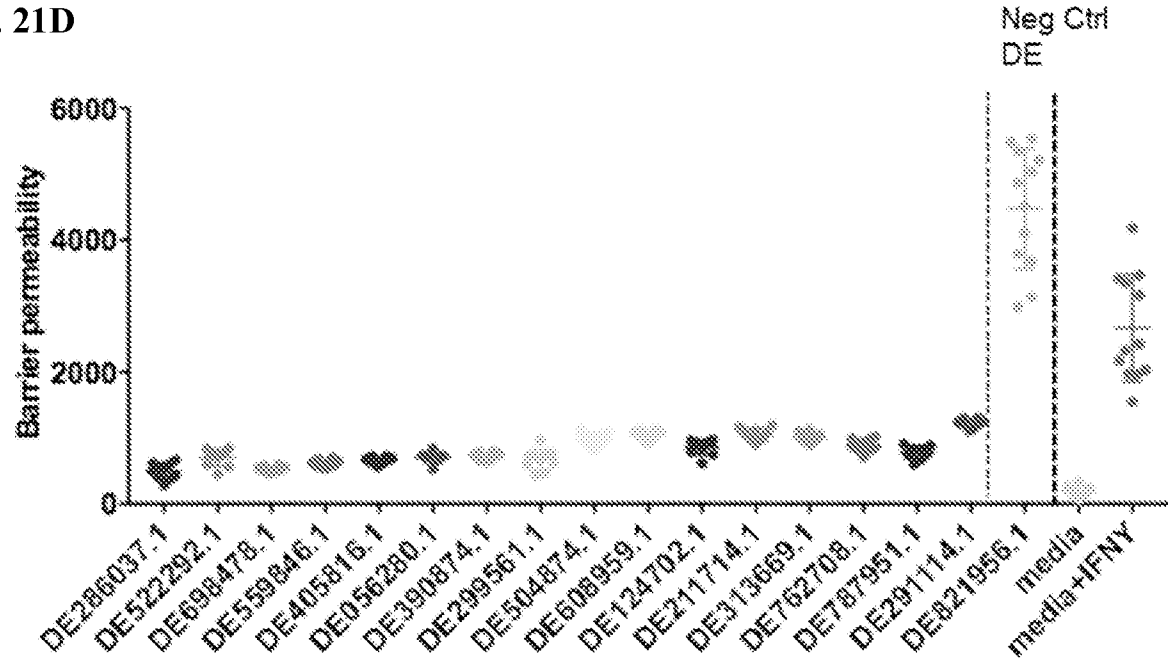


FIG. 21E

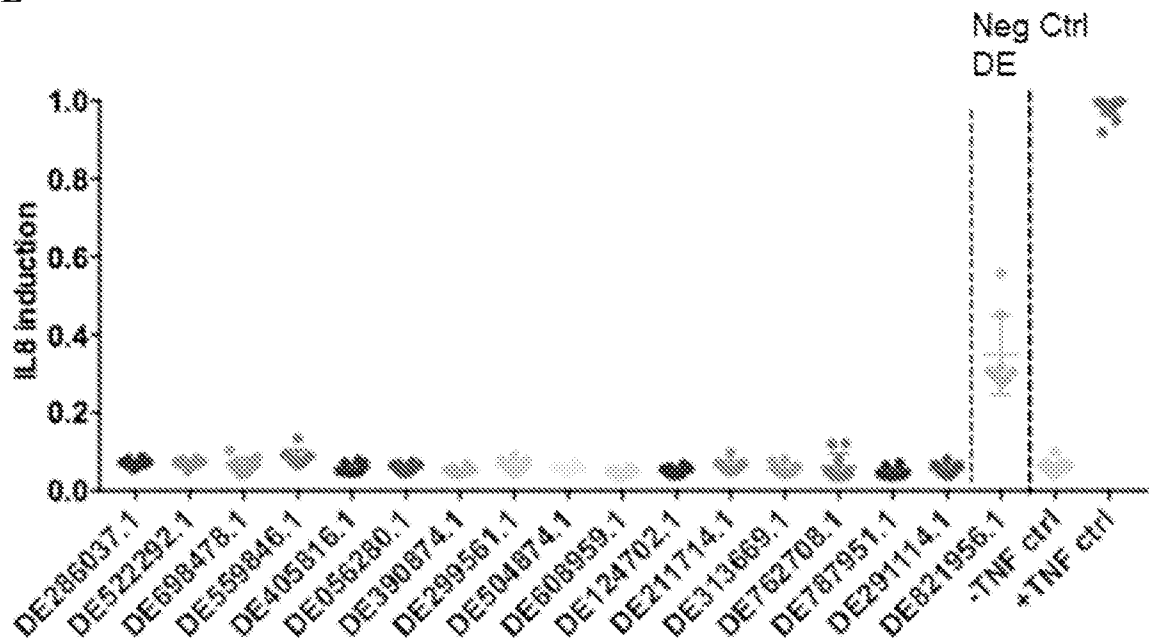


FIG. 21F

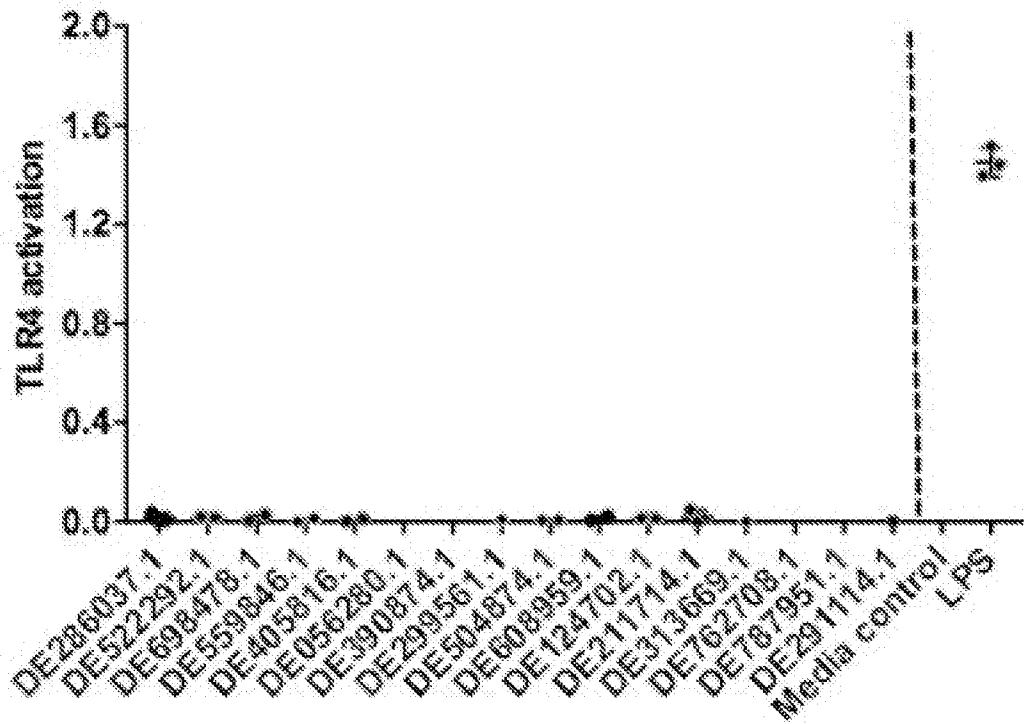


FIG. 21G

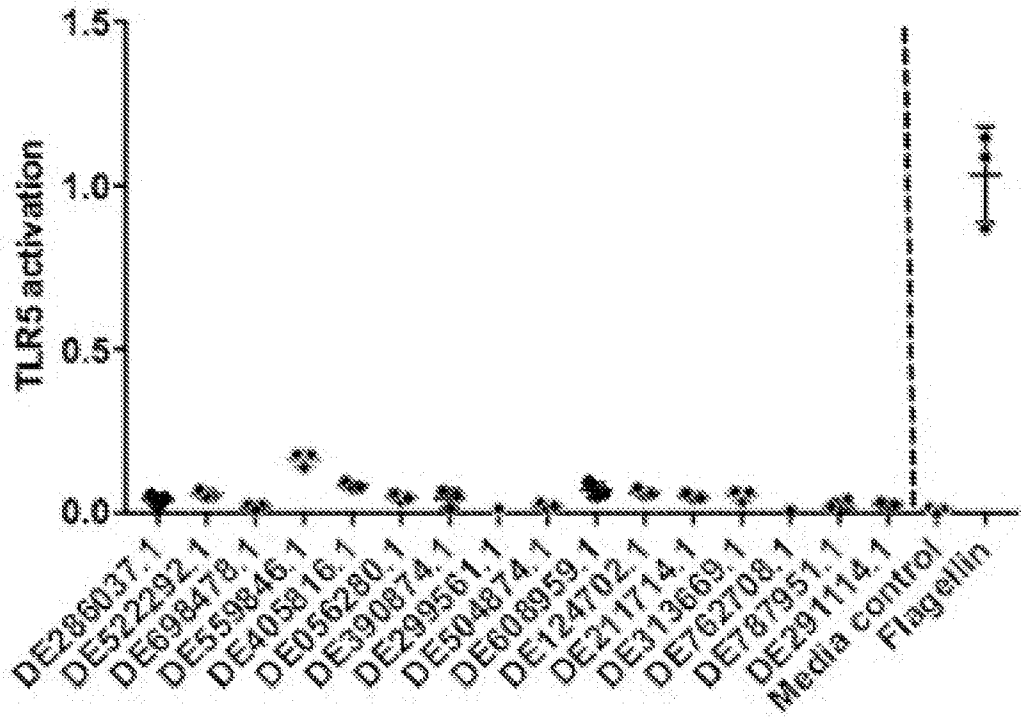


FIG. 21H

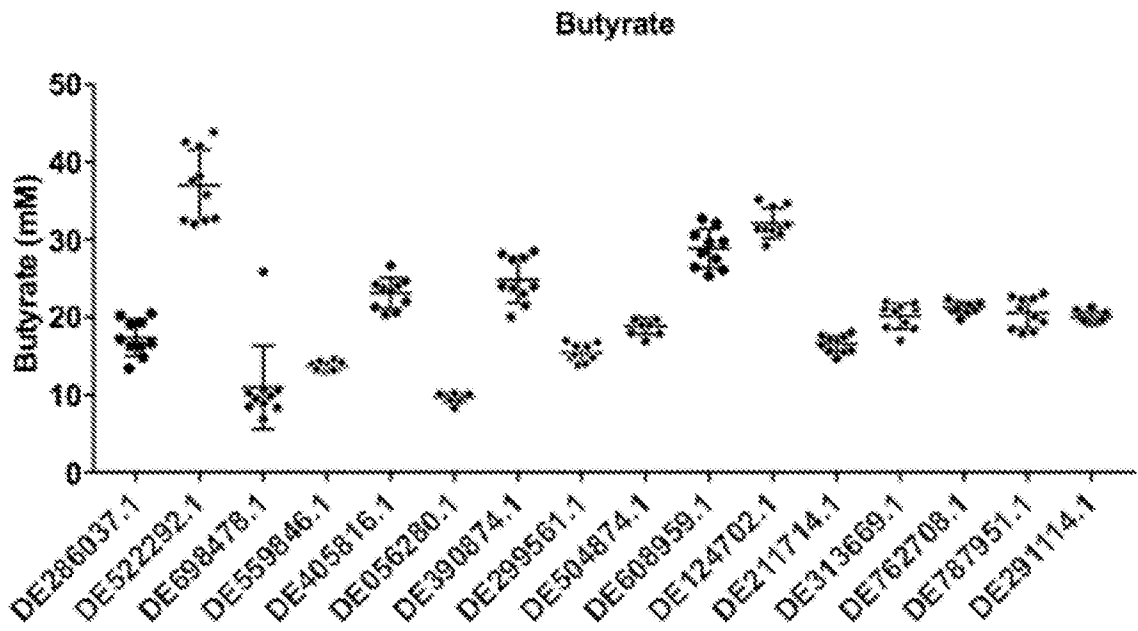


FIG. 21I

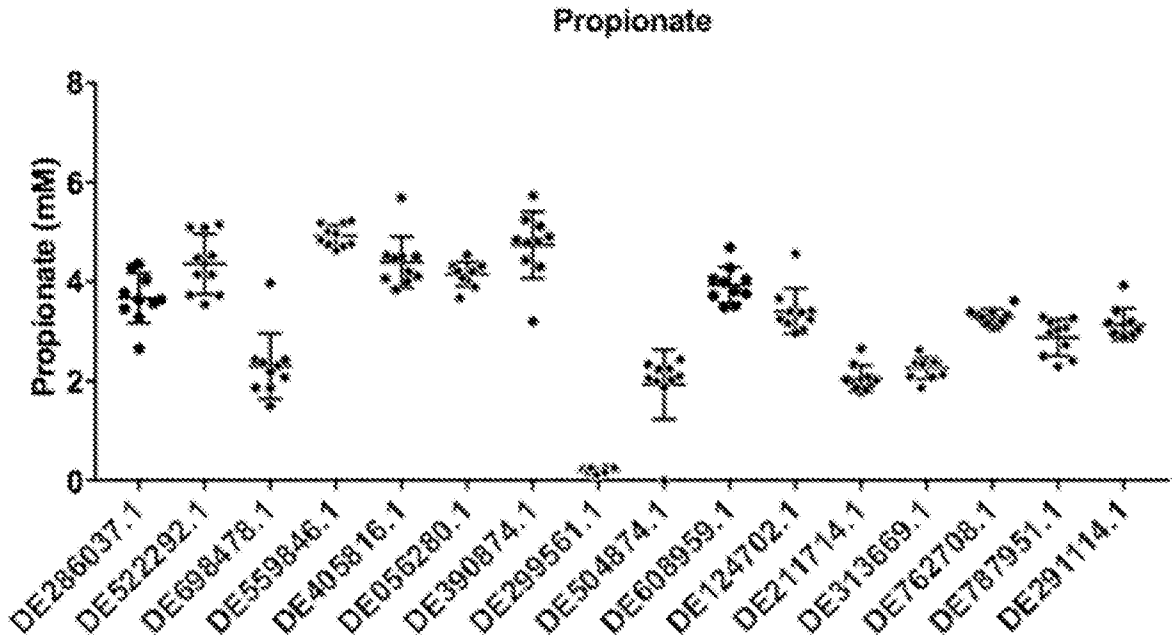


FIG. 21J

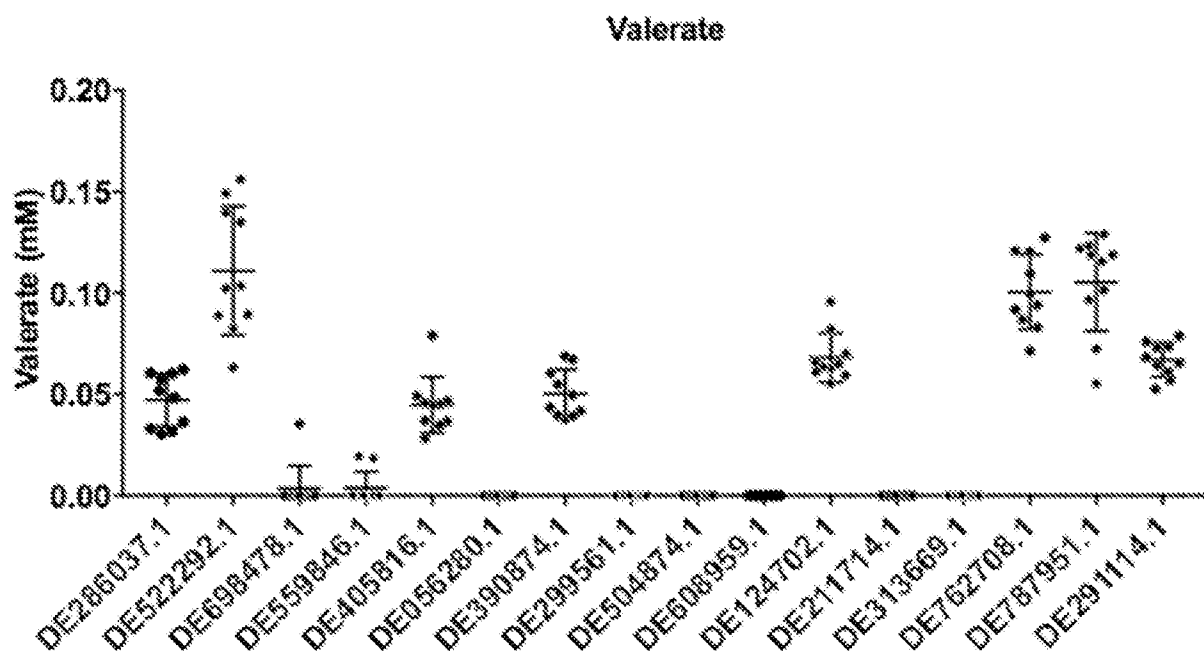


FIG. 21K

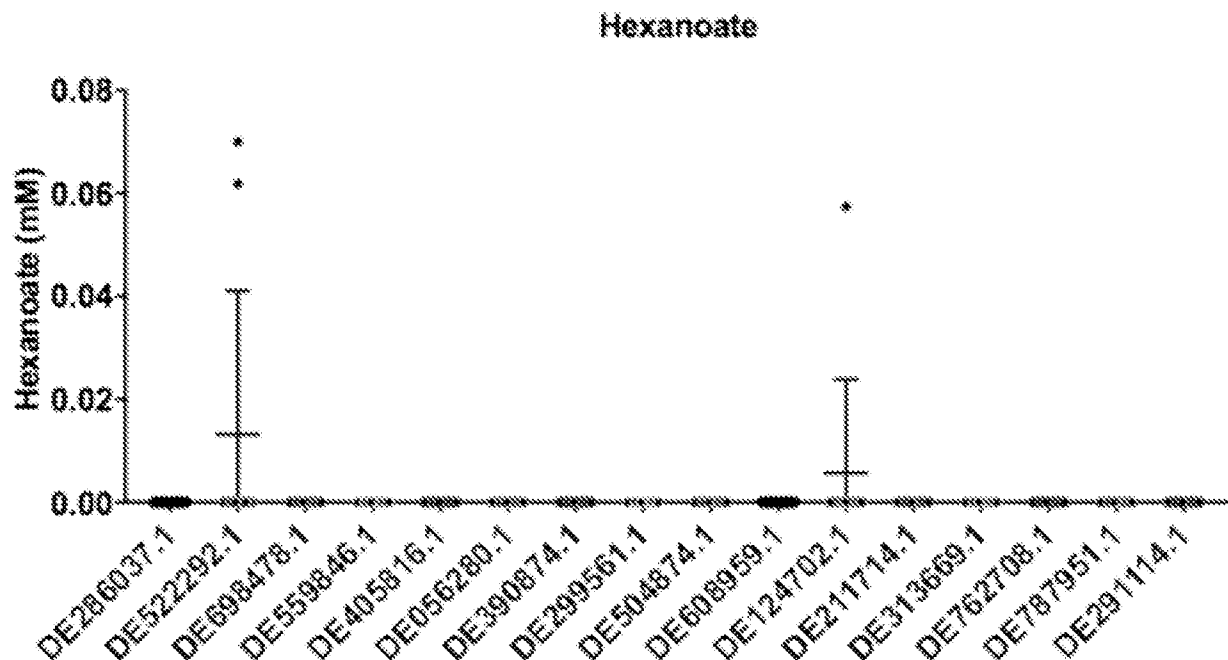


FIG. 21L

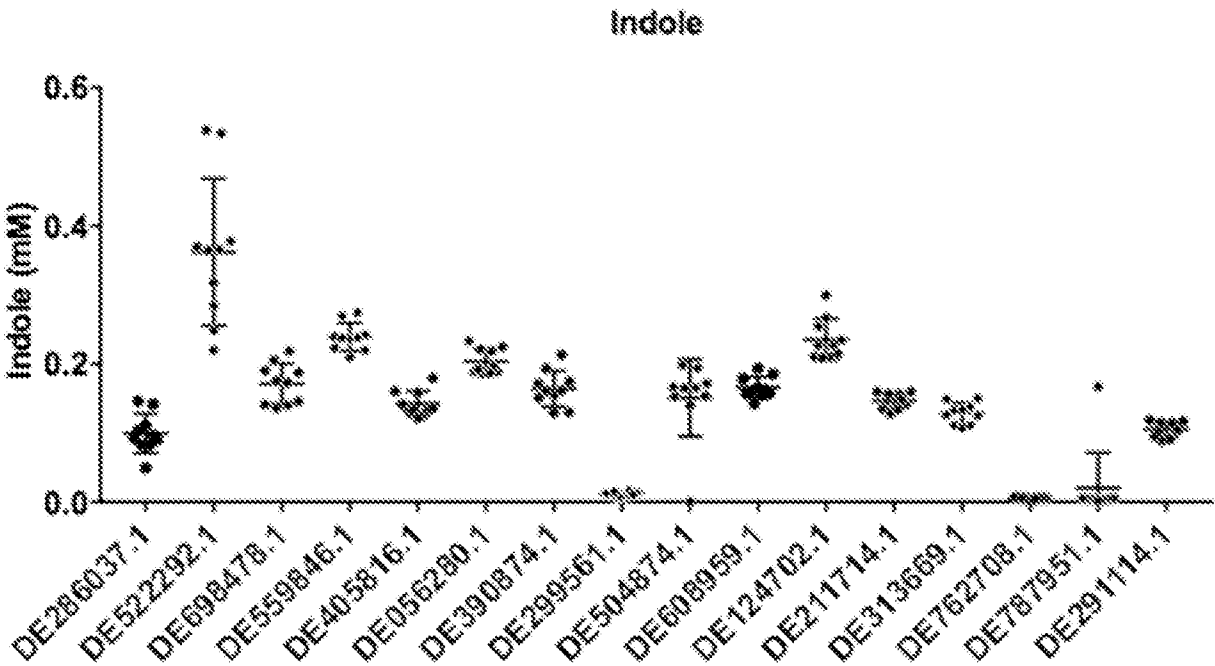


FIG. 21M

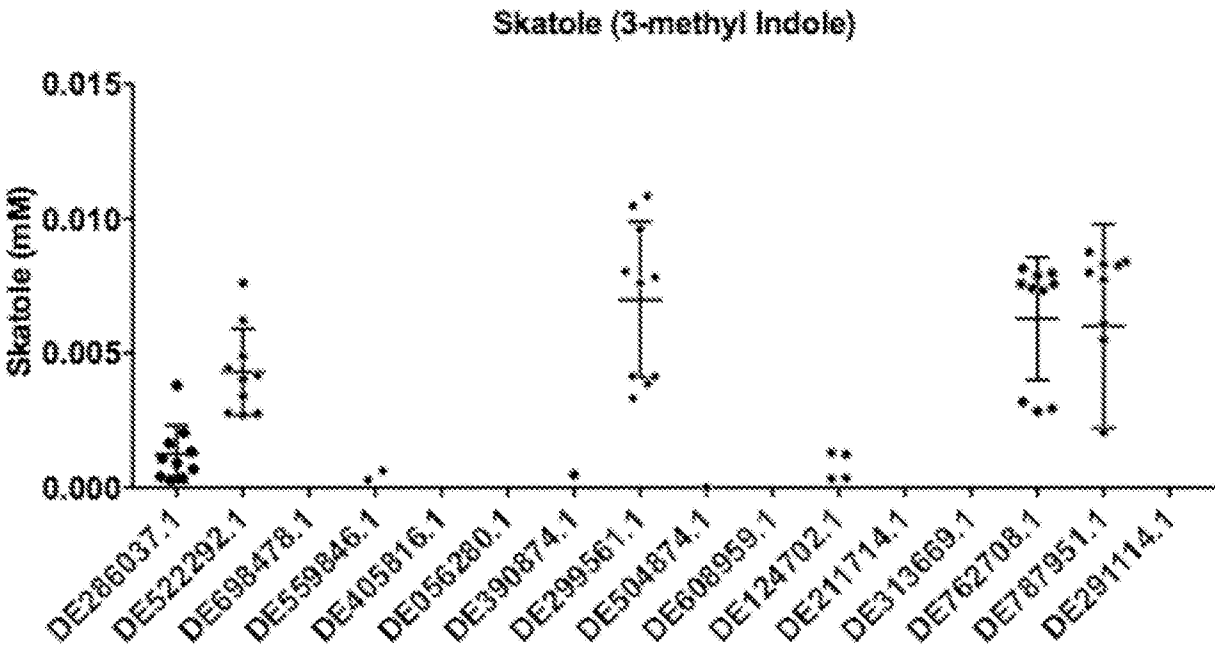


FIG. 21N

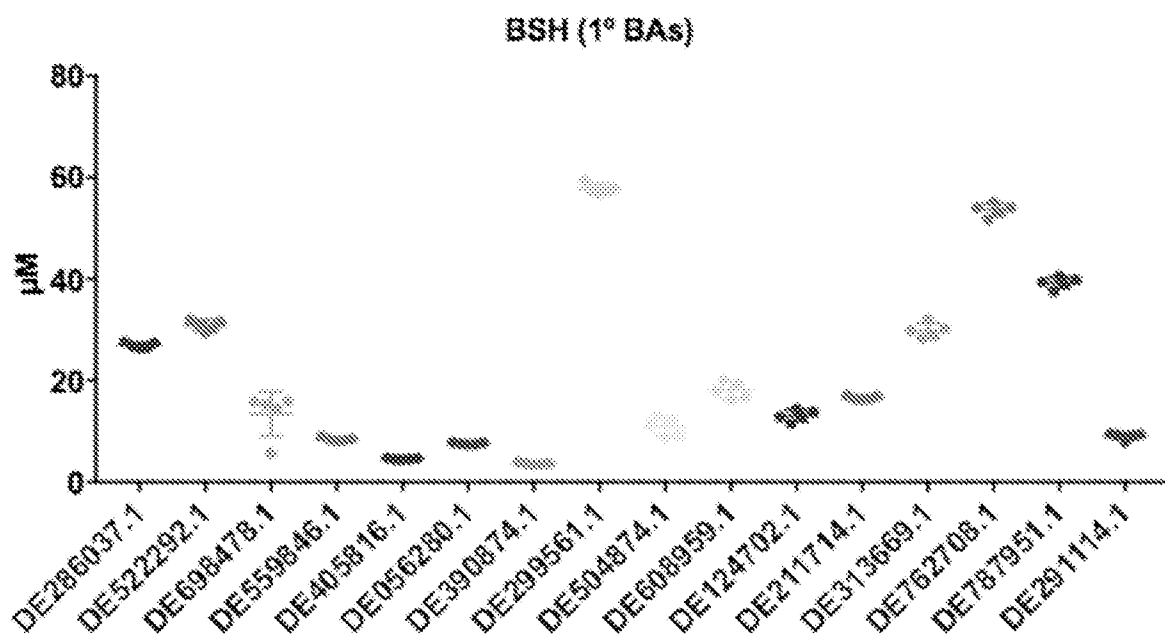


FIG. 21O

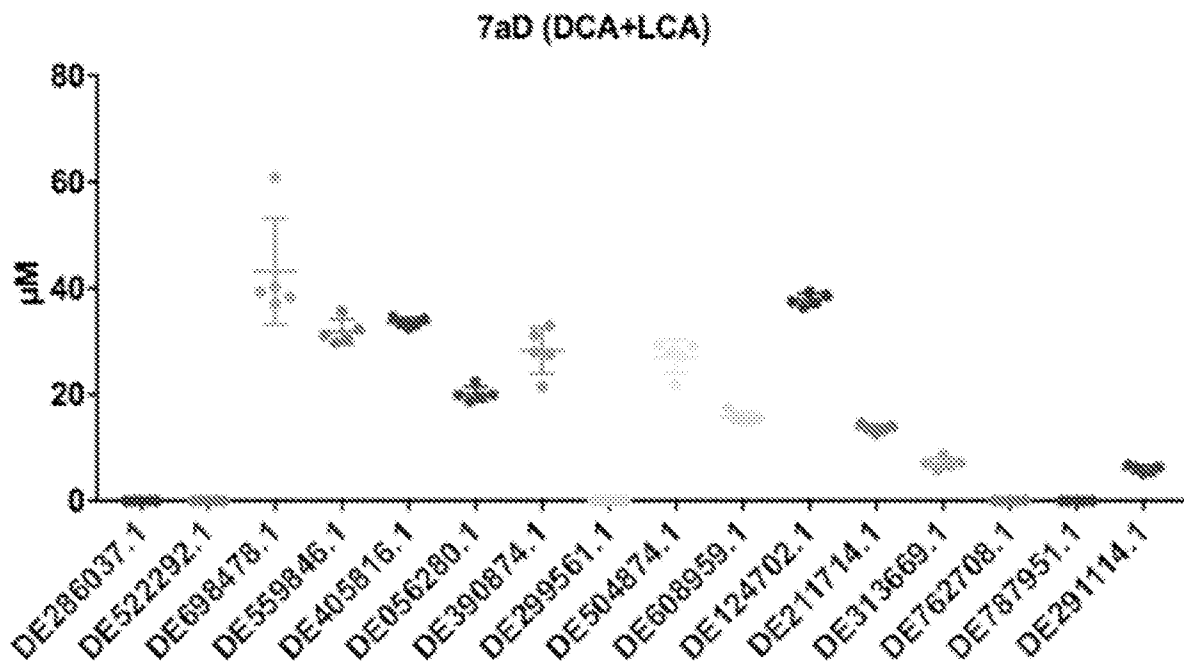


FIG. 21P

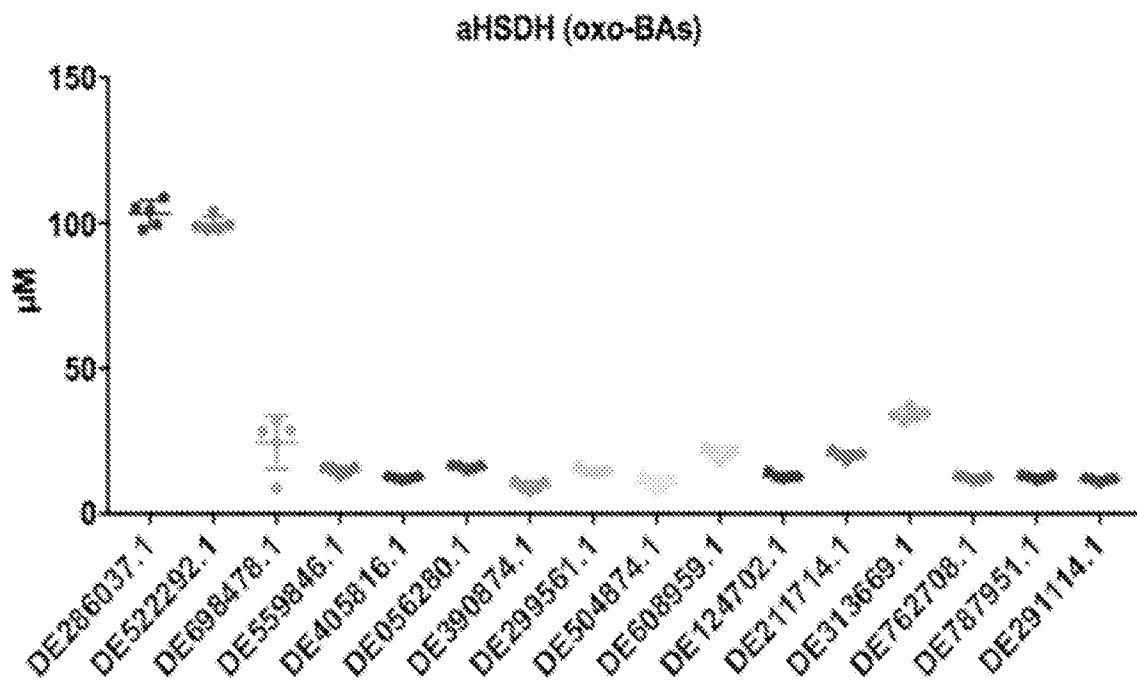


FIG. 21Q

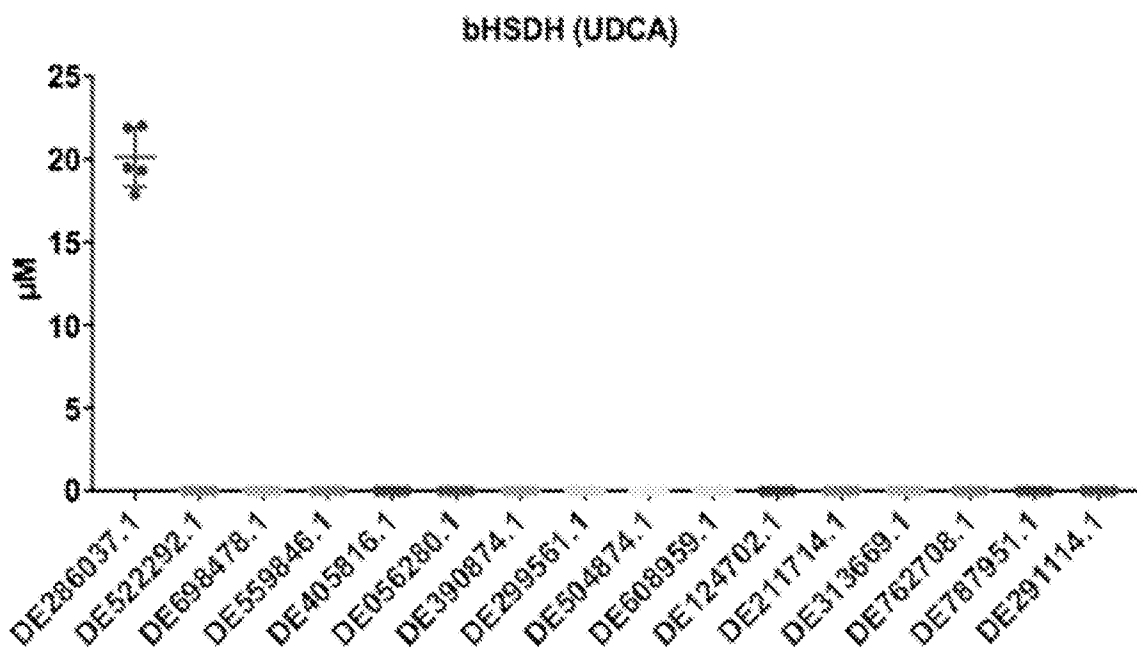


FIG. 22A

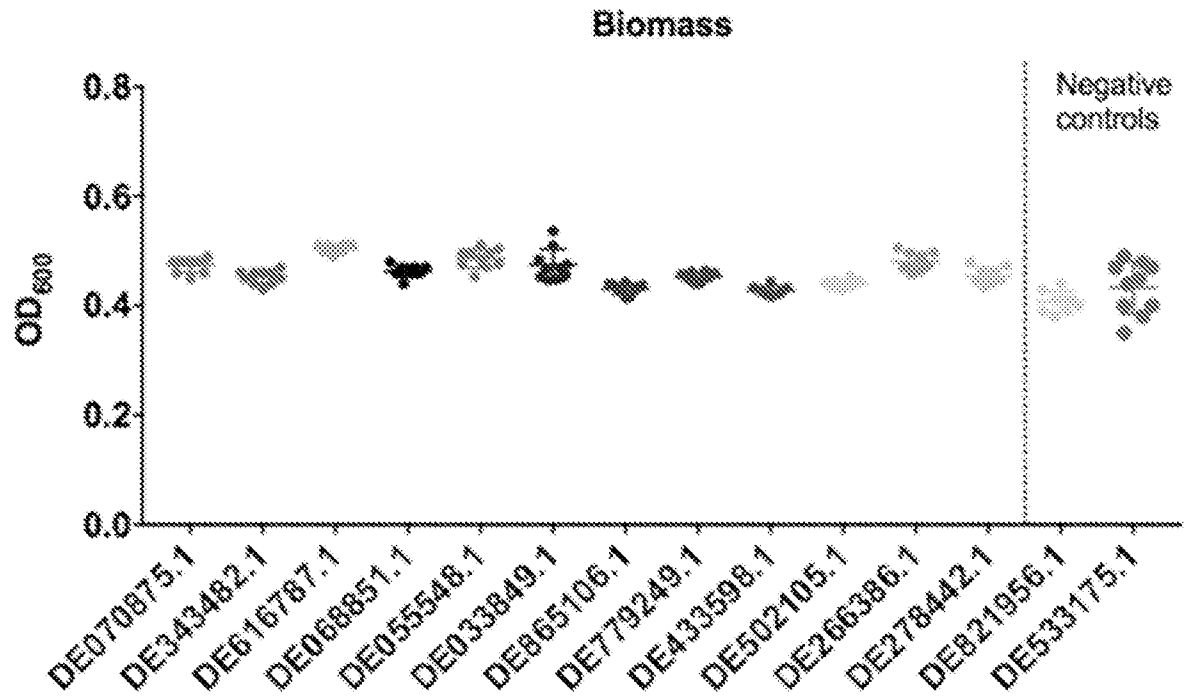


FIG. 22B

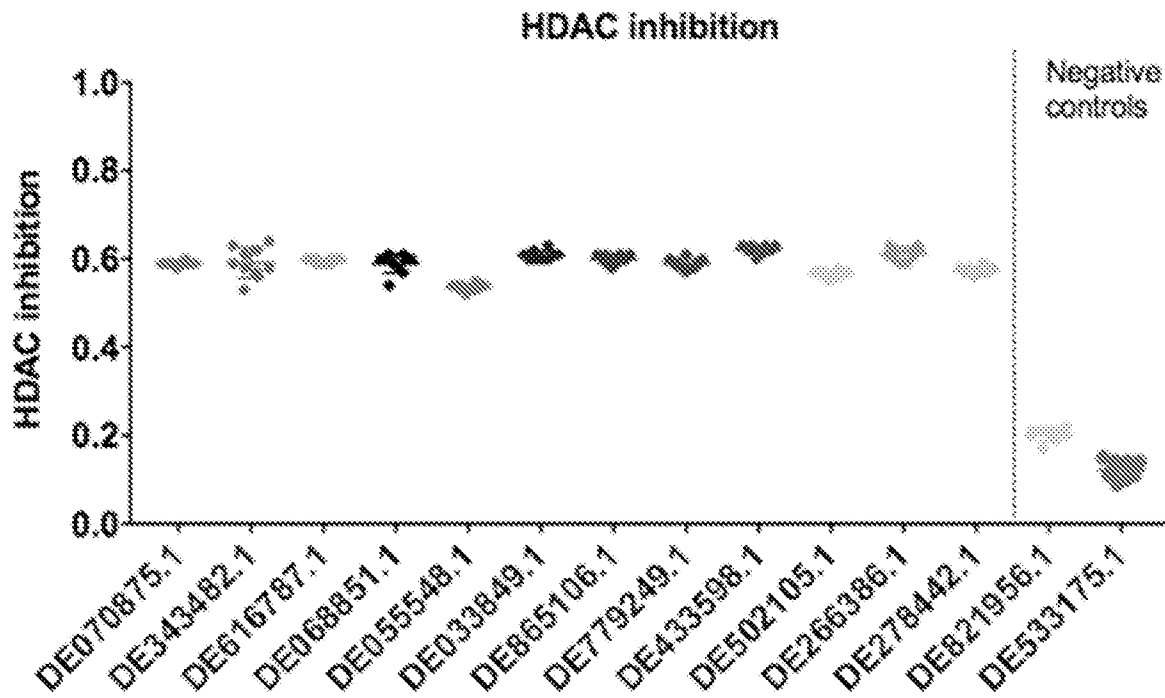


FIG. 22C

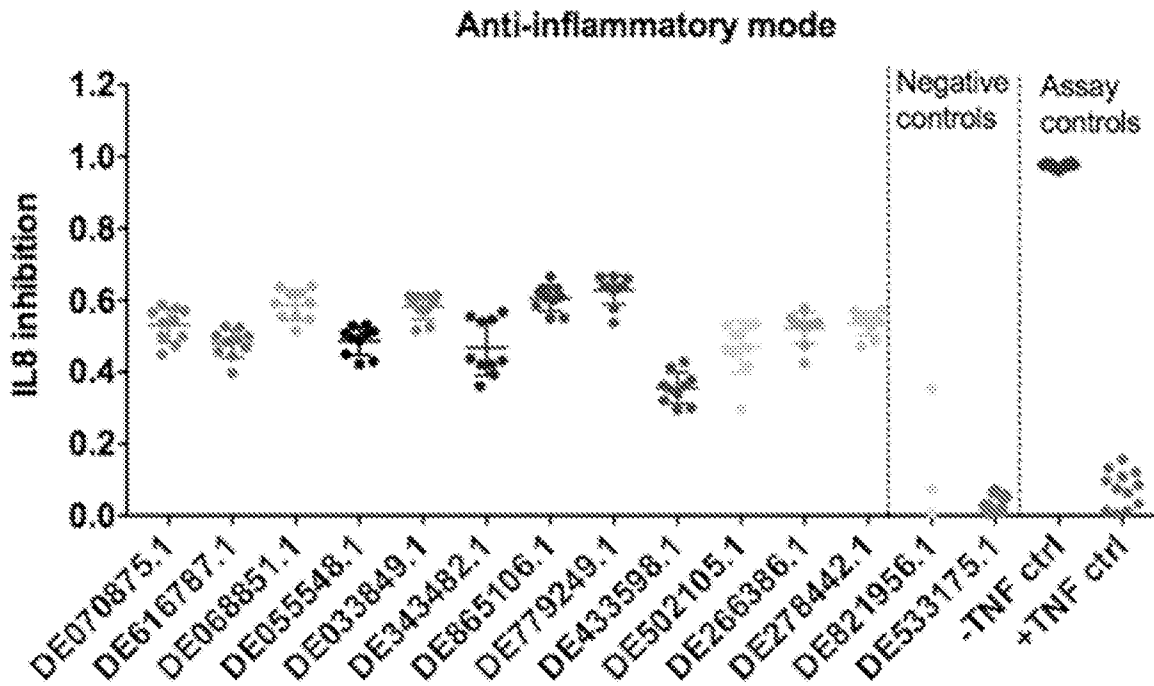


FIG. 22D

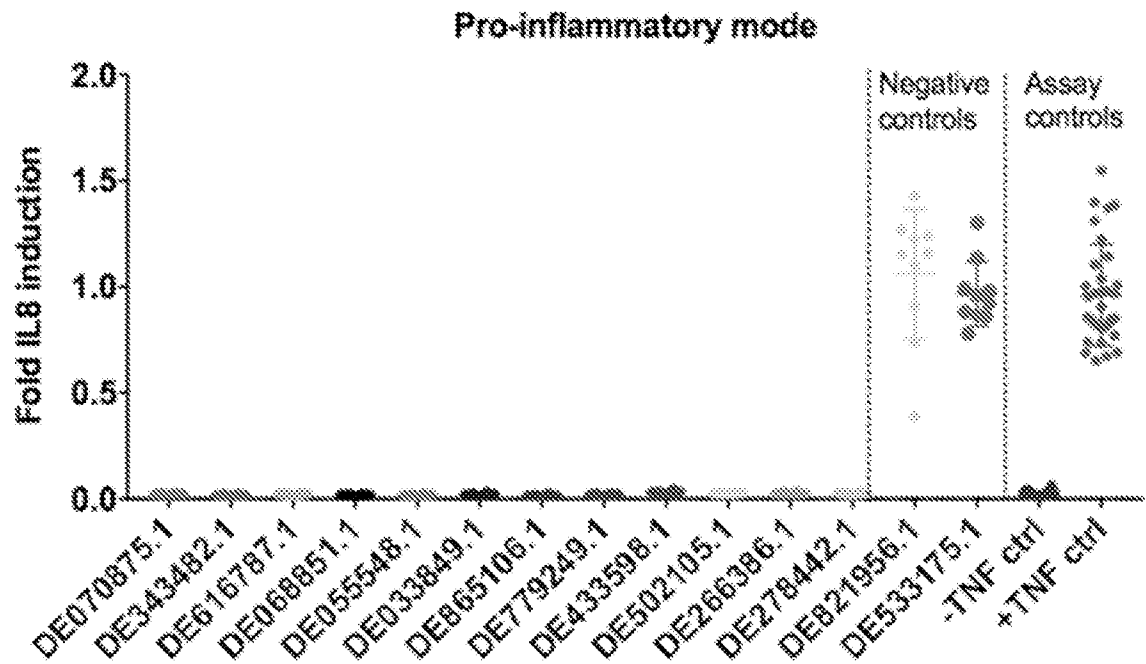


FIG. 22E

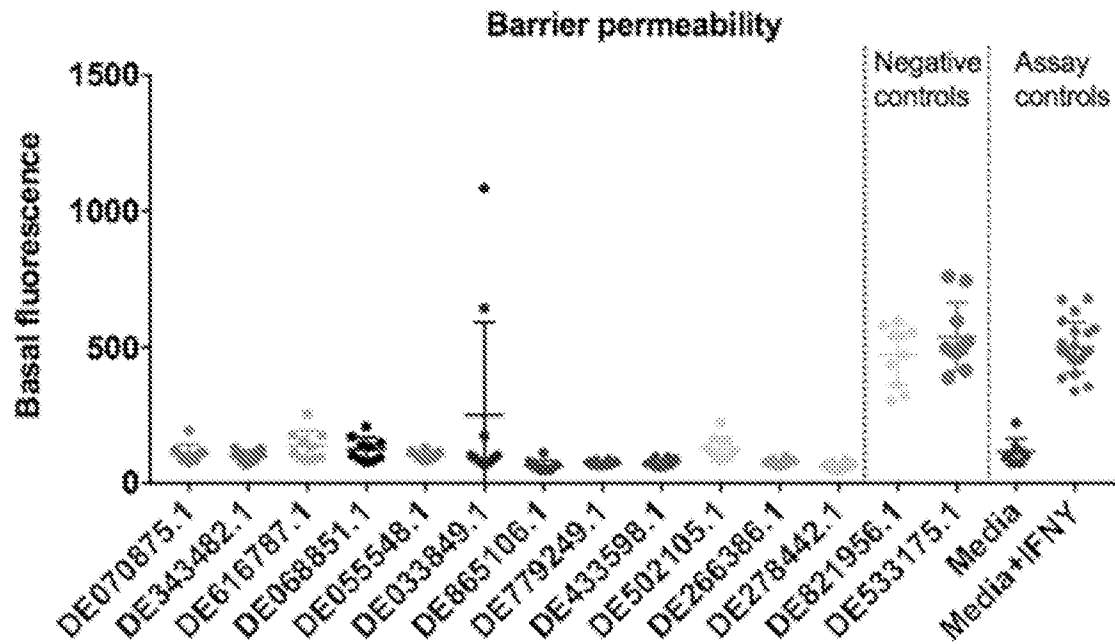


FIG. 22F

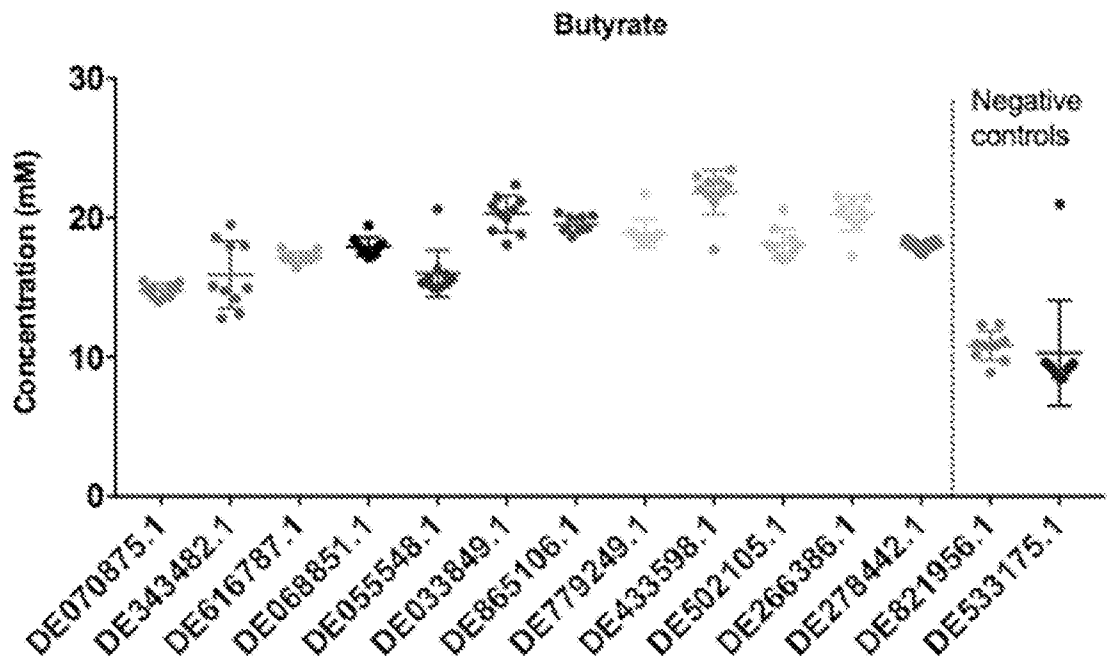


FIG. 22G

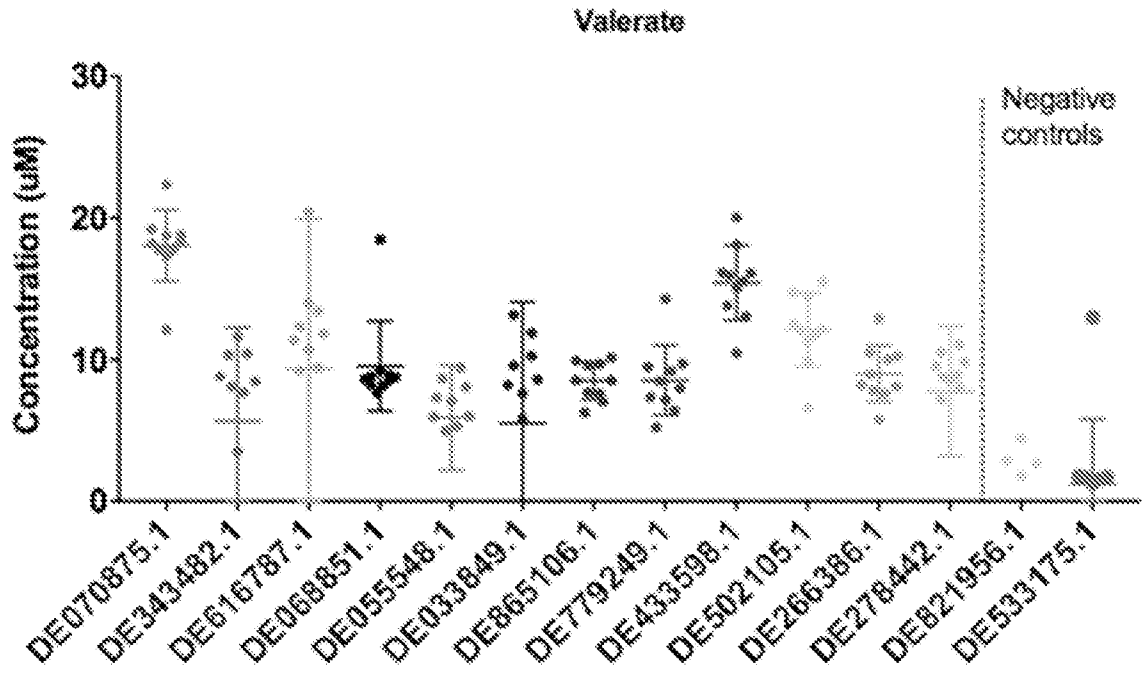


FIG. 22H

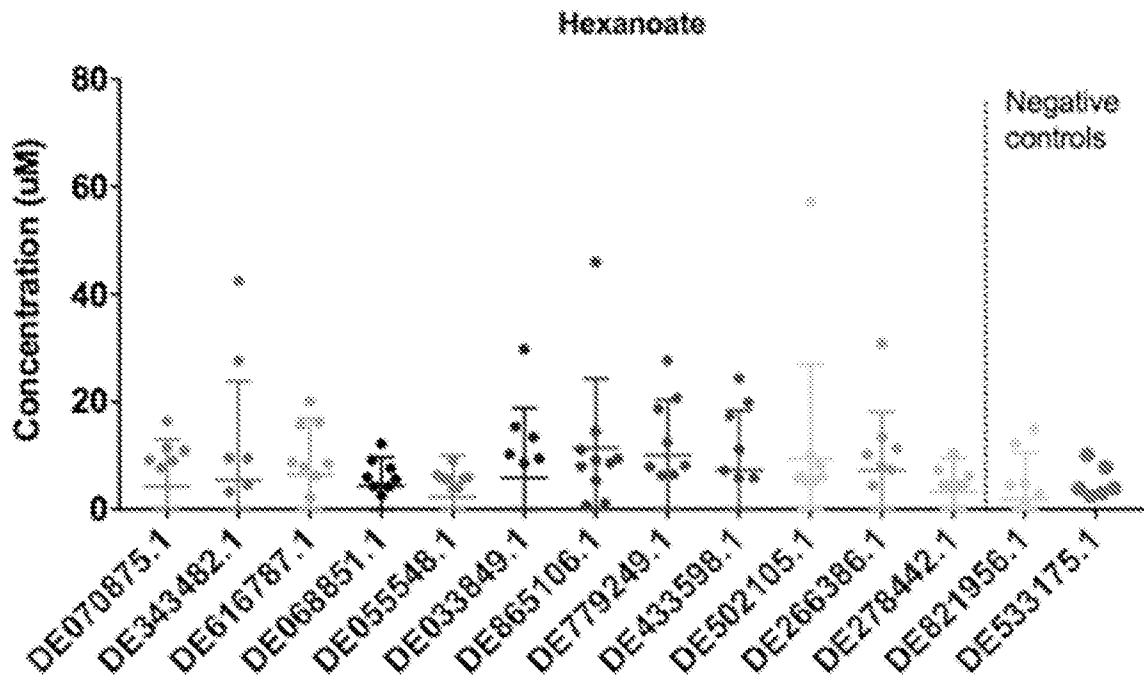


FIG. 22I

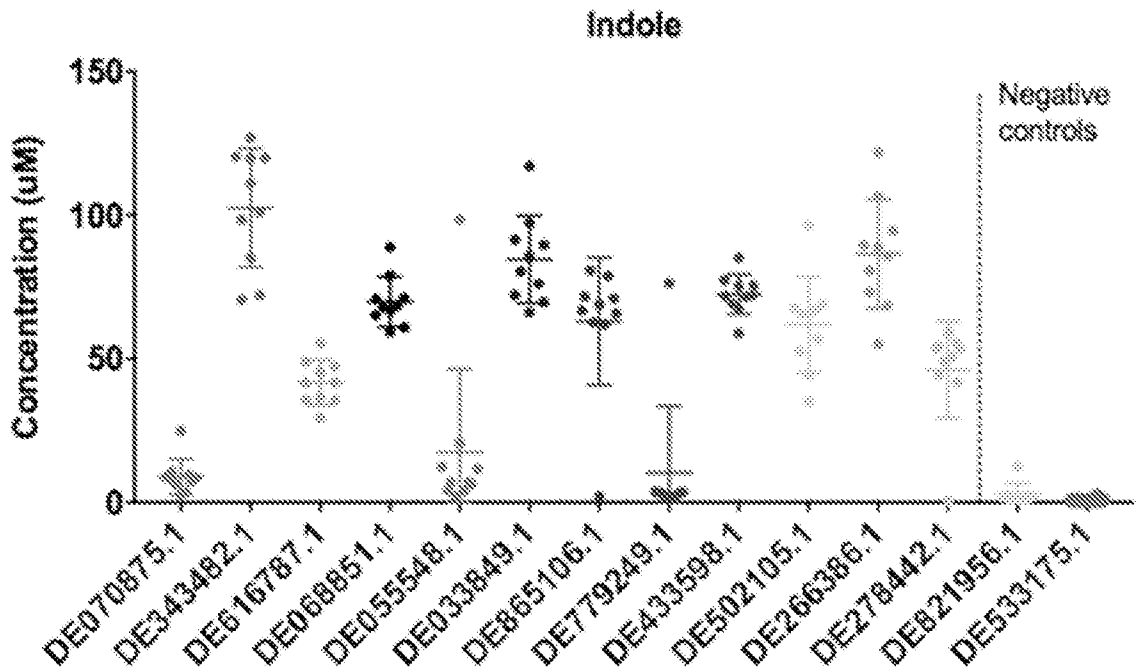


FIG. 22J

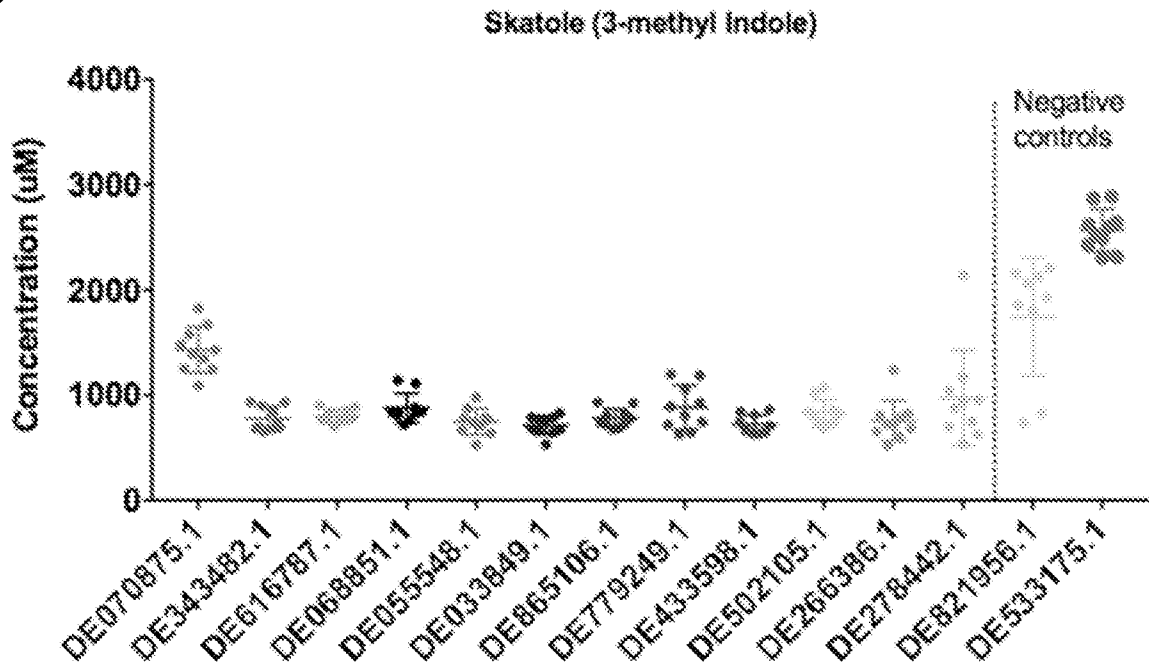


FIG. 22K

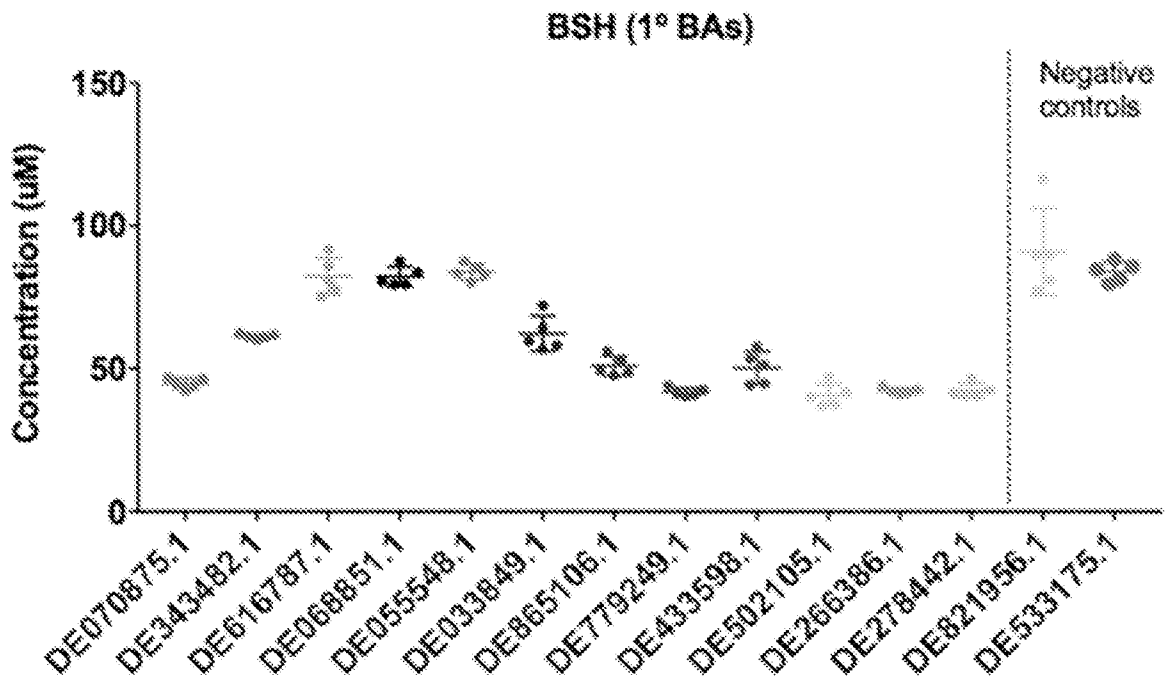


FIG. 22L

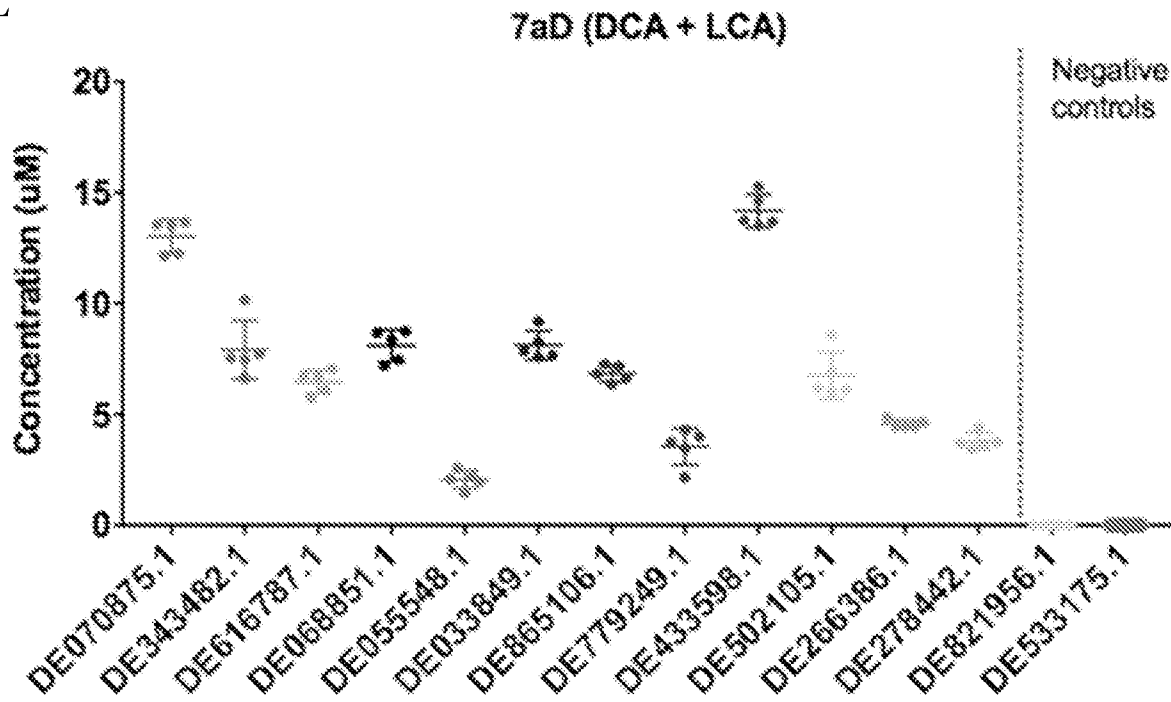


FIG. 22M

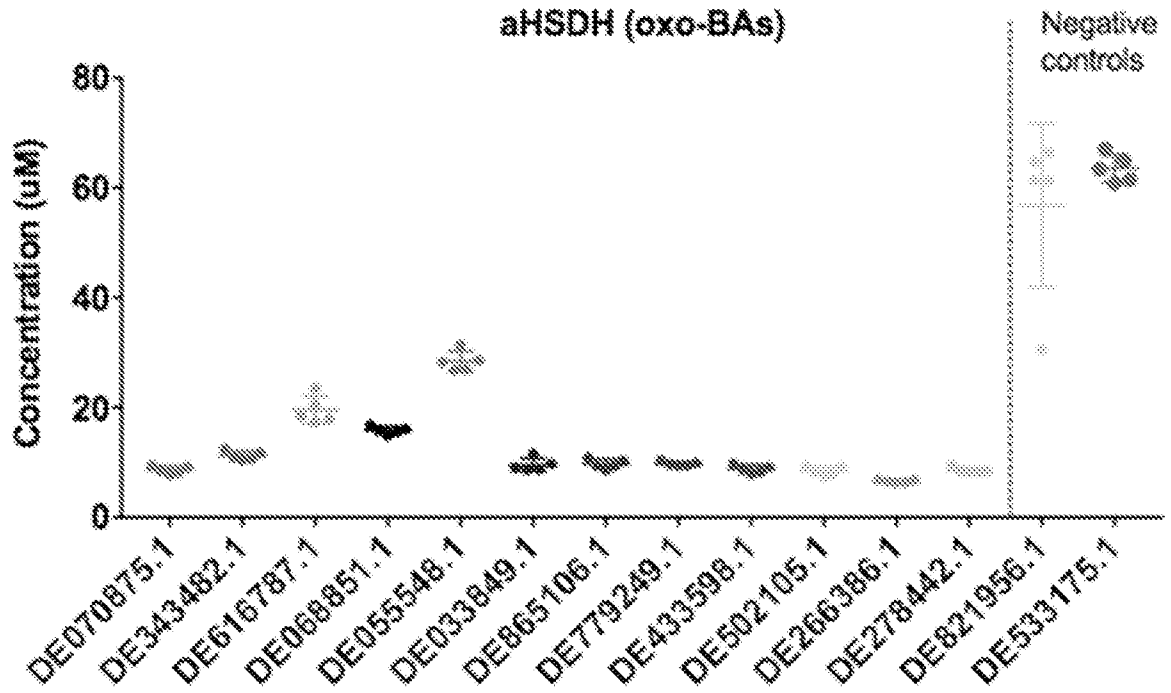


FIG. 22N

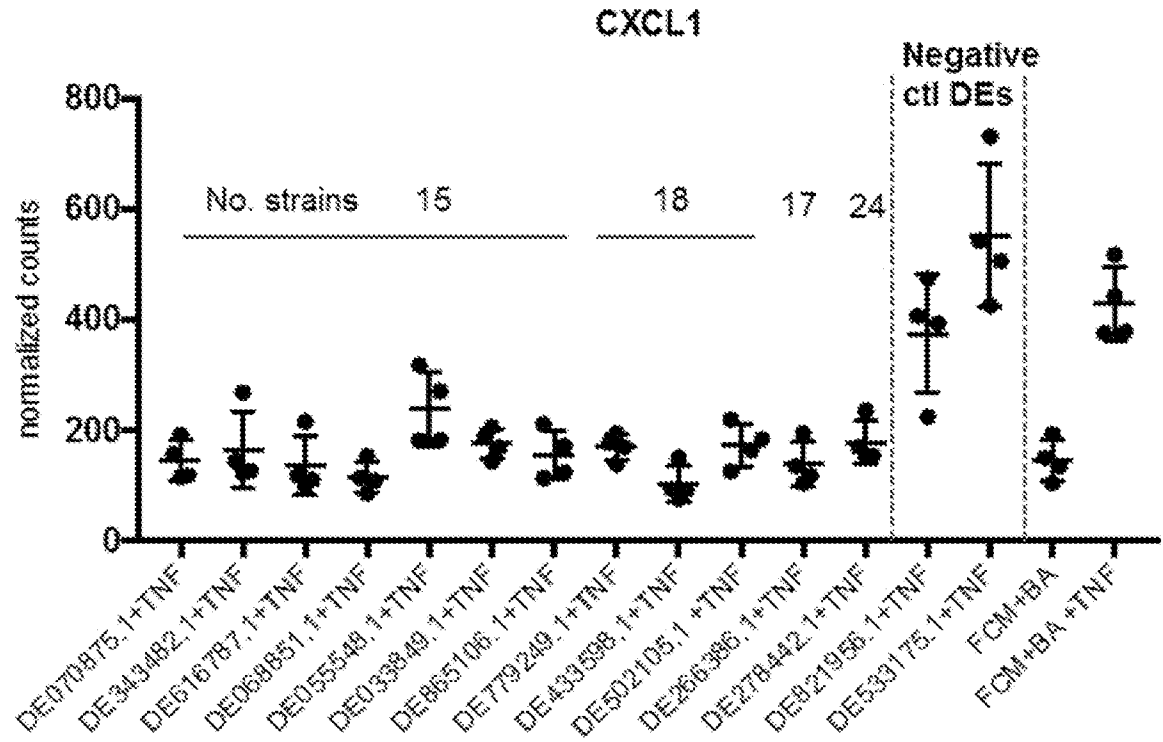


FIG. 22O

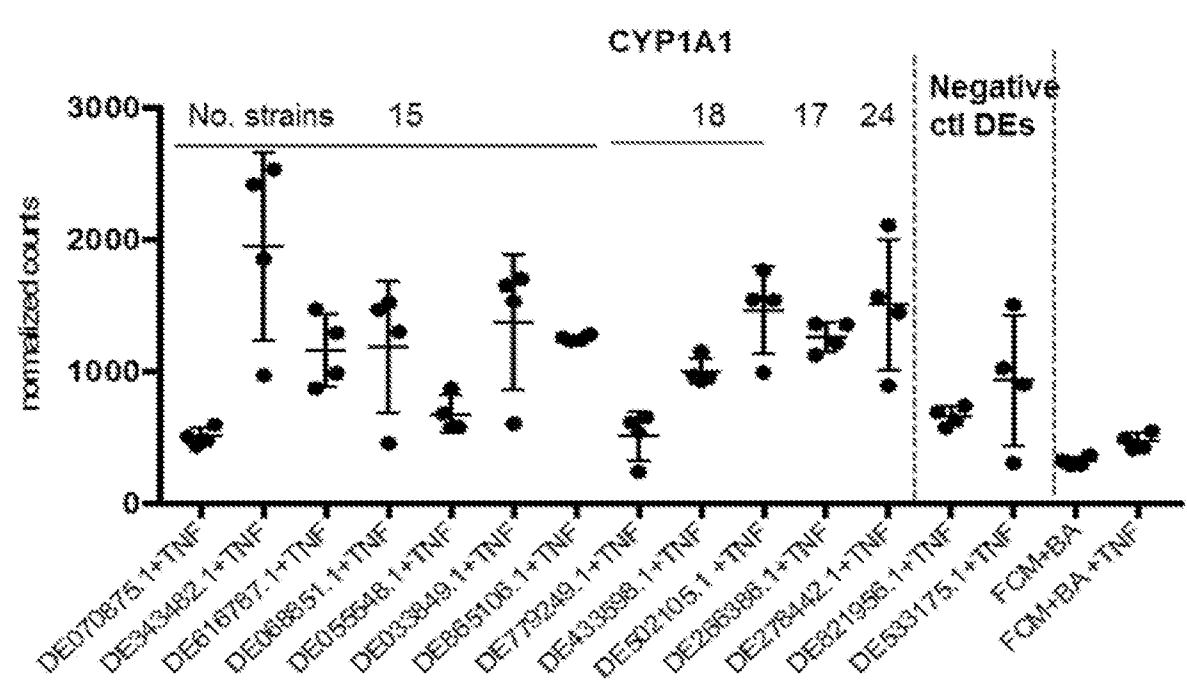


FIG. 22P

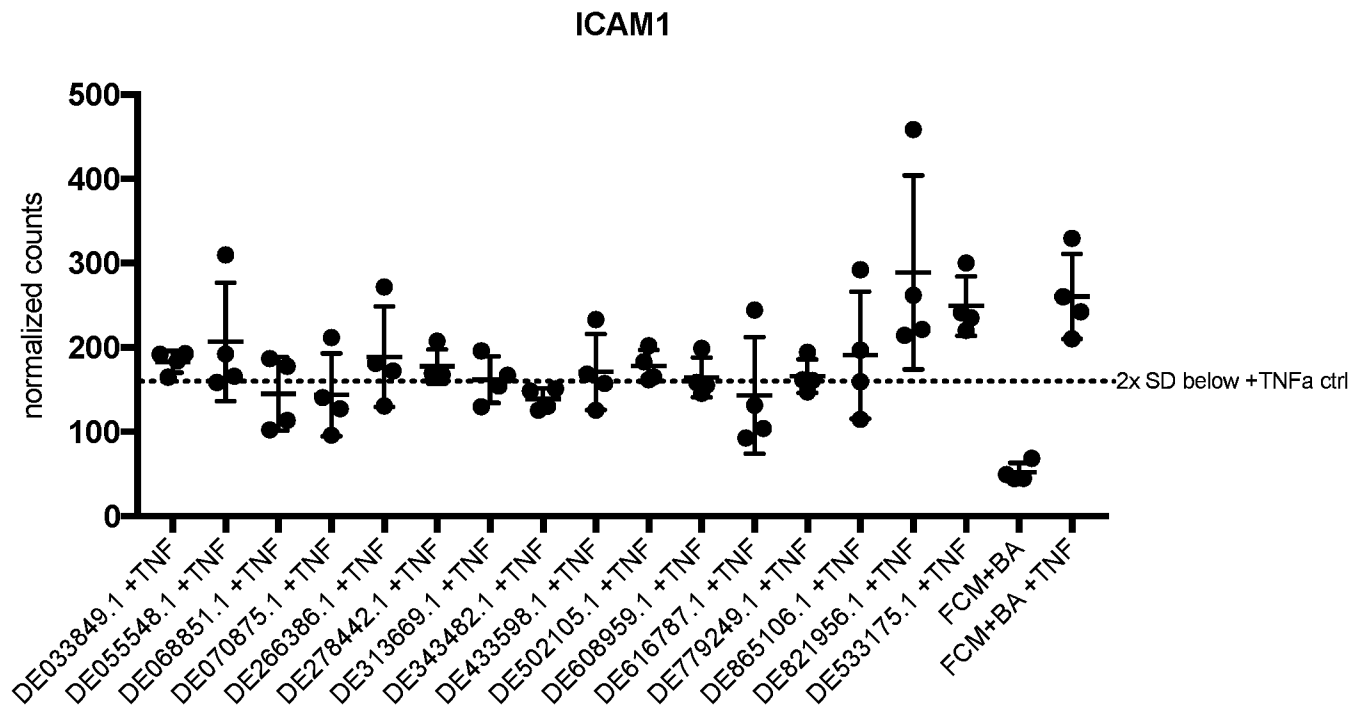


FIG. 22Q

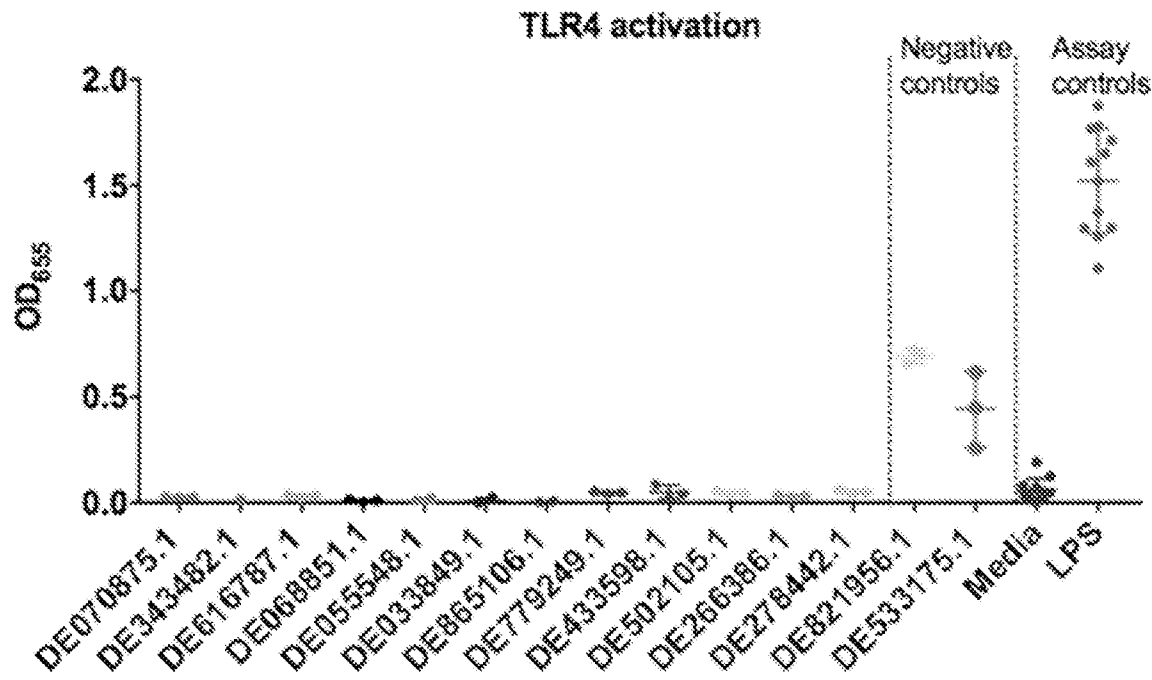


FIG. 22R

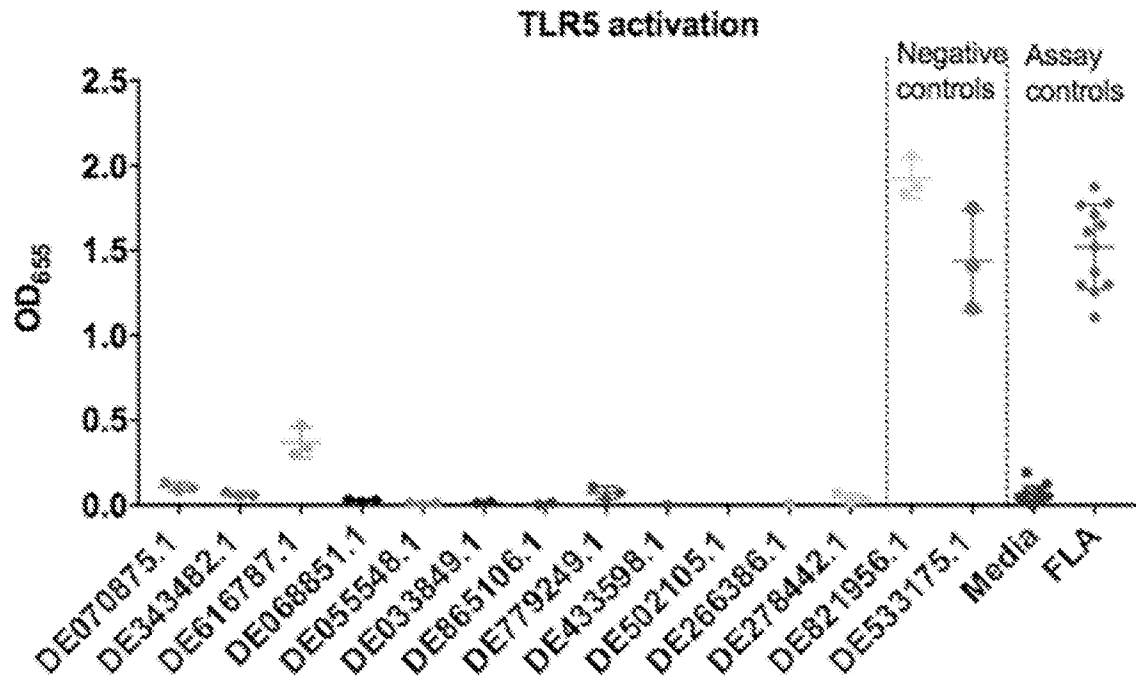


FIG. 23A

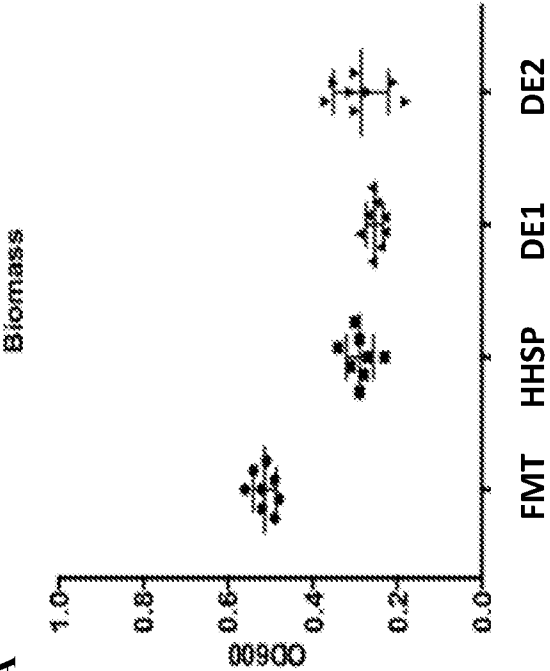


FIG. 23B

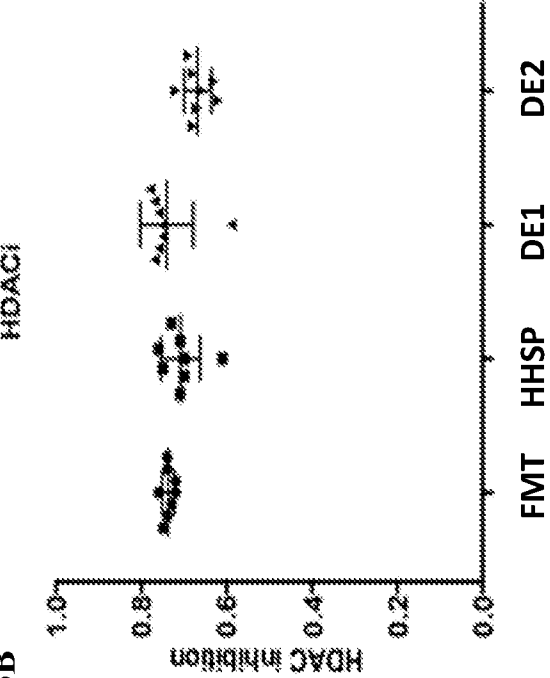


FIG. 23C

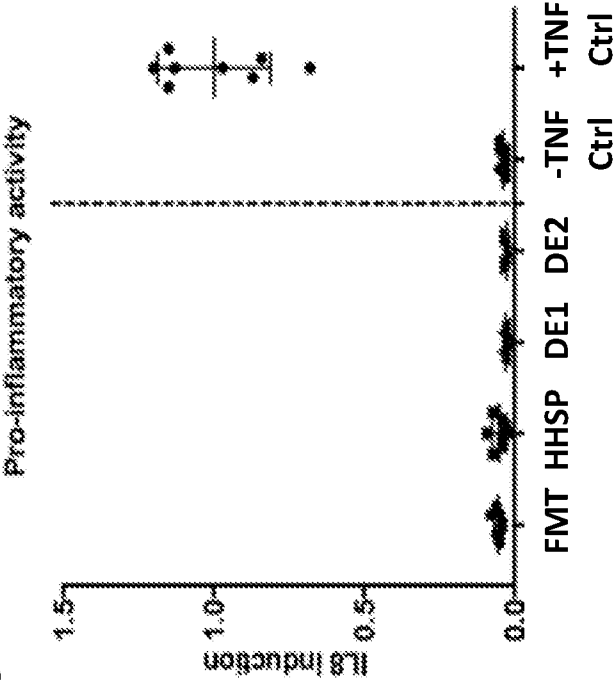


FIG. 23D

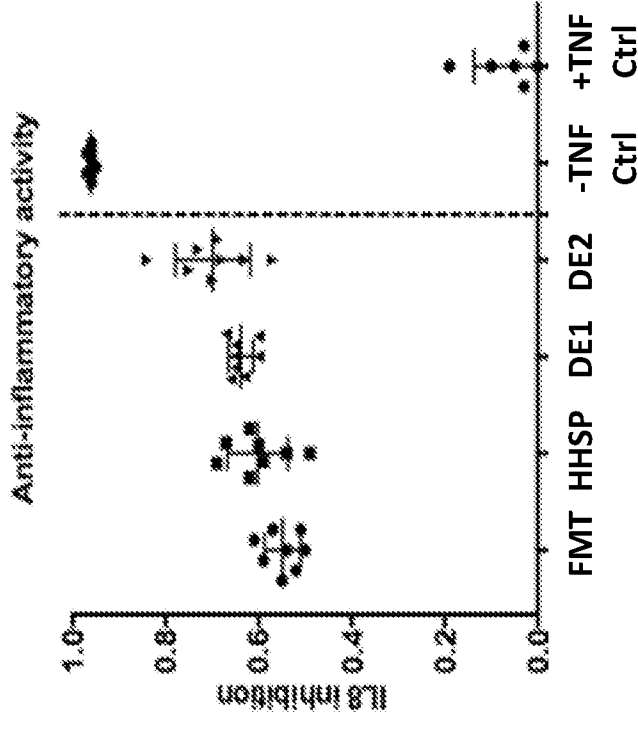


FIG. 23E

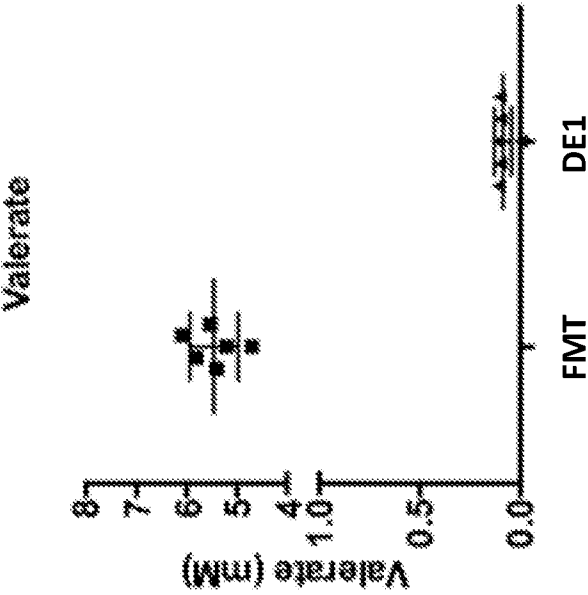


FIG. 23F

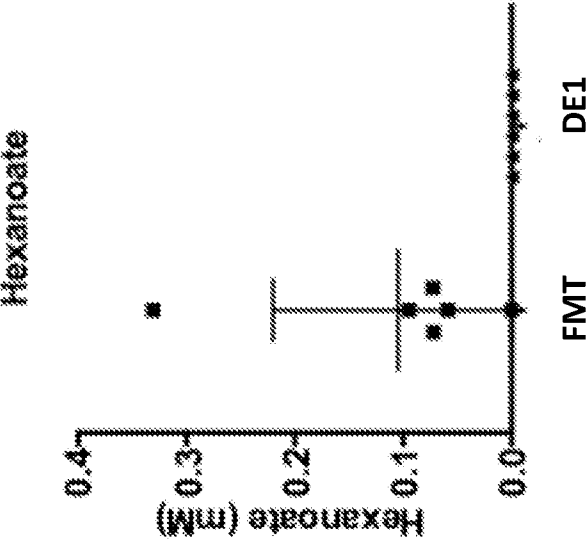


FIG. 23G

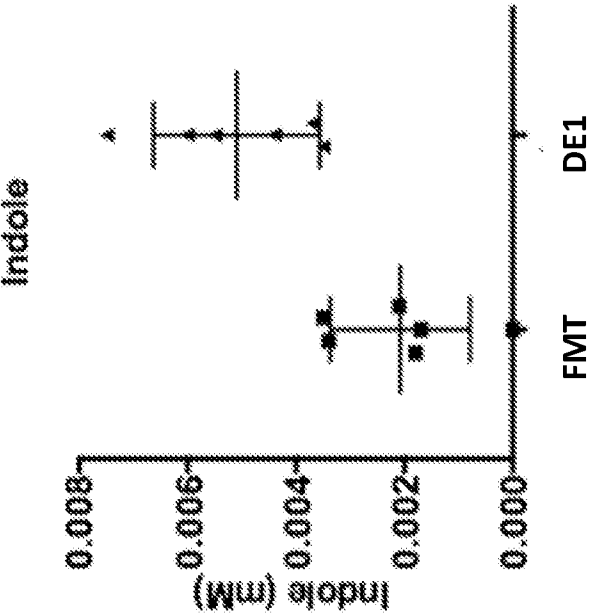
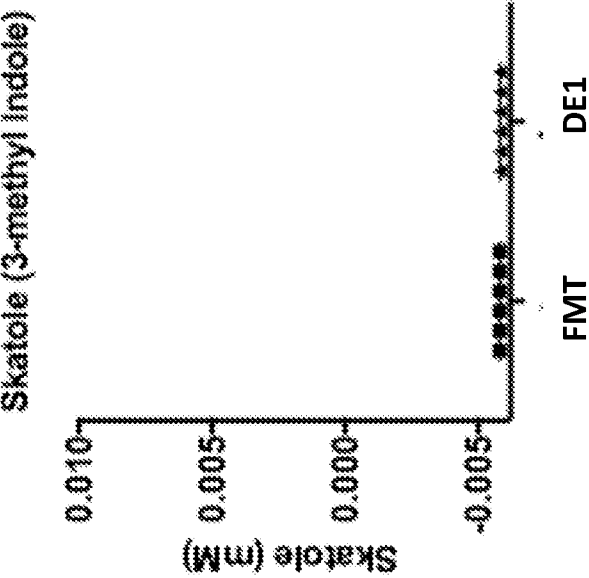


FIG. 23H



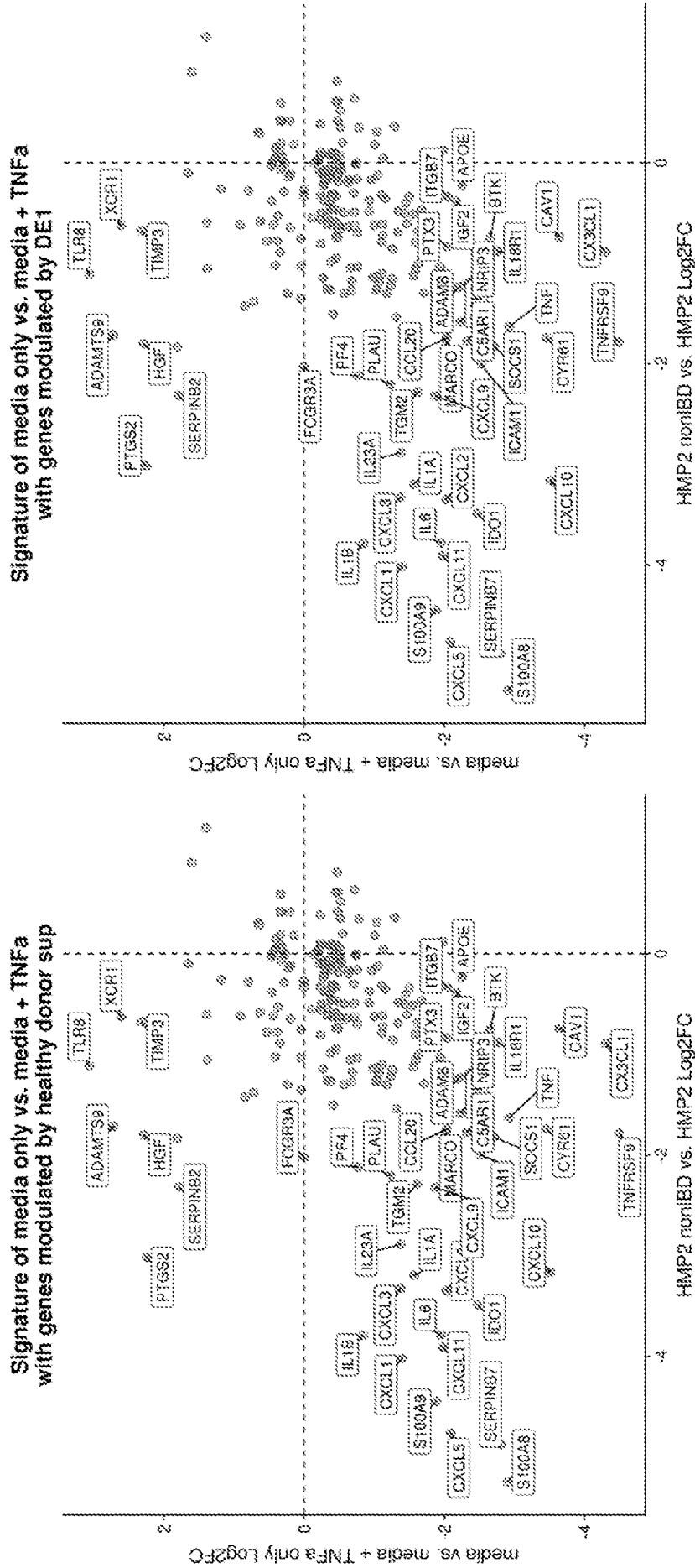


FIG. 24B

FIG. 24A

FIG. 25A

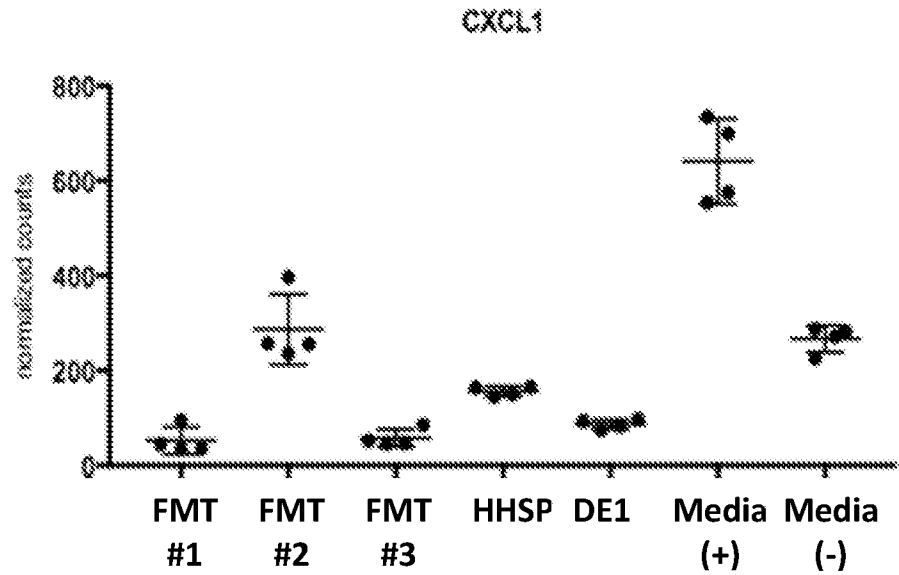


FIG. 25B

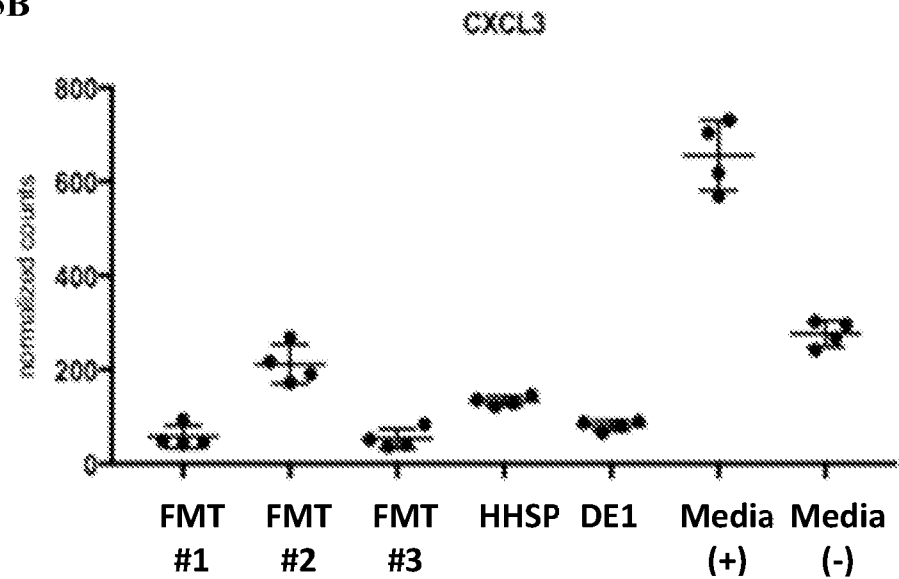


FIG. 25C

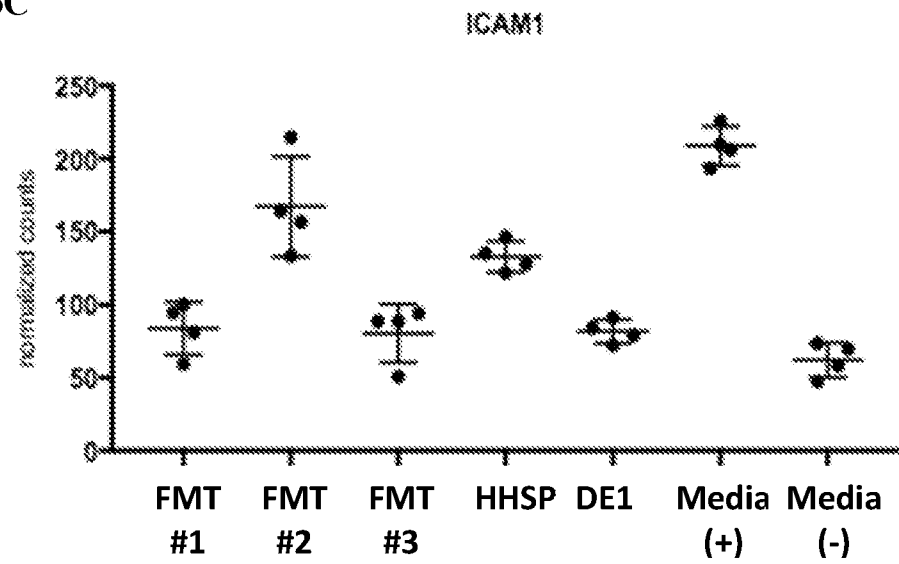


FIG. 26A

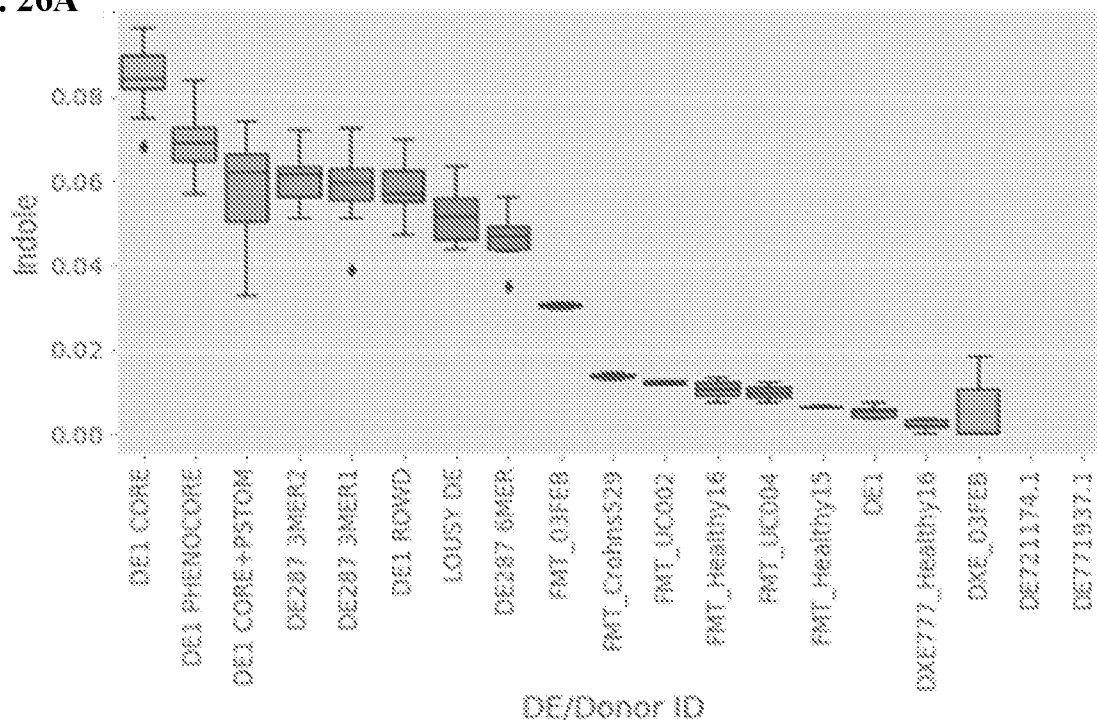
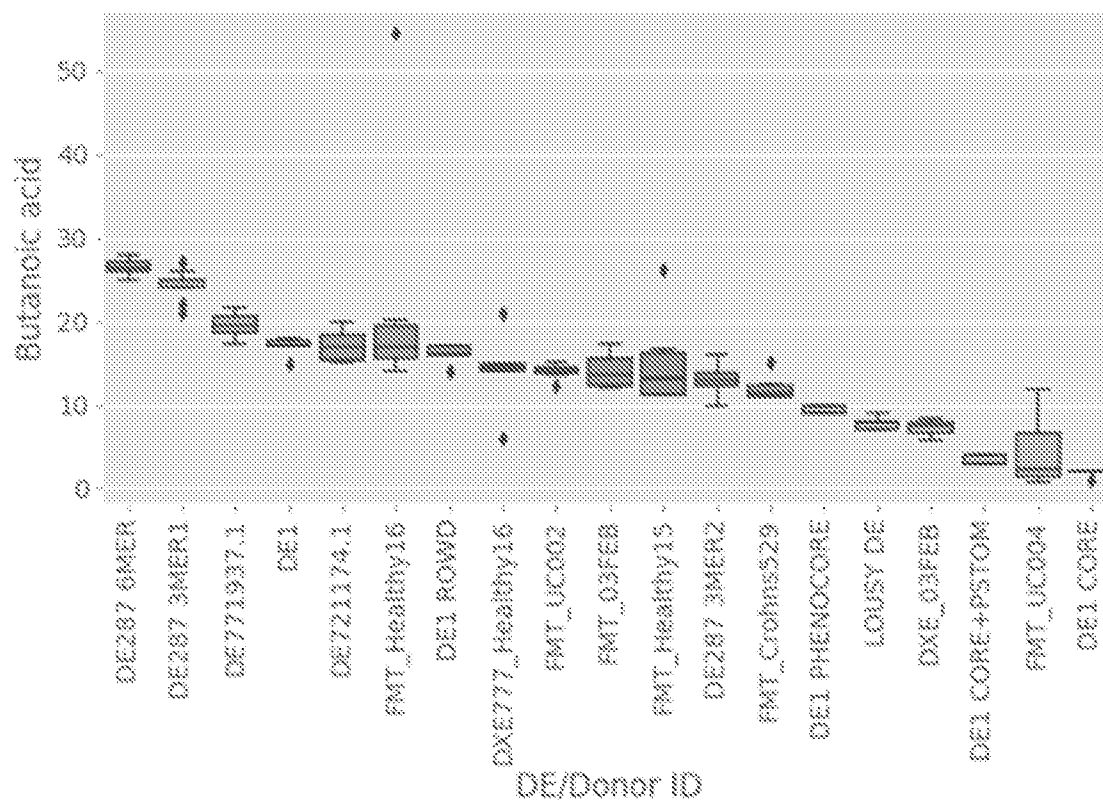


FIG. 26B



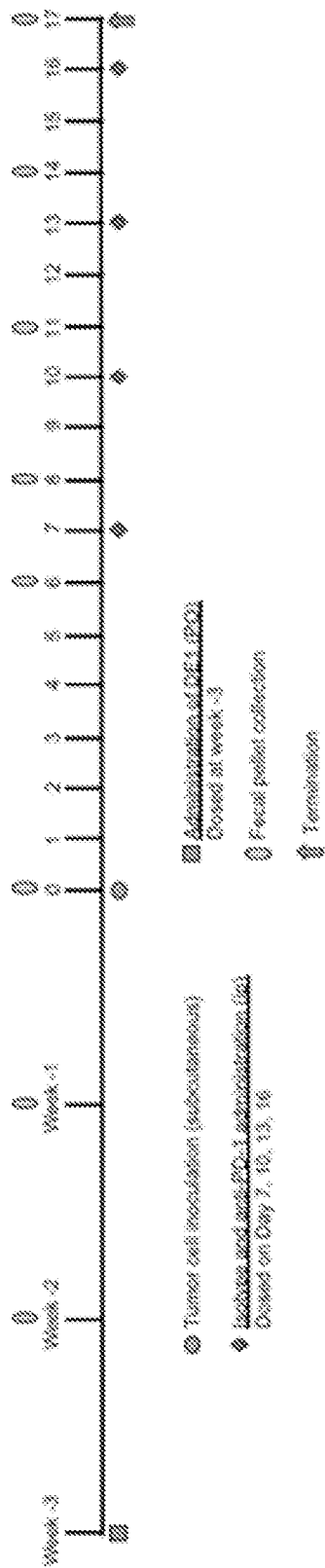


FIG. 27A

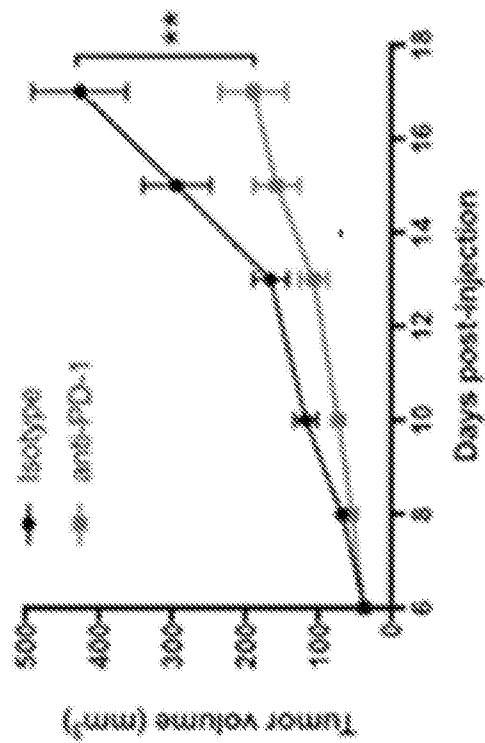


FIG. 27B

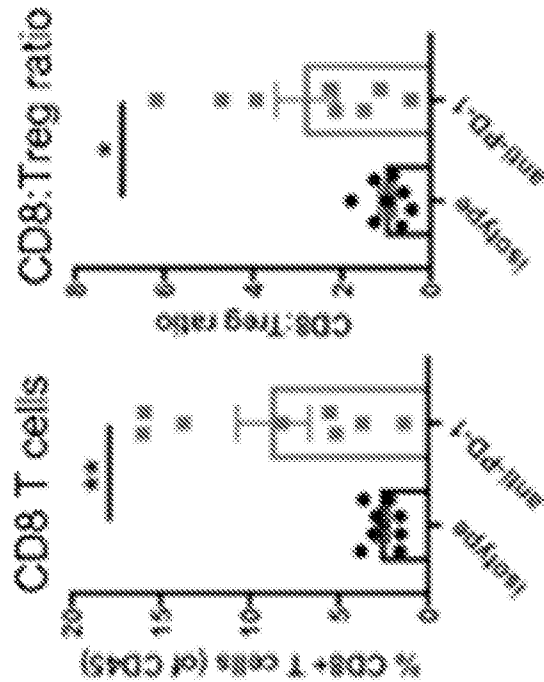


FIG. 27C

FIG. 28A

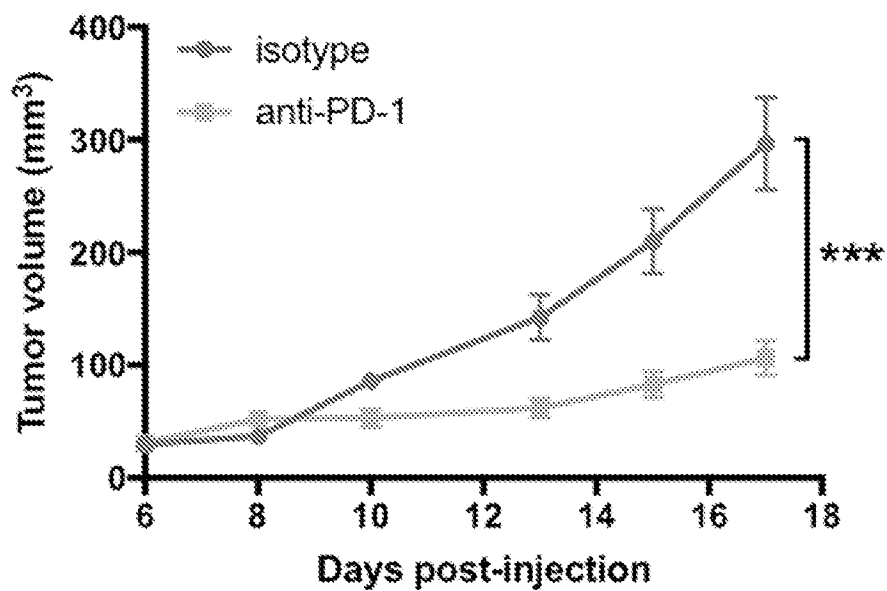


FIG. 28B

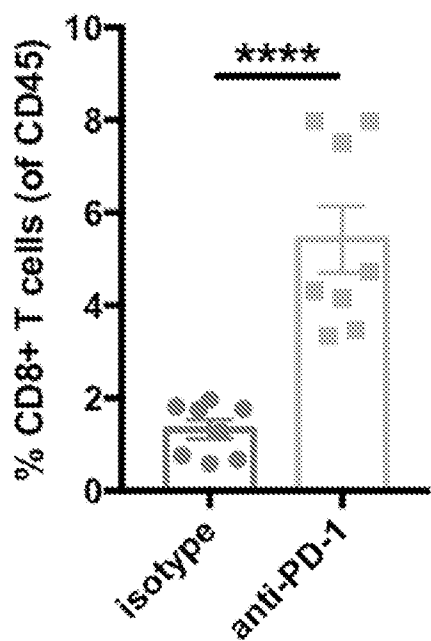
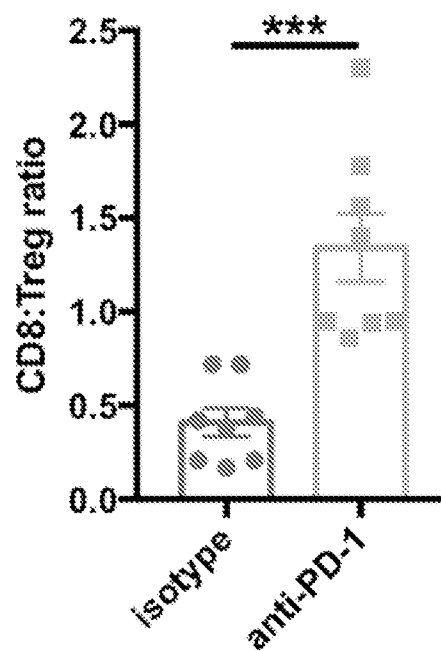


FIG. 28C



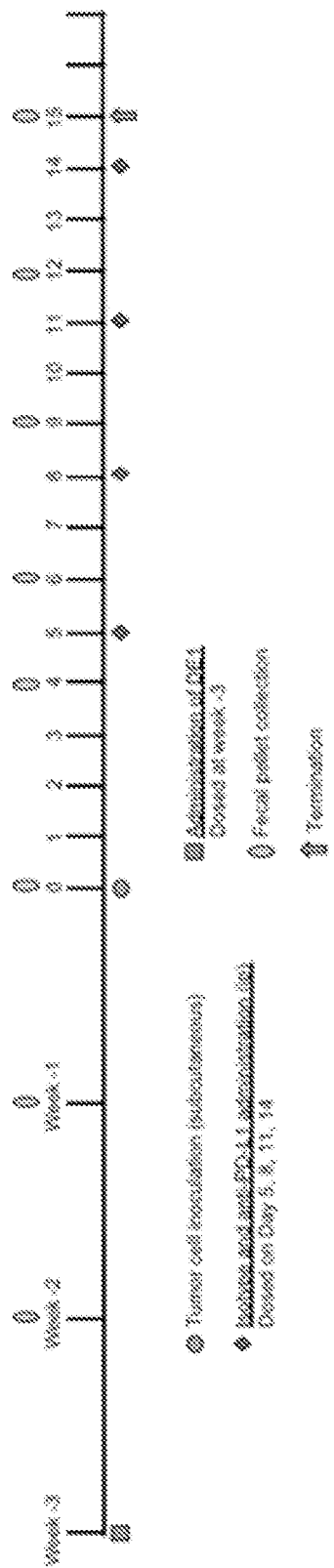


FIG. 29A

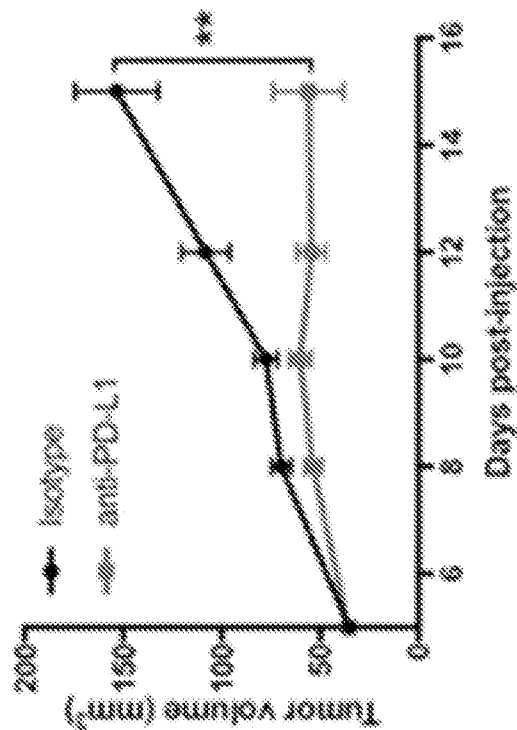


FIG. 29B

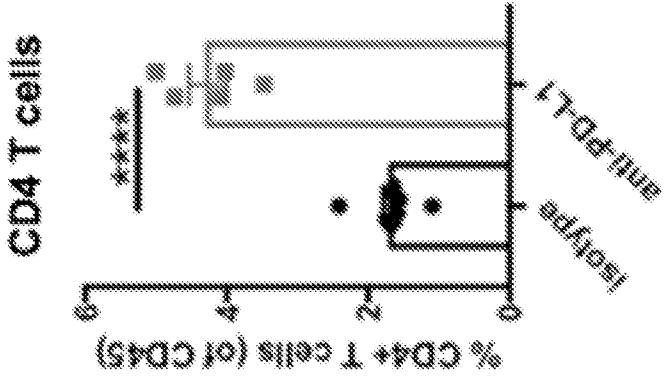


FIG. 29E

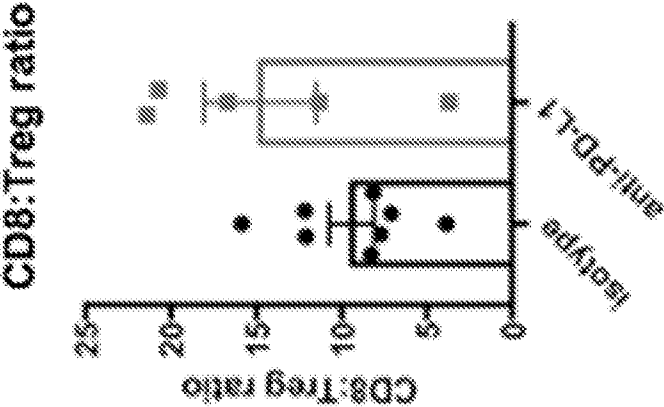


FIG. 29D

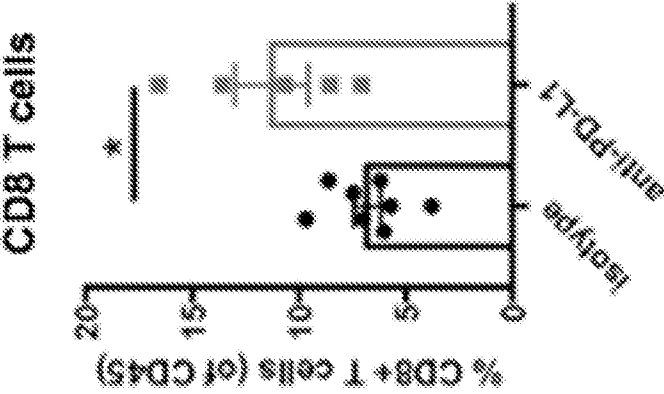


FIG. 29C

FIG. 30

<u>Species</u>	<u>DE1</u>	<u>DE2</u>	<u>DE3</u>	<u>DE4</u>	<u>DE5</u>	<u>DE6</u>	<u>DE7</u>	<u>DE8</u>	<u>DE9</u>
<i>Alistipes onderdonkii</i> (SEQ ID NO: 112)	0	1	0	0	0	0	0	0	0
<i>Anaerotruncus colihominis</i> (SEQ ID NO: 178)	1	1	1	1	0	1	1	1	0
<i>Bacteria unclassified</i> (SEQ ID NO: 119)	1	0	0	0	0	1	1	0	0
<i>Bacteroides sahysiaiae</i> (SEQ ID NO: 198)	0	1	0	0	0	0	0	0	0
<i>Bacteroides unclassified</i> (SEQ ID NO: 213)	0	1	0	0	0	0	0	0	0
<i>Bacteroides uniformis</i> (SEQ ID NO: 151)	0	1	0	0	0	0	0	0	0
<i>Bacteroides xylanisolvens</i> (SEQ ID NO: 182)	0	1	0	0	0	0	0	0	0
<i>Bifidobacterium pseudocatenulatum</i> (SEQ ID NO: 136)	0	1	0	0	0	0	0	0	0
<i>Bifidobacterium unclassified</i> (SEQ ID NO: 227)	0	0	0	0	0	0	0	0	1
<i>Blautia producta</i> (SEQ ID NO: 107) (SEQ ID NO: 108) (SEQ ID NO: 109) (SEQ ID NO: 110) (SEQ ID NO: 111)	1	0	0	0	0	1	1	1	0
<i>Blautia wexlerae</i> (SEQ ID NO: 196)	0	1	0	0	1	0	0	0	0
<i>Clostridium bolteae</i> <i>str. 1</i> (SEQ ID NO: 200) (SEQ ID NO: 201) (SEQ ID NO: 202) (SEQ ID NO: 203) (SEQ ID NO: 204)	1	0	0	0	0	0	0	0	0

FIG. 30 (cont.)

Species	DE1	DE2	DE3	DE4	DE5	DE6	DE7	DE8	DE9
(SEQ ID NO: 188)									
<i>Eubacterium siracum</i> (SEQ ID NO: 223)	0	0	0	0	0	0	1	1	0
<i>Faecalicatena contorta</i> (SEQ ID NO: 132) (SEQ ID NO: 133) (SEQ ID NO: 134) (SEQ ID NO: 135) (SEQ ID NO: 314) (SEQ ID NO: 315) (SEQ ID NO: 316) (SEQ ID NO: 317)	0	1	0	0	0	0	0	0	0
<i>Firmicutes unclassified</i> (SEQ ID NO: 195)	0	0	0	0	0	1	0	1	0
<i>Flavonifractor plautii</i> <i>str. 1</i> (SEQ ID NO: 148) (SEQ ID NO: 149) (SEQ ID NO: 150)	0	0	0	0	1	0	0	0	0
<i>Flavonifractor plautii</i> <i>str. 2</i> (SEQ ID NO: 214) (SEQ ID NO: 215) (SEQ ID NO: 216)	0	1	0	0	0	0	0	0	0
<i>Holdemannia filiformis</i> (SEQ ID NO: 211)	0	0	0	0	0	0	1	1	0
<i>Intestinimonas butyrificiproducens</i> <i>str. 1</i> (SEQ ID NO: 117)	1	0	0	0	0	1	1	1	0
<i>Intestinimonas butyrificiproducens</i> <i>str. 2</i> (SEQ ID NO: 102)	0	0	0	0	1	0	0	0	0
<i>Lachnospiraceae unclassified</i> <i>str. 1</i> (SEQ ID NO: 219)	1	0	1	1	0	1	1	1	0
<i>Lachnospiraceae</i>	1	0	0	0	0	0	0	0	0

FIG. 30 (cont.)

Species	DE1	DE2	DE3	DE4	DE5	DE6	DE7	DE8	DE9
<i>unclassified str. 2</i> (SEQ ID NO: 153)									
<i>Lachnospiraceae</i> <i>unclassified str. 3</i> (SEQ ID NO: 222)	1	0	0	0	0	1	1	0	0
<i>Lachnospiraceae</i> <i>unclassified str. 5</i> (SEQ ID NO: 179) (SEQ ID NO: 180)	0	0	0	0	0	1	0	1	0
<i>Murimonas intestini</i> <i>str. 2</i> (SEQ ID NO: 154) (SEQ ID NO: 155) (SEQ ID NO: 156) (SEQ ID NO: 157) (SEQ ID NO: 158)	1	0	0	0	0	1	1	0	0
<i>Oscillibacter</i> <i>unclassified</i> (SEQ ID NO: 116)	0	0	0	0	0	0	1	1	0
<i>Paeniclostridium</i> <i>sordellii</i> (SEQ ID NO: 118)	1	0	1	1	1	1	1	1	0
<i>Peptostreptococcus</i> <i>stomatitis</i> (SEQ ID NO: 189)	0	0	0	1	0	0	0	0	0
<i>Roseburia unclassified</i> <i>str. 1</i> (SEQ ID NO: 160)	0	0	0	0	0	0	0	0	1
<i>Streptococcus</i> <i>parasanguinis</i> (SEQ ID NO: 113)	0	0	0	0	0	0	0	0	1
<i>Subdoligranulum</i> <i>unclassified</i> (SEQ ID NO: 105)	0	1	0	0	0	0	0	0	0
<i>Terrisporobacter</i> <i>mayombi</i> (SEQ ID NO: 120) (SEQ ID NO: 121) (SEQ ID NO: 122) (SEQ ID NO: 123)	1	1	0	0	0	0	0	0	0

[illegible][illegible]

FIG. 31

[illegible]

FIG. 31 (cont.)

Species	DE10	DE11	DE12	DE13	DE14	DE15	DE16	DE17	DE18	DE19	DE20	DE21	DE22	DE23
<i>Flavonifractor</i> <i>plautii</i> str. 1 (SEQ ID NO: 148) (SEQ ID NO: 149) (SEQ ID NO: 150)	1	1	1	1	1	0	1	1	1	1	1	0	0	1
<i>Holdemannia</i> <i>filiformis</i> (SEQ ID NO: 211)	0	0	0	1	1	0	0	0	0	0	0	1	1	1
<i>Intestinibacter</i> <i>barilettii</i> (SEQ ID NO: 103)	0	0	0	0	0	0	0	0	1	0	1	0	0	0
<i>Intestinimonas</i> <i>butyrificiproducens</i> str. 1 (SEQ ID NO: 117)	0	1	1	1	1	0	0	1	0	0	0	0	0	0
<i>Lachnospiraceae</i> unclassified str. 4 (SEQ ID NO: 224)	0	0	0	0	0	0	0	1	0	0	0	1	1	1
<i>Lachnospiraceae</i> unclassified str. 5 (SEQ ID NO: 179) (SEQ ID NO: 180)	0	0	1	0	1	1	1	1	1	1	1	1	1	1
<i>Murimonas</i> <i>intestinalis</i> str. 1 (SEQ ID NO: 161)	0	0	0	0	0	0	0	0	0	1	0	0	0	0
<i>Oscillibacter</i> unclassified (SEQ ID NO: 116)	0	0	0	1	1	0	0	1	0	0	1	1	1	1
<i>Paeniclostridium</i> <i>sordellii</i> (SEQ ID NO: 118)	0	1	1	1	1	0	0	0	1	0	0	0	0	0
<i>Ruminococcaceae</i> unclassified str. 2 (SEQ ID NO: 199)	0	0	0	0	0	0	0	0	0	0	0	1	0	0
<i>Ruminococcaceae</i> unclassified str. 3 (SEQ ID NO: 181)	0	0	0	0	0	1	1	1	1	1	1	1	1	1
<i>Ruminococcaceae</i> unclassified	0	0	0	0	0	0	0	1	0	0	1	1	1	1

FIG. 31 (cont.)

[illegible]

FIG. 32

[illegible]

FIG. 32 (cont.)

[illegible]

FIG. 32 (cont.)

Species	DE24	DE25	DE26	DE27	DE28	DE29	DE30	DE31	DE32	DE33	DE34	DE35	DE36	DE37	DE38
<i>Clostridium</i> <i>ternum</i> (SEQ ID NO: 137) (SEQ ID NO: 138) (SEQ ID NO: 139) (SEQ ID NO: 140) (SEQ ID NO: 141) (SEQ ID NO: 142) (SEQ ID NO: 143) (SEQ ID NO: 144) (SEQ ID NO: 145) (SEQ ID NO: 146)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
<i>Coprobacillus</i> <i>unclassified</i> (SEQ ID NO: 186)	0	0	0	0	0	1	1	0	1	1	1	1	1	1	0
<i>Eisenbergiella</i> <i>tayi</i> (SEQ ID NO: 104)	1	0	1	0	0	0	0	0	0	1	0	1	1	1	0
<i>Emergencia</i> <i>timonensis</i> str. 2 (SEQ ID NO: 210)	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0
<i>Escherichia</i> <i>fergusonii</i> (SEQ ID NO: 188)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
<i>Enbacterium</i> <i>siraeum</i>	0	0	0	0	1	1	0	1	1	0	0	1	1	0	0

FIG. 32 (cont.)

[illegible]

FIG. 32 (cont.)

[illegible]

SEQUENCE LISTING

<110> SERES THERAPEUTICS, INC.

<120> DESIGNED BACTERIAL COMPOSITIONS AND USES THEREOF

<130> 4268.016PC01/ELE/JBF/DKC

<150> US 62/676,236

<151> 2018-05-24

<160> 398

<170> PatentIn version 3.5

<210> 1

<211> 1253

<212> DNA

<213> Artificial Sequence

<220>

<223> Clostridium_bolteae

<220>

<221> misc_feature

<222> (207)..(207)

<223> n is a, c, g, or t

<400> 1

cggtgtatacc ctgcctcact gtggggggata acagttaaaa gtgagtgcta ataccgcata
60

agcgcacagt accgcgtggt acggtgtgaa aaactccggt ggtgtgagat ggatccgcgt
120

ctgattaccc tgggtgggggg gtaacggccc cccaaagcga ctatcaatac ccgacctgag
180

agggtgaccg gccacttttg gactganaca cggcccactc tcctacggga ggcagcagtg
240

gggaatattg cacagtggga gaaagcctga tgcagccacc ccgcgtgagt gaaaatttcg
300

aaggaaaaaa tgacggcctg ataaaacccc ggctaactac gtgccagcac cgcggttaata
360

ctaggggggca agcgttatcc ggatttactg ggtgtaaagg gagcgtaacg gcaacagtct
420

gaagtgaaaa cccgggctca ccctggactg ctttggaac tgttttgcta gagtgtcgag
480

aggtaagtga ttcctagtgt agcgggtgatg cgtaatatta gagaacacca gtggcagcgg
540

cttactgtac gataactgac attgacgctc aagagcgtgg agagcaaacg agattaaata
600

ccctggtaat ccacgccgta caccatgagt gctacgtgtt ggggggcaaa gcccttcggt
660

gccgtcgcaa acgcagtaag cattccacct ggggagtacg ttcgcaagaa tgaaactcaa
720

aggaattgac ggggacccgc acaagcggtg gagcatgtgg ttttaattcga agcaacgcga
780

agaaccttac caagtcttga catcctcttg accggcgtgt aacggcgcct tcccttcggg
840

gcaagagaga caggtggtgc atggttgctg tcagctcgtg tcgtgagatg ttgggttaag
900

tcccgcaacg agcgcaaccc ttatccttag tagccagcag gtagagctgg gcactctagg
960

gagactgcca gggataacct ggaggaaggt ggggatgacg tcaaatacgc atgcccctta
1020

tgatttgggc tacacacgtg ctacaatggc gtaaacaag ggaagcaaga cagtgatgtg
1080

gagcaaattc caaaaataac gtcccagttc ggactgtagt ctgcaaccgc actacacgaa
1140

gctggaatcg ctagtaatcg cgaatcagaa tgctgcgggtg aatacgttcc cgggtcttgt
1200

acacaccgcc cgtcacacca tgggagtcag caacgcccga agtcagtgac cca
1253

<210> 2

<211> 1361

<212> DNA

<213> Artificial Sequence

<220>

<223> Clostridium_innocuum

<400> 2

agcttgcttc caaagagact tagtggcgaa cgggtgagta acacgtaggt aacctgcca
60

tgtgtccggg ataactgctg gaaacggtag ctaaaaccgg ataggtatac agagcgcattg
120

ctcagtatat taaagcgccc ttcaaggcgt gaacatggat ggacctgcgg cgcattagct
180

agttggtgag gtaacggccc accaaggcaa tgatgcgtag ccggcctgag agggtaaacg
240

gccacattgg gactgagaca cggcccaaac tcctacggga ggcagcagta gggaattttc
300

gtcaatgggg gaaaccctga acgagcaatg ccgcgtgagt gaagaaggtc ttcggatcgt
360

aaagctctgt tgtaagttaa gaacggctca tagaggaaat gctatgggag tgacggtagc
420

ttaccagaaa gccacggcta actacgtgcc agcagccgcg gtaatacgtg ggtggcaagc
480

gttatccgga atcattgggc gtaaaggggtg cgtagggtggc gtactaagtc tgtagtaaaa
540

ggcaatggct caaccattgt aagctatgga aactgggtatg ctggagtgca gaagagggcg
600

atggaattcc atgtgtagcg gtaaaatgcg tagatatatg gaggaacacc agtggcgaag
660

gcggtcgcct ggtctgtaac tgacactgag gcacgaaagc gtggggagca aataggatta
720

gataccctag tagtccacgc cgtaaacgat gagaactaag tgttggagga attcagtgct
780

gcagttaacg caataagttc tccgcctggg gagtatgcac gcaagtgtga aactcaaagg
840

aattgacggg ggcccgcaca agcgggtggag tatgtggttt aattcgaagc aacgcgaaga
900

atcttaccag gccttgacat ggaaacaaat accctagaga tagggggata attatggatc
960

acacaggtgg tgcattggtt tcgtcagctc gtgtcgtgag atgttgggtt aagtcccgca
1020

acgagcgcaa cccttgtcgc atgttaccag catcaagttg gggactcatg cgagactgcc
1080

ggtgacaaac cggaggaagg tggggatgac gtcaaatacat catgcccctt atggcctggg
1140

ctacacacgt actacaatgg cgaccacaaa gagcagcgac acagtgatgt gaagcgaatc
1200

tcataaaggt cgtctcagtt cggattgaag tctgcaactc gacttcatga agtcggaatc
1260

gctagtaatc gcagatcagc atgctgcggt gaatacgttc tcgggccttg tacacaccgc
1320

ccgtcaaacc atgggagtgca gtaatacccg aagccggtgg c
1361

<210> 3

<211> 1334

<212> DNA

<213> Artificial Sequence

<220>

<223> Clostridium_viride

<400> 3

gtcgaacgga gcacccctga cggagttttc ggacaacgaa agggaatgct tagtggcgga
60

cgggtgagta acgcgtgagt aacctgcctt ggagtgggga ataacagccg gaaacggctg
120

ctaataccgc atgatgtatc tggatcgcac ggttctggat accaaagatt tatcgctctg
180

agatggactc gcgtctgatt agctagttgg tgaggtaatg gctcaccaag gcgacgatca
240

gtagccggac tgagaggttg gccggccaca ttgggactga gacacggccc agactcctac
300

gggaggcagc agtggggaat attgggcaat gggcgaaagc ctgacccagc aacgccgcgt
360

gaaggaagaa ggccctcggg ttgtaaactt cttttgtcag gcgaacaagt gcggacctgc
420

aataaccacg gctaactacg tgccagcagc cgcggttaata cgtaggtggc aagcgttatc
480

cggatttact gggtgtaaag ggcgtgtagg cgggagtgca agtcagatgt gaaaactatg
540

ggctcaaccc atagcctgca tttgaaactg tacttcttga gtgatggaga ggcaggcgga
600

attccctgtg tagcggtgaa atgcgtagat atagggagga acaccagtgg cgaaggcggc
660

ctgctggaca ttaactgacg ctgagcgcga aagcgtgggg agcaaacagg attagatacc
720

ctggtagtcc acgccgtaaa cgatggatac taggtgtggg gggctctgacc ccctccgtgc
780

cgcagttaac acaataagta tcccacctgg ggagtacgat cgcaagggtt aaactcaaag
840

gaattgacgg gggcccgcac aagcgggtgga gtatgtgggt taattcgaag caacgcgaag
900

aaccttacca ggacttgaca tcctactaac gaagcagata tgcatagatg gccatgcggg
960

caaaattccc tgtgtagcgg tgagatgcgt agatataggg aggaacacca gtgggggttaa
1020

gtcccgcaac gagcgcaacc cttattgtta gttgctacgc aagagcactc tagcgagact
1080

gccgttgaca aaacggagga aggtggggac gacgtcaaata catcatgccc cttatgtcct
1140

gggccacaca cgtactacaa tggcgggtcaa cagaggggaag caaagccgcg aggtggagca
1200

aatccctaaa agccgtccca gttcggattg caggctgaaa ctcgcctgta tgaagtcgga
1260

atcgctagta atcgcggatc agcatgccgc ggtgaatacg ttcccggggc ttgtacacac
1320

c g c c c g t c a c a c c a
1334

<210> 4

<211> 962

<212> DNA

<213> Artificial Sequence

<220>

<223> Anaerotruncus_colihominis

<220>

<221> misc_feature

<222> (27)..(27)

<223> n is a, c, g, or t

<220>

<221> misc_feature

<222> (747)..(747)

<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (865)..(865)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (937)..(937)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (939)..(939)
<223> n is a, c, g, or t

<400> 4
cttacgtttt gaagtttttc gatggangaa tgtaagctta gtggcggacg ggtgagtaac
60

acgtgagcaa cctgcctttc agaggggggat aacagccgga aacggctgct aataccgcat
120

gatgttgagg gggcacatgc ccctgcaacc aaaggagcaa tccgctgaaa gatgggctcg
180

cgtccgatta gccagttggc ggggtaacgg cccaccaaag cgacgatcgg tagccggact
240

gagaggttga acggccacat tgggactgag acacggccca gactcctacg ggaggcagca
300

gtgggggata ttgcacaatg ggcgaaagcc tgatgcagcg acgccgcgtg agggaagacg
360

gtcttcggat tgtaaacctc tgtcttttggg gaagaaaatg acggtaccca aagaggaagc
420

tccggctaac tacgtgccag cagccgcggt aatacgtagg gagcaagcgt tgtccggaat
480

tactgggtgt aaaggagcgc taggcgggat ggcaagtaga atgttaaata catcggctca
540

accggtggct gcgttctaaa ctgccgttct tgagtgaagt agaggcaggc ggaattccta
600

gtgtagcggg gaaatgcgta gatattagga ggaacaccag tggcgaaggc ggcctgctgg
660

gctttaactg acgctgaggc tcgaaagcgt ggggagcaaa caggattaga taccctggta
720

gtccacgccg taaacgatga ttactangtg tggggggggac tgacccttc cgtgccgcag
780

ttaacacaat aagtaatcca cctggggagt acggccgcaa ggttgaaact caaaggaatt
840

gacggggggc cgcacaagca gtgngtatg tggtttaatt cgaagcaacg cgaagaacct
900

taccaggtct tgacatcgga tgcatagcct agagatngnt gaagcccttt cggggcatcc
960

a g
962

<210> 5

<211> 1249

<212> DNA

<213> Artificial Sequence

<220>

<223> Clostridium_glycolicum

<400> 5

ttcggagaag agcggcggac gggtagtaa cgcgtgggta acctgcctca tacacatgga
60

taacataccg aaaggtatgc taatacagga taacataaga gattcgcatg tttctcttat
120

caaagctccg gcggtatgag atggacccgc gtctgattag ctagttggta aggtaatggc
180

ttaccaaggc gacgatcagt agccgacctg agaggggtgat cggccacatt ggaactgaga
240

cacggtccaa actcctacgg gaggcagcag tggggaatat tgcacaatgg gcgaaagcct
300

gatgcagcaa cgccgcgtga gtgatgaagg ccttcgggtc gtaaaactct gtcctcaagg
360

aagataatga cgggtacttga ggaggaagcc ccggctaact acgtgccagc agccgcggta
420

atacgtaggg ggctagcggtt atccggattt actgggcgta aaggggtgcgt aggtgggtttc
480

ttaagtcagg agtgaaaggc tacggcttaa ccgtagtaag ctcttgaaac tgggaaactt
540

gagtgcagga gaggaaagtg gaattcctag tgtagcgggtg aaatgcgtag atattaggag
600

gaacaccagt agcgaaggcg gcttttctgga ctgtaactga cactgaggca cgaaagcgtg
660

gggagcaaac aggattagat accctggtag tccacgccgt aaacgatgag tactaggtgt
720

cggggggttac cccctcgggt gccgcagcta acgcattaag tactccgcct ggggagtacg
780

ctcgcaagag tgaaactcaa aggaattgac ggggacccgc acaagtagcg gagcatgtgg
840

tttaattcga agcaacgcga agaaccttac ctaagcttga catccttttg accgatgcct
900

aatcgcattt ttcccttcgg ggacagaagt gacgaaggcg gcttgctgga ctgtagctcg
960

tgtcgtgaga tgttgggtta agtcccgcaa cgagcgcaac ccttgccttt agttgccagc
1020

attaagttgg gcactctaga gggactgccca gggataacct ggaggaaggt ggggatgacg
1080

tcaaatacatc atgcccctta tgcttagggc tacacacgtg ctacaatggg tgggtacagag
1140

ggcagccaag tcgtgaggcc gagctaattc cttaaagcca ttctcagttc ggattgtagg
1200

ctgaaactcg cctacatgaa gctggagtta ctagtaatcg cagatcaga
1249

<210> 6

<211> 1373

<212> DNA

<213> Artificial Sequence

<220>

<223> Clostridium_disporicum

<220>

<221> misc_feature

<222> (10)..(10)

<223> n is a, c, g, or t

<220>

<221> misc_feature

<222> (23)..(24)

<223> n is a, c, g, or t

<400> 6

gcgagtggan gttcttcgga gcnaagcta gcggcggacg ggtgagtaac acgtgggcaa
60

cctgcctcat agaggggaat agcctcccga aaggagatt aataccgcat aagattgtag
120

cttcgcatga agtagcaatt aaaggagcaa tccgctatga gatgggcccg cggcgcatta
180

gctagttggt gaggtaacgg ctcaccaagg cgacgatgcg tagccgacct gagaggggtga
240

tcggccacat tgggactgag acacggccca gactcctacg ggaggcagca gtggggaata
300

ttgcacaatg ggggaaaccc tgatgcagca atgccgcgtg agtgatgacg gccttcgggt
360

tgtaaagctc tgtcttcggg gacgataatg acggtacccg aggaggaagc cacggctaac
420

tacgtgccag cagccgcggt aatacgtagg tggcaagcgt tgtccggatt tactgggcgt
480

aaagggagcg taggcggatt ttttaagtgag atgtgaaata cccgggctta acttgggtgc
540

tgcatttcaa actggaagtc tagagtgcag gagaggagaa ggaattcct agtgtagcgg
600

tgaaatgcgt agagattagg aagaacacca gtggcgaagg cgcttctctg gactgtaact
660

gacgctgagg ctcgaaagcg tggggagcaa acaggattag ataccctggg agtccacgcc
720

gtaaacgatg aatactaggt gtaggggttg tcatgacctc tgtgccgccg ctaacgcatt
780

aagtattccg cctggggagt acggtcgcaa gattaaaact caaaggaatt gacggggggcc
840

cgcacaagca gcggagcatg tggtttaatt cgaagcaacg cgaagaatct tacctagact
900

tgacgtctcc tgaattaccc gtaactgggg aagtcgcttc ggcgacagga agacaggtgg
960

tgcattggtg tcgtcagctc gtgtcgtgag atgttgggtt aagtcccgca acgagcgcaa
1020

cccttattgt tagttgctac catttagttg agcactctag cgagactgcc cgggttaacc
1080

gggaggaagg tggggatgac gtcaaatacat catgcccctt atgtctaggg ctacacacgt
1140

gctacaatgg caagtacaaa gagaagcaag accgcgaggt ggagcaaaac tcaaaaactt
1200

gtctcagttc ggattgtagg ctgaaactcg cctacatgaa gctggagttg ctagtaatcg
1260

cgaatcagca tgtcgcggtg aatacgttcc cgggccttgt acacaccgcc cgtcacacca
1320

tgagagttgg caatacccaa agtgcgatgat ctaactcgca agagaggaag cgc
1373

<210> 7

<211> 1357

<212> DNA

<213> Artificial Sequence

<220>

<223> Clostridium_ghonii

<400> 7

cgaacccttc ggggtgagcg gcggacgggt gagtaacgcg tgggtaacct gccctgtaca
60

cacggataac ataccgaaag gtatgctaata acgggataac atatgagagt cgcattggctt
120

ttgtatcaaa gctccggcggt tacaggatgg acccgcgctct gattagctag ttggtaagggt
180

aacggcttac caaggcaacg atcagtagcc gacctgagag ggtgatcggc cacattggaa
240

ctgagacacg gtccaaactc ctacgggagg cagcagtggg gaatattgca caatgggcga
300

aagcctgatg cagcaacgcc gcgtgagcga tgaaggcctt cgggtcgtaa agctctgtcc
360

tcaaggaaga taatgacggt acttgaggag gaagccccgg ctaactacgt gccagcagcc
420

gcggtaatac gtagggggct agcgttatcc ggaattactg ggcgtaaagg gtgcgtaggc
480

ggtctttcaa gccagaagtg aaaggctacg gctcaaccgt agtaagcttt tggaactgta
540

ggacttgagt gcaggagagg agagtggaat tcctagtgtg gcggtgaaat gcgtagatat
600

taggaggaac accagtagcg aaggcggctc tctggactgt aactgacgct gaggcacgaa
660

agcgtgggga gcaaacagga ttagataccc tggtagtcca cgccgtaaac gatgagtact
720

aggtgtcggg ggttaccccc ctcggtgccg cagctaacgc attaagtact ccgcctggga
780

agtacgctcg caagagtgaa actcaaagga attgacgggg acccgacaaa gtagcggatc
840

atgtggttta attcgaagca acgcgaagaa ccttacctaa gcttgacatc ccattgacct
900

ctccctattc ggagatttcc cttcggggac cttggggaca ggtggggcat ggaggtcgtc
960

agctcgtgtc gtgagatggt gggttaagtc ccgcaacgag cgcaaccctt gccttttagtt
1020

gccagcatta agttgggcac tctagaggga ctgccgagga taactcggag gaaggtgggg
1080

atgacgtcaa atcatcatgc cccttatgct tagggctaca cacgtgctac aatgggtggt
1140

acagaggggt gccaaagccgt gaggtggagc taatccctta aagccattct cagttcggat
1200

tgtaggctga aactcgccta catgaagctg gagttactag taatcgcaga tcagaatgct
1260

gcggtgaatg cgttcccggg tcttgtacac accgcccgtc acaccatggg agttgggggc
1320

g c c c g a a g c c g g t t a g c t a a c c t t t t a g g a a g c g g c c
1357

<210> 8

<211> 1360

<212> DNA

<213> Artificial Sequence

<220>

<223> Ruminococcus_lactaris

<220>

<221> misc_feature

<222> (16)..(16)

<223> n is a, c, g, or t

<400> 8

gtcttcggat ggaagngttg gatacttagc ggcggacggg tgagtaacgc gtgggcaacc
60

tgccccatac cggggggataa cagccagaaa tggctgctaa taccgcataa gcgcacagcg
120

cctcatggcg cgggtgtgaaa aactccggtg gtatgggatg ggcccgcgtc tgattaggta
180

gttggcgggg taacggccca ccaagccgac gatcagtagc cgacctgaga gggtgaccgg
240

ccacattggg actgagacac ggcccaaact cctacgggag gcagcagtgg ggaatattgc
300

acaatggggg aaaccctgat gcagcgacgc cgcgtgagcg aagaagtatt tcggtatgta
360

aagctctatc agcagggaag aaaaatgacg gtacctgact aagaagcccc ggctaactac
420

gtgccagcag ccgcggtaat acgtaggggg caagcggttat ccggatttac tgggtgtaaa
480

gggagcgtag acggccaggc aagtctgatg tgaaaggcag gggctcaacc cctggactgc
540

attggaaact gtcaggctgg agtgccggag aggtaagcgg aattcctagt gtagcgggtga
600

aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg cttactggac ggtaactgac
660

gttgatgctc gaaagcgtgg ggagcaaaca ggattagata ccctggtagt ccacgccgta
720

aacgatgaat actaggtgtc ggggggcaaa gcccttcggt gccgccgcaa acgcattaag
780

tattccacct ggggagtagg ttcgcaagaa tgaaactcaa aggaattgac ggggacccgc
840

acaagcgggtg gagcatgtgg ttttaatttcg aagcaacgcg aagaacctta ccaagccttg
900

acatcccatt gaagccagag taacgtctga cggccttcgg gacaatggag acaggtggtg
960

catggttgtc gtcagctcgt gtcgtgagat gttgggttaa gtcccgcaac gagcgcaacc
1020

cttatcttca gtagccagca cgcgatgggtg ggcactctgg agagactgcc agggacaacc
1080

tggaggaagg tggggatgac gtcaaatacat catgcccctt atggcttggg ctacacacgt
1140

gctacaatgg cgtaaacaga gggaagcagc cctgcgaagg tgagcgaatc ccaaaaataa
1200

cgtctcagtt cggattgtag tctgcaactc gactacatga agctggaatc gctagtaatc
1260

gcgaatcaga atgtcgcggg gaatacgttc ccgggtcttg tacacaccgc ccgtcacacc
1320

atggggagtca gtaacgcccg aagtcagtga cctaaccgaa
1360

<210> 9

<211> 1377

<212> DNA

<213> Artificial Sequence

<220>

<223> Lactonifactor_longoviformis

<220>

<221> misc_feature

<222> (438)..(438)

<223> n is a, c, g, or t

<400> 9

cataaggaac ggattatttc ggtaagaagt actttatgac tgagtggcgg acgggtgagt
60

aacgcgtgga taacctgcct catacagggg gataacagtt agaaatgact gctaataccg
120

cataagcgca cagtgctgca tggcacagtg tgaaaagctc cggcggtatg agatggatcc
180

gcgtttgatt agctagttag tggggtaaag gcctaccaag gcgacgatca atagccgacc
240

tgagaggggtg accggccaca ttgggactga gacacggccc aaactcctac gggaggcagc
300

agtggggaat attgcacaat gggggaaacc ctgatgcagc gacgccgcgt gaaggaagaa
360

gtatttcggg atgtaaactt ctatcagcag ggaagaaaat gacgggtacct gactaagaag
420

ccccggctaa ttacgtgncc agcagccgcg gtaatacgta aggggcaagc gttatccgga
480

tttactgggt gtaaaggag cgtagacggc agtgcaagtc tgatgtgaaa gcccggggct
540

caaccccggg actgcattgg aaactgtgca gctagagtgt cggagaggta agtggaattc
600

ctagtgtagc ggtgaaatgc gtagatatta ggaggaacac cagtggcgaa ggcggcttac
660

tgacgataa ctgacgttga ggctcgaaag cgtggggagc aaacaggatt agataccctg
720

gtagtccacg ccgtaaacga tgaatactag gtgtcgggcg ccaaaggcgt tcggtgccgc
780

agcaaacgca ataagtattc cacctgggga gtacgttcgc aagaatgaaa ctcaaaggaa
840

ttgacgggga cccgcacaag cggtaggagca tgtggtttaa ttcgaagcaa cgcgagaac
900

cttaccaagt cttgacatct gcctgaccgg tccgtaacag gaccctttcc ttcgggacag
960

gcaagacagg tgggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc
1020

gcaacgagcg caacccttat ccttagtagc cagcaggtag agctggggcac tctagggaga
1080

ctgccaggga caacctggag gaagggtgggg atgacgtcaa atcatcatgc cccttatgat
1140

ttgggctaca cacgtgctac aatggcgtaa acaaaggag gcgaaggggt gacctggagc
1200

aaatcccaaa aataacgtct cagttcggat tgtagtctgc aactcgacta catgaagctg
1260

gaatcgctag taatcgcgaa tcagaatgtc gcggtgaata cgttcccggg tcttgtagac
1320

accgcccgtc acaccatggg agtcggatat gcccgagcc ggtgaccgaa cccgaaa
1377

<210> 10

<211> 1370

<212> DNA

<213> Artificial Sequence

<220>

<223> Eubacterium_sp_WAL_14571

<220>

<221> misc_feature

<222> (22)..(22)

<223> n is a, c, g, or t

<400> 10

gagcgagaag ccattgactg anacttcggt gagaaggata tgggtggaaag cggcggacgg
60

gtgagtaacg cgtaggcaac ctgcccctta cagagggata gccattggaa acgatgatta
120

aaacctcata acgcatcccc cccacatgga ggggatgcc aagattcatc ggtaagggat
180

gggcctgcgt ctgattagct tggtggcggg gtaacggccc accaaggcga cgatcagtag
240

ccgacctgag agggatgatcg gccacattgg aactgagaca cggtcctaac tcctacggga
300

ggcagcagtg gggaatattg cacaatgggc gaaagcctga tgcagcaacg ccgcgtgagg
360

gatgaaggcc ttcgggtcgt aaacctctgt ccttggggaa gaaacaaatg acggtacca
420

tggaggaagc cccggctaac tacgtgccag cagccgcggt aatacgtagg gggcgagcgt
480

tatccggaat tattgggcgt aaagagtgcg taggtggtta cctaagcgca gggcttaagg
540

caatggctca accattgttc gccctgcgaa ctgggctact tgagtgcagg agaggaaagc
600

ggaattccta gtgtagcggg gaaatgcgta gatattagga ggaacaccag tggcgaaggc
660

ggctttctgg actgttactg acactgaggc acgaaagcgt ggggagcaaa caggattaga
720

taccctggta gtccacgccg taaacgatga gcactaggtg tcggggccgc aaggcttcgg
780

tgccgcagtt aacgcattaa gtgctccgcc tggggagtag gcacgcaagt gtgaaactca
840

aaggaattga cggggacccg cacaagcagc ggagcatgtg gtttaattcg aagcaacgcg
900

aagaacctta ccaggacttg acatcccact gacagatccc taaccggatc cttcttcgga
960

cagtggagac aggtgggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1020

cccgcaacga gcgcaaccct tgccattagt tgccatcatt cagttgggca ctctaattggg
1080

actgccgggg acaactcgga ggaaggtggg gatgacgtca aatcatcatg ccccttatgt
1140

tctgggctac acacgtgcta caatggccgg tacagcaaga agcaaaaccg cgaggtggag
1200

caaattctcaa aaaccgggtcc cagttcggac tgcaggctga aaccgcctg cacgaagccg
1260

gagttgctag taatcgtgga tcagaatgcc acggtgaatg cgttcccggg tcttgtagac
1320

accgcccgtc acaccatgga agttgggggt gcccgaagcc ggcagggaaa
1370

<210> 11

<211> 1374

<212> DNA

<213> Artificial Sequence

<220>

<223> Lachnospiraceae_bacterium_3_1_57FAA

<220>

<221> misc_feature

<222> (908)..(908)

<223> n is a, c, g, or t

<220>

<221> misc_feature

<222> (914)..(916)

<223> n is a, c, g, or t

<220>

<221> misc_feature

<222> (918)..(920)

<223> n is a, c, g, or t

<220>

<221> misc_feature
<222> (933)..(936)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (939)..(939)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (958)..(958)
<223> n is a, c, g, or t

<400> 11
agtttttcgga tggaatcggg ataacttagt ggcggacggg tgagtaacgc gtgggaaacc
60

tgccctgtac cgggggataa cacttagaaa tgggtgctaa taccgcataa gcgcacggaa
120

ccgcatgggt gtgtgtgaaa aactccgggt gtacaggatg gtcccgcgtc tgattagcca
180

gttggcaggg taacggccta ccaaagcgac gatcagtagc cggcctgaga ggggtgaacgg
240

ccacattggg actgagacac ggcccaaact cctacgggag gcagcagtgg ggaatattgc
300

acaatggggg aaaccctgat gcagcgacgc cgcgtgagtg aagaagtatt tcggtatgta
360

aagctctatc agcagggaag aaaatgacgg tacctgacta agaagccccg gctaactacg
420

tgccagcagc cgcggtaata cgtagggggc aagcgttatc cggatttact ggggtgtaaag
480

ggagcgtaga cggcatggca agccagatgt gaaaaccag ggctcaacct tgggattgca
540

tttggaactg ccaggctgga gtgcaggaga ggtaagcgga attcctagt tagcggtgaa
600

atgcgtagat attaggagga acaccagtgg cgaaggcggc ttactggact gtaactgacg
660

ttgaggctcg aaagcgtggg gagcaaacag gattagatac cctggtagtc cacgcggtaa
720

acgatgattg ctaggtgtag gtgggtatgg acccatcggg gccgcagcta acgcaataag
780

caatccacct ggggagtacg ttcgcaagaa tgaaactcaa aggaattgac ggggacccgc
840

acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga agaaccttac caagtcttga
900

catcccnct gacnnncnnn atatcttgta aannnngana gggcttgccc ttcggganca
960

agggagacag gtggtgcatg gttgtcgtca gctcgtgtcg tgagatgttg gggttaagtc
1020

ccgcaacgag cgcaaccctt attcttagta gccagcaggt aaagctgggc actctaagga
1080

gactgccggg gataaccgga aggaaggcgg ggatgacgtc aaatcatcat gcccttatg
1140

atttgggcta cacacgtgct acaatggcgt aaacaaaggg aagcgagaca gtgatgtgga
1200

gcaaatccca gaaataacgt ctcagttcgg attgtagtct gcaactcgac tacatgaagc
1260

tggaatcgct agtaatcgcg aatcagcatg tcgcggtgaa tacgttcccg ggtcttgtag
1320

acaccgcccg tcacaccatg ggagttggaa atgcccgaag tctgtgacct aacc
1374

<210> 12

<211> 1365

<212> DNA

<213> Artificial Sequence

<220>

<223> Blautia_producta

<220>

<221> misc_feature

<222> (913)..(913)

<223> n is a, c, g, or t

<400> 12

ttcttcggat tgaagttttt gtgactgagc ggcggacggg tgagtaacgc gtgggtaacc
60

tgcctcatac aggggggataa cagttagaaa tggctgctaa taccgcataa gcgcacagga
120

ccgcatggtc tgggtgtgaaa aactccgggtg gtatgagatg gacccgcgtc tgattagcta
180

gttggagggg taacggccca ccaaggcgac gatcagtagc cggcctgaga ggggtgaacgg
240

ccacattggg actgagacac ggcccagact cctacgggag gcagcagtgg ggaatattgc
300

acaatggggg aaaccctgat gcagcgacgc cgcgtgaagg aagaagtatc tcggtatgta
360

aacttctatc agcagggaag aaaatgacgg tacctgacta agaagccccg gctaactacg
420

tgccagcagc cgcggtaata cgtagggggc aagcgttatc cggatttact ggggtgtaaag
480

ggagcgtaga cggaagagca agtctgatgt gaaaggctgg ggcttaaccc caggactgca
540

ttggaaactg tttttctaga gtgccggaga ggtaagcgga attcctagtg tagcggtgaa
600

atgcgtagat attaggagga acaccagtgg cgaaggcggc ttactggacg gtaactgacg
660

ttgaggctcg aaagcgtggg gagcaaacag gattagatac cctggtagtc cacgccgtaa
720

acgatgaata ctaggtgtcg ggtggcaaag ccattcgggtg ccgcagcaaa cgcaataagt
780

attccacctg gggagtacgt tgcgaagaat gaaactcaaa ggaattgacg gggacccgca
840

caagcgggtg agcatgtggt ttaattcgaa gcaacgcgaa gaaccttacc aagtcttgac
900

atccctctga ccnggcccgt aacggggcct tcccttcggg gcagaggaga caggtggtgc
960

atggttgtcg tcagctcgtg tcgtgagatg ttgggttaag tcccgcacacg agcgcaaccc
1020

ctatccttag tagccagcag gtgaagctgg gcactctagg gagactgccg gggataaccc
1080

ggaggaaggc ggggacgacg tcaaatacatc atgcccctta tgatttgggc tacacacgtg
1140

ctacaatggc gtaaacaaga ggaagcgaga cagcgatggt gagcaaatcc caaaaataac
1200

gtcccagttc ggactgcagt ctgcaactcg actgcacgaa gctggaatcg ctagtaatcg
1260

cgaatcagaa tgtcgcgggtg aatacgttcc cgggtcttgt acacaccgcc cgtcacacca
1320

tgggagtcag taacgcccga agtcagtgac ccaaccttat aggag
1365

<210> 13

<211> 1338

<212> DNA

<213> Artificial Sequence

<220>

<223> Lachnospiraceae_bacterium_oral_taxon_F15

<220>

<221> misc_feature

<222> (917)..(917)

<223> n is a, c, g, or t

<400> 13

cttgctccat gaagtttagtg gcggacgggt gagtaacgcg tgggtaacct gccctatgca
60

gggggataac gtttggaac gaacgctaata accgcataac ctagttgggt cgcatgaacc
120

gactagcaaa gattttatcg gcataggatg gacccgcgtt ggattagcta gttggtgaga
180

taacagccca ccaaggcaac gatccatagc cggcctgaga ggggtgaacgg ccacactggg
240

actgagacac ggcccagact cctacgggag gcagcagtgg ggaatattgc acaatgggcg
300

caagcctgat gcagcgacgc cgcgtgaagg atgaaggctt tcggatcgta aacttctatc
360

agcagggaag aaaccatgac ggtacctgac taagaagccc cggctaacta cgtgccagca
420

gccgcggtaa tacgtagggg gcaagcgtaa tccggaatta ctgggtgtaa aggggtgcgta
480

ggcggcgatt taagtcagat gtgaaaactc agggctcaac cttgagactg catctgaaac
540

tgagttgcta gagtgcagga gaggaaagcg gaattccgag tgtagcggtg aaatgcgtag
600

agattcggag gaacaccagt agcgaaggcg gctttctgga ctgtaactga cgctgaggca
660

cgaaagcgtg gggagcgaac aggattagat accctggtag tccacgccgt aaacgatgaa
720

tactaggtgt cggggcttac gggctctcggg gccgcagcta acgcattaag tattccacct
780

gggaagtacg accgcaaggt tgaaactcaa aggaattgac ggggaccgcg acaagcgggtg
840

gagcatgtgg ttttaattcga agcaacgcga agaacccttac ctaaacttga catccctttt
900

gaccggacgg taatgcnttc ttcactagct tgctagtgcg aaagtgcacg gtggtgcatg
960

gttgctcgtca gctcgtgtcg tgagatgttg ggtaagtcc cgcaacgagc gcaacccta
1020

tcttttagtag ccatcattca gttgggcact ctagagagac tgccagggat aacctggagg
1080

aagggtgggga tgacgtcaaa tcatcatgcc ccttatgttt agggctacac acgtgctaca
1140

atgggtgcta caaagggaag caaatccgcg aggccgagca aatctcaaaa aagcactccc
1200

agttcggatt gtagtctgca actcgactac atgaagttgg aatcgctagt aatcgcgaat
1260

cagaatgtcg cgggtgaatac gttcccgggt cttgtacaca ccgcccgtca caccatggga
1320

g t t g g g g g g g c c c a a c g c
1338

<210> 14

<211> 1338

<212> DNA

<213> Artificial Sequence

<220>

<223> Clostridium_lactatifermentans

<220>

<221> misc_feature

<222> (897)..(897)

<223> n is a, c, g, or t

<220>

<221> misc_feature

<222> (917)..(917)

<223> n is a, c, g, or t

<400> 14

cttgctccat gaagttagtg gcggacgggt gagtaacgcg tgggtaacct gccctatgca
60

gggggataac gtttggaaac gaacgctaata accgcataac ctagttgggt cgcatgaacc
120

gactagcaaa gattttatcg gcataggatg gacccgcgtt ggattagcta gttggtgaga
180

taacagccca ccaaggcaac gatccatagc cggcctgaga ggggtgaacgg ccacactggg
240

actgagacac ggcccagact cctacgggag gcagcagtgg ggaatattgc acaatgggcg
300

caagcctgat gcagcgacgc cgcgtgaagg atgaagggtct tcggatcgta aacttctatc
360

agcaggggaag aaaccatgac ggtacctgac taagaagccc cggctaacta cgtgccagca
420

gccgcggtaa tacgtagggg gcaagcgtaa tccggaatta ctgggtgtaa aggggtgcgta
480

ggcggcgatt taagtcagat gtgaaaactc agggctcaac cttgagactg catctgaaac
540

tgagttgcta gagtgcagga gaggaaagcg gaattccgag tgtagcgggtg aaatgcgtag
600

agattcggag gaacaccagt agcgaaggcg gctttctgga ctgtaactga cgctgaggca
660

cgaaagcgtg gggagcgaac aggattagat accctggtag tccacgccgt aaacgatgaa
720

tactaggtgt cggggccttac ggggtctcgggt gccgcagcta acgcattaag tattccacct
780

gggaagtacg accgcaaggt tgaaactcaa aggaattgac ggggacccgc acaagcgggtg
840

gagcatgtgg ttttaattcga agcaacgcga agaacccttac ctaaacttga catcctnttt
900

gaccggacgg taatgcnttc ttcactagct tgctagtgcga aaagtgcacag gtggtgcatg
960

gttgctcgtca gctcgtgtcg tgagatgttg ggtaagtcc cgcaacgagc gcaaccccta
1020

tcttttagtag ccatcattca gttgggcact ctagagagac tgccagggat aacctggagg
1080

aagggtgggga tgacgtcaaa tcatcatgcc ccttatgttt agggctacac acgtgctaca
1140

atgggtgcta caaagggaag caaatccgcg aggccgagca aatctcaaaa aagcactccc
1200

agttcggatt gtagtctgca actcgactac atgaagttgg aatcgctagt aatcgcgaaat
1260

cagaatgtcg cgggtgaatac gttcccgggt cttgtacaca ccgcccgtca caccatggga
1320

g t t g g g g g g g c c c a a c g c
1338

<210> 15

<211> 1305

<212> DNA

<213> Artificial Sequence

<220>

<223> Clostridium_SC174.GCA_900066055.CNDBEJEM_03146 16S ribosomal
RNA

<400> 15

tccggtggta tgagatggac ccgcgtctga ttagctagtt ggtgaggtaa cggcccacca
60

aggcgacgat cagtagccga cctgagaggg tgaccggcca cattgggact gagacacggc
120

ccagactcct acgggaggca gcagtggggg atattgcaca atggaggaaa ctctgatgca
180

gcgacgccgc gtgagtgaag aagtatttcg gtatgtaaag ctctatcagc agggaagaaa
240

atgacggtac ctgactaaga agccccggct aactacgtgc cagcagccgc ggtaatacgt
300

agggggcaag cgttatccgg atttactggg tgtaaaggga gcgtagacgg cgacgcaagt
360

ctgaagtgaa ataccgggc tcaacctggg aactgctttg gaaactgtgt tgctagagtg
420

ctggagaggt aagcgggaatt cctagtgtag cggtgaaatg cgtagatatt aggaagaaca
480

ccagtggcga aggcggccta ctggacagta actgacgttg aggctcgaaa gcgtggggag
540

caaacaggat tagataccct ggtagtccac gccgtaaacg atgaatacta ggtgttggtg
600

agcaaagctc atcggtgccg ccgcaaacgc aataagtatt ccacctgggg agtacgttcg
660

caagaatgaa actcaaagga attgacgggg acccgcacaa gcggtggagc atgtggttta
720

attcgaagca acgcgaagaa ccttaccaa tcttgacatc cctctgaaaa gcctttaatc
780

gggctcctcc ttcgggacag aggtgacagg tgggtgcatgg ttgtcgtcag ctcggtcgt
840

gagatgttgg gttaagtccc gcaacgagcg caaccctat tgtcagtagc cagcaggtaa
900

agctgggcac tctgatgaga ctgccaggga taacctggag gaagggtgggg atgacgtcaa
960

atcatcatgc cccttatgat ttgggctaca cacgtgctac aatggcgtaa acaaagagaa
1020

gcgagcctgc gagggggagc aaatctcaaa aataacgtct cagttcggat tgtagtctgc
 1080

aactcgacta catgaagctg gaatcgctag taatcgcaga tcagaatgct gcggtgaata
 1140

cgttcccggg tcttgtacac accgcccgtc acaccatggg agtcggaaat gcccgaagcc
 1200

agtgacccaa gcgaaagcag ggagctgtcg aaggcaggtc tgataactgg ggtgaagtcg
 1260

taacaaggta gccgtatcgg aagggtgcggc tggatcacct ccttt
 1305

<210> 16
 <211> 1509
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Akkermansia_muciniphila.GCF_000020225.FDANIDBG_00277 16S
 ribosomal RNA

<400> 16
 atggagagtt tgattctggc tcagaacgaa cgctggcggc gtggataaga catgcaagtc
 60

gaacgagaga attgctagct tgctaataat tctctagtgg cgcacgggtg agtaacacgt
 120

gagtaacctg cccccgagag cgggatagcc ctgggaaact gggattaata ccgcatagta
 180

tcgaaagatt aaagcagcaa tgcgcttggg gatgggctcg cggcctatta gttagttggt
 240

gaggtaacgg ctcaccaagg cgatgacggg tagccgggtc gagaggatgt ccggccacac
 300

tggaaactgag acacggtcca gacacctacg ggtggcagca gtcgagaatc attcacaatg
 360

ggggaaaccc tgatggtgcg acgccgcgtg ggggaatgaa ggtcttcgga ttgtaaaccc
 420

ctgtcatgtg ggagcaaatt aaaaagatag taccacaaga ggaagagacg gctaactctg
480

tgccagcagc cgcggtataa cagaggtctc aagcgttgtt cggaatcact gggcgtaaag
540

cgtgcgtagg ctgtttcgta agtcgtgtgt gaaaggcgcg ggctcaaccc gcggacggca
600

catgatactg cgagactaga gtaatggagg gggaaccgga attctcgggtg tagcagtga
660

atgcgtagat atcgagagga acactcgtgg cgaaggcggg ttcctggaca ttaactgacg
720

ctgaggcacg aaggccaggg gagcgaaagg gattagatac ccctgtagtc ctggcagtaa
780

acggtgcacg cttggtgtgc ggggaatcga cccctgcgt gccggagcta acgcgttaag
840

cgtgccgcct ggggagtagc gtcgcaagat taaaactcaa agaaattgac ggggaccgcg
900

acaagcgggtg gagtatgtgg ctttaattcga tgcaacgcga agaacccttac ctgggcttga
960

catgtaatga acaacatgtg aaagcatgcg actcttcgga ggcgttacac aggtgctgca
1020

tggccgtcgt cagctcgtgt cgtgagatgt ttggttaagt ccagcaacga gcgcaacccc
1080

tgttgccagt taccagcacg tgaagggtgg gactctggcg agactgccca gatcaactgg
1140

gaggaagggtg gggacgacgt caggtcagta tggcccttat gcccagggtc gcacacgtac
1200

tacaatgccc agtacagagg gggccgaagc cgcgaggcgg aggaaatcct aaaaactggg
1260

cccagttcgg actgtaggct gcaaccgcgc tacacgaagc cggaatcgct agtaatggcg
1320

catcagctac ggcgccgtga atacgttccc gggctcttgta cacaccgccc gtcacatcat
1380

ggaagccggt cgcacccgaa gtatctgaag ccaaccgcaa ggaggcaggg tcctaagggtg
1440

agactggtaa ctgggatgaa gtcgtaacaa ggtagccgta ggggaacctg cggctggatc
1500

a c c t c c t t t
1509

<210> 17

<211> 1509

<212> DNA

<213> Artificial Sequence

<220>

<223> Akkermansia_muciniphila.GCF_000020225.FDANIDBG_00864 16S
ribosomal RNA

<400> 17

atggagagtt tgattctggc tcagaacgaa cgctggcggc gtggataaga catgcaagtc
60

gaacgagaga attgctagct tgctaataat tctctagtgg cgcacggggtg agtaacacgt
120

gagtaacctg ccccgagag cgggatagcc ctgggaaact gggattaata ccgcatagta
180

tcgaaagatt aaagcagcaa tgcgcttggg gatgggctcg cggcctatta gttagttggt
240

gaggtaacgg ctcaccaagg cgatgacggg tagccgggtct gagaggatgt ccggccacac
300

tggaactgag acacggtcca gacacctacg ggtggcagca gtcgagaatc attcacaatg
360

ggggaaaccc tgatggtgcg acgccgcgtg ggggaatgaa ggtcttcgga ttgtaaaccc
420

ctgtcatgtg ggagcaaatt aaaaagatag taccacaaga ggaagagacg gctaactctg
480

tgccagcagc cgcggtataa cagaggtctc aagcgttgtt cggaatcact gggcgtaaag
540

cgtgcgtagg ctgtttcgtg agtcgtgtgt gaaaggcgcg ggctcaaccc gcggacggca
600

catgatactg cgagactaga gtaatggagg gggaaccgga attctcgggtg tagcagtga
660

atgcgtagat atcgagagga acactcgtgg cgaaggcggg ttcctggaca ttaactgacg
720

ctgaggcacg aaggccaggg gagcgaaagg gattagatac ccctgtagtc ctggcagtaa
780

acggtgcacg cttggtgtgc ggggaatcga cccctgcgt gccggagcta acgcgttaag
840

cgtgccgcct ggggagtacg gtcgcaagat taaaactcaa agaaattgac ggggacccgc
900

acaagcgggtg gagtatgtgg cttaatcga tgcaacgcga agaaccttac ctgggcttga
960

catgtaatga acaacatgtg aaagcatgcg actcttcgga ggcgttacac aggtgctgca
1020

tggccgtcgt cagctcgtgt cgtgagatgt ttggttaagt ccagcaacga gcgcaacccc
1080

tgttgccagt taccagcacg tgaagggtgg gactctggcg agactgcca gatcaactgg
1140

gaggaagggtg gggacgacgt caggtcagta tggcccttat gccagggct gcacacgtac
1200

tacaatgccc agtacagagg gggccgaagc cgcgaggcgg aggaaatcct aaaaactggg
1260

cccagttcgg actgtaggct gcaaccgcgc tacacgaagc cggaatcgct agtaatggcg
1320

catcagctac ggcgccgtga atacgttccc gggctcttgta cacaccgccc gtcacatcat
1380

ggaagccggt cgcacccgaa gtatctgaag ccaaccgcaa ggaggcaggg tcctaagggtg
1440

agactggtaa ctgggatgaa gtcgtaacaa ggtagccgta ggggaacctg cggctggatc
1500

a c c t c c t t t
1509

<210> 18

<211> 1509

<212> DNA

<213> Artificial Sequence

<220>

<223> Akkermansia_muciniphila.GCF_000020225.FDANIDBG_01254 16S
ribosomal RNA

<400> 18

atggagagtt tgattctggc tcagaacgaa cgctggcggc gtggataaga catgcaagtc
60

gaacgagaga attgctagct tgctaataat tctctagtgg cgcacgggtg agtaacacgt
120

gagtaacctg ccccgagag cgggatagcc ctgggaaact gggattaata ccgcatagta
180

tcgaaagatt aaagcagcaa tgcgcttggg gatgggctcg cggcctatta gttagttggt
240

gaggtaacgg ctcaccaagg cgatgacggg tagccggtct gagaggatgt ccggccacac
300

tggaactgag acacggtcca gacacctacg ggtggcagca gtcgagaatc attcacaatg
360

ggggaaaccc tgatggtgcg acgccgcgtg ggggaatgaa ggtcttcgga ttgtaaaccc
420

ctgtcatgtg ggagcaaatt aaaaagatag taccacaaga ggaagagacg gctaactctg
480

tgccagcagc 540	cgcggttaata	cagaggtctc	aagcgttggt	cggaatcact	gggcgtaaag
cgtgcgtagg 600	ctgttttcgta	agtcgtgtgt	gaaaggcgcg	ggctcaaccc	gcggacggca
catgatactg 660	cgagactaga	gtaatggagg	gggaaccgga	attctcgggtg	tagcagtgaa
atgcgtagat 720	atcgagagga	acactcgtgg	cgaaggcggg	ttcctggaca	ttaactgacg
ctgaggcacg 780	aaggccaggg	gagcgaaagg	gattagatac	ccctgtagtc	ctggcagtaa
acggtgcacg 840	cttggtgtgc	ggggaatcga	ccccctgcgt	gccggagcta	acgcgttaag
cgtgccgcct 900	ggggagtacg	gtcgcaagat	taaaactcaa	agaaattgac	ggggacccgc
acaagcgggtg 960	gagtatgtgg	cttaattcga	tgcaacgcga	agaaccttac	ctgggcttga
catgtaatga 1020	acaacatgtg	aaagcatgcg	actcttcgga	ggcgttacac	aggtgctgca
tggccgtcgt 1080	cagctcgtgt	cgtgagatgt	ttggttaagt	ccagcaacga	gcgcaacccc
tgttgccagt 1140	taccagcacg	tgaagggtggg	gactctggcg	agactgccca	gatcaactgg
gaggaagggtg 1200	gggacgacgt	caggtcagta	tggcccttat	gcccagggt	gcacacgtac
tacaatgccc 1260	agtacagagg	gggccgaagc	cgcgaggcgg	aggaaatcct	aaaaactggg
cccagttcgg 1320	actgtaggct	gcaacccgcc	tacacgaagc	cggaatcgct	agtaatggcg
catcagctac 1380	ggcgccgtga	atacgttccc	gggtcttgta	cacaccgccc	gtcacatcat

ggaagccggt cgcacccgaa gtatctgaag ccaaccgcaa ggaggcaggg tcctaagggtg
1440

agactggtaa ctgggatgaa gtcgtaacaa ggtagccgta ggggaacctg cggctggatc
1500

a c c t c c t t t
1509

<210> 19

<211> 1244

<212> DNA

<213> Artificial Sequence

<220>

<223> Bacteroides_ovatus.GCF_000273195.POLEICMM_00001 16S ribosomal
RNA
(partial)

<400> 19

cgatggatag gggttctgag aggaagggtcc cccacattgg aactgagaca cggtcctaaac
60

tcctacggga ggcagcagtg aggaatatattg gtcaatgggc gagagcctga accagccaag
120

tagcgtgaag gatgaaggct ctatgggtcg taaacttctt ttatatggga ataaagtttt
180

ccacgtgtgg aattttgtat gtaccatatg aataaggatc ggctaactcc gtgccagcag
240

ccgcggtaat acggaggatc cgagcgttat ccggatttat tgggttttaa gggagcgtag
300

gtggattgtt aagtcagttg tgaaagtttg cggctcaacc gtaaaattgc agttgaaact
360

ggcagtcttg agtacagtag aggtgggcgg aattcgtggg gtagcgggtga aatgcttaga
420

tatcacgaag aactccgatt gcgaaggcag ctcactagac tgtcactgac actgatgctc
480

gaaagtgtgg gtatcaaaca ggattagata ccctggtagt ccacacagta aacgatgaat
540

actcgctgtt tgcgatatac agtaagcggc caagcgaaag cattaagtat tccacctggg
600

gagtacgccg gcaacgggtga aactcaaagg aattgacggg ggcccgcaca agcggaggaa
660

catgtggttt aattcgatga tacgcgagga accttaccg ggcttaaatt gcaacagaat
720

atattggaaa cagtatagcc gtaaggctgt tgtgaagggtg ctgcatgggtt gtcgtcagct
780

cgtgccgtga ggtgtcggct taagtgccat aacgagcgca acccttatct ttagttacta
840

acaggtcatg ctgaggactc tagagagact gccgtcgtaa gatgtgagga aggtggggat
900

gacgtcaaat cagcacggcc ccttacgtcc ggggctacac acgtgttaca atggggggta
960

cagaaggcgg ctacctgggtg acaggatgct aatcccaaaa acctctctca gttcgggatcg
1020

aagtctgcaa cccgacttcg tgaagctgga ttcgctagta atcgcgcatc agccatggcg
1080

cggtgaatac gttcccgggc cttgtacaca ccgcccgtca agccatgaaa gccgggggta
1140

cctgaagtac gtaaccgcaa ggagcgtcct agggtaaaac tggttaattgg ggctaagtcg
1200

taacaaggta gccgtaccgg aagggtgcggc tggaacacct cctt
1244

<210> 20

<211> 1526

<212> DNA

<213> Artificial Sequence

<220>

<223> Bacteroides_ovatus.GCF_000273195.POLEICMM_03664 16S ribosomal
RNA

<400> 20

atgaagagtt tgatcctggc tcaggatgaa cgctagctac aggcttaaca catgcaagtc
60

gaggggcagc attttagttt gcttgcaaac tgaagatggc gaccggcgca cgggtgagta
120

acacgtatcc aacctgccga taactccgga atagcctttc gaaagaaaga ttaataccgg
180

atagcatacg aatatcgcat gatattttta ttaaagaatt tcggttatcg atggggatgc
240

gttccattag tttgttggcg gggtaacggc ccaccaagac tacgatggat aggggttctg
300

agaggaaggt cccccacatt ggaactgaga cacgggtccaa actcctacgg gaggcagcag
360

tgaggaatat tgggtcaatgg gcgagagcct gaaccagcca agtagcgtga aggatgaagg
420

ctctatgggt cgtaaacttc ttttatatgg gaataaagtt ttccacgtgt ggaattttgt
480

atgtaccata tgaataagga tcggctaact ccgtgccagc agccgcggta atacggagga
540

tccgagcgtt atccggattt attgggttta aaggagcgt aggtggattg ttaagtcagt
600

tgtgaaagtt tgcggctcaa ccgtaaaatt gcagttgaaa ctggcagtct tgagtacagt
660

agaggtgggc ggaattcgtg gtgtagcggc gaaatgctta gatatcacga agaactccga
720

ttgcgaaggc agctcactag actgtcactg acactgatgc tcgaaagtgt gggatatcaaa
780

caggattaga taccctggta gtccacacag taaacgatga atactcgctg tttgcgatat
840

acagtaagcg gccaaagcgaa agcattaagt attccacctg gggagtacgc cggcaacggg
900

gaaactcaaa ggaattgacg gggggcccgca caagcggagg aacatgtggt ttaattcgat
960

gatacgcgag gaaccttacc cgggcttaaa ttgcaacaga atatattgga aacagtatag
1020

ccgtaaggct gttgtgaagg tgctgcatgg ttgtcgtcag ctcgtgccgt gaggtgtcgg
1080

cttaagtgcc ataacgagcg caacccttat ctttagttac taacaggtta tgctgaggac
1140

tctagagaga ctgccgtcgt aagatgtgag gaagggtgggg atgacgtcaa atcagcacgg
1200

ccccttacgt ccgggggctac acacgtgtta caatggggggg tacagaaggc ggctacctgg
1260

tgacaggatg ctaatcccaa aaacctctct cagttcggat cgaagtctgc aacccgactt
1320

cgtgaagctg gattcgctag taatcgcgca tcagccatgg cgcgggtgaat acgttcccgg
1380

gccttgtaca caccgcccgt caagccatga aagccgggggg tacctgaagt acgtaaccgc
1440

aaggagcgtc ctagggtaaa actggtaatt ggggctaagt cgtaacaagg tagccgtacc
1500

g g a a g g t g c g g c t g g a a c a c c t c c t t
1526

<210> 21

<211> 1525

<212> DNA

<213> Artificial Sequence

<220>

<223> Bacteroides_ovatus.GCF_000273195.POLEICMM_06357 16S ribosomal RNA

<400> 21

atgaagagtt tgatcctggc tcaggatgaa cgctagctac aggcttaaca catgcaagtc
60

gaggggcagc attttagttt gcttgcaaac tgaagatggc gaccggcgca cgggtgagta
120

acacgtatcc aacctgccga taactccgga atagcctttc gaaagaaaga ttaataccgg
180

atagcatacg aatatcgcat gatattttta ttaaagaatt tcggttatcg atggggatgc
240

gttccattag tttgttggcg gggtaacggc ccaccaagac tacgatggat aggggttctg
300

agaggaaggt ccccccacatt ggaactgaga cacgggtccaa actcctacgg gaggcagcag
360

tgaggaatat tgggtcaatgg gcgagagcct gaaccagcca agtagcgtga aggatgaagg
420

ctctatgggt cgtaaaacttc ttttatatgg gaataaagtt ttccacgtgt ggaattttgt
480

atgtaccata tgaataagga tcggctaact ccgtgccagc agccgcggta atacggagga
540

tccgagcgtt atccggattt attgggttta aaggagcgt aggtggattg ttaagtcagt
600

tgtgaaagtt tgcggctcaa ccgtaaaatt gcagttgaaa ctggcagtct tgagtacagt
660

agaggtgggc ggaattcgtg gtgtagcggc gaaatgctta gatatcacga agaactccga
720

ttgcgaaggc agctcactag actgtcactg aactgatgc tcgaaagtgt gggtatcaaa
780

caggattaga taccctggta gtccacacag taaacgatga atactcgctg tttgcgatat
840

acagtaagcg gccaaagcgaa agcattaagt attccacctg gggagtagcg cggcaacggg
900

gaaactcaaa ggaattgacg ggggcccgcg caagcggagg aacatgtggg ttaattcgat
960

gatacgcgag gaaccttacc cgggcttaaa ttgcaacaga atatattgga aacagtatag
1020

ccgtaaggct gttgtgaagg tgctgcatgg ttgtcgtcag ctcgtgccgt gaggtgtcgg
1080

cttaagtgcc ataacgagcg caacccttat ctttagttac taacaggtta tgctgaggac
1140

tctagagaga ctgccgtcgt aagatgtgag gaagggtgggg atgacgtcaa atcagcacgg
1200

cccttacgtc cggggctaca cacgtgttac aatggggggg acagaaggca gctacacggc
1260

gacgtgatgc taatcccaaa aacctctctc agttcggatc gaagtctgca acccgacttc
1320

gtgaagctgg attcgctagt aatcgcgcat cagccatggc gcggtgaata cgttcccggg
1380

ccttgtacac accgcccgtc aagccatgaa agccgggggg acctgaagta cgtaaccgca
1440

aggagcgtcc tagggtaaaa ctggtaattg gggctaagtc gtaacaagggt agccgtaccg
1500

g a a g g t g c g g c t g g a a c a c c t c c t t
1525

<210> 22

<211> 1525

<212> DNA

<213> Artificial Sequence

<220>

<223> Bacteroides_ovatus.GCF_000273195.POLEICMM_06418 16S ribosomal
RNA

<400> 22

atgaagagtt tgatcctggc tcaggatgaa cgctagctac aggcttaaca catgcaagtc
60

gaggggcagc attttagttt gcttgcaaac taaagatggc gaccggcgca cgggtgagta
120

acacgtatcc aacctgccga taactcgggg atagcctttc gaaagaaaga ttaatatccg
180

atggtatatt ttctccgcat ggtgagaata tttaaagaatt tcggttatcg atggggatgc
240

gttcatttag tttgttggcg gggtaacggc ccaccaagac cacgatggat aggggttctg
300

agaggaaggt cccccacatt ggaactgaga cacgggtccaa actcctacgg gaggcagcag
360

tgaggaatat tgggtcaatgg acgagagtct gaaccagcca agtagcgtga aggatgactg
420

ccctatgggt tgtaaacttc ttttatatgg gaataaagtg ttccacgtgt gggattttgt
480

atgtaccata tgaataagga tcggctaact ccgtgccagc agccgcggta atacggagga
540

tccgagcgtt atccggattt attgggttta aagggagcgt aggtggattg ttaagtcagt
600

tgtgaaagtt tgcggctcaa ccgtaaaatt gcagttgaaa ctggcagtct tgagtacagt
660

agaggtgggc ggaattcgtg gtgtagcggc gaaatgctta gatatcacga agaactccga
720

ttgcgaaggc agctcactag actgttactg aactgatgc tcgaaagtgt gggatatcaa
780

caggattaga taccctggta gtccacacag taaacgatga atactcgctg tttgcgatat
840

acagtaagcg gccaaagcgaa agcattaagt attccacctg gggagtacgc cggcaacggc
900

gaaactcaaa ggaattgacg ggggcccgcg caagcggagg aacatgtggt ttaattcgat
960

gatacgcgag gaaccttacc cgggcttaaa ttgcaacaga atatattgga aacagtatag
1020

ccgtaaggct gttgtgaagg tgctgcatgg ttgtcgtcag ctcgtgccgt gaggtgtcgg
1080

cttaagtgcc ataacgagcg caacccttat ctttagttac taacagggtca tgctgaggac
1140

tctagagaga ctgccgtcgt aagatgtgag gaaggtgggg atgacgtcaa atcagcacgg
1200

cccttacgtc cggggctaca cacgtgttac aatgggggggt acagaaggcg gctacctggt
1260

gacaggatgc taatcccaaa aacctctctc agttcggatc gaagtctgca acccgacttc
1320

gtgaagctgg attcgctagt aatcgcgcat cagccatggc gcggtgaata cgttcccggg
1380

ccttgtacac accgcccgtc aagccatgaa agccgggggt acctgaagta cgtaaccgca
1440

aggagcgtcc tagggtaaaa ctggtaattg gggctaagtc gtaacaaggt agccgtaccg
1500

g a a g g t g c g g c t g g a a c a c c t c c t t
1525

<210> 23

<211> 1051

<212> DNA

<213> Artificial Sequence

<220>

<223> Bacteroides_vulgatus.GCF_000273295.HJEBINN_01362 16S
ribosomal
RNA (partial)

<400> 23

tttgcattgta ctttatgaat aaggatcggc taactccgtg ccagcagccg cggtaatacg
60

gaggatccga gcgttatccg gatttattgg gtttaaaggg agcgtagatg gatgtttaag
120

tcagttgtga aagtttgagg ctcaaccgta aaattgcagt tgataactgga tatcttgagt
180

gcagttgagg caggcggaat tcgtgggtgta gcgggtgaaat gcttagatat cacgaagaac
240

tccgattgag aaggcagcct gctaagctgc aactgacatt gaggctcgaa agtgtgggta
300

tcaaacagga ttagataccc tggtagtcca cacggtaaac gatgaatact cgctgtttgc
360

gatatacggc aagcggccaa gcgaaagcgt taagtattcc acctggggag tacgccggca
420

acgggtgaaac tcaaaggaat tgacgggggc cgcacaagc ggaggaacat gtgggtttaat
480

tcgatgatac gcgaggaacc ttaccggggc ttaaattgca gatgaattac ggtgaaagcc
540

gtaagccgca aggcattctgt gaagggtgctg catggttgtc gtcagctcgt gccgtgaggt
600

gtcggcttaa gtgccataac gagcgcaacc cttgttgtca gttactaaca ggttctgctg
660

aggactctga caagactgcc atcgtaagat gtgaggaagg tggggatgac gtcaaatacag
720

cacggccctt acgtccgggg ctacacacgt gttacaattg ggggtacaga gggccgctac
780

cacgcgagtg gatgccaatc ccaaaaacct ctctcagttc ggactggagt ctgcaacccg
840

actccacgaa gctggattcg ctagtaatcg cgcattcagcc acggcgcggt gaatacgttc
900

ccgggccttg tacacaccgc ccgtcaagcc atgggagccg ggggtacctg aagtgcgtaa
960

ccgcgaggag cgccctaggg taaaactggg gactggggct aagtcgtaac aaggtagccg
1020

t a c c g g a a g g t g c g g c t g g a a c a c c t c c t t t
1051

<210> 24

<211> 1524

<212> DNA

<213> Artificial Sequence

<220>

<223> Bacteroides_vulgatus.GCF_000273295.HJEBINN_01365 16S
ribosomal
RNA

<400> 24

atgaagagtt tgatcctggc tcaggatgaa cgctagctac aggcttaaca catgcaagtc
60

gaggggcagc atgggtcttag cttgctaagg ccgatggcga ccggcgcacg ggtgagtaac
120

acgtatccaa cctgccgtct actcttggac agccttctga aaggaagatt aatacaagat
180

ggcatcatga gttcacatgt tcacatgatt aaaggatttc cggtagacga tggggatgcg
240

ttccattaga tagtaggcgg ggtaacggcc cacctagtct tcgatggata ggggttctga
300

gaggaaggtc cccacattg gaactgagac acgggtccaaa ctcctacggg aggcagcagt
360

gaggaatatt ggtcaatggg cgagagcctg aaccagccaa gtagcgtgaa ggatgactgc
420

cctatggggt gttaaacttct tttataaagg aataaagtcg ggtatggata cccgtttgca
480

tgtactttat gaataaggat cggctaactc cgtgccagca gccgcggtaa tacggaggat
540

ccgagcgтта tccggattta ttgggtttta agggagcgta gatggatgтт taagtcagтт
600

gtgaaagттt gcggctcaac cgtaaaattg cagttgatac tggatatттt gagtgcagттt
660

gaggcaggcg gaattcgtgg tgtagcggтg aaatgcttag atatcacgaa gaactccgat
720

tgcgaaggca gcctgctaag ctgcaactga cattgaggct cgaaagtгtg ggtatcaaac
780

aggattagat accctggtag tccacacggт aaacgatgaa tactcgctгt ttgcgatata
840

cggcaagcgг ccaagcgaaa gcгttaagta ttccacctгg ggagtacгcc ggcaacggтg
900

aaactcaaag gaattgacгg gggcccгcac aagcгgagga acatгtgгтт taattcgatг
960

atacгcgagg aaccttaccc gggcttaaат tgсagatgaa ttacггtgaa agccгtaagс
1020

cгcaaggсat ctгtgaaггt гctгсatггt tgтсгтсagс tcгtgccгтg agгtgтсггс
1080

ttaagtгсca taacгagгсгc aaccттгтт gтсagттact aacagгттct гctгaggact
1140

ctгacaagac тgссatсгta агatгtgagg aagгtgггga тgacгtсaaa тсagсacггс
1200

сттtacгтсc gggгctacac acгtgттaca atggggггta сagagггссг сtaccacгсг
1260

agтggatгсc aatсссaaaa acттctттca гттсггactг gagtттгсaa ссгgactсca
1320

сgaagттгga ттсгctagta атсгсгсатс агссacггсг сггтgaатac гттсссгггс
1380

cttgtacaca cgcgccgtca agccatggga gccgggggta cctgaagtgc gtaaccgcga
1440

ggagcgcctt agggtaaaac tgggtgactgg ggctaagtcg taacaaggta gccgtaccgg
1500

a a g g t g c g g c t g g a a c a c c t c c t t
1524

<210> 25

<211> 1524

<212> DNA

<213> Artificial Sequence

<220>

<223> Bacteroides_vulgatus.GCF_000273295.HJEBINN_02805 16S
ribosomal
RNA

<400> 25

atgaagagtt tgatcctggc tcaggatgaa cgctagctac aggcttaaca catgcaagtc
60

gaggggcagc atgggtcttag cttgctaagg ccgatggcga ccggcgcacg ggtgagtaac
120

acgtatccaa cctgccgtct actcttggac agccttctga aaggaagatt aatacaagat
180

ggcatcatga gtccgcatgt tcacatgatt aaaggatttc cggtaggcga tggggatgcg
240

ttccattaga tagtaggcgg ggtaacggcc cacctagtct tcgatggata ggggttctga
300

gaggaaggtc cccacattg gaactgagac acggtcctaa ctcctacggg aggcagcagt
360

gaggaatatt ggtcaatggg cgagagcctg aaccagccaa gtagcgtgaa ggatgactgc
420

cctatggggt gtaaacttct tttataaagg aataaagtcg ggtatgtata cccgtttgca
480

tgtactttat gaataaggat cggctaactc cgtgccagca gccgcggtaa tacggaggat
540

ccgagcgтта tccggattta ttgggtttta agggagcgta gatggatgтт taagtcagтт
600

gtgaaagттt gcggctcaac cgtaaaattg cagttgatac tggatatттt gagtgcagттt
660

gaggcaggcg gaattcgтгg tgtagcgггtг aaatgттtag atatacagaa gaactccgat
720

tgcgaaggca gcctgctaag ctgcaactga cattgaggct cgaaagtггtг ggtatcaaac
780

aggattagat accctггtag tccacacггt aaacgatgaa tactcgctгt ttgcgatata
840

cagcaagcgг ccaagcgaaa gcгttaagta ttccacctгг ggagtacгcc ggcaacггтг
900

aaactcaaag gaattgacгг gggcccгcac aagcgгagga acatггггтт таattcgatг
960

atacgcgagg aaccttaccc gggтттаaat tgcagatgaa ttacггггaa agccгтаagc
1020

cgcaaggcat ctгггаagгt гctгcatггt тгтсггсagc тсгггсггтг agггггсггс
1080

ttaagtгcca таacгagгсгc aacctттгтт гтсagттact aacagгтттт гctгaggact
1140

ctgacaagac тгccatсгта agatгггagg aagгггггга тгacггсaaa тсagсacггс
1200

cттtacгтсc gggгггtacac acгггттaca atggggгггга сagagгггсгг сtaccacггг
1260

agтггatгсc aatccccaaaa acттттттсa гттсгггactг gagtттгcaa cccgactcca
1320

cgaagctгга ттсггtagта atсгсгсатс agccacгггсг сггггаатас гттcccгггс
1380

cttgtacaca cgcgccgtca agccatggga gccgggggta cctgaagtgc gtaaccgcga
1440

ggagcgcctt agggtaaaac tgggtgactgg ggctaagtcg taacaaggta gccgtaccgg
1500

a a g g t g c g g c t g g a a c a c c t c c t t
1524

<210> 26

<211> 1524

<212> DNA

<213> Artificial Sequence

<220>

<223> Bacteroides_vulgatus.GCF_000273295.HJEBINN_03454 16S
ribosomal
RNA

<400> 26

atgaagagtt tgatcctggc tcaggatgaa cgctagctac aggcttaaca catgcaagtc
60

gaggggcagc atgggtcttag cttgctaagg ccgatggcga ccggcgcacg ggtgagtaac
120

acgtatccaa cctgccgtct actcttggac agccttctga aaggaagatt aatacaagat
180

ggcatcatga gtccgcatgt tcacatgatt aaaggatttc cggtagacga tggggatgcg
240

ttccattaga tagtaggcgg ggtaacggcc cacctagtct tcgatggata ggggttctga
300

gaggaaggtc cccacattg gaactgagac acggtcctaaa ctcctacggg aggcagcagt
360

gaggaatatt ggtcaatggg cgcaggcctg aaccagccaa gtagcgtgaa ggatgactgc
420

cctatggggt gtaaacttct tttataaagg aataaagtcg ggtatgcata cccgtttgca
480

tgtactttat gaataaggat cggctaactc cgtgccagca gccgcggtaa tacggaggat
540

ccgagcgтта tccggattta ttgggtttta agggagcgta gatggatgтт taagtcagтт
600

gtgaaagттt gcggctcaac cgtaaaattg cagttgatac tggatatттt gagtgcagттt
660

gaggcaggcg gaattcgtgg tgtagcggтg aaatgcttag atatcacgaa gaactccgat
720

tgcgaaggca gcctgctaag ctgcaactga cattgaggct cgaaagtгtg ggtatcaaac
780

aggattagat accctggtag tccacacggт aaacgatgaa tactcgctгt ttgcgatata
840

cagcaagcgг ccaagcgaaa gcgttaagta ttccacctгg ggagtacgcc ggcaacggтg
900

aaactcaaag gaattgacгg gggcccгcac aagcggagga acatгtgгтт taattcgatг
960

atacgcgagg aaccttaccc gggcttaaат tgсagatgaa ttacggтgaa agccгtaagc
1020

cgcaaggcat ctгtgaaaggт gctгcatggт tgтcgтcagc тcгtgccгтg aggtггtcггc
1080

ttaagtгcca taacгagггc aaccттгтт gтcagттact aacaggттcc гctгaggact
1140

ctgacaagac тgccatггta agatгггagg aaggтggгga тgacгтcaaa тcagcagггc
1200

cттtacгтcc gggггctacac acгггттaca atggggгггta cagaggггггcг ctaccacггг
1260

agтggatгcc aatccccaaa acттттттca гттcgгactг gagтттгcaa cccгactcca
1320

cgaagctгga ттcггtagta atггггcatc agccacггггг cггггgaatac гттccccгггг
1380

cttgtacaca cgcgccgtca agccatggga gccgggggta cctgaagtgc gtaaccgcga
1440

ggagcgcctt agggtaaaac tgggtgactgg ggctaagtcg taacaaggta gccgtaccgg
1500

a a g g t g c g g c t g g a a c a c c t c c t t
1524

<210> 27

<211> 1524

<212> DNA

<213> Artificial Sequence

<220>

<223> Bacteroides_vulgatus.GCF_000273295.HJEBINN_03696 16S
ribosomal
RNA

<400> 27

atgaagagtt tgatcctggc tcaggatgaa cgctagctac aggcttaaca catgcaagtc
60

gaggggcagc atgggtcttag cttgctaagg ccgatggcga ccggcgcacg ggtgagtaac
120

acgtatccaa cctgccgtct actcttggac agccttctga aaggaagatt aatacaagat
180

ggcatcatga gtccgcatgt tcacatgatt aaaggatttc cggtagacga tggggatgcg
240

ttccattaga tagtaggcgg ggtaacggcc cacctagtct tcgatggata ggggttctga
300

gaggaaggtc cccacattg gaactgagac acgggtccaaa ctcctacggg aggcagcagt
360

gaggaatatt ggtcaatggg cgagagcctg aaccagccaa gtagcgtgaa ggatgactgc
420

cctatggggt gtaaacttct tttataaagg aataaagtcg ggtatggata cccgtttgca
480

cttgtacaca cgcgccgtca agccatggga gccgggggta cctgaagtgc gtaaccgcga
1440

ggagcgcctt agggtaaaac tgggtgactgg ggctaagtcg taacaaggta gccgtaccgg
1500

a a g g t g c g g c t g g a a c a c c t c c t t
1524

<210> 28

<211> 1054

<212> DNA

<213> Artificial Sequence

<220>

<223> Bacteroides_vulgatus.GCF_000273295.HJEBINN_04056 16S
ribosomal
RNA (partial)

<400> 28

ccgtttgcat gtactttatg aataaggatc ggctaactcc gtgccagcag ccgcggtaat
60

acggaggatc cgagcgttat ccggatttat tgggttttaa gggagcgtag atggatgttt
120

aagtcagttg tgaaagtttg cggctcaacc gtaaaattgc agttgatact ggatatcttg
180

agtgcagttg aggcaggcgg aattcgtggt gtagcgggtga aatgcttaga tatcacgaag
240

aactccgatt gcgaaggcag cctgctaagc tgcaactgac attgaggctc gaaagtgtgg
300

gtatcaaaca ggattagata ccctggtagt ccacacggta aacgatgaat actcgtctgt
360

tgcgatatac agcaagcggc caagcgaaag cgtaagtat tccacctggg gagtacgccg
420

gcaacgggtga aactcaaagg aattgacggg ggcccgcaca agcggaggaa catgtggttt
480

aattcgatga tacgcgagga accttaccg ggcttaaatt gcagatgaat tacggtgaaa
540

gccgtaagcc gcaaggcatc tgtgaagggtg ctgcatgggtt gtcgtcagct cgtgccgtga
600

gggtgtcggct taagtgccat aacgagcgca acccttggtg tcagttacta acaggttctg
660

ctgaggactc tgacaagact gccatcgtaa gatgtgagga aggtggggat gacgtcaaat
720

cagcacggcc cttacgtccg gggctacaca cgtgttacia tgggggggtac agagggccgc
780

taccacgcga gtggatgcc aatccccaaa cctctctcag ttcggactgg agtctgcaac
840

ccgactccac gaagctggat tcgctagtaa tcgcgcatca gccacggcgc ggtgaatacg
900

ttcccgggcc ttgtacacac cgcccgtcaa gccatgggag ccgggggtac ctgaagtgcg
960

taaccgag gagcgcccta gggtaaaact ggtgactggg gctaagtcgt aacaaggtag
1020

c c g t a c c g g a a g g t g c g g c t g g a a c a c c t c c t t t
1054

<210> 29

<211> 1523

<212> DNA

<213> Artificial Sequence

<220>

<223> Bacteroides_vulgatus_SC203.GCA_900066655.JNKMEEPB_01845 16S
ribosomal RNA

<400> 29

taaagagttt gatcctggct caggacgaac gctggcggcg cgcttaacac atgcaagtcg
60

aacggacaca	tccgacggaa	tagcttgcta	ggaagatgga	tgttgtagt	ggcggacggg
120					
tgagtaacac	gtgagcaacc	tacctcagag	tgggggacaa	cagttggaaa	cgactgctaa
180					
taccgcataa	gatggcaggg	tcgcatggcc	tggtcataaa	aggagcaatt	cgctctgaga
240					
tgggctcgcg	tctgattagc	tagttggtga	ggtaacggct	caccaaggca	acgatcagta
300					
gccggactga	gaggttgaac	ggccacattg	ggactgagac	acggcccaga	ctcctacggg
360					
aggcagcagt	ggggaatatt	gcacaatggg	ggaaaccctg	atgcagcgac	gccgcgtgag
420					
ggaagacggt	tttcggattg	taaacctctg	tcttgtggga	cgatagtgac	ggtaccacag
480					
gaggaagcca	tggctaacta	cgtgccagca	gccgcggtaa	tacgtagatg	gcgagcgttg
540					
tccggaatta	ctgggtgtaa	agggagtgtg	ggcgggctgg	taagttgaat	gtgaaacctt
600					
cgggctcaac	ccggagcgtg	cgttcaaaac	tgctggtcct	gagtgaagta	gaggcaggcg
660					
gaattcccgg	tgtagcgggtg	gaatgcgtag	atatcgggag	gaacaccagt	ggcgaaggcg
720					
gcctgctggg	cttttactga	cgctgaggct	cgaaagcatg	ggtagcaaac	aggattagat
780					
accctggtag	tccatgccgt	aaacgatgat	tactaggtgt	ggggggattg	acccctccg
840					
tgccggagtt	aacacaataa	gtaatccacc	tggggagtac	gaccgcaagg	ttgaaactca
900					
aaggaattga	cgggggcccg	cacaagcagt	ggagtatgtg	gtttaattcg	aagcaacgcg
960					

aaaaacctta ccaggtcttg acatccatcg ccaggctaag agattagctg ttccctccgg
1020

ggacgatgag acaggtggtg catggttgtc gtcagctcgt gtcgtgagat gttgggttaa
1080

gtcccgcaac gagcgcaacc cttactatta gttgctacgc aagagcactc taatgggact
1140

gccgttgaca aaacggagga aggtggggat gacgtcaaata catcatgccc cttatgacct
1200

gggctacaca cgtactacaa tggccgttaa cagagagcag cgataccgcg aggtggagcg
1260

aatctagaaa aacggtctca gttcggattg caggctgaaa ctcgcctgca tgaagtcgga
1320

attgctagta atcgcggatc agcatgccgc ggtgaatacg ttcccggggc ttgtacacac
1380

cgcccgtcac accatgagag ccggtaacac ccgaagtcag tagcctaacc gcaaggaggg
1440

cgctgccgaa ggtggggctg gtaattgggg tgaagtcgta acaaggtagc cgtatcggaa
1500

g g t g c g g c t g g a t c a c c t c c t t t
1523

<210> 30

<211> 1524

<212> DNA

<213> Artificial Sequence

<220>

<223> Bacteroides_vulgatus_SC203.GCA_900066655.JNKMEEPB_02609 16S
ribosomal RNA

<400> 30

atgaagagtt tgatcctggc tcaggatgaa cgctagctac aggcttaaca catgcaagtc
60

gaggggcagc atggtcttag cttgctaagg ccgatggcga ccggcgcacg ggtgagtaac
120

acgtatccaa cctgccgtct actcttggac agccttctga aaggaagatt aatacaagat
180

ggcatcatga gtccgcatgt tcacatgatt aaaggatttc cggtagacga tggggatgcg
240

ttccattaga tagtaggcgg ggtaacggcc cacctagtct tcgatggata ggggttctga
300

gaggaaggtc ccccacattg gaactgagac acggtccaaa ctcctacggg aggcagcagt
360

gaggaatatt ggtcaatggg cgagagcctg aaccagccaa gtagcgtgaa ggatgactgc
420

cctatggggtt gtaaacttct ttataaagg aataaagtcg ggtatgtata cccgtttgca
480

tgtactttat gaataaggat cggctaactc cgtgccagca gccgcggtaa tacggaggat
540

ccgagcggtta tccggattta ttgggttttaa agggagcgta gatggatggt taagtcagtt
600

gtgaaagttt gcggctcaac cgtaaaattg cagttgatac tggatatctt gagtgcagtt
660

gaggcaggcg gaattcgtgg tgtagcggtg aaatgcttag atatcacgaa gaactccgat
720

tgcgaaggca gcctgctaag ctgcaactga cattgaggct cgaaagtgtg ggtatcaaac
780

aggattagat accctggtag tccacacggt aaacgatgaa tactcgctgt ttgcgatata
840

cggcaagcgg ccaagcgaaa gcgttaagta ttccacctgg ggagtacgcc ggcaacggtg
900

aaactcaaag gaattgacgg gggcccgcac aagcggagga acatgtgggt taattcgatg
960

atacgcgagg aaccttacct gggcttaaat tgcagatgaa ttacggtgaa agccgtaagc
1020

cgcaaggcat ctgtgaaggt gctgcatggt tgtcgtcagc tcgtgccgtg aggtgtcggc
1080

ttaagtgcc aacgagcgc aacccttggt gtcagttact aacaggtttt gctgaggact
1140

ctgacaagac tgccatcgta agatgtgagg aaggtgggga tgacgtcaaa tcagcacggc
1200

ccttacgtcc ggggctacac acgtgttaca atgggggggta cagagggccg ctaccacgcg
1260

agtggatgcc aatcccca aaacctctctca gttcggactg gagtctgcaa cccgactcca
1320

cgaagctgga ttcgctagta atcgcgcata agccacggcg cgggtgaatac gttcccgggc
1380

cttgtacaca ccgcccgtca agccatggga gccgggggta cctgaagtgc gtaaccgcga
1440

ggagcgccct agggtaaaac tgggtgactgg ggctaagtcg taacaaggta gccgtaccgg
1500

a a g g t g c g g c t g g a a c a c c t c c t t
1524

<210> 31

<211> 1528

<212> DNA

<213> Artificial Sequence

<220>

<223> Bifidobacterium_dentium.GCF_000146775.BPHFADFC_02149 16S
ribosomal RNA

<400> 31

tatggagggt tcgattctgg ctcaggatga acgctggcgg cgtgcttaac acatgcaagt
60

cgaacgggat cccggggggt cgctcccggg tgagagtggc gaacgggtga gtaatgcgtg
120

accgacctgc cccatacacc ggaatagctc ctggaaacgg gtggtaatgc cggatgctcc
180

ggttggatgc atgtccttcc gggaaagatt ccatcggtat gggatgggggt cgcgtcctat
240

cagcttgatg gcggggtaac ggcccacat ggcttcgacg ggtagccggc ctgagagggc
300

gaccggccac attgggactg agatacggcc cagactccta cgggaggcag cagtggggaa
360

tattgcacaa tgggcgcaag cctgatgcag cgacgccgcg tgcgggatgg aggccttcgg
420

gttgtaaacc gcttttgatc gggagcaagc ccttcgggggt gagtgtacct ttcgaataag
480

caccggctaa ctacgtgcca gcagccgcg taatacgtag ggtgcaagcg ttatccggaa
540

ttattgggcg taaagggtc gtaggcggtt cgtcgcgtcc ggtgtgaaag cccatcgctt
600

aacggtgggt ctgcgccggg tacgggcggg ctggagtgcg gtaggggaga ctggaattcc
660

cggtgtaacg gtggaatgtg tagatatcgg gaagaacacc aatggcgaag gcaggctctt
720

gggccgtcac tgacgctgag gagcgaaagc gtggggagcg aacaggatta gataccctgg
780

tagtccacgc cgtaaacggt ggatgctgga tgtggggccc gttccacggg ttccgtgtcg
840

gagctaacgc gttaagcatc ccgcctgggg agtacggccg caaggctaaa actcaaagaa
900

attgacgggg gcccgcacaa gcggcggagc atgcggatta attcgatgca acgcgaagaa
960

ccttacctgg gcttgacatg ttcccgcag ccgtagagat atggcctccc ttcggggcgg
1020

gttcacaggt ggtgcatggt cgtcgtcagc tcgtgtcgtg agatggtggg ttaagtcccg
1080

caacgagcgc aaccctcgcc ctgtgttgcc agcacgtcat ggtgggaact cacgggggac
1140

cgccgggggtc aactcggagg aaggtgggga tgacgtcaga tcatcatgcc ccttacgtcc
1200

agggcttcac gcatgctaca atggccggta cagcgggatg cgacatggcg acatggagcg
1260

gatccctgaa aaccggtctc agttcggatt ggagtctgca acccgactcc atgaaggcgg
1320

agtcgctagt aatcgcggat cagcaacgcc gcggtgaatg cgttcccggg ccttgtaacac
1380

accgcccgtc aagtcatgaa agtgggcagc acccgaagcc ggtggcctaa ccccttgcg
1440

gatggagccg tctaagggtga ggctcgtgat tgggactaag tcgtaacaag gtagccgtac
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 32

<211> 1548

<212> DNA

<213> Artificial Sequence

<220>

<223> Bilophila_sp_4_1_30.GCF_000224655.HINPIMKF_01376 16S
ribosomal
RNA

<400> 32

ctggagagtt tgattctggc tcagattgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgtgaaa gtccttcggg atgagtaaag tggcgcacgg gtgagtaacg cgtggataat
120

ctacccttaa gatggggata acggctggaa acggtcgcta ataccgaata cgctcccgat
180

tttatcgttg gggggaaaga tggcctctgc ttgcaagcta tcgcttaagg atgagtccgc
240

gtcccattag ctagttggcg gggtaacggc ccaccaaggc aacgatgggt agccgggtctg
300

agaggatgac cggccacact ggaactggaa cacgggtccag actcctacgg gaggcagcag
360

tgggggaatat tgcgcaatgg gcgaaagcct gacgcagcga cgccgcgtga gggatgaagg
420

ttctcggatc gtaaacctct gtcagggggg aagaaacccc ctcgtgtgaa taatgcgagg
480

gcttgacggg acccccaaag gaagcaccgg ctaactccgt gccagcagcc gcggtaatac
540

ggaggggtgca agcgттаатс ggaatcactg ggcgtaaagc gcacgtaggc ggcttggtaa
600

gtcaggggtg aaatcccaca gcccaactgt ggaactgcct ttgatactgc caggcttgag
660

taccggagag ggtggcggaa ttccagggtg aggagtgaaa tccgtagata tctggaggaa
720

caccgggtggc gaaggcggcc acctggacgg taactgacgc tgagggtgcga aagcgtgggt
780

agcaaacagg attagatacc ctggtagtcc acgctgtaaa cgatgggtgc tgggtgctgg
840

gatgtatgtc tcggtgccgt agctaacgcg ataagcacc cgcctgggga gtacggtcgc
900

aaggctgaaa ctcaaagaaa ttgacggggg cccgcacaag cgggtggagta tgtggtttaa
960

ttcgatgcaa cgcgaagaac cttaccagg cttgacatct agggaaccct tcggaaatga
1020

aggggtgccc ttcggggagc cctaagacag gtgctgcatg gctgtcgtca gctcgtgccg
 1080

tgagggtgttg ggttaagtcc cgcaacgagc gcaaccccta tcttcagttg ccagcaggta
 1140

aggctgggca ctctggagag accgccccgg tcaacgggga ggaagggtgg gacgacgtca
 1200

agtcatcatg gcccttacgc ctgggggctac acacgtacta caatggcgcg cacaaagggt
 1260

agcgagaccg cgagggtggag ccaatcccaa aaaacgcgtc ccagtccgga ttggagtctg
 1320

caactcgact ccatgaagtc ggaatcgcta gtaattcgag atcagcatgc tcgggtgaat
 1380

gcgttcccgg gccttgtaca caccgcccgt cacaccacga aagtcggttt taccgaagc
 1440

cggtgagcta actcgcaaga ggagcagccg tctacggtag ggccgatgat tgggggtgaag
 1500

tcgtaacaag gtagccgtag gggaacctgc ggctggatca cctccttt
 1548

<210> 33
 <211> 1548
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Bilophila_wadsworthia.GCF_000185705.BLECPLCK_00498 16S
 ribosomal
 RNA

<400> 33
 ctggagagtt tgattctggc tcagattgaa cgctggcggc gtgcttaaca catgcaagtc
 60

gaacgtgaaa gtccttcggg gcgagtaaag tggcgcacgg gtgagtaacg cgtggataat
 120

ctacccttaa gatggggata acggctggaa acggtcgcta ataccgaata cgctcccgat
180

tttatcattg gggggaaaga tggcctctgc ttgcaagcta tcgcttaagg atgagtccgc
240

gtcccattag ctagttggcg gggtaacggc ccaccaaggc gacgatgggt agccgggtctg
300

agaggatgac cggccacact ggaactggaa cacgggtccag actcctacgg gaggcagcag
360

tgggggaatat tgcgcaatgg gcgaaagcct gacgcagcga cgccgcgtga gggatgaagg
420

ttctcggatc gtaaacctct gtcagggggg aagaaacccc ctcgtgtgaa taatgcgagg
480

gcttgacggt acccccaaag gaagcaccgg ctaactccgt gccagcagcc gcggtaatac
540

ggaggggtgca agcgттаатс ggaatcactg ggcgtaaagc gcacgtaggc ggcttggtaa
600

gtcaggggtg aaatcccaca gcccaactgt ggaactgcct ttgatactgc caggcttgag
660

taccggagag ggtggcggaa ttccagggtgt aggagtgaaa tccgtagata tctggaggaa
720

caccgggtggc gaaggcggcc acctggacgg taactgacgc tgagggtgcga aagcgtgggt
780

agcaaacagg attagatacc ctggtagtcc acgctgtaaa cgatgggtgc tgggtgctgg
840

gatgtatgtc tcggtgccgt agctaacgcg ataagcaccc cgcctgggga gtacggtcgc
900

aaggctgaaa ctcaaagaaa ttgacggggg cccgcacaag cgggtggagta tgtgggttaa
960

ttcgatgcaa cgcgaagaac cttaccagg cttgacatct agggaaccct tcggaaatga
1020

aggggtgccc ttcggggagc cctaagacag gtgctgcatg gctgtcgtca gctcgtgccg
1080

tgagggtgttg ggttaagtcc cgcaacgagc gcaaccccta tcttcagttg ccagcaggta
1140

aggctgggca ctctggagag accgccccgg tcaacgggga ggaagggtgg gacgacgtca
1200

agtcatcatg gcccttacgc ctgggggctac acacgtacta caatggcgcg cacaaaggg
1260

agcgagaccg cgagggtggag ccaatcccaa aaaacgcgtc ccagtccgga ttggagtctg
1320

caactcgact ccatgaagtc ggaatcgcta gtaattcgag atcagcatgc tcgggtgaat
1380

gcgttcccgg gccttgtaca caccgcccgt cacaccacga aagtcggttt taccgaagc
1440

cggtgagcta actcgcaaga ggagcagccg tctacggtag ggccgatgat tgggggtgaag
1500

tcgtaacaag gtagccgtag gggaacctgc ggctggatca cctccttt
1548

<210> 34
<211> 1548
<212> DNA
<213> Artificial Sequence

<220>
<223> Bilophila_wadsworthia.GCF_000185705.BLECPLCK_01077 16S
ribosomal
RNA

<400> 34
ctggagagtt tgattctggc tcagattgaa cgctggcggc gtgcttaaca catgcaagtc
60
gaacgtgaaa gtccttcggg gcgagtaaag tggcgcacgg gtgagtaacg cgtggataat
120

ctacccttaa gatggggata acggctggaa acggtcgcta ataccgaata cgctcccgat
180

tttatcgttg gggggaaaga tggcctctgc ttgcaagcta tcgcttaagg atgagtccgc
240

gtcccattag ctagttggcg gggtaacggc ccaccaaggc gacgatgggt agccggtctg
300

agaggatgac cggccacact ggaactggaa cacgggtccag actcctacgg gaggcagcag
360

tgggggaatat tgcgcaatgg gcgaaagcct gacgcagcga cgccgcgtga gggatgaagg
420

ttctcggatc gtaaacctct gtcagggggg aagaaacccc ctcgtgtgaa taatgcgagg
480

gcttgacggt acccccaaag gaagcaccgg ctaactccgt gccagcagcc gcggtaatac
540

ggaggggtgca agcgttaatc ggaatcactg ggcgtaaagc gcacgtaggc ggcttggtaa
600

gtcaggggtg aaatcccaca gcccaactgt ggaactgcct ttgatactgc caggcttgag
660

taccggagag ggtggcggaa ttccagggtg aggagtgaaa tccgtagata tctggaggaa
720

caccggtggc gaaggcggcc acctggacgg taactgacgc tgagggtgcga aagcgtgggt
780

agcaaacagg attagatacc ctggtagtcc acgctgtaaa cgatgggtgc tgggtgctgg
840

gatgtatgtc tcggtgccgt agctaacgcg ataagcacc cgcctgggga gtacggtcgc
900

aaggctgaaa ctcaaagaaa ttgacggggg cccgcacaag cgggtggagta tgtggtttaa
960

ttcgatgcaa cgcgaagaac cttaccagg cttgacatct agggaaccct tcggaaatga
1020

aggggtgccc ttcggggagc cctaagacag gtgctgcatg gctgtcgtca gctcgtgccg
 1080

tgagggtgttg ggttaagtcc cgcaacgagc gcaacccta tcttcagttg ccagcaggta
 1140

aggctgggca ctctggagag accgccccgg tcaacgggga ggaagggtgg gacgacgtca
 1200

agtcatcatg gcccttacgc ctggggctac acacgtacta caatggcgcg cacaaagggt
 1260

agcgagaccg cgagggtggag ccaatcccaa aaaacgcgtc ccagtccgga ttggagtctg
 1320

caactcgact ccatgaagtc ggaatcgcta gtaattcgag atcagcatgc tcgggtgaat
 1380

gcgttcccgg gccttgtaca caccgcccgt cacaccacga aagtcggttt taccgaagc
 1440

cggtgagcta actcgcaaga ggagcagccg tctacggtag ggccgatgat tgggggtgaag
 1500

tcgtaacaag gtagccgtag gggaacctgc ggctggatca cctccttt
 1548

<210> 35
 <211> 1548
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Bilophila_wadsworthia.GCF_000185705.BLECPLCK_01159 16S
 ribosomal
 RNA

<400> 35
 ctggagagtt tgattctggc tcagattgaa cgctggcggc gtgcttaaca catgcaagtc
 60

gaacgtgaaa gtccttcggg gcgagtaaag tggcgcacgg gtgagtaacg cgtggataat
 120

ctacccttaa gatggggata acggctggaa acggtcgcta ataccgaata cgctcccgat
180

tttatcattg gggggaaaga tggcctctgc ttgcaagcta tcgcttaagg atgagtccgc
240

gtcccattag ctagttggcg gggtaacggc ccaccaaggc gacgatgggt agccggtctg
300

agaggatgac cggccacact ggaactggaa cacggtccag actcctacgg gaggcagcag
360

tgggggaatat tgcgcaatgg gcgaaagcct gacgcagcga cgccgcgtga gggatgaagg
420

ttctcggatc gtaaacctct gtcagggggg aagaaacccc ctcgtgtgaa taatgcgagg
480

gcttgacggt acccccaaag gaagcaccgg ctaactccgt gccagcagcc gcggtaatac
540

ggaggggtgca agcgттаатс ggaatcactg ggcgtaaagc gcacgtaggc ggcttggtaa
600

gtcaggggtg aaatcccaca gcccaactgt ggaactgcct ttgatactgc caggcttgag
660

taccggagag ggtggcggaa ttccagggtgt aggagtgaaa tccgtagata tctggaggaa
720

caccggtggc gaaggcggcc acctggacgg taactgacgc tgagggtgcga aagcgtgggt
780

agcaaacagg attagatacc ctggtagtcc acgctgtaaa cgatgggtgc tgggtgctgg
840

gatgtatgtc tcggtgccgt agctaacgcg ataagcacc cgcctgggga gtacggtcgc
900

aaggctgaaa ctcaaagaaa ttgacggggg ccgcacaag cgggtggagta tgtgggttaa
960

ttcgatgcaa cgcgaagaac cttaccagg cttgacatct agggaaccct tcggaaatga
1020

aggggtgccc ttcggggagc cctaagacag gtgctgcatg gctgtcgtca gctcgtgccg
 1080

tgagggtgttg ggttaagtcc cgcaacgagc gcaaccccta tcttcagttg ccagcaggta
 1140

aggctgggca ctctggagag accgccccgg tcaacgggga ggaagggtgg gacgacgtca
 1200

agtcatcatg gcccttacgc ctgggggctac acacgtacta caatggcgcg cacaaagggt
 1260

agcgagaccg cgagggtggag ccaatcccaa aaaacgcgtc ccagtccgga ttggagtctg
 1320

caactcgact ccatgaagtc ggaatcgcta gtaattcgag atcagcatgc tcgggtgaat
 1380

gcgttcccgg gccttgtaca caccgcccgt cacaccacga aagtcggttt taccgaagc
 1440

cggtgagcta actcgcaaga ggagcagccg tctacggtag ggccgatgat tgggggtgaag
 1500

tcgtaacaag gtagccgtag gggaacctgc ggctggatca cctccttt
 1548

<210> 36
 <211> 1548
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Bilophila_wadsworthia.GCF_000185705.BLECPLCK_02201 16S
 ribosomal
 RNA

<400> 36
 ctggagagtt tgattctggc tcagattgaa cgctggcggc gtgcttaaca catgcaagtc
 60

gaacgtgaaa gtccttcggg gcgagtaaag tggcgcacgg gtgagtaacg cgtggataat
 120

ctacccttaa gatggggata acggctggaa acggtcgcta ataccgaata cgctcccgat
180

tttatcgttg gggggaaaga tggcctctgc ttgcaagcta tcgcttaagg atgagtccgc
240

gtcccattag ctagttggcg gggtaacggc ccaccaaggc gacgatgggt agccggtctg
300

agaggatgac cggccacact ggaactggaa cacgggtccag actcctacgg gaggcagcag
360

tgggggaatat tgcgcaatgg gcgaaagcct gacgcagcga cgccgcgtga gggatgaagg
420

ttctcggatc gtaaacctct gtcagggggg aagaaacccc ctcgtgtgaa taatgcgagg
480

gcttgacggt acccccaaag gaagcaccgg ctaactccgt gccagcagcc gcggtaatac
540

ggaggggtgca agcgттаатс ggaatcactg ggcgtaaagc gcacgtaggc ggcttggtaa
600

gtcaggggtg aaatcccaca gcccaactgt ggaactgcct ttgatactgc caggcttgag
660

taccggagag ggtggcggaa ttccaggtgt aggagtgaaa tccgtagata tctggaggaa
720

caccggtggc gaaggcggcc acctggacgg taactgacgc tgagggtgcga aagcgtgggt
780

agcaaacagg attagatacc ctggtagtcc acgctgtaaa cgatgggtgc tgggtgctgg
840

gatgtatgtc tcggtgccgt agctaacgcg ataagcacc cgcctgggga gtacggtcgc
900

aaggctgaaa ctcaaagaaa ttgacggggg cccgcacaag cgggtggagta tgtggtttaa
960

ttcgatgcaa cgcgaagaac cttaccagg cttgacatct agggaaccct tcggaaatga
1020

aggggtgccc ttcggggagc cctaagacag gtgctgcatg gctgtcgtca gctcgtgccg
 1080

tgaggtgttg ggttaagtcc cgcaacgagc gcaacccta tcttcagttg ccagcaggta
 1140

aggctgggca ctctggagag accgccccgg tcaacgggga ggaagggtgg gacgacgtca
 1200

agtcatcatg gcccttacgc ctggggctac acacgtacta caatggcgcg cacaaagggt
 1260

agcgagaccg cgaggtggag ccaatcccaa aaaacgcgtc ccagtccgga ttggagtctg
 1320

caactcgact ccatgaagtc ggaatcgcta gtaattcgag atcagcatgc tcgggtgaat
 1380

gcgttcccgg gccttgtaca caccgcccgt cacaccacga aagtcggttt taccgaagc
 1440

cggtagagcta actcgcaaga ggagcagccg tctacggtag ggccgatgat tgggggtgaag
 1500

tcgtaacaag gtagccgtag gggaacctgc ggctggatca cctccttt
 1548

<210> 37
 <211> 1526
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Blautia_SC109.SPC10877.OHAPKBMM_03334 16S ribosomal RNA

<400> 37
 atgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
 60

agcgaagcaa tttaagtga gttttcggat ggatcctaga ttgactgagc ggcggacggg
 120

tgagtaacgc gtggataacc tgcctcacac aggggggataa cagttagaaa tgactgctaa
 180

taccgcataa gcgcacggta ccgcatggta cagtgtgaaa aactccggtg gtgtgagatg
240

gatccgcgtc tgattaggta gttggtgagg taacggccca ccaagccgac gatcagtagc
300

cgacctgaga gggtgaccgg ccacattggg actgagacac ggcccaaact cctacgggag
360

gcagcagtgg ggaatattgc acaatgggcg aaagcctgat gcagcaacgc cgcgtgagtg
420

aagaagtatc tcggtatgta aagctctatc agcaggggaag aaaatgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggtaata cgtagggggc aagcgttata
540

cggatttact gggtgtaaag ggagcgcaga cggcactgca agtctgaagt gaaagcccgg
600

ggctcaacc cgggactgct ttggaaactg tagagctaga gtgctggaga ggcaagcgga
660

attcctagt tagcggtgaa atgcgtagat attaggaaga acaccagtgg cgaaggcggc
720

ttgctggaca gtaactgacg ttcaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgaata ctaggtgttg gtgggcaaag cccatcgggtg
840

ccgccgcaaa cgcaataagt attccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg gggacccgca caagcgggtg agcatgtggt ttaattcgaa gcaacgcgaa
960

gaaccttacc aagtcttgac atcgtgatga ccggaactta accgttcctt cccttcgggg
1020

catcatagac aggtgggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaaccct tatcctcagt agccagcagt aagatgggca ctctggggag
1140

actgccaggg ataacctgga ggaaggtggg gatgacgtca aatcatcatg ccccttatga
1200

tttgggctac acacgtgcta caatggcgta aacaaaggga agcaagaggg tgacctggag
1260

caaatcccaa aaataacgtc ccagttcgga ctgtagtctg caacccgact acacgaagct
1320

ggaatcgcta gtaatcgag atcagaatgc tgcggtgaat acgttcccgg gtcttgtaca
1380

caccgcccgt cacaccatgg gagtcagcaa cgcccgaagt cagtgactca accgcaagga
1440

gagagctgcc gaaggcgggg caggtaactg ggggtgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t c c t t t
1526

<210> 38

<211> 1526

<212> DNA

<213> Artificial Sequence

<220>

<223> Blautia_SC109.SPC10877.OHAPKBMM_03923 16S ribosomal RNA

<400> 38

atgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

agcgaagcaa tttaagtgaa gttttcggat ggatcttaga ttgactgagc ggcggacggg
120

tgagtaacgc gtggataacc tgcctcacac aggggggataa cagttagaaa tgactgctaa
180

taccgcataa gcgcacggta ccgcatggta cagtgtgaaa aactccggtg gtgtgagatg
240

gatccgcgtc tgattaggta gttggtgagg taacggccca ccaagccgac gatcagtagc
300

cgacctgaga gggtgaccgg ccacattggg actgagacac ggcccaaact cctacgggag
360

gcagcagtgg ggaatattgc acaatgggcg aaagcctgat gcagcaacgc cgcgtgagtg
420

aagaagtatc tcggtatgta aagctctatc agcagggaag aaaatgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggtaata cgtagggggc aagcgttata
540

cggatttact gggtgtaaag ggagcgcaga cggcactgca agtctgaagt gaaagcccgg
600

ggctcaaccc cgggactgct ttggaaactg tagagctaga gtgctggaga ggcaagcgga
660

attcctagtg tagcggtgaa atgcgtagat attaggaaga acaccagtgg cgaaggcggc
720

ttgctggaca gtaactgacg ttcaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgaata ctaggtgttg gtgggcaaag cccatcgggtg
840

ccgccgcaaa cgcaataagt attccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg gggacccgca caagcgggtg agcatgtggt ttaattcgaa gcaacgcgaa
960

gaaccttacc aagtcttgac atcgtgatga ccggaactta accgttcctt cccttcgggg
1020

catcatagac aggtgggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaaccct tatcctcagt agccagcagt aagatgggca ctctgtggag
1140

actgccaggg ataacctgga ggaaggtggg gatgacgtca aatcatcatg ccccttatga
1200

tttgggctac acacgtgcta caatggcgta aacaaagggg agcaagaggg tgacctggag
1260

caaatcccaa aaataacgtc ccagttcgga ctgtagtctg caacccgact acacgaagct
1320

ggaatcgcta gtaatcgag atcagaatgc tgcggtgaat acgttcccgg gtcttgtaca
1380

caccgcccgt cacaccatgg gagtcagcaa cgcccgaagt cagtgactca accgcaagga
1440

gagagctgcc gaaggcgggg caggtaactg ggggtgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t c c t t t
1526

<210> 39

<211> 1531

<212> DNA

<213> Artificial Sequence

<220>

<223> Clostridiaceae_bacterium_JC118.GCF_000313565.GNHMFION_03462
16S

ribosomal RNA

<400> 39

atggagagtt tgatcctggc tcaggatgaa cgctggcggc atgcctaata catgcaagtc
60

gaacgaagtg aagatagctt gctattggaa cttagtggcg aacgggtgag taacacgtag
120

ataacctgcc tgtatgaccg ggataacagt tggaacgac tgctaatacc ggataggcag
180

agaggaggca tctcttctct gttaaagttg ggacacaacg caaacagatg gatctgcggt
240

gcattagcta	gttggtgagg	taacggccca	ccaaggcgat	gatgcatagc	cggcctgaga
300					
gggcgaacgg	ccacattggg	actgagacac	ggcccaaact	cctacgggag	gcagcagtag
360					
ggaattttcg	gcaatggggg	aaaccctgac	cgagcaatgc	cgcgtagagt	aagacggcct
420					
tcgggttgta	aagctctgtt	gtaagggaag	aacggcatag	agagggaatg	ctctatgagt
480					
gacggtacct	taccagaaag	ccacggctaa	ctacgtgcca	gcagccgcgg	taatacgtag
540					
gtggcaagcg	ttatccggaa	ttattgggcg	taaagggtgc	gtaggcggcg	agataagtct
600					
gaggtaaaag	cccgtggctc	aaccacggta	agccttggaa	actgtctggc	tggagtgcag
660					
gagaggacaa	tggaattcca	tgtgtagcgg	taaaatgcgt	agatatatgg	aggaacacca
720					
gtggcgaagg	cggttgtctg	gcctgtaact	gacgctgaag	cacgaaagcg	tggggagcaa
780					
ataggattag	ataccctagt	agtccacgcc	gtaaacgatg	agaactaagt	gttggggaaa
840					
ctcagtgctg	cagttaacgc	aataagttct	ccgcctgggg	agtatgcacg	caagtgtgaa
900					
actcaaagga	attgacgggg	gcccgcacaa	gcggtggagt	atgtggttta	attcgacgca
960					
acgcgaagaa	ccttaccagg	ccttgacatg	gtatcaaagg	ccctagagat	agggagatag
1020					
ttatggtaca	cacaggtggg	gcatggttgt	cgtcagctcg	tgtcgtgaga	tgttgggtta
1080					
agtcccgcaa	cgagcgcaac	ccttgtttct	agttaccaac	agtaagatgg	ggactctaga
1140					

gagactgccg gtgacaaacc ggaggaaggt ggggatgacg tcaaatacatc atgcccctta
1200

tggcctgggc tacacacgta ctacaatggc gtctacaaag agcagcgagc aggtgactgt
1260

gagcgaatct cataaaggac gtctcagttc ggattgaagt ctgcaactcg acttcatgaa
1320

gtcgggaatcg ctagtaatcg cggatcagca tgccgcggtg aatacgttct cgggccttgt
1380

acacaccgcc cgtcaaacca tgggagttga taatacccga agccggtggc ctaaccattt
1440

atggagggag ccgtcgaagg taggatcgat gactgggggtt aagtcgtaac aaggtatccc
1500

t a c g g g a a c g t g g g g a t g g a t c a c c t c c t t t
1531

<210> 40

<211> 1531

<212> DNA

<213> Artificial Sequence

<220>

<223> Clostridium_aldenense_SC114.SPC11276.OLKKOKAM_04952 16S
ribosomal
RNA

<400> 40

tttgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcctaaca catgcaagtc
60

gaacgaagcg attaggatga agtttttcgga tggattcctg gttgactgag tggcggacgg
120

gtgagtaacg cgtggataac ctgcctcaca ctggggggata acagttagaa atggctgcta
180

ataccgcata agcgcacagt accgcatggt acggtgtgaa aaaccacaggt ggtgtgagat
240

ggatccgcgt ctgattagcc agttggcggg gtaacggccc accaaagcga cgatcagtag
300

ccgacctgag aggggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggc ggaagcctga tgcagcgacg ccgcgtgagt
420

gaagaagtat ctcggtatgt aaagctctat cagcaggga gaaaatgacg gtacctgact
480

aagaagcccc ggctaactac gtgccagcag ccgcggtaat acgtaggggg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgtag acggcgacgc aagtctggag tgaaagcccc
600

gggccaacc ccgggactgc tttggaaact gtgctgctgg agtgcaggag aggtaagtgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac tgtaactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat gctagggtgtc ggggggcaaa gcccttcggt
840

gccgccgcta acgcaataag cattccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac caagtcttga catccccctg accggcgcggt aacgggtgccc ttccttcggg
1020

acagggggaga cagggtggtgc atgggttgctg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ttatccttag tagccagcac gtcgtggtgg gcactctagg
1140

gagactgcc a gggataacct ggaggaaggt ggggatgacg tcaaatacat atgcccctta
1200

tgatttgggc tacacacgtg ctacaatggc gtaaacaag ggaggcgacc ctgcgaaggt
1260

aagcaaattc caaaaataac gtcccagttc ggactgtagt ctgcaaccgc actacacgaa
1320

gctggaatcg ctagtaatcg cggatcagaa tgccgcggtg aatacgttcc cgggtcttgt
1380

acacaccgcc cgtcacacca tgggagtcag caacgcccga agtcagtgac ccaaccttaa
1440

caggagggag ctgccgaagg cggggcaggt aactggggtg aagtcgtaac aaggtagccg
1500

t a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1531

<210> 41

<211> 1528

<212> DNA

<213> Artificial Sequence

<220>

<223> Clostridium_bolteae.GCF_000154365.IEEMCAGI_02026 16S
ribosomal
RNA

<400> 41

atgagagttt gatcctggct caggatgaac gctggcggcg tgcctaacac atgcaagtcg
60

aacgaagcaa ttgaaggaag ttttcggatg gaattcgatt gactgagtgg cggacgggtg
120

agtaacgcgt ggataacctg cctcacactg ggggataaca gttagaaatg actgctaata
180

ccgcataagc gcacagtacc gcatggtaca gtgtgaaaaa ctccggtggg gtgagatgga
240

tccgcgtctg attagccagt tggcggggta acggcccacc aaagcgacga tcagtagccg
300

acctgagagg gtgaccggcc acattgggac tgagacacgg cccaaactcc tacgggaggg
360

agcagtgggg aatattgcac aatgggcgaa agcctgatgc agcgacgccg cgtgagtgaa
420

gaagtatttc ggtatgtaaa gctctatcag cagggaagaa aatgacggta cctgactaag
480

aagccccggc taactacgtg ccagcagccg cggtaatcag tagggggcaa gcgttatccg
540

gatttactgg gtgtaaaggg agcgtagacg gcgaagcaag tctgaagtga aaaccaggg
600

ctcaaccctg ggactgcttt ggaaactggt ttgctagagt gtcggagagg taagtggaat
660

tcctagtgtg gcggtgaaat gcgtagatat taggaggaac accagtggcg aaggcggctt
720

actggacgat aactgacggt gaggctcgaa agcgtgggga gcaaacagga ttagataccc
780

tggtagtcca cgccgtaaac gatgaatgct aggtgttggg gggcaaagcc cttcggtgcc
840

gtcgcaaacg cagtaagcat tccacctggg gagtacgttc gcaagaatga aactcaaagg
900

aattgacggg gacccgcaca agcgggtggag catgtggttt aattcgaagc aacgcgaaga
960

accttaccaa gtcttgacat cctcttgacc ggcgtgtaac ggcgccttcc cttcggggca
1020

agagagacag gtggtgcatg gttgtcgtca gctcgtgtcg tgagatgttg ggttaagtcc
1080

cgcaacgagc gcaaccctta tccttagtag ccagcaggta aagctgggca ctctagggag
1140

actgccaggg ataacctgga ggaaggtggg gatgacgtca aatcatcatg ccccttatga
1200

tttgggctac acacgtgcta caatggcgta aacaaaggga agcaagacag tgatgtggag
1260

caaatcccaa aaataacgtc ccagttcgga ctgtagtctg caacccgact acacgaagct
1320

ggaatcgcta gtaatcgcgga atcagaatgt cgcggtgaat acgttcccgg gtcttgtaca
1380

caccgcccgt cacaccatgg gagtcagcaa cgcccgaagt cagtgacca actcgcaaga
1440

gagggagctg ccgaaggcgg ggcaggtaac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 42

<211> 1528

<212> DNA

<213> Artificial Sequence

<220>

<223> Clostridium_hathewayi.GCF_000371445.MHGGNMMN_02421 16S
ribosomal
RNA

<400> 42

atgagagttc gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

agcgaagcgg tttcaatgaa gttttcggat ggaattgaaa ttgacttagc ggcggacggg
120

tgagtaacgc gtgggtaacc tgccttacac tgggggataa cagttagaaa tgactgctaa
180

taccgcataa gcgcacaggg ccgcatggtc tgggtgtgaaa aactccggtg gtgtaagatg
240

gacccgcgtc tgattaggta gttggtggg taacggccca ccaagccgac gatcagtagc
300

cgacctgaga gggtgaccgg ccacattggg actgagacac ggcccaaact cctacgggag
360

gcagcagtgg ggaatattgg acaatgggcg aaagcctgat ccagcgacgc cgcgtgagtg
420

aagaagtatt tcggtatgta aagctctatc agcagggaag aaaatgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggtaata cgtagggggc aagcgttata
540

cggatttact gggtgtaaag ggagcgtaga cggttaagca agtctgaagt gaaagcccgg
600

ggctcaaccc cgggtactgct ttggaaactg tttgacttga gtgcaggaga ggtaagtgga
660

attcctagtg tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcggc
720

ttactggact gtaactgacg ttgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgaata ctaggtgtcg ggggacaacg tccttcggtg
840

ccgccgctaa cgcaataagt attccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg gggacccgca caagcggtagg agcatgtggt ttaattcgaa gcaacgcgaa
960

gaaccttacc aagtcttgac atcccattga aaacacttta accggtgtcc ctcttcggag
1020

caatggagac aggtgggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaaccct tatccttagt agccagcaca tgatgggtggg cactctgggg
1140

agactgccag ggataacctg gaggaaggtg gggatgacgt caaatcatca tgccccttat
1200

gatttgggct acacacgtgc tacaatggcg taaacaaagg gaagcaaagg agcgatctgg
1260

agcaaacccc aaaaataacg tctcagttcg gattgcaggc tgcaactcgc ctgcatgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcgggtga atacgttccc ggggtcttgta
1380

cacaccgccc gtcacaccat gggagttggt aacgcccga gtcagtgacc caaccgcaag
1440

gagggagctg ccgaaggcgg gactgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 43

<211> 927

<212> DNA

<213> Artificial Sequence

<220>

<223> Clostridium_hathewayi.GCF_000371445.MHGGNMMN_05914 16S
ribosomal
RNA (partial)

<400> 43

atgagagttc gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

agcgaagcgg tttcaatgaa gttttcggat ggatttgaaa ttgacttagc ggcggacggg
120

tgagtaacgc gtgggtaacc tgccttacac tgggggataa cagttagaaa tgactgctaa
180

taccgcataa gcgcacaggg ccgcatggtc tgggtgtgaaa aactccgggtg gtgtaagatg
240

gacccgcgtc tgattaggta gttggtggg taacggcca ccaagccgac gatcagtagc
300

cgacctgaga gggtgaccgg ccacattggg actgagacac ggcccaaact cctacgggag
360

gcagcagtgg ggaatattgg acaatgggcg aaagcctgat ccagcgacgc cgcgtgagtg
420

aagaagtatt tcggtatgta aagctctatc agcagggaag aaaatgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggtaata cgtagggggc aagcgttata
540

cggatttact gggtgtaaag ggagcgtaga cggttaagca agtctgaagt gaaagcccgg
600

ggctcaaccc cgggtactgct ttggaaactg tttgacttga gtgcaggaga ggtaagtgga
660

attcctagtg tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcggc
720

ttactggact gtaactgacg ttgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgaata ctaggtgtcg ggggacaaag tccttcggtg
840

ccgccgctaa cgcaataagt attccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

g g a a t t g a c g g g g a c c c g c a c a a g c g g
927

<210> 44

<211> 1548

<212> DNA

<213> Artificial Sequence

<220>

<223> Clostridium_leptum.GCF_000154345.EBFLKIBH_01280 16S ribosomal
RNA

<400> 44

tttagagagt ttgatacctgg ctcaggacga acgctggcgg cgtgcctaac acatgcaagt
60

cgaacggagt taaattcgac acccgagtat ccggccggga ggcggggtgc tgggggttgg
120

atttaactta gtggcggacg ggtgagtaac gcgtgagtaa cctgcctttc agagggggat
180

aacgttctga aaagaacgct aataccgcat aacatcaatt tatcgcatga taggttgatc
240

aaaggagcaa tccgctggaa gatggactcg cgtccgatta gccagttggc ggggtaacgg
300

cccaccaaag cgacgatcgg tagccggact gagagggtga acggccacat tgggactgag
360

acacggccca gactcctacg ggaggcagca gtgggggata ttgcacaatg ggggaaaccc
420

tgatgcagca acgccgcgtg agggaagaag gttttcggat tgtaaacctc tgttcttagt
480

gacgataatg acggtagcta aggagaaagc tccggctaac tacgtgccag cagccgcggt
540

aatacgtagg gagcgagcgt tgtccggatt tactgggtgt aaaggggtgcg taggcggcga
600

ggcaagtcag gcgtgaaatc tatgggctta acccataaac tgcgcttgaa actgtcttgc
660

ttgagtgaag tagaggtagg cggaattccc ggtgtagcgg tgaaatgcgt agagatcggg
720

aggaacacca gtggcgaagg cggcctactg ggctttaact gacgctgaag cacgaaagca
780

tgggtagcaa acaggattag ataccctggt agtccatgcc gtaaacgatg attactaggt
840

gtgggggggtc tgaccccctc cgtgccgcag ttaacacaat aagtaatcca cctggggagt
900

acggccgcaa ggttgaaact caaaggaatt gacgggggcc cgcacaagca gtggagtatg
960

tggtttaatt cgaagcaacg cgaagaacct taccaggtct tgacatccgt ctaacgaagc
1020

agagatgcat taggtgccct tcgggggaaag gcgagacagg tggatgcatgg ttgtcgtcag
1080

ctcgtgtcgt gagatgttgg gttaagtccc gcaacgagcg caacccttgt ttctagttgc
1140

tacgcaagag cactctagag agactgccgt tgacaaaacg gaggaagggtg gggacgacgt
1200

caaatcatca tgccccttat gacctgggcc acacacgtac tacaatggct gtaaacagag
1260

ggaagcaaag ccgcgagggtg gagcaaaacc ctaaaagcag tcccagttcg gatcgcaggc
1320

tgcaaccgc ctgctgaag tcggaattgc tagtaatcgc ggatcagcat gccgcggtga
1380

atacgttccc gggccttgta cacaccgccc gtcacaccat gggagccggt aatacccgaa
1440

gccagtagtt caaccgcaag gagagcgctg tcgaaggtag gattggcgac tgggggtgaag
1500

tcgtaacaag gtagccgtat cggaagggtgc ggctggatca cctccttt
1548

<210> 45

<211> 1548

<212> DNA

<213> Artificial Sequence

<220>

<223> Clostridium_leptum.GCF_000154345.EBFLKIBH_02083 16S ribosomal
RNA

<400> 45

tttagagagt ttgatcctgg ctcaggacga acgctggcgg cgtgcctaac acatgcaagt
60

cgaacggagt taaattcgac acccgagtat ccggccggga ggcgggggtgc tggggggttg
120

atttaactta gtggcggacg ggtgagtaac gcgtgagtaa cctgcctttc agagggggat
180

aacgttctga aaagaacgct aataccgcat aacatcaatt tatcgcatga taggttgatc
240

aaaggagcaa tccgctggaa gatggactcg cgtccgatta gccagttggc ggggtaacgg
300

cccaccaaag cgacgatcgg tagccggact gagagggtga acggccacat tgggactgag
360

acacggccca gactcctacg ggaggcagca gtgggggata ttgcacaatg ggggaaaccc
420

tgatgcagca acgccgcgtg agggaagaag gttttcggat tgtaaacctc tgttcttagt
480

gacgataatg acggtagcta aggagaaagc tccggctaac tacgtgccag cagccgcggt
540

aatacgtagg gagcgagcgt tgtccggatt tactgggtgt aaaggggtgcg taggcggcga
600

ggcaagtcag gcgtgaaatc tatgggctta acccataaac tgcgcttgaa actgtcttgc
660

ttgagtgaag tagaggtagg cggaattccc ggtgtagcgg tgaaatgcgt agagatcggg
720

aggaacacca gtggcgaagg cggcctactg ggctttaact gacgctgaag cacgaaagca
780

tgggtagcaa acaggattag ataccctggg agtccatgcc gtaaacgatg attactaggt
840

gtgggggggtc tgaccccctc cgtgccgcag ttaacacaat aagtaatcca cctggggagt
900

acggccgcaa ggttgaaact caaaggaatt gacgggggcc cgcacaagca gtggagtatg
960

tggtttaatt cgaagcaacg cgaagaacct taccaggtct tgacatccgt ctaacgaagc
1020

agagatgcat taggtgccct tcgggggaaag gcgagacagg tggatgcatgg ttgtcgtcag
1080

ctcgtgtcgt gagatgttgg gttaagtccc gcaacgagcg caacccttgt ttctagttgc
1140

tacgcaagag cactctagag agactgccgt tgacaaaacg gaggaagggtg gggacgacgt
1200

caaatcatca tgccccttat gacctgggcc acacacgtac tacaatggct gtaaacagag
1260

ggaagcaaag ccgcgagggtg gagcaaaacc ctaaaagcag tcccagttcg gatcgcaggc
1320

tgcaaccgcg ctgctgaag tcggaattgc tagtaatcgc ggatcagcat gccgcggtga
1380

atacgttccc gggccttgta cacaccgcc gtcacaccat gggagccggt aatacccgaa
1440

gccagtagtt caaccgcaag gagagcgctg tcgaaggtag gattggcgac tgggggtgaag
1500

tcgtaacaag gtagccgtat cggaagggtgc ggctggatca cctccttt
1548

<210> 46

<211> 1524

<212> DNA

<213> Artificial Sequence

<220>

<223> Clostridium_amosum.GCF_000154485.DBDELJNL_00399 16S
ribosomal
RNA

<400> 46

atggagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcctaata catgcaagtc
60

gaacgcgagc acttgtgctc gagtggcgaa cgggtgagta atacataagt aacctgccct
120

agacaggggg ataactattg gaaacgatag ctaagaccgc ataggtagcg aactgcatg
180

gtgaccgtat taaaagtgcc tcaaagcact ggtagaggat ggacttatgg cgcattagct
240

ggttggcggg gtaacggccc accaaggcga cgatgcgtag ccgacctgag agggtgaccg
300

gccacactgg gactgagaca cggcccagac tcctacggga ggacagcagta gggaattttc
360

ggcaatgggg gaaaccctga ccgagcaacg ccgcgtgaag gaagaagggtt ttcggattgt
420

aaacttctgt tataaaggaa gaacggcggc tacaggaaat ggtagccgag tgacggtact
480

ttattagaaa gccacggcta actacgtgcc agcagccgcg gtaatacgta ggtggcaagc
540

gttatccgga attattgggc gtaaagaggg agcaggcggc agcaagggtc tgtggtgaaa
600

gcctgaagct taacttcagt aagccataga aaccaggcag ctagagtgca ggagaggatc
660

gtggaattcc atgtgtagcg gtgaaatgcg tagatatatg gaggaacacc agtggcgaag
720

gcgacgatct ggcctgcaac tgacgctcag tcccgaagc gtggggagca aataggatta
780

gataccctag tagtccacgc cgtaaacgat gagtactaag tgttggatgt caaagttcag
840

tgctgcagtt aacgcaataa gtactccgcc tgagtagtac gttcgcaaga atgaaactca
900

aaggaattga cggggggcccg cacaagcggg ggagcatgtg gtttaattcg aagcaacgcg
960

aagaacctta ccagggtcttg acatactcat aaaggctcca gagatggaga gatagctata
1020

tgagatacag gtggtgcatg gttgtcgtca gctcgtgtcg tgagatgttg ggttaagtcc
1080

cgcaacgagc gcaaccctta tcgttagtta ccatcattaa gttggggact ctagcgagac
1140

tgccagtgac aagctggagg aaggcgggga tgacgtcaaa tcatcatgcc ctttatgacc
1200

tgggctacac acgtgctaca atggatgggtg cagagggaag cgaagccgcg aggtgaagca
1260

aaacccataa aaccattctc agttcggatt gtagtctgca actcgactac atgaagttgg
1320

aatcgctagt aatcgcgaaat cagcatgtcg cgggtgaatac gttctcgggc cttgtacaca
1380

ccgcccgtca caccacgaga gttgataaca cccgaagccg gtggcctaac cgcaaggaag
1440

gagctgtcta aggtgggatt gatgattggg gtgaagtcgt aacaaggtat ccctacggga
1500

a c g t g g g g a t g g a t c a c c t c c t t t
1524

<210> 47

<211> 1522

<212> DNA

<213> Artificial Sequence

<220>

<223> Erysipelotrichaceae_SC11.GCA_900066915.NFPLMCGC_00592 16S
ribosomal RNA

<400> 47

atggagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcctaata catgcaagtc
60

gaacgcttca cttcggtgaa gagtggcgaa cgggtgagta atacataagt aacctggcat
120

ctacaggggg ataactgatg gaaacgtcag ctaagaccgc ataggtgtag agatcgcatg
180

aactctatat gaaaagtgct acgggactgg tagatgatgg acttatggcg cattagctgg
240

ttggtagggg aacggcctac caaggcgacg atgcgtagcc gacctgagag ggtgaccggc
300

cacactggga ctgagacacg gccagactc ctacgggagg cagcagtagg gaattttcgg
360

caatggggga aaccctgacc gagcaacgcc gcgtgaagga agaagtaatt cgttatgtaa
420

acttctgtca tagaggaaga acggtggata tagggaatga tatccaagtg acggtactct
480

ataagaaagc cacggctaac tacgtgccag cagccgcggt aatacgtagg tggcgagcgt
540

tatccggaat tattgggcggt aaagagggag caggcggcac taagggtctg tggtgaaaga
600

tcgaagctta acttcggtaa gccatggaaa ccgtagagct agagtgtgtg agaggatcgt
660

ggaattccat gtgtagcgggt gaaatgcgta gatatatgga ggaacaccag tggcgaaggc
720

gacgatctgg cgcataactg acgctcagtc ccgaaagcgt ggggagcaaa taggattaga
780

taccctagta gtccacgccg taaacgatga gtactaagtg ttgggtgtca aagctcagtg
840

ctgcagttaa cgcaataagt actccgcctg agtagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg ggggcccgcg caagcgggtgg agcatgtggt ttaattcgaa gcaacgcgaa
960

gaaccttacc aggtcttgac atcgatctaa aggtccaga gatggagaga tagctataga
1020

gaagacaggt ggtgcatggt tgtcgtcagc tcgtgtcgtg agatggtggg ttaagtcccg
1080

caacgagcgc aaccctgtt gccagttgcc agcattaagt tggggactct ggcgagactg
1140

ccggtgacaa gccggaggaa ggcggggatg acgtcaaata atcatgcccc ttatgacctg
1200

ggctacacac gtgctacaat ggacagagca gaggggaagcg aagccgagag gtggagcgaa
1260

accataaaa ctgttctcag ttcggactgc agtctgcaac tcgactgcac gaagatggaa
1320

tcgctagtaa tcgcgaatca gcatgtcgcg gtgaatacgt tctcgggcct tgtacacacc
1380

gcccgtcaca ccatgagagt cggtaacacc cgaagccggt ggcctaaccg caaggaagga
1440

gctgtctaag gtgggactga tgattggggg gaagtcgtaa caaggatatcc ctacgggaac
1500

g t g g g a t g g a t c a c c t c c t t t
1522

<210> 48

<211> 1526

<212> DNA

<213> Artificial Sequence

<220>

<223> Clostridium_SC125.GCA_900066805.HEBHMNF_02162 16S ribosomal
RNA

<400> 48

tttagagagt ttgatacctgg ctcaggatga acgctggcgg cgtgcctaac acatgcaagt
60

cgaacggggt tatttttgaa atctcttcgg agatggaatt cttaacctag tggcggacgg
120

gtgagtaacg cgtgagcaat ctgccttttag gaggggggata acagtcggaa acggctgcta
180

ataccgcata atacgttttg gaggcattctc ttgaacgtca aagattttat cgcctttaga
240

tgagctcgcg tctgattagc tggttggcgg ggtaacggcc caccaaggcg acgatcagta
300

gccggactga gaggttgaac ggccacattg ggactgagac acggcccaga ctcctacggg
360

aggcagcagt ggggaatatatt gcgcaatggg ggaaaccctg acgcagcaac gccgcgtgat
420

tgaagaaggc cttcggggttg taaagatctt taatcaggga cgaaaaatga cggtacctga
480

agaataagct ccggctaact acgtgccagc agccgcggta atacgtaggg agcaagcgtt
540

atccggattt actgggtgta aagggcgcgc aggcggggccg gcaagttggg agtgaaatcc
600

cggggcttaa ccccggaact gctttcaaaa ctgctggtct tgagtgatgg agaggcaggc
660

ggaattccgt gtgtagcggg gaaatgcgta gatatacgga ggaacaccag tggcgaaggc
720

ggcctgctgg acattaactg acgctgaggc gcgaaagcgt ggggagcaaa caggattaga
780

taccctggta gtccacgccg taaacgatgg atactaggtg tgggaggtat tgacccttc
840

cgtgccgcag ttaacacaat aagtatccca cctggggagt acggccgcaa ggttgaaact
900

caaaggaatt gacggggggc cgcacaagca gtggagtatg tggtttaatt cgaagcaacg
960

cgaagaacct taccaggtct tgacatcccg atgaccggcg tagagatacg ccctctcttc
1020

ggagcatcgg tgacaggtgg tgcattggtg tcgtcagctc gtgtcgtgag atgttgggtt
1080

aagtcccgca acgagcgcaa cccttacggt tagttgatac gcaagatcac tctagccgga
1140

ctgccgttga caaacgggag gaaggtgggg acgacgtcaa atcatcatgc cccttatgac
1200

ctgggctaca cacgtactac aatggcagtc atacagaggg aagcaatacc gcgaggtgga
1260

gcaaatccct aaaagctgtc ccagttcaga ttgcaggctg caaccgcct gcatgaagtc
1320

ggaattgcta gtaatcgcgg atcagcatgc cgcggtgaat acgttcccg gcttgtaca
1380

caccgcccgt cacaccatga gagccgtcaa taccgaagt ccgtagccta accgcaagg
1440

gggcgcggcc gaaggtaggg gtggtaatta gggatgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t c c t t t
1526

<210> 49

<211> 1515

<212> DNA

<213> Artificial Sequence

<220>

<223> Lachnospiraceae_SC188.GCA_900066365.OIBDOBNI_03045 16S
ribosomal
RNA

<400> 49

atgagagttt gatcctggct caggatgaac gctggcggcg tgcctaacac atgcaagtcg
60

aacggaattt acatgaagcc tagcgattgt aaatttagtg gcggacgggt gagtaacgcg
120

tgggtaacct gccttgactt gggggacaac agttggaaac gactgctaata accgcataag
180

cgcacagctt cgcatagaagc agtgtgaaaa actccgggtgg tacaagatgg acccgcgtct
240

gattagctgg ttggtgaggt aacggcccac caaggcgacg atcagtagcc ggcctgagag
300

ggtgaacggc cacattggga ctgagacacg gcccaaactc ctacgggagg cagcagtggg
360

gaatattgca caatggggga aaccctgatg cagcaacgcc gcgtgagtga agaagtattt
420

cggtatgtaa agctctatca gcaggaaaga aaatgacggc acctgactaa gaagccccgg
480

ctaactacgt gccagcagcc gcggtataac gtagggggca agcgttatcc ggatttactg
540

ggtgtaaagg gagcgtagac ggttttgcaa gtctgaagtg aaagccccgg gcttaacccc
600

gggactgctt tggaaactgt aggactagag tgcaggagag gtaagtggaa ttcctagtgt
660

agcggtgaaa tgcgtagata ttaggaggaa caccagtggc gaaggcggct tactggactg
720

taactgacgt tgaggctcga aagcgtgggg agcaaacagg attagatacc ctggtagtcc
780

acgccgtaaa cgatgattac taggtgttgg tgggtacgac ccatcgggtgc cgcagcaaac
840

gcaataagta atccacctgg ggagtacgtt cgcaagaatg aaactcaaag gaattgacgg
900

ggacccgcac aagcgggtgga gcatgtggtt taattcgaag caacgcgaag aaccttacct
960

ggctcttgaca tccctatgaa taacgggcaa tgccgttagt acttcggtac ataggagaca
1020

ggtggtgcat ggttgtcgtc agctcgtgtc gtgagatgtt gggttaagtc ccgcaacgag
1080

cgcaaccctt atcttttagta gccagcagta agatgggcac tctagagaga ctgccgggga
1140

taacccggag gaaggtgggg atgacgtcaa atcatcatgc cccttatgac cagggctaca
1200

cacgtgctac aatggcgtaa acaaagagaa gcgaagtcgt gaggcagagc gaatctcaaa
1260

aataacgtct cagttcggat tgtagtctgc aactcgacta catgaagctg gaatcgctag
1320

taatcgcaga tcagaatgct gcggtgaata cgttcccggg tcttgtacac accgcccgtc
1380

acaccatggg agtcggaaat gcccgaagtc ggtgacctaa ccgaaaggaa ggagccgccg
1440

aaggcaggtc tgataactgg ggtgaagtcg taacaaggta gccgtatcgg aagggtgcggc
1500

t g g a t c a c c t c c t t t
1515

<210> 50

<211> 1420

<212> DNA

<213> Artificial Sequence

<220>

<223> Lachnospiraceae_SC52.SPC10801.PLHJGIDB_03707 16S ribosomal
RNA

<400> 50

tagtggcgga cgggtgagta acgcgtgggt aacctgcctt gtactggggg acaacagttg
60

gaaacgactg ctaataccgc ataagcgcac agcttcgcat gaagcagtgt gaaaaactcc
120

ggtggtacaa gatggacccg cgtctgatta gctggtttgt gaggtaacgg cccaccaagg
180

cgacgatcag tagccggcct gagaggggtga acggccacat tgggactgag acacggccca
240

aactcctacg ggaggcagca gtggggaata ttgcacaatg ggggaaaccc tgatgcagca
300

acgccgcgtg agtgaagaag tatttcggta tgtaaagctc tatcagcagg aaagaaaatg
360

acggtacctg actaagaagc cccggctaac tacgtgccag cagccgcggt aatacgtagg
420

gggcaagcgt tatccggatt tactgggtgt aaagggagcg tagacggttt tgcaagtctg
480

aagtgaaagc ccggggccta accccgggac tgctttggaa actgtagaac tagagtgcag
540

gagaggtaag tggaattcct agtgtagcgg tgaaatgcgt agatattagg aggaacacca
600

gtggcgaagg cggcttactg gactgtaact gacgttgagg ctcgaaagcg tggggagcaa
660

acaggattag ataccctggg agtccacgcc gtaaacgatg attactaggt gttggtgggt
720

acgacccatc ggtgccgcag caaacgcaat aagtaatcca cctggggagt acgttcgcaa
780

gaatgaaact caaaggaatt gacggggacc cgcacaagcg gtggagcatg tggtttaatt
840

cgaagcaacg cgaagaacct tacctgggtc tgacatccct atgaataacg ggcaatgccg
900

ttagtacttc ggtacatagg agacagggtg tgcatggttg tcgtcagctc gtgtcgtgag
960

atgttggggt aagtcccgca acgagcgcaa cccttatctt tagtagccag cagtaagatg
1020

ggcactctag agagactgcc ggggataacc cggaggaagg tggggatgac gtcaaatacat
1080

catgcccctt atgaccaggg ctacacacgt gctacaatgg cgtaaacaaa gagaagcgaa
1140

gtcgtgaggc agagcgaatc tcaaaaataa cgtctcagtt cggattgtag tctgcaactc
1200

gactacatga agctggaatc gctagtaatc gcagatcaga atgctgcggt gaatacgttc
1260

ccgggtcttg tacacaccgc ccgtcacacc atgggagtcg gaaatgcccg aagtcggtga
1320

cctaaccgca aggaaggagc cgccgaaggc aggtctgata actgggggtga agtcgtaaca
1380

aggtagccgt atcggaagg tgcggctggat cacctccttt
1420

<210> 51

<211> 1527

<212> DNA

<213> Artificial Sequence

<220>

<223> Clostridium_symbiosum.GCF_000466485.MLALJMBA_01519 16S
ribosomal
RNA

<400> 51

atgagagttt gatcctggct caggatgaac gctggcggcg tgcctaacac atgcaagtcg
60

aacgaagcga tttaacggaa gttttcggat ggaagttgaa ttgactgagt ggcggacggg
120

tgagtaacgc gtgggtaacc tgccttgtag tgggggacaa cagttagaaa tgactgctaa
180

taccgcataa gcgcacagta ttgcatgata cagtgtgaaa aactccggtg gtacaagatg
240

gacccgcgtc tgattagcta gttggttaagg taacggctta ccaaggcgac gatcagtagc
300

cgacctgaga gggtgaccgg ccacattggg actgagacac ggcccaaact cctacgggag
360

gcagcagtgg ggaatattgc acaatgggcg aaagcctgat gcagcgacgc cgcgtgagtg
420

aagaagtatt tcggtatgta aagctctatc agcagggaag aaaatgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggtaata cgtagggggc aagcgttadc
540

cggatttact gggtgtaaag ggagcgtaga cggtaaagca agtctgaagt gaaagcccg
600

ggctcaactg cgggactgct ttggaaactg ttttaactgga gtgtcggaga ggtaagtgga
660

attcctagtg tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcgac
720

ttactggacg ataactgacg ttgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgaata ctaggtgttg gggagcaaag ctcttcggtg
840

ccgtcgcaaa cgcagtaagt attccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg gggacccgca caagcggtagg agcatgtggt ttaattcgaa gcaacgcgaa
960

gaaccttacc aggtcttgac atcgatccga cgggggagta acgtcccctt cccttcgggg
1020

cggagaagac aggtgggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaaccct tattctaagt agccagcggg tcggccggga actcttgga
1140

gactgccagg gataacctgg aggaagggtg ggatgacgtc aaatcatcat gccccttatg
1200

atctgggcta cacacgtgct acaatggcgt aaacaaagag aagcaagacc gcgagggtgga
1260

gcaaattctca aaaataacgt ctcagttcgg actgcaggct gcaactcgcc tgcacgaagc
1320

tggaatcgct agtaatcgcg aatcagaatg tcgcggtgaa tacgttcccg ggtcttgtac
1380

acaccgcccc tcacaccatg ggagtcagta acgcccgaag tcagtgaccc aaccgcaagg
1440

agggagctgc cgaaggcggg accgataact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g g c t g g a t c a c c t c c t t t
1527

<210> 52

<211> 1565

<212> DNA

<213> Artificial Sequence

<220>

<223> Dialister_invisus.GCF_000160055.ONFICEAE_00534 16S ribosomal RNA

<400> 52

atggagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgaaaag acggaaagag cttgctcttt tcagaattga gtggcaaacg ggtgagtaac
120

acgtaaacaa cctgccttca ggatggggac aacagacgga aacgactgct aataccgaat
180

aagttccaag agccgcatgg cccatggaag aaaagggtggc ctctacctgt aagctatcgc
240

ctgaagaggg gtttgcgtct gattagctgg ttggaggggt aacggcccac caaggcgacg
300

atcagtagcc ggtctgagag gatgaacggc cacactggaa ctgagacacg gtccagactc
360

ctacgggagg cagcagtggg gaatcttccg caatgggcga aagcctgacg gagcaacgcc
420

gcgtgagtga tgacggcctt cgggttgtaa aactctgtga tccgggacga aaaggcagag
480

tgcaagaac aaactgcatt gacggtaccg gaaaagcaag ccacggctaa ctacgtgcca
540

gcagccgcgg taatacgtag gtggcaagcg ttgtccggaa ttattgggcg taaagcgcg
600

gcaggcggct tccaagtcc ctcttaaaag tgcggggctt aaccccgtga tgggaaggaa
660

actgggaagc tggagtatcg gagaggaaag tggaattcct agtgtagcgg tgaaatgcgt
720

agagattagg aagaacaccg gtggcgaagg cgactttctg gacgaaaact gacgctgagg
780

cgcgaaagcg tggggagcaa acaggattag ataccctggg agtccacgcc gtaaacgatg
840

gatactaggt gtaggaggta tcgaccctc ctgtgccgga gttaacgcaa taagtatccc
900

gcctgggaag tacgatcgca agattaaaac tcaaaggaat tgacggggcc cgcacaagcg
960

gtggagtatg tggtttaatt cgacgcaacg cgaagaacct taccaggtct tgacattgat
1020

cgcgatctgc agaaatgcgg agttcttctt cggaagacga gaaaacaggt ggtgcacggc
1080

tgtcgtcagc tcgtgtcgtg agatgttggg ttaagtcccg caacgagcgc aaccctatc
1140

atttggtacc agcacgtaaa ggtggggact caaatgagac cgccgcggac aacgcggagg
1200

aaggcgggga cgacgtcaag tcatcatgcc ccttatgacc tgggctacac acgtactaca
1260

atgggtgtca acaaagagaa gcgaaccgc gaggaagagc aaacctcaaa aacacacccc
1320

cagttcagat cgcaggctgc aaccgcctg cgtgaagtag gaatcgctag taatcgcgga
1380

tcagcatacc gcggtgaata cggtcccgga ccttgtacac accgcccgtc acactatgag
1440

agtcagaaac acccgaagcc ggtgaggtaa ccgcaaggag ccagccgtcg aaggcggagc
1500

tgatgattgg agtgaagtcg taacaaggta gccgtatcgg aagggtgcggc tggatcacct
1560

c c t t t
1565

<210> 53

<211> 1566

<212> DNA

<213> Artificial Sequence

<220>

<223> Dialister_invisus.GCF_000160055.ONFICEAE_00810 16S ribosomal
RNA

<400> 53

atggagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgaaaag agggaaagag cttgctcttt ccggaattga gtggcaaacg ggtgagtaac
120

acgtaaacia cctgccttca ggatggggac aacagacgga aacgactgct aataccgaat
180

aagttccaag agccgcatgg cccatggaag aaaagggtggc ctctacctgt aagctatcgc
240

ctgaagaggg gtttgcgtct gattagctgg ttggaggggt aacggcccac caaggcgacg
300

atcagtagcc ggtctgagag gatgaacggc cacactggaa ctgagacacg gtccagactc
360

ctacgggagg cagcagtggg gaatcttccg caatgggcga aagcctgacg gagcaacgcc
420

gcgtgagtga tgacggcctt cgggttgtaa aactctgtga tccgggacga aaaggcagag
480

tgcgaagaac aaactgcatt gacgggtaccg gaaaagcaag ccacggctaa ctacgtgcca
540

gcagccgcgg taatacgtag gtggcaagcg ttgtccggaa ttattgggcg taaagcgcgc
600

gcaggcggct tccaagtcc ctcttaaaag tgcggggcctt aaccccgtga tgggaaggaa
660

actgggaagc tggagtatcg gagaggaaag tggaattcct agtgtagcgg tgaaatgcgt
720

agagattagg aagaacaccg gtggcgaagg cgactttctg gacgaaaact gacgctgagg
780

cgcgaaagcg tggggagcaa acaggattag ataccctggg agtccacgcc gtaaacgatg
840

gatactaggt gtaggaggta tcgaccctc ctgtgccgga gttaacgcaa taagtatccc
900

gcctgggaag tacgatcgca agattaaaac tcaaaggaat tgacgggggc ccgcacaagc
960

ggtggagtat gtggtttaat tcgacgcaac gcgaagaacc ttaccaggtc ttgacattga
1020

tcgcatctg cagaaatgcg gagttcttct tcggaagacg agaaaacagg tgggtgcacgg
1080

ctgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc gcaacgagcg caaccctat
1140

catttgttac cagcacgtaa aggtggggac tcaaattgaga ccgccgcgga caacgcggag
1200

gaaggcgggg acgacgtcaa gtcattcatgc cccttatgac ctgggctaca cacgtactac
1260

aatgggtgtc aacaaagaga agcgaacccg cgaggaagag caaacctcaa aaacacaccc
1320

ccagttcaga tcgcaggctg caaccgcctt gcgtgaagta ggaatcgcta gtaatcgcg
1380

gtcagcatac cgcggtgaat acgttcccgg gccttgtaca caccgcccggt cacactatga
1440

gagtcagaaa caccgaagc cggtgaggta accgcaagga gccagccgtc gaaggcggag
1500

ctgatgattg gagtgaagtc gtaacaaggt agccgtatcg gaagggtgcgg ctggatcacc
1560

t c c t t t
1566

<210> 54

<211> 1566

<212> DNA

<213> Artificial Sequence

<220>

<223> Dialister_invisus.GCF_000160055.ONFICEAE_01219 16S ribosomal
RNA

<400> 54

atggagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgaaaag acggaaagag cttgctcttt tcagaattga gtggcaaacg ggtgagtaac
120

acgtaaacia cctgccttca ggatggggac aacagacgga aacgactgct aatgccgaat
180

aagttccaag agccgcatgg cccatggaag aaaagggtggc ctctacctgt aagctatcgc
240

ctgaagaggg gtttgcgctct gattagctgg ttggaggggt aacggcccac caaggcgacg
300

atcagtagcc ggtctgagag gatgaacggc cacactggaa ctgagacacg gtccagactc
360

ctacgggagg cagcagtggg gaatcttccg caatgggcga aagcctgacg gagcaacgcc
420

gcgtgagtga tgacggcctt cgggttgtaa aactctgtga tccgggacga aaaggcagag
480

tgcaagaac aaactgcatt gacgggtaccg gaaaagcaag ccacggctaa ctacgtgcca
540

gcagccgcgg taatacgtag gtggcaagcg ttgtccggaa ttattgggcg taaagcgcgc
600

gcaggcggct tcccaagtcc ctcttaaaag tgcggggctt aaccccgtga tgggaaggaa
660

actgggaagc tggagtatcg gagaggaaag tggaattcct agtgtagcgg tgaaatgcgt
720

agagattagg aagaacaccg gtggcgaagg cgactttctg gacgaaaact gacgctgagg
780

cgcgaaagcg tggggagcaa acaggattag ataccctggg agtccacgcc gtaaacgatg
840

gatactaggt gtaggaggta tcgaccctc ctgtgccgga gttaacgcaa taagtatccc
900

gcctgggaag tacgatcgca agattaaaac tcaaaggaat tgacgggggc ccgcacaagc
960

ggtggagtat gtggtttaat tcgacgcaac gcgaagaacc ttaccaggtc ttgacattga
1020

tcgcgatctg cagaaatgcg gagttcttct tcggaagacg agaaaacagg tgggtgcacgg
1080

ctgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc gcaacgagcg caaccctat
1140

catttgttac cagcacgtaa aggtggggac tcaaagtaga ccgccgcgga caacgcggag
1200

gaaggcgggg acgacgtcaa gtcatcatgc cccttatgac ctgggctaca cacgtactac
1260

aatgggtgtc aacaaagaga agcgaaccgc cgaggaagag caaacctcaa aaacacaccc
1320

ccagttcaga tcgcaggctg caaccgcct gcgtgaagta ggaatcgcta gtaatcgcg
1380

gtcagcatac cgcggtgaat acgttcccgc gccttgtaca caccgcccgt cacactatga
1440

gagtcagaaa caccgaagc cggtaggta accgcaagga gccagccgtc gaaggcggag
1500

ctgatgattg gagtgaagtc gtaacaaggt agccgtatcg gaaggcgcg ctggatcacc
1560

t c c t t t
1566

<210> 55

<211> 1530

<212> DNA

<213> Artificial Sequence

<220>

<223> Eubacterium_contortum_SC46.SPC10987.PGIJJNHC_00268 16S
ribosomal
RNA

<400> 55

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gagcgaagcg ctttacttag atttcttcgg attgaagagt tttgcgactg agcggcggac
120

gggtgagtaa cgcgtgggta acctgcctca tacaggggga taacagttag aaatgactgc
180

taataaccgca taagaccaca gtaccgcatg gtaccgtggg aaaaactccg gtggtatgag
240

atggacccgc gtctgattag ctagttggta aggtaacggc ttaccaaggc gacgatcagt
300

agccgacctg agaggggtgac cggccacatt gggactgaga cacggcccaa actcctacgg
360

gaggcagcag tggggaatat tgcacaatgg gggaaaccct gatgcagcga cgccgcgtga
420

aggatgaagt atttcggtat gtaaacttct atcagcaggg aagaaaatga cggtacctga
480

ctaagaagcc ccggctaact acgtgccagc agccgcggta atacgtaggg ggcaagcggt
540

atccggattt actgggtgta aagggagcgt agacggttat gtaagtctga tgtgaaaacc
600

cggggctcaa ccccgggact gcattggaaa ctatgtaact agagtgtcgg agaggtaagt
660

ggaattccta gtgtagcggg gaaatgcgta gatattagga ggaacaccag tggcgaaggc
720

ggcttactgg acgatgactg acgttgaggc tcgaaagcgt ggggagcaaa caggattaga
780

taccctggta gtccacgccg taaacgatgc atactaggtg tcgggtggca aagccattcg
840

gtgccgcagc aaacgcaata agtatgccac ctggggagta cgttcgcaag aatgaaactc
900

aaaggaattg acgggggaccc gcacaagcgg tggagcatgt ggtttaattc gaagcaacgc
960

gaagaacctt acctgctctt gacatcccc tgaccggcgc gtaatggtgc ctttccttcg
1020

ggacagggga gacaggtggt gcatggttgt cgtcagctcg tgtcgtgaga tgttgggtta
1080

agtcccgcaa cgagcgcaac cttatcttt agtagccagc ggttcggccg ggcactctag
1140

agagactgcc agggataacc tggaggaagg tggggatgac gtcaaatacat catgcccctt
1200

atgagcaggg ctacacacgt gctacaatgg cgtaaacaaa gggaggcgaa gccgcgaggt
1260

ggagcaaatac ccaaaaataa cgtctcagtt cggattgtag tctgcaactc gactacatga
1320

agctggaatac gctagtaatac gcgaatcaga atgtcgcggt gaatacgttc ccgggtcttg
1380

tacacaccgc ccgtcacacc atgggagttg gtaacgcccg aagtcagtga cccaaccgta
1440

aggagggagc tgccgaaggt gggaccgata actgggggtga agtcgtaaca aggtagccgt
1500

a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1530

<210> 56

<211> 1530

<212> DNA

<213> Artificial Sequence

<220>

<223> Eubacterium_contortum_SC46.SPC10987.PGIJJNHC_03558 16S
ribosomal
RNA

<400> 56

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gagcgaagcg ctttacttag atttcttcgg attgaagagt tttgcgactg agcggcggac
120

gggtgagtaa cgcggtgggta acctgcctca tacaggggga caacagttag aaatgactgc
180

taataaccgca taagaccacg gtaccgcatg gtacagtggg aaaaactccg gtggtatgag
240

atggacccgc gtctgattag ctagttggta aggtaacggc ttaccaaggc gacgatcagt
300

agccgacctg agaggggtgac cggccacatt gggactgaga cacggcccaa actcctacgg
360

gaggcagcag tggggaatat tgcacaatgg gggaaaccct gatgcagcga cgccgcgtga
420

aggatgaagt atttcggtat gtaaacttct atcagcaggg aagaaaatga cggtacctga
480

ctaagaagcc ccggctaact acgtgccagc agccgcggta atacgtaggg ggcaagcggt
540

atccggattt actgggtgta aagggagcgt agacggttat gtaagtctga tgtgaaaacc
600

cggggctcaa ccccgggact gcattggaaa ctatgtaact agagtgtcgg agaggtaagt
660

ggaattccta gtgtagcggg gaaatgcgta gatattagga ggaacaccag tggcgaaggc
720

ggcttactgg acgatgactg acgttgaggc tcgaaagcgt ggggagcaaa caggattaga
780

taccctggta gtccacgccg taaacgatgc atactaggtg tcgggtggca aagccattcg
840

gtgccgcagc aaacgcaata agtatgccac ctggggagta cgttcgcaag aatgaaactc
900

aaaggaattg acgggggaccc gcacaagcgg tggagcatgt ggtttaattc gaagcaacgc
960

gaagaacctt acctgctctt gacatcccc tgaccggcgc gtaatggtgc ctttccttcg
1020

ggacagggga gacaggtggt gcatggttgt cgtcagctcg tgtcgtgaga tgttgggtta
1080

agtcccgcaa cgagcgcaac ccttatcttt agtagccagc gggtcggccg ggcactctag
1140

agagactgcc agggataacc tggaggaagg tggggatgac gtcaaatacat catgcccctt
1200

atgagcaggg ctacacacgt gctacaatgg cgtaaacaaa gggaggcgaa gccgcgaggt
1260

ggagcaaatac ccaaaaataa cgtctcagtt cggattgtag tctgcaactc gactacatga
1320

agctggaatac gctagtaatac gcgaatacaga atgtcgcggt gaatacgttc ccgggtcttg
1380

tacacaccgc ccgtcacacc atgggagttg gtaacgcccg aagtcagtga cccaaccgta
1440

aggagggagc tgccgaaggt gggaccgata actgggggtga agtcgtaaca aggtagccgt
1500

a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1530

<210> 57

<211> 1530

<212> DNA

<213> Artificial Sequence

<220>

<223> Eubacterium_contortum_SC46.SPC10987.PGIJJNHC_03567 16S
ribosomal
RNA

<400> 57

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gagcgaagcg ctttacttag atttcttcgg attgaagagt tttgcgactg agcggcggac
120

gggtgagtaa cgcgtgggta acctgcctca tacaggggga taacagttag aaatgactgc
180

taataaccgca taagaccacg gtaccgcatg gtacagtggg aaaaactccg gtggtatgag
240

atggacccgc gtctgattag ctagttggta aggtaacggc ttaccaaggc gacgatcagt
300

agccgacctg agaggggtgac cggccacatt gggactgaga cacggcccaa actcctacgg
360

gaggcagcag tggggaatat tgcacaatgg gggaaaccct gatgcagcga cgccgcgtga
420

aggatgaagt atttcggtat gttaaacttct atcagcaggg aagaaaatga cggtacctga
480

ctaagaagcc ccggctaact acgtgccagc agccgcggta atacgtaggg ggcaagcggt
540

atccggattt actgggtgta aagggagcgt agacggttat gtaagtctga tgtgaaaacc
600

cggggctcaa ccccgggact gcattggaaa ctatgtaact agagtgtcgg agaggtaagt
660

ggaattccta gtgtagcggg gaaatgcgta gatattagga ggaacaccag tggcgaaggc
720

ggcttactgg acgatgactg acgttgaggc tcgaaagcgt ggggagcaaa caggattaga
780

taccctggta gtccacgccg taaacgatgc atactaggtg tcgggtggca aagccattcg
840

gtgccgcagc aaacgcaata agtatgccac ctggggagta cgttcgcaag aatgaaactc
900

aaaggaattg acgggggaccc gcacaagcgg tggagcatgt ggtttaattc gaagcaacgc
960

gaagaacctt acctgctctt gacatcccc tgaccggcgc gtaatggtgc ctttccttcg
1020

ggacagggga gacaggtggt gcatggttgt cgtcagctcg tgtcgtgaga tgttgggtta
1080

agtcccgcaa cgagcgcaac ccttatcttt agtagccagc ggttcggccg ggcactctag
1140

agagactgcc agggataacc tggaggaagg tggggatgac gtcaaatacat catgcccctt
1200

atgagcaggg ctacacacgt gctacaatgg cgtaaacaaa gggaggcgaa gccgcgaggt
1260

ggagcaaatac ccaaaaataa cgtctcagtt cggattgtag tctgcaactc gactacatga
1320

agctggaatac gctagtaatac gcgaatcaga atgtcgcggt gaatacgttc ccgggtcttg
1380

tacacaccgc ccgtcacacc atgggagttg gtaacgcccg aagtcagtga cccaaccgta
1440

aggagggagc tgccgaaggt gggaccgata actgggggtga agtcgtaaca aggtagccgt
1500

a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1530

<210> 58

<211> 1530

<212> DNA

<213> Artificial Sequence

<220>

<223> Eubacterium_contortum_SC46.SPC10987.PGIJJNHC_04151 16S
ribosomal
RNA

<400> 58

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gagcgaagca ctttacttag atttcttcgg aatgaagagt gttgtgactg agcggcggac
120

gggtgagtaa cgcgtgggta acctgcctca tacaggggga taacagttag aaatgactgc
180

taataaccgca taagaccacg gtaccgcatg gtacagtggg aaaaactccg gtggtatgag
240

atggacccgc gtctgattag ctagttggta aggtaacggc ttaccaaggc gacgatcagt
300

agccgacctg agaggggtgac cggccacatt gggactgaga cacggcccaa actcctacgg
360

gaggcagcag tggggaatat tgcacaatgg gggaaaccct gatgcagcga cgccgcgtga
420

aggatgaagt atttcggtat gttaaacttct atcagcaggg aagaaaatga cggtacctga
480

ctaagaagcc ccggctaact acgtgccagc agccgcggta atacgtaggg ggcaagcggt
540

atccggattt actgggtgta aagggagcgt agacggttat gtaagtctga tgtgaaaacc
600

cggggctcaa ccccgggact gcattggaaa ctatgtaact agagtgtcgg agaggtaagt
660

ggaattccta gtgtagcggg gaaatgcgta gatattagga ggaacaccag tggcgaaggc
720

ggcttactgg acgatgactg acgttgaggc tcgaaagcgt ggggagcaaa caggattaga
780

taccctggta gtccacgccg taaacgatgc atactaggtg tcgggtggca aagccattcg
840

gtgccgcagc aaacgcaata agtatgccac ctggggagta cgttcgcaag aatgaaactc
900

aaaggaattg acgggggaccc gcacaagcgg tggagcatgt ggtttaattc gaagcaacgc
960

gaagaacctt acctgctctt gacatcccc tgaccggcgc gtaatggtgc ctttccttcg
1020

ggacagggga gacaggtggt gcatggttgt cgtcagctcg tgtcgtgaga tgttgggtta
 1080

agtcccgcaa cgagcgcaac ccttatcttt agtagccagc gggtcggccg ggcaactctag
 1140

agagactgcc agggataacc tggaggaagg tggggatgac gtcaaatacat catgcccctt
 1200

atgagcaggg ctacacacgt gctacaatgg cgtaaacaaa gggaggcgaa gccgcgaggt
 1260

ggagcaaatac ccaaaaataa cgtctcagtt cggattgtag tctgcaactc gactacatga
 1320

agctggaatac gctagtaatac gcgaatacaga atgtcgcggt gaatacgttc ccgggtcttg
 1380

tacacaccgc ccgtcacacc atgggagttg gtaacgcccg aagtcagtga cccaaccgta
 1440

aggagggagc tgccgaaggt gggaccgata actgggggtga agtcgtaaca aggtagccgt
 1500

a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
 1530

<210> 59
 <211> 1505
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Eubacterium_siraeum.GCF_000154325.NCECJGME_00373 16S
 ribosomal
 RNA

<400> 59
 caaagagttt gatcctggct caggacgaac gctggcggcg cgcctaacac atgcaagtcg
 60

aacggtgaag aggagcttgc tcctcggatc agtggcggac gggtgagtaa cacgtgagca
 120

acctggctct	aagaggggga	caacagttgg	aaacgactgc	taataccgca	taacgtatcg
180					
ggatggcatc	ttcctgatac	caaagatfff	atcgcttaga	gatgggctcg	cgtctgatta
240					
gatagttggc	ggggtaacgg	cccaccaagt	cgacgatcag	tagccggact	gagaggttga
300					
acggccacat	tgggactgag	acacggccca	gactcctacg	ggaggcagca	gtgggggata
360					
ttggacaatg	ggggcaaccc	tgatccagcg	acgccgcgtg	agggaagaag	gttttcggat
420					
tgtaaacctc	tgttgacgga	gaaaaaaaaatg	atggtatccg	tttagaaagc	cacggctaac
480					
tacgtgccag	cagccgcggt	aatacgtagg	tggcaagcgt	tgtccggaat	tactgggtgt
540					
aaagggagtg	taggcgggat	atcaagtcag	aagtgaaaat	tacgggctca	actcgtaacc
600					
tgcttttgaa	actgacattc	ttgagtgaag	tagaggcaag	cggaattcct	agtgtagcgg
660					
tgaaatgcgt	agatattagg	aggaacacca	gtggcgaagg	cggcttgctg	ggcttttact
720					
gacgctgagg	ctcgaaagcg	tggggagcaa	acaggattag	ataccctggg	agtccacgcc
780					
gtaaacgatg	attactaggt	gtgggggggat	tgacccttc	cgtgccggag	taaacacaat
840					
aagtaatcca	cctggggagt	acgaccgcaa	ggttgaaact	caaaggaatt	gacgggggcc
900					
cgcacaagca	gtggagtatg	tggtttaatt	cgacgcaacg	cgaagaacct	taccaggtct
960					
tgacatcgag	tgaccgccta	agagattagg	ctttcccttc	ggggacacaa	agacaggtgg
1020					

tgcatgggttg tcgtcagctc gtgtcgtgag atgttgggtt aagtcccgca acgagcgcaa
1080

cccttatcat tagttgctac gcaagagcac tctaatagaga ctgccgttga caaaacggag
1140

gaaggtgggg atgacgtcaa atcatcatgc cctttatgac ctgggctaca cacgtactac
1200

aatggcggtt aacaaagaga agcaaagccg cgaggcagag caaatctcca aaaaacgtct
1260

cagttcggat tgtaggctgc aactcgccta catgaagtcg gaattgctag taatcgtagg
1320

tcagcatact acggtgaata cgttcccggg ccttgtagac accgcccgtc aaaccatgag
1380

agttggcaac acccgaagtc ggtagtctaa ccgcaaggag gacgccgccg aaggtggggt
1440

tgatgattag ggtaaagtcg taacaaggta gccgtatcgg aaggtgcggc tggatcacct
1500

c c t t t
1505

<210> 60

<211> 1505

<212> DNA

<213> Artificial Sequence

<220>

<223> Eubacterium_siraeum.GCF_000154325.NCECJGME_01093 16S
ribosomal
RNA

<400> 60

caaagagttt gatcctggct caggacgaac gctggcggcg cgcctaacac atgcaagtcg
60

aacggtgaag aggagcttgc tcctcggaac agtggcggac gggtgagtaa cacgtgagca
120

acctggctct aagaggggga caacagttgg aaacgactgc taataccgca taacgtatcg
180

ggatggcatc ttcctgatac caaagatttt atcgcttaga gatgggctcg cgtctgatta
240

gatagttggc ggggtaacgg cccaccaagt cgacgatcag tagccggact gagaggttga
300

acggccacat tgggactgag acacggccca gactcctacg ggaggcagca gtgggggata
360

ttggacaatg ggggcaaccc tgatccagcg acgccgcgtg agggaagaag gttttcggat
420

tgtaaacctc tgttgacgga gaaaaaaatg atggtatccg tttagaaagc cacggctaac
480

tacgtgccag cagccgcggt aatacgtagg tggcaagcgt tgtccggaat tactgggtgt
540

aaagggagtg taggcgggat atcaagtcag aagtgaaaat tacgggctca actcgtaacc
600

tgcttttgaa actgacattc ttgagtgaag tagaggcaag cggaattcct agtgtagcgg
660

tgaaatgcgt agatattagg aggaacacca gtggcgaagg cggcttgctg ggcttttact
720

gacgctgagg ctcgaaagcg tggggagcaa acaggattag ataccctggg agtccacgcc
780

gtaaacgatg attactaggt gtgggggggat tgacccttc cgtgccggag taaacacaat
840

aagtaatcca cctggggagt acgaccgcaa ggttgaaact caaaggaatt gacgggggcc
900

cgcacaagca gtggagtatg tggtttaatt cgacgcaacg cgaagaacct taccaggtct
960

tgacatcgag tgaccgccta agagattagg ctttccttc ggggacacaa agacaggtgg
1020

tgcatgggttg tcgtcagctc gtgtcgtgag atgttgggtt aagtcccgca acgagcgcaa
1080

cccttatcat tagttgctac gcaagagcac tctaatagaga ctgccgttga caaaacggag
1140

gaaggtgggg atgacgtcaa atcatcatgc cctttatgac ctgggctaca cacgtactac
1200

aatggcgttt aacaaagaga agcaaagccg cgaggcagag caaatctcca aaaaacgtct
1260

cagttcggat tgtaggctgc aactcgccta catgaagtcg gaattgctag taatcgtagg
1320

tcagcatact acggtgaata cgttcccggg ccttgtagac accgcccgtc aaaccatgag
1380

agttggcaac acccgaagtc ggtagtctaa ccgcaaggag gacgccgccg aaggtggggg
1440

tgatgattag ggtaaagtcg taacaaggta gccgtatcgg aaggtgcggc tggatcacct
1500

c c t t t
1505

<210> 61

<211> 1505

<212> DNA

<213> Artificial Sequence

<220>

<223> Eubacterium_siraeum.GCF_000154325.NCECJGME_01403 16S
ribosomal
RNA

<400> 61

caaagagttt gatcctggct caggacgaac gctggcggcg cgcctaacac atgcaagtcg
60

aacggtgaag aggagcttgc tcctcggatc agtggcggac gggtgagtaa cacgtgagca
120

acctggctct	aagaggggga	caacagttgg	aaacgactgc	taataccgca	tgatgtatcg
180					
ggatggcatc	ttcctgatac	caaagatfff	atcgcttaga	gatgggctcg	cgtctgatta
240					
gatagttggc	ggggtaacgg	cccaccaagt	cgacgatcag	tagccggact	gagaggttga
300					
acggccacat	tgggactgag	acacggccca	gactcctacg	ggaggcagca	gtgggggata
360					
ttggacaatg	ggggcaaccc	tgatccagcg	acgccgcgtg	agggaagaag	gttttcggat
420					
tgtaaacctc	tgttgacgga	gaaaaaaatg	atggtatccg	tttagaaagc	cacggctaac
480					
tacgtgccag	cagccgcggt	aatacgtagg	tggcaagcgt	tgtccggaat	tactgggtgt
540					
aaagggagtg	taggcgggat	atcaagtcag	aagtgaaaat	tacgggctca	actcgtaacc
600					
tgcttttgaa	actgacattc	ttgagtgaag	tagaggcaag	cgaatttcct	agtgtagcgg
660					
tgaaatgcgt	agatattagg	aggaacacca	gtggcgaagg	cggcttgctg	ggcttttact
720					
gacgctgagg	ctcgaaagcg	tggggagcaa	acaggattag	ataccctggg	agtccacgcc
780					
gtaaacgatg	attactaggt	gtggggggat	tgacccttc	cgtgccggag	taaacacaat
840					
aagtaatcca	cctggggagt	acgaccgcaa	ggttgaaact	caaaggaatt	gacgggggcc
900					
cgcacaagca	gtggagtatg	tggtttaatt	cgacgcaacg	cgaagaacct	taccaggtct
960					
tgacatcgag	tgaccgccta	agagattagg	ctttcccttc	ggggacacaa	agacaggtgg
1020					

tgcatgggttg tcgtcagctc gtgtcgtgag atgttgggtt aagtcccgca acgagcgcaa
1080

cccttatcat tagttgctac gcaagagcac tctaatagaga ctgccgttga caaaacggag
1140

gaaggtgggg atgacgtcaa atcatcatgc cctttatgac ctgggctaca cacgtactac
1200

aatggcggtt aacaaagaga agcaaagccg cgaggcagag caaatctcca aaaaacgtct
1260

cagttcggat tgtaggctgc aactcgccta catgaagtcg gaattgctag taatcgtagg
1320

tcagcatact acggtgaata cgttcccggg ccttgtagac accgcccgtc aaaccatgag
1380

agttggcaac acccgaagtc ggtagtctaa ccgcaaggag gacgccgccg aaggtggggg
1440

tgatgattag ggtaaagtcg taacaaggta gccgtatcgg aaggtgcggc tggatcacct
1500

c c t t t
1505

<210> 62

<211> 1505

<212> DNA

<213> Artificial Sequence

<220>

<223> Eubacterium_siraeum.GCF_000154325.NCECJGME_01403 16S
ribosomal
RNA

<400> 62

caaagagttt gatcctggct caggacgaac gctggcggcg cgcctaacac atgcaagtcg
60

aacggtgaag aggagcttgc tcctcggatc agtggcggac gggtgagtaa cacgtgagca
120

acctggctct 180	aagaggggga	caacagttgg	aaacgactgc	taataccgca	taacgtatcg
ggatggcatc 240	ttcctgatac	caaagatfff	atcgcttaga	gatgggctcg	cgtctgatta
gatagttggc 300	ggggtaacgg	cccaccaagt	cgacgatcag	tagccggact	gagaggttga
acggccacat 360	tgggactgag	acacggccca	gactcctacg	ggaggcagca	gtgggggata
ttggacaatg 420	ggggcaaccc	tgatccagcg	acgccgcgtg	agggaagaag	gttttcggat
tgtaaacctc 480	tgttgacgga	gaaaaaaatg	atggtatccg	tttagaaagc	cacggctaac
tacgtgccag 540	cagccgcggt	aatacgtagg	tggcaagcgt	tgtccggaat	tactgggtgt
aaagggagtg 600	taggcgggat	atcaagtcag	aagtgaaaat	tacgggctca	actcgtaacc
tgcttttgaa 660	actgacattc	ttgagtgaag	tagaggcaag	cggaattcct	agtgtagcgg
tgaaatgcgt 720	agatattagg	aggaacacca	gtggcgaagg	cggcttgctg	ggcttttact
gacgctgagg 780	ctcgaaagcg	tggggagcaa	acaggattag	ataccctggg	agtccacgcc
gtaaacgatg 840	attactaggt	gtggggggat	tgacccttc	cgtgccggag	taaacacaat
aagtaatcca 900	cctggggagt	acgaccgcaa	ggttgaaact	caaaggaatt	gacgggggcc
cgcacaagca 960	gtggagtatg	tggtttaatt	cgacgcaacg	cgaagaacct	taccaggtct
tgacatcgag 1020	tgaccgccta	agagattagg	ccttccttc	ggggacacaa	agacaggtgg

tgcattggttg tcttcagctc gtgtcgtgag atgttgggtt aagtcccgca acgagcgcaa
1080

cccttatcat tagttgctac gcaagagcac tctaattgaga ctgccgttga caaaacggag
1140

gaaggtgggg atgacgtcaa atcatcatgc cctttatgac ctgggctaca cacgtactac
1200

aatggcggtt aacaaagaga agcaaagccg cgaggcagag caaatctcca aaaaacgtct
1260

cagttcggat tgtaggctgc aactcgccta catgaagtcg gaattgctag taatcgtagg
1320

tcagcatact acggtgaata cgttcccggg ccttgctacac accgcccgtc aaaccatgag
1380

agttggcaac acccgaagtc ggtagtctaa ccgcaaggag gacgccgccg aaggtggggt
1440

tgatgattag ggttaagtcg taacaaggta gccgtatcgg aaggtgcggc tggatcacct
1500

c c t t t
1505

<210> 63

<211> 1530

<212> DNA

<213> Artificial Sequence

<220>

<223> Flavonifractor_plautii.GCF_000239295.GPJGAEF0_00132 16S
ribosomal
RNA

<400> 63

tattgagagt ttgatcctgg ctcaggatga acgctggcgg cgtgcttaac acatgcaagt
60

cgaacgggggt gctcatgacg gaggattcgt ccaatggatt gagttaccta gtggcggacg
120

ggtgagtaac gcgtgaggaa cctgccttgg agaggggaat aacactccga aaggagtgct
180

aataccgcat gaagcagttg ggtcgcattg ctctgactgc caaagattta tcgctctgag
240

atggcctcgc gtctgattag ctagtaggcg gggtaacggc ccacctaggc gacgatcagt
300

agccggactg agaggttgac cggccacatt gggactgaga cacggcccag actcctacgg
360

gaggcagcag tggggaatat tgggcaatgg gcgcaagcct gaccagcaa cgccgcgtga
420

aggaagaagg ctttcggggt gttaaacttct tttgtcgggg acgaaacaaa tgacgggtacc
480

cgacgaataa gccacggcta actacgtgcc agcagccgcg gtaatacgta ggtggcaagc
540

gttatccgga tttactgggt gttaaaggcg tgtaggcggg attgcaagtc agatgtgaaa
600

actgggggct caacctccag cctgcatttg aaactgtagt tcttgagtgc tggagaggca
660

atcggaattc cgtgtgtagc ggtgaaatgc gtagatatac ggaggaacac cagtggcgaa
720

ggcggattgc tggacagtaa ctgacgctga ggcgcgaaag cgtggggagc aaacaggatt
780

agataccctg gtagtccacg ccgtaaacga tggatactag gtgtgggggg tctgaccccc
840

tccgtgccgc agttaacaca ataagtatcc cacctgggga gtacgatcgc aaggttgaaa
900

ctcaaaggaa ttgacggggg cccgcacaag cgggtggagta tgtgggtttaa ttcgaagcaa
960

cgcgaagaac cttaccaggg cttgacatcc cactaacgag gcagagatgc gttaggtgcc
1020

cttcgggggaa agtggagaca ggtggtgcat ggttgtcgtc agctcgtgtc gtgagatggt
1080

gggttaagtc ccgcaacgag cgcaaccctt attgttagtt gctacgcaag agcactctag
1140

cgagactgcc gttgacaaaa cggaggaagg tggggacgac gtcaaatacat catgcccctt
1200

atgtcctggg ccacacacgt actacaatgg tggttaacag agggaggcaa taccgcgagg
1260

tggagcaaat ccctaaaagc catcccagtt cggattgcag gctgaaaccc gcctgtatga
1320

agttggaatc gctagtaatc gcggatcagc atgccgcggt gaatacgttc ccgggccttg
1380

tacacaccgc ccgtcacacc atgagagtcg ggaacacccg aagtccgtag cctaaccgca
1440

aggagggcgc ggccgaaggt gggttcgata attgggggtga agtcgtaaca aggtagccgt
1500

a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1530

<210> 64

<211> 1529

<212> DNA

<213> Artificial Sequence

<220>

<223> Flintibacter_SC49.GCA_900066645.DBEMCOBG_02766 16S ribosomal
RNA

<400> 64

tattgagagt ttgatacctgg ctcaggatga acgctggcgg cgtgcttaac acatgcaagt
60

cgaacggagt gctcatgaca gaggattcgt ccaatggagt gagttactta gtggcggacg
120

ggtgagtaac gcgtgagtaa cctgccttgg agtgggggaat aacagggtgga aacatctgct
180

aataccgcat gatgcagttg ggtcgcattg ctctgactgc caaagattta tcgctctgag
240

atggactcgc gtctgattag ctggttggcg gggtaacggc ccaccaaggc gacgatcagt
300

agccggactg agaggttggc cggccacatt gggactgaga cacggcccag actcctacgg
360

gaggcagcag tggggaatat tgggcaatgg gcgcaagcct gaccagcaa cgccgcgtga
420

aggaagaagg ctttcggggt gtaaacttct tttctcaggg acgaagcaag tgacggtacc
480

tgaggaataa gccacggcta actacgtgcc agcagccgcg gtaatacgta ggtggcgagc
540

gttatccgga ttactgggt gtaaagggcg tgtaggcggg actgcaagtc agatgtgaaa
600

accatgggct caacctgtgg cctgcatttg aaactgtagt tcttgagtac tggagaggca
660

gacggaattc ctagtgtagc ggtgaaatgc gtagatatta ggaggaacac cagtggcgaa
720

ggcggctctgc tggacagcaa ctgacgctga ggcgcgaaag cgtggggagc aaacaggatt
780

agataccctg gtagtccacg ctgtaaacga tggatactag gtgtgggggg tctgaccccc
840

tccgtgccgc agttaacaca ataagtatcc cacctgggga gtacgatcgc aaggttgaaa
900

ctcaaaggaa ttgacggggg cccgcacaag cggtgaggta tgtgggtttaa ttcgaagcaa
960

cgcgaagaac cttaccaggg cttgacatcc cggtgaccgg ttagagata caccttcttc
1020

ttcggaagcg ccggtgacag gtggtgcatg gttgtcgtca gctcgtgtcg tgagatgttg
1080

ggttaagtcc cgcaacgagc gcaaccctta ttgttagttg ctacgcaaga gcactctagc
1140

gagactgccg ttgacaaaac ggaggaaggt ggggacgacg tcaaatacatc atgcccctta
1200

tgtcctgggc cacacacgta ctacaatggt ggtcaacaga gggaagcaag accgcgaggt
1260

ggagcaaacc cctaaaagcc atcccagttc ggattgcagg ctgcaactcg cctgtatgaa
1320

gttggaatcg ctagtaatcg cggatcagca tgccgcggtg aatacgttcc cgggccttgt
1380

acacaccgcc cgtcacacca tgagagtcgg gaacacccga agtccgtagc ctaaccgcaa
1440

ggggggcgcg gccgaaggtg ggttcgataa ttgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1529

<210> 65

<211> 1307

<212> DNA

<213> Artificial Sequence

<220>

<223> Gemmiger_formicilis_SC193.SPC10676.BNNMOMCD_02995 16S
ribosomal
RNA

<400> 65

aaaaggattt attcgcttta ggatggactc gcgtccaatt agctagttgg tgaggtaacg
60

gcccaccaag gcgacgattg gtagccggac tgagaggttg aacggccaca ttgggactga
120

gacacggccc agactcctac gggaggcagc agtgggggat attgcacaat gggggaaacc
180

ctgatgcagc gacgccgcgt ggaggaagaa ggttttcgga ttgtaaactc ctgtcgtttag
240

ggacgataat gacgggtacct aacaagaaag caccggctaa ctacgtgcca gcagccgcgg
300

taaaacgtag ggtgcaagcg ttgtccggaa ttactgggtg taaagggagc gcaggcggga
360

agacaagttg gaagtgaaaa ccatgggctc aacccatgaa ttgctttcaa aactgttttt
420

cttgagtagt gcagaggtag atggaattcc cgggtgtagcg gtggaatgcg tagatatcgg
480

gaggaacacc agtggcgaag gcggtctact gggcaccaac tgacgctgag gctcgaaagc
540

atgggtagca aacaggatta gataccctgg tagtccatgc cgtaaacgat gattactagg
600

tgttggggga ttgaccccct cagtgccgca gttaacacaa taagtaatcc acctggggag
660

tacgaccgca aggttgaaac tcaaaggaat tgacgggggc ccgcacaagc agtggagtat
720

gtggtttaat tcgaagcaac gcgaagaacc ttaccaggtc ttgacatccg atgcatagca
780

cagagatgtg tgaaatcctt cgggacatcg agacagggtg tgcatgggtg tcgtcagctc
840

gtgtcgtgag atgttggggt aagtcccgca acgagcgcaa cccttattgc cagttactac
900

gttaagagga ctctggcgag actgccgttg acaaaacgga ggaagggtgg gatgacgtca
960

aatcatcatg ccctttatga cctgggctac acacgtacta caatggcggtt aaacaaagag
1020

aagcaagacc gcgaggtgga gcaaaactca aaaacaacgt ctcagttcag attgcaggct
1080

gcaactcgcc tgcataaagt cggaaattgct agtaatcgcg gatcagcatg ccgcggtgaa
1140

tacgttcccg ggccttgtac acaccgcccg tcacaccatg agagccgggg ggacccgaag
1200

tcgatatgtct aaccgcaagg aggacgtcgc cgaaggtaaa actggtgatt ggggtgaagt
1260

cgtaacaagg tagccgtatc ggaagggtgcg gctggatcac ctccttt
1307

<210> 66

<211> 1264

<212> DNA

<213> Artificial Sequence

<220>

<223> Holdemania_filiiformis.GCF_000157995.GAIEDKPD_00018 16S
ribosomal
RNA (partial)

<400> 66

acctaggcga tgatacgtag ccgacctgag aggggtgaccg gccacattgg gactgagaca
60

cggcccaaac tcctacggga ggcagcagta gggaattttc ggcaatgggc gaaagcctga
120

ccgagcaacg ccgcgtgagt gaagaaggcc ttcgggttgt aaagctctgt tgtgaaggaa
180

gaacggctca tacagggaat ggtatgggag tgacggtact ttaccagaaa gccacggcta
240

actacgtgcc agcagccgcg gtaatacgtg ggtggcgagc gttatccgga attattgggc
300

gtaaaggggtg cgcaggcggt ttgttaagtt taagggtgaaa gcgtggggct taaccccata
360

tagccttaga aactgacaga ctagagtaca ggagagggca atggaattcc atgtgtagcg
420

gtaaaatgcg tagatatatg gaggaacacc agtggcgaag gcggttgcct ggcctgtaac
480

tgacgctcat gcacgaaagc gtggggagca aataggatta gataccctag tagtccacgc
540

cgtaaacgat gagaactaag tgttggggaa actcagtgtc gcagttaacg caataagttc
600

tccgcctggg gagtatgcac gcaagtgtga aactcaaagg aattgacggg ggcccgcaca
660

agcgggtggag tatgtggttt aattcgacgc aacgcgaaga accttaccag gtcttgacat
720

cccctgcaaa gacatagaga tatgttggag gttatcaggg agacaggtgg tgcattggtt
780

tcgtcagctc gtgtcgtgag atgttgggtt aagtcccgca acgagcgcaa cccttgtctt
840

tagttgctaa cattaagttg aggactctag agagactgcc ggtgacaaac cggaggaagg
900

tggggatgac gtcaaatacat catgcccctt atgacctggg ctacacacgt actacaatgg
960

cggatacaac gagaagcaag acagtgatgt ggagcaaaac tcagaaagtc cgtctcagtt
1020

cggattgaag tctgcaaccc gacttcatga agccggaatc gctagtaatc gcggatcagc
1080

atgccgcggt gaatacgttc tcgggccttg tacacaccgc ccgtcaaacc atgagagttg
1140

gcaataacccg aagccggtgg cctaacctcg caagaggagg gagccgtcga aggtagggct
1200

gatgattggg gttaagtcgt aacaagggtat ccctacggga acgtggggat ggatcacctc
1260

c t t t
1264

<210> 67
<211> 1535
<212> DNA
<213> Artificial Sequence

<220>
<223> Holdemania_sp_AP2.GCF_000327285.CMMLILNL_03489 16S ribosomal RNA

<400> 67
atggagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcctaata catgcaagtc
60
gaacgctttg taaaggagct tgcttcttta cgaggagtgg cgaacgggtg agtaatacat
120
aagcaatctg cccatcggcc tgggataaca gttggaaacg gctgctaata ccgгатaggt
180
tagtttctgg catcagggac taattaaagt tgggatacaa cacggatgga tgagcttatg
240
gcgtattagc tagtaggtga ggtaacggcc cacctaggcg atgatacgta gccgacctga
300
gagggtgacc ggccacattg ggactgagac acggcccaaa ctcctacggg aggcagcagt
360
agggaatttt cggcaatggg cgaaagcctg accgagcaac gccgcgtgag tgaagaaggc
420
cttcggggtg taaagctctg ttgtgaagga agaacggctc atagagggaa tgctatggga
480
gtgacggtac tttaccagaa agccacggct aactacgtgc cagcagccgc ggtaatacgt
540
aggtggcgag cgttatccgg aattattggg cgtaaagggt gcgcaggcgg ttgaaaagt
600
ttaaggtgaa agcgtggggc ttaaccccat acagccttag aaactgtcag actagagtac
660

aggagagggc aatggaattc catgtgtagc ggtaaaatgc gtagatatat ggaggaacac
720

cagtggcgaa ggcggttgcc tggcctgtaa ctgacgctca tgcacgaaag cgtggggagc
780

aaataggatt agatacccta gtagtccacg ccgtaaacga tgagaactaa gtgttgggga
840

aactcagtgc tgcagttaac gcaataagtt ctccgcctgg ggagtatgca cgcaagtgtg
900

aaactcaaag gaattgacgg gggcccgcac aagcggtgga gtatgtgggt taattcgacg
960

caacgcgaag aaccttacca ggtcttgaca taccaggcaa agctatagag atatagtgga
1020

ggttatcctg gatacagggtg gtgcatgggt gtcgtcagct cgtgtcgtga gatgttgggt
1080

taagtcccgc aacgagcgca acccttgtct ttagttacta acattaagtt gaggactcta
1140

gagagactgc cggtgacaaa ccggaggaag gtggggatga cgtcaaataca tcatgcccct
1200

tatgacctgg gctacacacg tactacaatg gcggatacaa cgagaagcaa gacagcaatg
1260

tggagcaaac ctcagaaagt ccgtctcagt tcggattgaa gtctgcaacc cgacttcatg
1320

aagccggaat cgctagtaat cgcggatcag catgccgcgg tgaatacgtt ctcgggcctt
1380

gtacacaccg cccgtcaaac catgagagtt ggcaataccc gaagccggtg gcctaaccct
1440

gcaaagggag ggagccgtcg aaggtagggc tgatgattgg ggttaagtcg taacaaggta
1500

t c c c t a c g g g a a c g t g g g g a t g g a t c a c c t c c t t t
1535

<210> 68
<211> 1537
<212> DNA
<213> Artificial Sequence

<220>
<223> Parasutterella_excrementihominis.GCF_000205025.CEOCABBK_01117
16S
ribosomal RNA

<400> 68
atagagtttg atcctggctc agattgaacg ctggcggaac gctttacaca tgcaagtcga
60
acggtaacgc ggagagaagc ttgcttctct ccggcgacga gtggcgaacg ggtgagtaat
120
acatcggaac gtgtccgctc gtgggggaca accagccgaa aggttggcta ataccgcatg
180
agttctacgg aagaaagagg gggacccgca agggcctctc gcgagcggag cggccgatga
240
ctgattagcc tgttggtgag gtaacggctc accaaagcaa cgatcagtag ctggtctgag
300
aggacgacca gccacactgg gactgagaca cggcccagac tcctacggga ggcagcagtg
360
gggaattttg gacaatgggc gcaagcctga tccagctatt ccgcgtgtgg gatgaaggcc
420
ctcgggttgt aaaccacttt tgtagagaac gaaaagacac cttcgaataa aggggtgttg
480
tgacggtact ctaagaataa gcaccggcta actacgtgcc agcagccgcg gtaatacgta
540
gggtgcgagc gttaatcgga attactgggc gttaaagggtg cgcaggcggt tgagtaagac
600
agatgtgaaa tccccgagct taactcggga atggcatatg tgactgctcg actagagtgt
660

gtcagagggga ggtggaattc cacgtgtagc agtgaaatgc gtagatatgt ggaagaacac
720

cgatggcgaa ggcagcctcc tgggacataa ctgacgctca ggcacgaaag cgtggggagc
780

aaacaggatt agataccctg gtagtccacg ccctaaacga tgttaactag ttgttgggaa
840

gtaaaattct cagtaacgca gccaacgcga gaagttaacc gcctgggaag tacggtcgca
900

agactaaaac tcaaaggaat tgacggggac cgcacaagc ggtggatgat gtggattaat
960

tcgatgcaac gcgaaaaacc ttacctaccc ttgacatgtc aggaagctct tgtaatgaga
1020

gcgtgcccgc aaggagagcct gaacacaggt gctgcatggc tgtcgtcagc tcgtgtcgtg
1080

agatgttggg ttaagtcccg caacgagcgc aacccttgtc actagttgct acgaaagggc
1140

actctagtga gactgccggt gacaaaccgg aggaagggtg ggatgacgtc aagtcctcat
1200

ggcccttatg ggtagggctt cacacgtcat acaatggtcg gaacagaggg cagcgaagcc
1260

gtgaggcgga gccaatccca gaaaaccgat cgtagtccgg attgcagtct gcaactcgac
1320

tgcataaagt cggaatcgct agtaatcgcg gatcagcatg ccgcggtgaa tacgttcccg
1380

ggtcttgtac acaccgcccg tcaaacaatg ggagtgggtg ttaccagaag tcgttagcct
1440

aaccgcaagg agggcggcga ccacggtgag caccgtgact aatgttaagt cgtaacaagg
1500

t a g c c g t a c c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1537

<210> 69
<211> 1221
<212> DNA
<213> Artificial Sequence

<220>
<223> Prevotella_copri.GCF_000157935.POCB0FGG_01227 16S ribosomal
RNA
(partial)

<400> 69
atggagagtt tgatcctggc tcaggatgaa cgctagctac aggcttaaca catgcaagtc
60

gaggggaaac gatattggaa gcttgcttcc gataggcgtc gaccggcgca cgggtgagta
120

acgcgtatcc aacctgccca tcacttgggg ataaccttgc gaaagtaaga ctaataccca
180

atgatatctc tagaagacat ctgaaagaga tttaaagattt atcgggtgatg gatggggatg
240

cgtctgatta gcttgttggc ggggtaacgg cccaccaagg cgacgatcag taggggttct
300

gagaggaagg tccccacat tggaactgag acacgggtcca aactcctacg ggaggcagca
360

gtgaggaata ttgggtcaatg gacgagagtc tgaaccagcc aagtagcgtg caggaagacg
420

gccctatggg ttgtaaactg cttttataag ggaataaagt gagcctcgtg aggctttttg
480

catgtacctt atgaataagg accggctaata tccgtgccag cagccgcggt aatacgggaag
540

gtccgggacgt tatccggatt tattgggttt aaaggagcg taggccggag attaagcgtg
600

ttgtgaaatg tagacgtca acgtctgcac tgcagcgca actggtttcc ttgagtacgc
660

acaaagtggg cggaattcgt ggtgtagcgg tgaaatgctt agatatcacg aagaactccg
720

attgcgaagg cagctcgctg gagcgcaact gacgctgaag ctcgaaagtg cgggtatcga
780

acaggattag ataccctggg agtccgcacg gtaaacgatg gatgcccgtt gttgggtctga
840

acaggtcagc ggccaagcga aagcattaag catcccacct ggggagtagc ccggcaacgg
900

tgaaactcaa aggaattgac gggggcccgc acaagcggag gaacatgtgg ttttaattcga
960

tgatacgca ggaaccttac ccgggcttga attgcagagg aagaatttgg agacaatgac
1020

gcccttcggg ccgtctgtga aggtgctgca tggttgtcgt cagctcgtgc cgtgaggtgt
1080

cggcttaagt gccataacga gcgcaacccc tctccttagt tgccatcagg ttatgctggg
1140

cactctgggg acactgccac cgtaagggtg gaggaagggtg gggatgacgt caaatcagca
1200

c g g c c c t t a c g t c c g g g g c t a
1221

<210> 70

<211> 1529

<212> DNA

<213> Artificial Sequence

<220>

<223> Prevotella_copri.GCF_000157935.POCB0FGG_01492 16S ribosomal
RNA

<400> 70

atggagagtt tgatcctggc tcaggatgaa cgctagctac aggcttaaca catgcaagtc
60

gaggggaaac gacatcgaaa gcttgctttt gatgggcgtc gaccggcgca cgggtgagta
120

acgcgtatcc aacctgcccc ccacttgggg ataaccttgc gaaagtaaga ctaataccca
180

atgatatctc tagaagacat ctgaaagaga tttaaagattt atcgggtgatg gatgggggatg
240

cgtctgatta gcttgttggc ggggtaacgg cccaccaagg cgacgatcag taggggttct
300

gagaggaagg tccccacat tggaactgag acacgggtcca aactcctacg ggaggcagca
360

gtgaggaata ttggtcaatg ggcgagagcc tgaaccagcc aagtagcgtg caggatgacg
420

gccctatggg ttgtaaactg cttttataag ggaataaagt tagtctcgtg agactttttg
480

catgtacctt atgaataagg accggctaata tccgtgccag cagccgcggt aatacggaag
540

gtccgggcggt tatccggatt tattgggttt aaaggggagcg taggccggag attaagcgtg
600

ttgtgaaatg taggcgctca acgtctgcac tgcagcgcgga actgggtttcc ttgagtacgc
660

acaaagtggg tggaattcgt ggtgtagcgg tgaaatgctt agatatcacg aagaactccg
720

attgcgaagg cagctcactg gagcgcaact gacgctgaag ctcgaaagtg cgggtatcga
780

acaggattag ataccctggg agtccgcacg gtaaaccgatg gatgcccgtt gttggtctga
840

acaggtcagc ggccaagcga aagcattaag catcccacct ggggagtagc ccggcaacgg
900

tgaaactcaa aggaattgac gggggcccgc acaagcggag gaacatgtgg ttttaattcga
960

tgatacgcgga ggaaccttac ccgggcttga attgcagagg aaggatttgg agacaatgac
1020

gcccttcggg gcctctgtga aggtgctgca tggttgtcgt cagctcgtgc cgtgaggtgt
1080

cggtttaagt gccataacga gcgcaacccc tctccttagt tgccatcagg ttatgctggg
1140

cactctgggg acactgccac cgtaaggtgt gaggaaggtg gggatgacgt caaatcagca
1200

cggcccttac gtccgggggt acacacgtgt tacaatggca ggtacagaga gacggttgta
1260

cgtaagtacg atcaaadcct taaagcctgt ctcagttcgg attgggggtct gcaacccgac
1320

cccacgaagc tggattcgt agtaatcgcg catcagccat ggcgcggtga atacgttccc
1380

gggccttgta cacaccgccc gtcaagccat gaaagccggg ggcgcctaaa gtccgtgacc
1440

gtaaggagcg gcctagggcg aaactggtaa ttgggggctaa gtcgtaacaa ggtagccgta
1500

c c g g a a g g t g c g g c t g g a a c a c c t c c t t t
1529

<210> 71

<211> 1529

<212> DNA

<213> Artificial Sequence

<220>

<223> Prevotella_copri.GCF_000157935.POCB0FGG_01527 16S ribosomal

<400> 71

atggagagtt tgatcctggc tcaggatgaa cgctagctac aggcttaaca catgcaagtc
60

gaggggaaac gacatcaaaa gcttgctttt gatgggcgtc gaccggcgca cgggtgagta
120

acgcgtatcc aacctgcccc ccacttgggg ataaccttgc gaaagtaaga ctaataccca
180

atgatatctc tagaagacat ctgaaagaga tttaaagattt atcggtgatg gatggggatg
240

cgtctgatta ccttgttggc ggggtaacgg cccaccaagg cgacgatcag taggggttct
300

gagaggaagg tccccacat tggaactgag acacggtcca aactcctacg ggaggcagca
360

gtgaggaata ttggtcaatg gacgagagtc tgaaccagcc aagtagcgtg caggatgacg
420

gccctatggg ttgtaaactg cttttataag ggaataaagt gagcctcgtg aggctttttg
480

catgtacctt atgaataagg accggctaata tccgtgccag cagccgcggt aatacgggaag
540

gtccgggCGT tatccggatt tattgggttt aaaggggagcg taggccggag attaagcgtg
600

ttgtgaaatg tagacgtca acgtctgcac tgcagcgcga actgggtttcc ttgagtacgc
660

acaaagtggg cggaattcgt ggtgtagcgg tgaaatgctt agatatcacg aagaactccg
720

attgcgaagg cagctcactg gagcgcaact gacgctgaag ctcgaaagtg cgggtatcga
780

acaggattag ataccctggg agtccgcacg gttaaactgat gatgcccgtt gttgggtctga
840

acaggtcagc ggccaagcga aagcattaag catcccacct ggggagtacg ccggcaacgg
900

tgaaactcaa aggaattgac gggggcccgc acaagcggag gaacatgtgg ttttaattcga
960

tgatacgcga ggaaccttac ccgggcttga attgcagagg aaggatttgg agacaatgac
1020

gcccttcggg gcctctgtga aggtgctgca tggttgtcgt cagctcgtgc cgtgagggtg
1080

cggccttaagt gccataacga gcgcaacccc tctccttagt tgccatcagg tcaagctggg
1140

cactctgggg acactgccac cgtaagggtgt gaggaagggtg gggatgacgt caaatcagca
1200

cggcccttac gtccggggct acacacgtgt tacaatggca ggtacagaga gacggttgta
1260

cgtaagtacg atcaaatacct taaagcctgt ctcagttcgg actgggggtct gcaacccgac
1320

cccacgaagc tggattcgct agtaatcgcg catcagccat ggcgcggtga atacgttccc
1380

gggccttgta cacaccgccc gtcaagccat gaaagccggg ggcgcctaaa gtccgtgacc
1440

gtaaggagcg gcctagggcg aaactggtaa ttgggggctaa gtcgtaacaa ggtagccgta
1500

c c g g a a g g t g c g g c t g g a a c a c c t c c t t t
1529

<210> 72

<211> 1528

<212> DNA

<213> Artificial Sequence

<220>

<223> Roseburia_hominis.GCF_000225345.MLGHKGPC_00026 16S ribosomal
RNA

<400> 72

atgagagttt gacctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

aacgaagcac tttaattgat ttcttcggaa tgaagttttt gtgactgagt ggcggacggg
120

tgagtaacgc gtgggtaacc tgcctcatac aggggggataa cagttggaaa cgactgctaa
180

taccgcataa gcgcacagga ttgcatgata cagtgtgaaa aactccggtg gtatgagatg
240

gacccgcgtc tgattagcca gttggcgggg taacggccca ccaaagcgac gatcagtagc
300

cgacctgaga gggtgaccgg ccacattggg actgagacac ggcccaaact cctacgggag
360

gcagcagtgg ggaatattgc acaatggggg aaaccctgat gcagcgacgc cgcgtgagcg
420

aagaagtatt tcggtatgta aagctctatc agcagggaag aagaatgacg gtacctgact
480

aagaagcacc ggctaaatac gtgccagcag ccgcggtaat acgtatgggtg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgcag gcggtacggc aagtctgatg tgaaatcccg
600

gggctcaacc ccggtactgc attggaaact gtcggactag agtgtcggag gggtaagtgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac gattactgac gctgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat actagggtgtc ggggagcatt gctcttcggt
840

gccgcagcaa acgcaataag tattccacct ggggagtacg ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg tttaattcga agcaacgcga
960

agaaccttac caagtcttga catcccactg acaaagtatg taatgtactt tctcttcgga
1020

gcagtgggtga cagggtgggtgc atgggtgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ctattcttag tagccagcgg ttcggccggg cactctaggg
1140

agactgccag ggataacctg gaggaagggt gggatgacgt caaatcatca tgccccttat
1200

gacttgggct acacacgtgc tacaatggcg taaacaaagg gaagcaatcc cgcgaggggg
1260

agcaaattctc aaaaataacg tctcagttcg gactgtagtc tgcaactcga ctacacgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcgggtga atacgttccc gggctcttgta
1380

cacaccgccc gtcacaccat gggagttggg aatgcccga gtcagtgacc caaccgcaag
1440

gagggagctg ccgaaggcag gactgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 73

<211> 1528

<212> DNA

<213> Artificial Sequence

<220>

<223> Roseburia_hominis.GCF_000225345.MLGHKGPC_00569 16S ribosomal
RNA

<400> 73

atgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

aacgaagcac tttaattgat ttcttcggaa tgaagttttt gtgactgagt ggcggacggg
120

tgagtaacgc gtgggtaacc tgcctcatac aggggggataa cagttggaaa cgactgctaa
180

taccgcataa gcgcacagga ttgcatgac cagtgtgaaa aactccggtg gtatgagatg
240

gacccgcgtc tgattagcca gttggcgggg taacggccca ccaaagcgac gatcagtagc
300

cgacctgaga gggtgaccgg ccacattggg actgagacac ggcccaaact cctacgggag
360

gcagcagtgg ggaatattgc acaatggggg aaaccctgat gcagcgacgc cgcgtgagcg
420

aagaagtatt tcggtatgta aagctctatc agcagggaag aagaatgacg gtacctgact
480

aagaagcacc ggctaaatac gtgccagcag ccgcggtaat acgtatgggtg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgcag gcggtacggc aagtctgatg tgaaatcccg
600

gggctcaacc ccggtactgc attggaaact gtcggactag agtgtcggag gggtaagtgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac gattactgac gctgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat actaggtgtc ggggagcatt gctcttcggt
840

gccgcagcaa acgcaataag tattccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac caagtcttga catcccactg acagagtatg taatgtactt tctcttcgga
1020

gcagtgggtga cagggtgggtgc atggttgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ctattcttag tagccagcgg ttcggccggg cactctaggg
1140

agactgccag ggataacctg gaggaaggtg gggatgacgt caaatcatca tgccccttat
1200

gacttgggct acacacgtgc tacaatggcg taaacaaagg gaagcaatcc cgcgaggggg
1260

agcaaattctc aaaaataacg tctcagttcg gactgtagtc tgcaactcga ctacacgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcgggtga atacgttccc ggggtcttgta
1380

cacaccgccc gtcacaccat gggagttggg aatgcccga gtcagtgacc caaccgcaag
1440

gagggagctg ccgaaggcag gactgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 74

<211> 1528

<212> DNA

<213> Artificial Sequence

<220>

<223> Roseburia_hominis.GCF_000225345.MLGHKGPC_00947 16S ribosomal
RNA

<400> 74

atgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

aacgaagcac ttttaattgat ttcttcggaa tgaagttttt gtgactgagt ggcggacggg
120

tgagtaacgc gtgggtaacc tgcctcatac aggggggataa cagttggaaa cgactgctaa
180

taccgcataa gcgcacagga ttgcatgac cagtgtgaaa aactccggtg gtatgagatg
240

gacccgcgtc tgattagcca gttggcgggg taacggccca ccaaagcgac gatcagtagc
300

cgacctgaga gggtgaccgg ccacattggg actgagacac ggcccaaact cctacgggag
360

gcagcagtgg ggaatattgc acaatggggg aaaccctgat gcagcgacgc cgcgtgagcg
420

aagaagtatt tcggtatgta aagctctatc agcagggaag aagaatgacg gtacctgact
480

aagaagcacc ggctaaatac gtgccagcag ccgcggtaat acgtatgggtg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgcag gcggtacggc aagtctgatg tgaaatcccg
600

gggctcaacc ccggtactgc attggaaact gtcggactag agtgtcggag gggtaagtgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac gattactgac gctgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat actagggtgc ggggagcatt gctcttcggt
840

gccgcagcaa acgcaataag tattccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac caagtcttga catcccactg acagagtatg taatgtactt tctcttcgga
1020

gcagtgggtga caggtgggtgc atggttgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ctattcttag tagccagcgg ttcggccggg cactctaggg
1140

agactgccag ggataacctg gaggaagggtg gggatgacgt caaatcatca tgccccttat
 1200

gacttgggct acacacgtgc tacaatggcg taaacaaagg gaagcaatcc cgcgaggggg
 1260

agcaaattctc aaaaataacg tctcagttcg gactgtagtc tgcaactcga ctacacgaag
 1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcgggtga atacgttccc gggctcttgta
 1380

cacaccgccc gtcacaccat gggagttggg aatgcccga gtcagtgacc caaccgcaag
 1440

gagggagctg ccgaaggcag gactgataac tgggggtgaag tcgtaacaag gtagccgtat
 1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
 1528

<210> 75
 <211> 1528
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Roseburia_hominis.GCF_000225345.MLGHKGPC_02811 16S ribosomal
 RNA

<400> 75
 atgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
 60

aacgaagcac tttaattgat ttcttcggaa tgaagttttt gtgactgagt ggcggacggg
 120

tgagtaacgc gtgggtaacc tgcctcatac aggggggataa cagttggaaa cgactgctaa
 180

taccgcataa gcgcacagga ttgcatgac cggtgtgaaa aactccggtg gtatgagatg
 240

gacccgcgtc tgattagcca gttggcgggg taacggccca ccaaagcgac gatcagtagc
 300

cgacctgaga gggtgaccgg ccacattggg actgagacac ggcccaaact cctacgggag
360

gcagcagtgg ggaatattgc acaatggggg aaaccctgat gcagcgacgc cgcgtagcgc
420

aagaagtatt tcggtatgta aagctctatc agcagggaag aagaatgacg gtacctgact
480

aagaagcacc ggctaaatac gtgccagcag ccgcggtaat acgtatgggtg caagcgttat
540

ccggattttac tgggtgtaaa gggagcgcag gcggtacggc aagtctgatg tgaaatcccg
600

gggctcaacc ccggtactgc attggaaact gtcggactag agtgtcggag gggtaagtgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac gattactgac gctgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat actagggtgtc ggggagcatt gctcttcggt
840

gccgcagcaa acgcaataag tattccacct ggggagtacg ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg tttaattcga agcaacgcga
960

agaaccttac caagtcttga catcccactg acagagtatg taatgtactt tctcttcgga
1020

gcagtgggtga caggtgggtgc atgggttgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ctattcttag tagccagcgg ttcgggccggg cactctaggg
1140

agactgccag ggataacctg gaggaagggtg gggatgacgt caaatcatca tgccccttat
1200

gacttgggct acacacgtgc tacaatggcg taaacaaagg gaagcaatcc cgcgaggggg
1260

agcaaattctc aaaaataacg tctcagttcg gactgtagtc tgcaactcga ctacacgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcgggtga atacgttccc gggctcttgta
1380

cacaccgccc gtcacaccat gggagttggg aatgcccga gtcagtgacc caaccgcaag
1440

gagggagctg ccgaaggcag gactgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 76

<211> 1531

<212> DNA

<213> Artificial Sequence

<220>

<223> Roseburia_sp_CAG_45_SC195.GCA_900066395.DFLPCHGC_01805 16S
ribosomal RNA

<400> 76

atgagagttt gatcctggct caggatgaac gctggcgggc tgcttaacac atgcaagtcg
60

aacgaagcac tttattacga tttcttcgga atgacgattt agtgactgag tggcggacgg
120

gtgagtaacg cgtgggtaac ctgccttata caggggggata acagttagaa atgactgcta
180

ataccgcata agcgcacagg attgcatgat ctgggtgtgaa aaactccggt ggtataagat
240

ggacccgcgt ctgattagct gggttggtgag gtaacggccc accaaggcga cgatcagtag
300

ccgacctgag aggggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtgagc
420

gaagaagtat ttcggtatgt aaagctctat cagcagggaa gaaaaaaatg acggtacctg
480

actaagaagc cccggctaac tacgtgccag cagccgcggt aatacgtagg gggcaagcgt
540

tatccggatt tactgggtgt aaaggagcgc caggcgggtgc ggcaagtctg atgtgaaagc
600

ccgggggctca accccgggac tgcattggaa actgtcgtac ttgagtatcg gagaggtaag
660

tggaattcct agtgtagcgg tgaaatgcgt agatattagg aggaacacca gtggcgaagg
720

cggcttactg gacgataact gacgctgagg ctcgaaagcg tggggagcaa acaggattag
780

ataccctggg agtccacgcc gtaaacgatg aatactaggt gtcggggggac atagtccttc
840

ggtgccgcag caaacgcaat aagtattcca cctgggggagt acgttcgcaa gaatgaaact
900

caaaggaatt gacgggggacc cgcacaagcg gtggagcatg tggtttaatt cgaagcaacg
960

cgaagaacct taccaagtct tgacatcccg gtgacaaagt atgtaatgta ctctttcttc
1020

ggaacaccgg tgacagggtg tgcattggtg tcgtcagctc gtgtcgtgag atgttgggtt
1080

aagtcccgca acgagcgcaa cccctgttct tagtagccag cggttcggcc gggcactcta
1140

gggagactgc cagggataac ctggaggaag gcggggatga cgtcaaataca tcatgccctt
1200

tatgacttgg gctacacacg tgctacaatg gcgtaaacia agggaagcga aaagggtgact
 1260

tctagcaaata cccaaaaata acgtcccagt tcggactgta gtctgcaact cgactacacg
 1320

aagctggaat cgctagtaat cgcgaatcag aatgtcgcgg tgaatacgtt cccgggtctt
 1380

gtacacaccg cccgtcacac catgggagtc gggaatgcc gaagccggtg actcaaccga
 1440

aaggagagag ccgtcgaagg caggtctgat aactgggggtg aagtcgtaac aaggtagccg
 1500

t a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
 1531

<210> 77
 <211> 1528
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Ruminococcus_gnavus.GCF_000507805.ONIFJNBG_02190 16S
 ribosomal
 RNA

<400> 77
 aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
 60

gagcgaagca cttttgcgga tttcttcgga ttgaagcaat tgtgactgag cggcggacgg
 120

gtgagtaacg cgtgggtaac ctgcctcata cagggggata acagttggaa acggctgcta
 180

ataccgcata agcgcacagt accgcatggt accgtgtgaa aaactccggt ggtatgagat
 240

ggacccgcgt ctgattagct agttgggtggg gtaacggcct accaaggcga cgatcagtag
 300

ccgacctgag aggggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtgagc
420

gatgaagtat ttcggtatgt aaagctctat cagcagggaa gaaaatgacg gtacctgact
480

aagaagcccc ggctaactac gtgccagcag ccgcggtaat acgtaggggg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgtag acggcatggc aagccagatg tgaaagcccc
600

gggctcaacc ccgggactgc atttggaact gtcaggctag agtgtcggag aggaaagcgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

ctttctggac gatgactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat actaggtgtc ggggtggcaaa gccattcggg
840

gccgcagcaa acgcaataag tattccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac ctggtcttga catccccctg accgctcttt aatcggagct ttccttcggg
1020

acaggggaga cagggtggtgc atggttgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ctatcttttag tagccagcat ttcggatggg cactctagag
1140

agactgccag ggataacctg gaggaaggtg gggatgacgt caaatcatca tgccccttat
1200

gaccagggct acacacgtgc tacaatggcg taaacaaagg gaagcgagcc cgcgaggggg
1260

agcaaattccc aaaaataacg tctcagttcg gattgtagtc tgcaactcga ctacatgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcggtga atacgttccc gggctcttgta
1380

cacaccgccc gtcacaccat gggagtcagt aacgcccga gtcagtgacc caaccgcaag
1440

gagggagctg ccgaagggtg gaccgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 78
<211> 1528
<212> DNA
<213> Artificial Sequence

<220>
<223> Ruminococcus_gnavus.GCF_000507805.ONIFJNBG_02411 16S
ribosomal
RNA

<400> 78
aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gagcgaagca ccttgacgga tttcttcgga ttgaagcctt ggtgactgag cggcggacgg
120

gtgagtaacg cgtgggtaac ctgcctcata caggggggata acagttggaa acggctgcta
180

ataccgcata agcgcacagt accgcatggt acggtgtgaa aaactccggt ggtatgagat
240

ggacccgcgt ctgattaggt agttgggtggg gtaacggcct accaagccga cgatcagtag
300

ccgacctgag aggggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtgagc
420

gatgaagtat ttcggtatgt aaagctctat cagcagggaa gaaaatgacg gtacctgact
480

aagaagcccc ggctaactac gtgccagcag ccgcggtaat acgtaggggg caagcgttat
540

ccggattttac tgggtgtaaa gggagcgtag acggcatggc aagccagatg tgaaagcccc
600

gggctcaacc ccgggactgc atttggaact gtcaggctag agtgtcggag aggaaagcgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

ctttctggac gatgactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat actaggtgtc ggggtggcaaa gccattcggg
840

gccgcagcaa acgcaataag tattccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac ctggtcttga catccctctg accgctcttt aatcggagct ttccttcggg
1020

acagaggaga cagggtggtgc atggttgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ctatcttttag tagccagcat tttggatggg cactctagag
1140

agactgccag ggataacctg gaggaagggtg gggatgacgt caaatcatca tgccccttat
1200

gatcagggct acacacgtgc tacaatggcg taaacaaagg gaagcgagcc cgcgaggggg
1260

agcaaattccc aaaaataacg tctcagttcg gattgtagtc tgcaactcga ctacatgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcggtga atacgttccc gggctcttgta
1380

cacaccgccc gtcacaccat gggagtcagt aacgcccga gtcagtgacc caaccgcaag
1440

gagggagctg ccgaaggtgg gaccgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 79
<211> 1528
<212> DNA
<213> Artificial Sequence

<220>
<223> Ruminococcus_gnavus.GCF_000507805.ONIFJNBG_02808 16S
ribosomal
RNA

<400> 79
aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gagcgaagca ccttgacgga tttcttcgga ttgaagcctt ggtgactgag cggcggacgg
120

gtgagtaacg cgtgggtaac ctgcctcata caggggggata acagttggaa acggctgcta
180

ataccgcata agcgcacagt accgcatggg acggtgtgaa aaactccggt ggtatgagat
240

ggacccgcgt ctgattaggt agttgggtggg gtaacggcct accaagccga cgatcagtag
300

ccgacctgag aggggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtgagc
420

gatgaagtat ttcggtatgt aaagctctat cagcagggaa gaaaatgacg gtacctgact
480

aagaagcccc ggctaactac gtgccagcag ccgcggtaat acgtaggggg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgtag acggcatggc aagccagatg tgaaagcccc
600

gggctcaacc ccgggactgc atttggaact gtcaggctag agtgtcggag aggaaagcgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

ctttctggac gatgactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat actagggtgtc ggggtggcaaa gccattcggg
840

gccgcagcaa acgcaataag tattccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac ctggtcttga catccccctg accgctcttt aatcggagct ttccttcggg
1020

acagaggaga cagggtggtgc atggttgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ctatcttttag tagccagcat tttggatggg cactctagag
1140

agactgccag ggataacctg gaggaaggtg gggatgacgt caaatcatca tgccccttat
1200

gatcagggct acacacgtgc tacaatggcg taaacaaagg gaagcgagcc cgcgaggggg
1260

agcaaattccc aaaaataacg tctcagttcg gattgtagtc tgcaactcga ctacatgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcggtga atacgttccc gggctcttgta
1380

cacaccgccc gtcacaccat gggagtcagt aacgcccga gtcagtgacc caaccgcaag
1440

gagggagctg ccgaaggtgg gaccgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 80
<211> 1242
<212> DNA
<213> Artificial Sequence

<220>
<223> Ruminococcus_gnavus.GCF_000507805.ONIFJNBG_02871 16S
ribosomal
RNA (partial)

<220>
<221> misc_feature
<222> (1)..(1)
<223> n is a, c, g, or t

<400> 80
ncgacgatca gtagccgacc tgagaggggtg accggccaca ttgggactga gacacggccc
60

aaactcctac gggaggcagc agtgggggaat attgcacaat gggggaaacc ctgatgcagc
120

gacgccgcgt gagcgatgaa gtatttcggt atgtaaagct ctatcagcag ggaagaaaat
180

gacggtacct gactaagaag ccccggtctaa ctacgtgccg gcagccgcgg taatacgtag
240

ggggcaagcg ttatccggat ttactgggtg taaagggagc gtagacggca tggcaagcca
300

gatgtgaaag cccggggctc aaccccggga ctgcatttgg aactgtcagg ctagagtgtc
360

ggagaggaaa gcggaattcc tagtgtagcg gtgaaatgcg tagatattag gaggaacacc
420

agtggcgaag gcggctttct ggacgatgac tgacgttgag gctcgaaagc gtggggagca
480

aacaggatta gataccctgg tagtccacgc cgtaaacgat gaatactagg tgtcgggtgg
540

caaagccatt cgggtgccgca gcaaacgcaa taagtattcc acctggggag tacgttcgca
600

agaatgaaac tcaaaggaat tgacggggac ccgcacaagc ggtggagcat gtggtttaat
660

tcgaagcaac gcgaagaacc ttacctggtc ttgacatccc tctgaccgct ctttaatcgg
720

aactttcctt cgggacagag gagacaggtg gtgcatggtt gtcgtcagct cgtgtcgtga
780

gatgttgggt taagtcccgc aacgagcgca acccctatct ttagtagcca gcattttgga
840

tgggcactct agagagactg ccagggataa cctggaggaa ggtggggatg acgtcaaadc
900

atcatgcccc ttatgaccag ggctacacac gtgctacaat ggcgtaaaca aagggaagcg
960

agcccgcgag ggggagcaaa tccccaaaat aacgtctcag ttcggattgt agtctgcaac
1020

tcgactacat gaagctggaa tcgctagtaa tcgcgaatca gaatgtcgcg gtgaatacgt
1080

tcccgggtct tgtacacacc gcccgtcaca ccatgggagt cagtaacgcc cgaagtcagt
 1140

gacccaaccg caaggaggga gctgccgaag gtgggaccga taactgggggt gaagtcgtaa
 1200

caaggtagcc gtatcggaag gtgcggctgg atcacctcct tt
 1242

<210> 81
 <211> 1528
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Ruminococcus_gnavus.GCF_000507805.ONIFJNBG_03037 16S
 ribosomal
 RNA

<400> 81
 aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
 60

gagcgaagca ccttgacgga tttcttcgga ttgaagcctt ggtgactgag cggcggacgg
 120

gtgagtaacg cgtgggtaac ctgcctcata cagggggata acagttggaa acggctgcta
 180

ataccgcata agcgcacagt accgcatggt acggtgtgaa aaactccggt ggtatgagat
 240

ggacccgcgt ctgattaggt agttggtggg gtaacggcct accaagccga cgatcagtag
 300

ccgacctgag agggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
 360

ggcagcagtg gggaatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtgagc
 420

gatgaagtat ttcggtatgt aaagctctat cagcagggaa gaaaatgacg gtacctgact
 480

aagaagcccc ggctaactac gtgccagcag ccgcggtaat acgtaggggg caagcgttat
540

ccggattttac tgggtgtaaa gggagcgtag acggcatggc aagccagatg tgaaagcccg
600

gggctcaacc ccgggactgc atttggaact gtcaggctag agtgtcggag aggaaagcgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

ctttctggac gatgactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat actagggtgtc ggggtggcaaa gccattcggg
840

gccgcagcaa acgcaataag tattccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac ctggtcttga catccctctg accgctcttt aatcggagct ttccttcggg
1020

acagaggaga caggtgggtgc atggttggtc tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ctatcttttag tagccagcat ttcggatggg cactctagag
1140

agactgccag ggataacctg gaggaagggtg gggatgacgt caaatcatca tgccccttat
1200

gaccagggct acacacgtgc tacaatggcg taaacaaagg gaagcgagcc cgcgaggggg
1260

agcaaattccc aaaaataacg tctcagttcg gattgtagtc tgcaactcga ctacatgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcgggtga atacgttccc gggctcttgta
1380

cacaccgccc gtcacaccat gggagtcagt aacgcccga gtcagtgacc caaccgcaag
1440

gagggagctg ccgaagggtg gaccgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 82

<211> 1528

<212> DNA

<213> Artificial Sequence

<220>

<223> Ruminococcus_gnavus_SC145.SPC11233.DDNHIDEK_02634 16S
ribosomal
RNA

<400> 82

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gagcgaagcg cttttgcgga tttcttcgga ttgaagcaac tgtgactgag cggcggacgg
120

gtgagtaacg cgtgggtaac ctgcctcata cagggggata acagttggaa acggctgcta
180

ataccgcata agcgcacagt accgcatggt accgtgtgaa aaactccggt ggtatgagat
240

ggacccgcgt ctgattagct agttgggtggg gtaacggcct accaaggcga cgatcagtag
300

ccgacctgag aggggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtgagc
420

gatgaagtat ttcggtatgt aaagctctat cagcagggaa gaaaatgacg gtacctgact
480

aagaagcccc ggctaactac gtgccagcag ccgcggtaat acgtaggggg caagcgttat
540

ccggattttac tgggtgtaaa gggagcgtag acggcatggc aagccagatg tgaaagcccg
600

gggctcaacc ccgggactgc atttggaact gtcaggctag agtgtcggag aggtaagcgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac gatgactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat actagggtgtc ggggtggcaaa gccattcggg
840

gccgcagcaa acgcaataag tattccacct ggggagtacg ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac ctggtcttga catccctatg accgctcttt aatcggagct ttccttcggg
1020

acagaggaga caggtggtgc atggttggtc tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ctatcttttag tagccagcat tttggatggg cactctagag
1140

agactgccag ggataacctg gaggaagggtg gggatgacgt caaatcatca tgccccttat
1200

gaccagggct acacacgtgc tacaatggcg taaacaaagg gaagcgaacc tgcgaggggg
1260

agcaaattccc aaaaataacg tctcagttcg gattgtagtc tgcaactcga ctacatgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcgggtga atacgttccc gggctcttgta
1380

cacaccgccc gtcacaccat gggagtcagt aacgcccga gtcagtgacc caaccgtaag
1440

gagggagctg ccgaagggtgg gaccgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 83

<211> 1528

<212> DNA

<213> Artificial Sequence

<220>

<223> Ruminococcus_SC103.GCA_900066095.HKFAEPAM_02180 16S ribosomal
RNA

<400> 83

tacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgaagca cttaagtttg attcttcgga tgaagacttt tgtgactgag tggcggacgg
120

gtgagtaacg cgtgggtaac ctgcctcata caggggggata acagttagaa atggctgcta
180

ataccgcata agaccacagc accgcatggc gcagggggtaa aaactccggt ggtatgagat
240

ggacccgcgt ctgattagct ggttggtggg gtaacggcct accaaggcga cgatcagtag
300

ccgacctgag aggggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtgaag
420

gatgaagtat ttcggtatgt aaacttctat cagcaggga gaaaatgacg gtacctgact
480

aagaagcccc ggctaactac gtgccagcag ccgcggtaat acgtaggggg caagcgttat
540

ccggattttac tgggtgtaaa gggagcgtag acggtatggc aagtctgatg tgaaaggcca
600

gggctcaacc ctgggactgc attggaaact gtcgaactag agtgtcggag aggcaagtgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttgctggac gatgactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgact actaggtgtc gggtagcaga gctattcggg
840

gccgcagcca acgcaataag tagtccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac ctgctcttga catctccctg accggcaagt aatgttgcct ttccttcggg
1020

acaggggatga caggtgggtgc atggttgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ctatcttttag tagccagcgg tacggccggg cactctagag
1140

agactgccag ggataacctg gaggaagggtg gggatgacgt caaatcatca tgccccttat
1200

gagcagggct acacacgtgc tacaatggcg taaacaaagg gaagcgagcc tgcgagggta
1260

agcaaattctc aaaaataacg tctcagttcg gattgtagtc tgcaactcga ctacatgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcgggtga atacgttccc ggggtcttgta
1380

cacaccgccc gtcacaccat gggagttggg aacgcccga gtcagtgacc caaccgcaag
1440

gagggagctg ccgaaggtgg gaccgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 84

<211> 1560

<212> DNA

<213> Artificial Sequence

<220>

<223> Veillonella_atypica.GCF_000179755.LBHEMEMC_00479 16S
ribosomal
RNA

<400> 84

ttggagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgaagag cgatggaagc ttgcttctat caatccttagt ggcgaaacggg tgagtaacgc
120

gtaatcaacc tgcccttcag aggggggacaa cagttggaaa cgactgctaa taccgcatac
180

gatccaatct cggcatcgag actggatgaa aggtggcctc tatttataag ctatcactga
240

aggaggggat tgcgtctgat tagctagttg gaggggtaac ggcccaccaa ggcgatgac
300

agtagccggt ctgagaggat gaacggccac attgggactg agacacggcc cagactccta
360

cgggaggcag cagtggggaa tcttccgcaa tggacgaaag tctgacggag caacgccgcg
420

tgagtgatga cggccttcgg gttgtaaagc tctgttaatc gggacgaatg gttcttgtgc
480

gaatagtgcg aggatttgac ggtaccggaa tagaaagcca cggctaacta cgtgccagca
540

gccgcggtaa tacgtagggtg gcaagcggtt tccggaatta ttgggcgtaa agcgcgcgca
600

ggcggattag ttagtctgtc ttaaaagtgc ggggcttaac cccgtgatgg gatggaaact
660

gctgatctag agtatcggag aggaaagtgg aattcctagt gtagcgggtga aatgcgtaga
720

tattaggaag aacaccagtgc gcgaaggcga ctttctggac gaaaactgac gctgaggcgc
780

gaaagccagg ggagcgaacg ggattagata ccccggtagt cctggccgta aacgatgggt
840

actaggtgta ggaggtatcg accccttctg tgccggagtt aacgcaataa gtaccccgcc
900

tggggagtac gaccgcaagg ttgaaactca aaggaattga cgggggcccg cacaagcggg
960

ggagtatgtg gtttaattcg acgcaacgcg aagaacctta ccagggtcttg acattgatgg
1020

acagaactag agatagttcc tcttcttcgg aagccagaaa acagggtgggtg cacgggtgtc
1080

gtcagctcgt gtcgtgagat gttgggttaa gtcccgcaac gagcgcaacc cctatcttat
1140

gttgccagca cttcgggtgg gaactcatga gagactgccg cagacaatgc ggaggaaggc
1200

ggggatgacg tcaaatacatc atgcccctta tgacctgggc tacacacgta ctacaatggg
1260

agttaataga cggaagcgaa accgcgaggt ggagcaaacc cgagaaacac tctctcagtt
1320

cggatcgtag gctgcaactc gcctacgtga agtcggaatc gctagtaatc gcaggtcagc
1380

atactgcggt gaatacgttc ccgggccttg tacacaccgc ccgtcacacc acgaaagtgc
1440

gaagtgccca aagccggtgg ggtaaccttc gggagccagc cgtctaaggt aaagtcgatg
1500

attgggggtga agtcgtaaca aggtagccgt atcggaaggt gcggttgat cacctccttt
1560

<210> 85

<211> 1560

<212> DNA

<213> Artificial Sequence

<220>

<223> Veillonella_dispar.GCF_000160015.BDENPNGG_00523 16S ribosomal
RNA

<400> 85

ttggagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgaagag cgatggaagc ttgcttctat caatcttagt ggcgaacggg tgagtaacgc
120

gtaatcaacc tgcccttcag agggggacaa cagttggaaa cgactgctaa taccgcatac
180

gatctaacct cggcatcgag gatagatgaa aggtggcctc tatttataag ctatcactga
240

aggaggggat tgcgtctgat tagctagttg gaggggtaac ggcccaccaa ggcgatgatc
300

agtagccggt ctgagaggat gaacggccac attgggactg agacacggcc cagactccta
360

cgggaggcag cagtggggaa tcttccgcaa tggacgaaag tctgacggag caacgccgcg
420

tgagtgatga cggccttcgg gttgtaaagc tctgttaatc gggacgaaag gccttcttgc
480

gaatagttag aaggattgac ggtaccggaa tagaaagcca cggctaacta cgtgccagca
540

gccgcggtaa tacgtagggtg gcaagcggtt tccggaatta ttgggcgtaa agcgcgcgca
600

ggcggattgg tcagtctgtc ttaaaagtgc ggggcttaac cccgtgatgg gatggaaact
660

gccaatctag agtatcggag aggaaagtgg aattcctagt gtagcgggtga aatgcgtaga
720

tattaggaag aacaccagtg gcgaaggcga ctttctggac gaaaactgac gctgaggcgc
780

gaaagccagg ggagcgaacg ggattagata ccccggtagt cctggccgta aacgatgggt
840

actaggtgta ggaggtatcg accccttctg tgccggagtt aacgcaataa gtaccccgcc
900

tggggagtac gaccgcaagg ttgaaactca aaggaattga cgggggcccg cacaagcggg
960

ggagtatgtg gtttaattcg acgcaacgcg aagaacctta ccagggtcttg acattgatgg
1020

acagaactag agatagttcc tcttcttcgg aagccagaaa acagggtggtg cacgggtgtc
1080

gtcagctcgt gtcgtgagat gttgggttaa gtcccgcaac gagcgcaacc cctatcttat
1140

gttgccagca ctttgggtgg gaactcatga gagactgccg cagacaatgc ggaggaaggc
1200

ggggatgacg tcaaatacatc atgcccctta tgacctgggc tacacacgta ctacaatggg
1260

agttaataga cggaagcaat accgcgagggt ggagcaaacc cgagaaacac tctctcagtt
1320

cggatcgtag gctgcaactc gcctacgtga agtcggaatc gctagtaatc gcaggtcagc
1380

atactgcggt gaatacgttc ccgggccttg tacacaccgc ccgtcacacc acgaaagtgc
1440

gaagtgccca aagccggtgg ggtaaccttc gggagccagc cgtctaaggt aaagtcgatg
1500

attggggtga agtcgtaaca aggtagccgt atcggaaggt gcggctggat tacctccttt
1560

<210> 86
<211> 1560
<212> DNA
<213> Artificial Sequence

<220>
<223> Veillonella_dispar.GCF_000160015.BDENPNGG_01115 16S ribosomal
RNA

<400> 86
ttggagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgaagag cgatggaagc ttgcttctat caatccttagt ggcgaaacggg tgagtaacgc
120

gtaatcaacc tgcccttcag aggggggacaa cagttggaaa cgactgctaa taccgcatac
180

gatctaacct cggcatcgag gatagatgaa aggtggcctc tatttataag ctatcactga
240

aggaggggat tgcgtctgat tagctagttg gaggggtaac ggcccaccaa ggcgatgac
300

agtagccggt ctgagaggat gaacggccac attgggactg agacacggcc cagactccta
360

cgggaggcag cagtggggaa tcttccgcaa tggacgaaag tctgacggag caacgccgcg
420

tgagtgatga cggccttcgg gttgtaaagc tctgttaatc gggacgaaag gccttcttgc
480

gaatagttag aaggattgac ggtaccggaa tagaaagcca cggctaacta cgtgccagca
540

gccgcggtaa tacgtagggt gcaagcgttg tccggaatta ttgggcgtaa agcgcgcgca
600

ggcggattgg tcagtctgtc ttaaaagttc ggggcttaac cccgtgatgg gatggaaact
660

gccaatctag agtatcggag aggaaagtgg aattcctagt gtagcgggtga aatgcgtaga
720

tattaggaag aacaccagtg gcgaaggcga ctttctggac gaaaactgac gctgaggcgc
780

gaaagccagg ggagcgaacg ggattagata ccccggtagt cctggccgta aacgatgggt
840

actaggtgta ggaggtatcg accccttctg tgccggagtt aacgcaataa gtaccccgcc
900

tggggagtac gaccgcaagg ttgaaactca aaggaattga cgggggcccg cacaagcggg
960

ggagtatgtg gtttaattcg acgcaacgcg aagaacctta ccaggtcttg acattgatgg
1020

acagaactag agatagttcc tcttcttcgg aagccagaaa acaggtggtg cacggttgtc
1080

gtcagctcgt gtcgtgagat gttgggttaa gtcccgcaac gagcgcaacc cctatcttat
1140

gttgccagca ctttgggtgg gaactcatga gagactgccg cagacaatgc ggaggaaggc
1200

ggggatgacg tcaaatacatc atgcccctta tgacctgggc tacacacgta ctacaatggg
1260

agttaataga cggaagcaat accgcgaggt ggagcaaacc cgagaaacac tctctcagtt
1320

cggatcgtag gctgcaactc gcctacgtga agtcggaatc gctagtaatc gcaggtcagc
1380

atactgcggg gaatacgttc ccgggccttg tacacaccgc ccgtcacacc acgaaagtcg
1440

gaagtgccca aagccgggtgg ggtaaccttc gggagccagc cgtctaaggt aaagtcgatg
1500

attggggtga agtcgtaaca aggtagccgt atcggaaggt gcggctggat cacctccttt
1560

<210> 87

<211> 1561

<212> DNA

<213> Artificial Sequence

<220>

<223> Veillonella_parvula.GCF_000215025.NBPOCHED_00439 16S
ribosomal
RNA

<400> 87

ttggagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgaagag cgatggaagc ttgcttctat caatcttagt ggcgaacggg tgagtaacgc
120

gtaatcaacc tgcccttcag agggggacaa cagttggaaa cgactgctaa taccgcatac
180

gatctaattc cggcatcgag gatagatgaa aggtggcctc tacatgtaag ctatcactga
240

aggaggggat tgcgtctgat tagctagttg gaggggtaac ggcccaccaa ggcgatgac
300

agtagccggt ctgagaggat gaacggccac attgggactg agacacggcc cagactccta
360

cgggaggcag cagtggggaa tcttccgcaa tggacgaaag tctgacggag caacgccgcg
420

tgagtgatga cggccttcgg gttgtaaagc tctgttaatc gggacgaaag gccttcttgc
480

gaacagttag aaggattgac ggtaccggaa tagaaagcca cggctaacta cgtgccagca
540

gccgcggtaa tacgtagggt gcaagcggtg tccggaatta ttgggcgtaa agcgcgcgca
600

ggcggatcag tcagtcctgtc ttaaaagttc ggggcttaac cccgtgatgg gatggaaact
660

gctgatctag agtatcggag aggaaagtgg aattcctagt gtagcgggtga aatgcgtaga
720

tattaggaag aacaccagtg gcgaaggcga ctttctggac gaaaactgac gctgaggcgc
780

gaaagccagg ggagcgaacg ggattagata ccccggtagt cctggccgta aacgatgggt
840

actaggtgta ggaggtatcg accccttctg tgccggagtt aacgcaataa gtaccccgcc
900

tggggagtac gaccgcaagg ttgaaactca aaggaattga cgggggcccg cacaagcgg
960

ggagtatgtg gtttaattcg acgcaacgcg aagaacctta ccaggtcttg acattgatgg
1020

acagaactag agatagttcc tcttcttcgg aagccagaaa acaggtggtg cacggttgtc
1080

gtcagctcgt gtcgtgagat gttgggttaa gtcccgcac gagcgcaacc cctatcttat
1140

gttgccagca cgtaatggtg ggaactcatg agagactgcc gcagacaatg cggaggaagg
1200

cgggggatgac gtcaaatacat catgcccctt atgacctggg ctacacacgt actacaatgg
1260

gagttaatag acggaagcga gatcgcgaga tggagcaaac ccgagaaaca ctctctcagt
1320

tcggatcgta ggctgcaact cgcctacgtg aagtcggaat cgctagtaat cgcaggtcag
1380

catactgcgg tgaatacgtt cccgggcctt gtacacaccg cccgtcacac cacgaaagtc
1440

ggaagtgcc aaagccggtg gggtaacctt cgggagccag ccgtctaagg taaagtcgat
1500

gattggggtg aagtcgtaac aaggtagccg tatcggaagg tgcggctgga tcacctcctt
1560

t
1561

<210> 88

<211> 1560

<212> DNA

<213> Artificial Sequence

<220>

<223> Veillonella_ratti.GCF_000315505.DOIPMBPC_01633 16S ribosomal RNA

<400> 88

ttggagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacggagag agatggaagc ttgcttctat caatccttagt ggcgaacggg tgagtaacgc
120

gtaaccaacc tgcccttcag aggggggataa caacgggaaa ccgttgctaa taccgcgtac
180

gaatgaactt cggcatcgga gctcattgaa aggtggcctc tatttataag ctatcgctga
240

aggaggggggt tgcgtctgat tagctagttg gaggggtaac ggcccaccaa ggcaatgatc
300

agtagccggt ctgagaggat gaacggccac attgggactg agacacggcc caaactccta
360

cgggaggcag cagtggggaa tcttccgcaa tggacgaaag tctgacggag caacgccgcg
420

tgagtgatga cggccttcgg gttgtaaagc tctgttaatc gggacgaatg gtctttgtgt
480

gaataatgca aagatttgac ggtaccggaa tagaaagcca cggctaacta cgtgccagca
540

gccgcggtaa tacgtagggtg gcaagcgttg tccggaatta ttgggcgtaa agcgcgcgca
600

ggcggtttca taagtctgtc ttaaaagtgc ggggcttaac cccgtgaggg gatggaaact
660

atggaactgg agtatcggag aggaaagcgg aattcctagt gtagcgggtga aatgcgtaga
720

tattaggaag aacaccagtg gcgaaggcgg ctttctggac gacaactgac gctgaggcgc
780

gaaagccagg ggagcgaacg ggattagata ccccggtagt cctggccgta aacgatgggt
840

actaggtgta ggaggtatcg accccttctg tgccggagtt aacgcaataa gtaccccgcc
900

tggggagtac ggtcgcaagg ctgaaactca aaggaattga cgggggcccg cacaagcgggt
960

ggagtatgtg gtttaattcg acgcaacgcg aagaacctta ccagggtcttg acattgatgg
1020

acgaaacaag agattgtttt tctccttcgg gagccagaaa acagggtggtg cacggctgtc
1080

gtcagctcgt gtcgtgagat gttgggttaa gtcccgcaac gagcgcaacc cctatcttat
1140

gttgccagca cttcgggttg gaactcatga gagactgccg cagacaatgc ggaggaaggc
1200

ggggatgacg tcaagtcacg atgcccctta tgacctgggc tacacacgta ctacaatggg
1260

ctttaataga gggaagcgaa accgcgaggt ggagcaaacc ccagaaacaa gctctcagtt
1320

cggatcgtag gctgcaactc gcctacgtga agtcggaatc gctagtaatc gcaggtcagc
1380

atactgcggt gaatacgttc ccgggccttg tacacaccgc ccgtcacacc acgaaagtcg
1440

gaagtaccca aagccggtgg ggtaaccttc gggagccagc cgtctaaggt aaagtcgatg
1500

attggggtga agtcgtaaca aggtagccgt atcggaaggt gcggctggat cacctccttt
1560

<210> 89
<211> 1562
<212> DNA
<213> Artificial Sequence

<220>
<223> Veillonella_sp_3_1_44.GCF_000163715.NFDDHLDP_00010 16S
ribosomal
RNA

<400> 89
ttggagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgaagag cgatggaagc ttgcttctat caatcttagt ggcgaacggg tgagtaacgc
120

gtaatcaacc tgcccttcag aggggggacaa cagttggaaa cgactgctaa taccgcatac
180

gatctaattc cggcatcgag gatagatgaa aggtggcctc tacatgtaag ctatcactga
240

aggaggggat tgcgtctgat tagctagttg gaggggtaac ggcccaccaa ggcgatgac
300

agtagccggt ctgagaggat gaacggccac attgggactg agacacggcc cagactccta
360

cgggaggcag cagtggggaa tcttccgcaa tggacgaaag tctgacggag caacgccgcg
420

tgagtgatga cggccttcgg gttgtaaagc tctgttaatc gggacgaaag gccttcttgc
480

gaatagtgag aaggattgac ggtaccggaa tagaaagcca cggctaacta cgtgccagca
540

gccgcggtaa tacgtagggtg gcaagcggtg tccggaatta ttgggcgtaa agcgcgcgca
600

ggcggatagg tcagtctgtc ttaaaagtgc ggggcttaac cccgtgatgg gatggaaact
660

gccaatctag agtatcggag aggaaagtgg aattcctagt gtagcgggtga aatgcgtaga
720

tattaggaag aacaccagtg gcgaaggcga ctttctggac gaaaactgac gctgaggcgc
780

gaaagccagg ggagcgaacg ggattagata ccccggtagt cctggccgta aacgatgggt
840

actaggtgta ggaggtatcg accccttctg tgccggagtt aacgcaataa gtaccccgcc
900

tggggagtac gaccgcaagg ttgaaactca aaggaattga cgggggcccg cacaagcggg
960

ggagtatgtg gtttaattcg acgcaacgcg aagaacctta ccagggtcttg acattgatgg
1020

acagaaccag agatgggttcc tcttcttcgg aagccagaaa acagggtggtg cacgggtgtc
1080

gtcagctcgt gtcgtgagat gttgggttaa gtcccgcac gagcgcacac cctatcttat
1140

gttgccagca cgtaaagggtg gggaaactcat gagagactgc cgcagacaat gcggaggaag
1200

gcgggggatga cgtcaaataca tcatgcccct tatgacctgg gctacacacg tactacaatg
1260

ggagttaata gacggaagcg agatcgcgag atggagcaaa cccgagaaac actctctcag
1320

ttcggatcgt aggctgcaac tcgcctacgt gaagtcggaa tcgctagtaa tcgcagggtca
1380

gcatactgcg gtgaatacgt tcccgggcct tgtacacacc gcccgtcaca ccacgaaagt
1440

cggaagtgcc caaagccggt ggggtaacct tcgggagcca gccgtctaag gtaaagtcga
1500

tgattgggggt gaagtcgtaa caaggtagcc gtatcggaag gtgcggctgg atcacctcct
1560

t
1562 t

<210> 90

<211> 1560

<212> DNA

<213> Artificial Sequence

<220>

<223> Veillonella_sp_6_1_27.GCF_000163735.LEKPOLAK_00006 16S
ribosomal
RNA

<400> 90

ttggagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgaagag cgatggaagc ttgcttctat caatcttagt ggcgaacggg tgagtaacgc
120

gtaatcaacc tgcccttcag agggggacaa cagttggaaa cgactgctaa taccgcatac
180

gatctaattc cggcatcgag gatagatgaa aggtggcctc tacatgtaag ctatcactga
240

aggaggggat tgcgtctgat tagctagttg gaggggtaac ggcccaccaa ggcgatgatc
300

agtagccggt ctgagaggat gaacggccac attgggactg agacacggcc cagactccta
360

cgggaggcag cagtggggaa tcttccgcaa tggacgaaag tctgacggag caacgccgcg
420

tgagtgatga cggccttcgg gttgtaaagc tctgttaatc gggacgaaag gccttcttgc
480

gaatagtgag aaggattgac ggtaccggaa tagaaagcca cggctaacta cgtgccagca
540

gccgcggtaa tacgtagggtg gcaagcggtg tccggaatta ttgggcgtaa agcgcgcgca
600

ggcggatcag tcagtctgtc ttaaaagttc ggggcttaac cccgtgatgg gatggaaact
660

gctgatctag agtatcggag aggaaagtgg aattcctagt gtagcgggtga aatgcgtaga
720

tattaggaag aacaccagtg gcgaaggcga ctttctggac gaaaactgac gctgaggcgc
780

gaaagccagg ggagcgaacg ggattagata ccccggtagt cctggccgta aacgatgggt
840

actaggtgta ggaggtatcg accccttctg tgccggagtt aacgcaataa gtaccccgcc
900

tggggagtac gaccgcaagg ttgaaactca aaggaattga cgggggcccg cacaagcgg
960

ggagtatgtg gtttaattcg acgcaacgcg aagaacctta ccaggctcttg acattgatgg
1020

acagaaccag agatggttcc tcttcttcgg aagccagaaa acagggtggtg cacggttgtc
1080

gtcagctcgt gtcgtgagat gttgggttaa gtcccgcac gagcgcgaacc cctatcttat
1140

gttgccagca ctttgggtgg ggactcatga gagactgccg cagacaatgc ggaggaaggc
1200

ggggatgacg tcaaatacgc atgcccctta tgacctgggc tacacacgta ctacaatggg
1260

agttaataga cggaagcgag atcgcgagat ggagcaaacc cgagaaacac tctctcagtt
1320

cggatcgtag gctgcaactc gcctacgtga agtcggaatc gctagtaatc gcaggtcagc
1380

atactgcggt gaatacgttc ccgggccttg tacacaccgc ccgtcacacc acgaaagtcg
1440

gaagtgccca aagccggtgg ggtaaccttc gggagccagc cgtctaaggt aaagtcgatg
1500

attggggtga agtcgtaaca aggtagccgt atcggaaggt gcggctggat cacctccttt
1560

<210> 91

<211> 1560

<212> DNA

<213> Artificial Sequence

<220>

<223> Veillonella_sp_HPA0037.GCF_000411535.CBIHEBNK_00803 16S
ribosomal
RNA

<400> 91

ttggagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgaagaa cgatggaagc ttgcttctat caatcttagt ggcgaacggg tgagtaacgc
120

gtaatcaacc tgcccttcag agggggacaa cagttggaaa cgactgctaa taccgcatac
180

gatccaatct cggcatcgag actggatgaa aggtggcctc tatttataag ctatcactga
240

aggaggggat tgcgtctgat tagctagttg gaggggtaac ggcccaccaa ggcgatgac
300

agtagccggt ctgagaggat gaacggccac attgggactg agacacggcc cagactccta
360

cgggaggcag cagtggggaa tcttccgcaa tggacgaaag tctgacggag caacgccgcg
420

tgagtgatga cggccttcgg gttgtaaagc tctgttaatc gggacgaatg gttcttgtgc
480

aaatagtgcg aggatttgac ggtaccggaa tagaaagcca cggctaacta cgtgccagca
540

gccgcggtaa tacgtagggtg gcaagcggtg tccggaatta ttgggcgtaa agcgcgcgca
600

ggcggattgg tcagtctgtc ttaaaagttc ggggcttaac cccgtgatgg gatggaaact
660

gccaatctag agtatcggag aggaaagtgg aattcctagt gtagcgggtga aatgcgtaga
720

tattaggaag aacaccagtg gcgaaggcga ctttctggac gaaaactgac gctgaggcgc
780

gaaagccagg ggagcgaacg ggattagata ccccggtagt cctggccgta aacgatgggt
840

actaggtgta ggaggtatcg accccttctg tgccggagtt aacgcaataa gtaccccgcc
900

tggggagtac gaccgcaagg ttgaaactca aaggaattga cgggggcccg cacaagcgg
960

ggagtatgtg gtttaattcg acgcaacgcg aagaacctta ccaggctctg acattgatgg
1020

acagaactag agatagttcc tcttcttcgg aagccagaaa acagggtggtg cacggttgtc
1080

gtcagctcgt gtcgtgagat gttgggttaa gtcccgcac gagcgcgaacc cctatcttat
1140

gttgccagca cttcgggtgg gaactcatga gagactgccg cagacaatgc ggaggaaggc
1200

ggggatgacg tcaaatacgc atgcccctta tgacctgggc tacacacgta ctacaatggg
1260

agttaataga cggaagcgaa accgcgaggt ggagcaaacc cgagaaacac tctctcagtt
1320

cggatcgtag gctgcaactc gcctacgtga agtcggaatc gctagtaatc gcaggtcagc
1380

atactgcggt gaatacgttc ccgggccttg tacacaccgc ccgtcacacc acgaaagtcg
 1440

gaagtgccca aagccggtgg ggtaaccttc gggagccagc cgtctaaggt aaagtcgatg
 1500

attggggtga agtcgtaaca aggtagccgt atcggaaggt gcggctggat cacctccttt
 1560

<210> 92
 <211> 1560
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Veillonella_sp_HPA0037.GCF_000411535.CBIHEBNK_01213 16S
 ribosomal
 RNA

<400> 92
 ttggagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcttaaca catgcaagtc
 60

gaacgaagag cgatggaagc ttgcttctat caatcttagt ggcgaacggg tgagtaacgc
 120

gtaatcaacc tgcccttcag agggggacaa cagttggaaa cgactgctaa taccgcatac
 180

gatccaatct cggcatcgag actggatgaa aggtggcctc tatttataag ctatcactga
 240

aggaggggat tgcgtctgat tagctagttg gaggggtaac ggcccaccaa ggcgatgatk
 300

agtagccggt ctgagaggat gaacggccac attgggactg agacacggcc cagactccta
 360

cgggaggcag cagtggggaa tcttccgcaa tggacgaaag tctgacggag caacgccgcg
 420

tgagtgatga cggccttcgg gttgtaaagc tctgttaatc gggacgaatg gttcttgtgc
 480

aaatagtgcg aggatttgac ggtaccggaa tagaaagcca cggctaacta cgtgccagca
540

gccgcggtaa tacgtagggtg gcaagcggtg tccggaatta ttgggcgtaa agcgcgcgca
600

ggcggattgg tcagtctgtc ttaaaagttc ggggcttaac cccgtgatgg gatggaaact
660

gccaatctag agtatcggag aggaaagtgg aattcctagt gtagcgggtga aatgcgtaga
720

tattaggaag aacaccagtg gcgaaggcga ctttctggac gaaaactgac gctgaggcgc
780

gaaagccagg ggagcgaacg ggattagata ccccggtagt cctggccgta aacgatgggt
840

actaggtgta ggaggtatcg accccttctg tgccggagtt aacgcaataa gtaccccgcc
900

tggggagtac gaccgcaagg ttgaaactca aaggaattga cgggggcccg cacaagcgg
960

ggagtatgtg gtttaattcg acgcaacgcg aagaacctta ccaggctctg acattgatgg
1020

acagaaccag agatgggttc tcttcttcgg aagccagaaa acagggtgggtg cacgggtgtc
1080

gtcagctcgt gtcgtgagat gttgggttaa gtcccgcaac gagcgcaacc cctatcttat
1140

gttgccagca cttcgggtgg gaactcatga gagactgccg cagacaatgc ggaggaaggc
1200

ggggatgacg tcaaatacatc atgcccctta tgacctgggc tacacacgta ctacaatggg
1260

agttaataga cggaagcgaa accgcgaggt ggagcaaacc cgagaaacac tctctcagtt
1320

cggatcgtag gctgcaactc gcctacgtga agtcggaatc gctagtaatc gcaggtcagc
1380

atactgcggt gaatacgttc ccgggccttg tacacaccgc ccgtcacacc acgaaagtcg
1440

gaagtgccca aagccggtgg ggtaaccttc gggagccagc cgtctaaggt aaagtcgatg
1500

attggggtga agtcgtaaca aggtagccgt atcggaaggt gtggctggat cacctccttt
1560

<210> 93

<211> 1560

<212> DNA

<213> Artificial Sequence

<220>

<223> Veillonella_sp_HPA0037.GCF_000411535.CBIHEBNK_01774 16S
ribosomal
RNA

<400> 93

ttggagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgaagag cgatggaagc ttgcttctat caatcttagt ggcgaacggg tgagtaacgc
120

gtaatcaacc tacccttcag agggggacaa cagttggaaa cgactgctaa taccgcatac
180

gatccaatct cggcatcgag actggatgaa aggtggcctc tatttataag ctatcactga
240

aggaggggat tgcgtctgat tagctagttg gaggggtaac ggcccaccaa ggcgatgatk
300

agtagccggt ctgagaggat gaacggccac attgggactg agacacggcc cagactccta
360

cgggaggcag cagtggggaa tattccgcaa tggacgaaag tctgacggag caacgccgcg
420

tgagtgatga cggccttcgg gttgtaaagc tctgttaatc gggacgaatg gttcttgtgc
480

gaatagtgcg aggatttgac ggtaccggaa tagaaagcca cggctaacta cgtgccagca
540

gccgcggtaa tacgtagggtg gcaagcggtg tccggaatta ttgggcgtaa agcgcgcgca
600

ggcggattgg tcagtctgtc ttaaaagttc ggggcttaac cccgtgatgg gatggaaact
660

gccaatctag agtatcggag aggaaagtgg aattcctagt gtagcgggtga aatgcgtaga
720

tattaggaag aacaccagtg gcgaaggcga ctttctggac gaaaactgac gctgaggcgc
780

gaaagccagg ggagcgaacg ggattagata ccccggtagt cctggccgta aacgatgggt
840

actaggtgta ggaggtatcg accccttctg tgccggagtt aacgcaataa gtaccccgcc
900

tggggagtac gaccgcaagg ttgaaactca aaggaattga cgggggcccg cacaagcgg
960

ggagtatgtg gtttaattcg acgcaacgcg aagaacctta ccaggctcttg acattgatgg
1020

acagaaccag agatgggttc tcttcttcgg aagccagaaa acagggtggtg cacgggtgtc
1080

gtcagctcgt gtcgtgagat gttgggttaa gtcccgcaac gagcgcaacc cctatcttat
1140

gttgccagca cttcgggtgg gaactcatga gagactgccg cagacaatgc ggaggaaggc
1200

ggggatgacg tcaaatacatc atgcccctta tgacctgggc tacacacgta ctacaatggg
1260

agttaataga cggaagcgaa accgcgaggt ggagcaaacc cgagaaacac tctctcagtt
1320

cggatcgtag gctgcaactc gcctacgtga agtcggaatc gctagtaatc gcaggtcagc
1380

atactgcggt gaatacgttc ccgggccttg tacacaccgc ccgtcacacc acgaaagtcg
 1440

gaagtgccca aagccggtgg ggtaaccttc gggagccagc cgtctaaggt aaagtcgatg
 1500

attggggtga agtcgtaaca aggtagccgt atcggaaggt gcggctggat cacctccttt
 1560

<210> 94
 <211> 885
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Veillonella_sp_oral_taxon_158.GCF_000183505.MDJKJNHE_00001
 16S
 ribosomal RNA (partial)

<400> 94
 ttggagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcttaaca catgcaagtc
 60

gaacgaagag cgatggaagc ttgcttctat caatcttagt ggcgaacggg tgagtaacgc
 120

gtaatcaacc tgcccttcag agggggacaa cagttggaaa cgactgctaa taccgcatac
 180

gatccaatct cggcatcgag gatggatgaa aggtggcctc tatttataag ctatcactga
 240

aggaggggat tgcgtctgat tagctagttg gaggggtaac ggcccaccaa ggcaatgatk
 300

agtagccggt ctgagaggat gaacggccac attgggactg agacacggcc cagactccta
 360

cgggaggcag cagtggggaa tcttccgcaa tggacgaaag tctgacggag caacgccgcg
 420

tgagtgatga cggccttcgg gttgtaaagc tctgttaatc gggacgaaag gtcttcttgc
 480

gaatagttag aagaattgac ggtaccggaa tagaaagcca cggctaacta cgtgccagca
 540

gccgcggtaa tacgtagggtg gcaagcggtg tccggaatta ttgggcgtaa agcgcgcgca
 600

ggcggatcag ttagtctgtc ttaaaagttc ggggcttaac cccgtgatgg gatggaaact
 660

gctgatctag agtatcggag aggaaagtgg aattcctagt gtagcgggtga aatgcgtaga
 720

tattaggaag aacaccagtg gcgaaggcga ctttctggac gaaaactgac gctgaggcgc
 780

gaaagccagg ggagcgaacg ggattagata ccccggtagt cctggccgta aacgatgggt
 840

actagggtgta ggaggtatcg accccttctg tgccggagtt aacgc
 885

<210> 95
 <211> 884
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Veillonella_sp_oral_taxon_158.GCF_000183505.MDJKJNHE_01282
 16S
 ribosomal RNA (partial)

<400> 95
 ttggagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcttaaca catgcaagtc
 60

gaacgaagag cgatggaagc ttgcttctat caatcctagt ggcgaacggg tgagtaacgc
 120

gtaatcaacc tgcccttcag agggggacaa cagttggaaa cgactgctaa taccgcatac
 180

gatccaacct cggcatcgag gatggatgaa aggtggcctc tatttataag ctatcactga
 240

aggaggggat tgcgtctgat tagctagttg gaggggtaac ggcccaccaa ggcaatgatac
300

agtagccggt ctgagaggat gaacggccac attgggactg agacacggcc cagactccta
360

cgggaggcag cagtggggaa tcttccgcaa tggacgaaag tctgacggag caacgccgcg
420

tgagtgatga cggccttcgg gttgtaaagc tctgttaatc gggacgaaag gtcctcttgc
480

gaatagttag aggaattgac ggtaccggaa tagaaagcca cggctaacta cgtgccagca
540

gccgcggtaa tacgtagggtg gcaagcggtg tccggaatta ttgggcgtaa agcgcgcgca
600

ggcggatcag tcagtctgtc ttaaaagtgc ggggcttaac cccgtgatgg gatggaaact
660

gctgatctag agtatcggag aggaaagtgg aattcctagt gtagcgggtga aatgcgtaga
720

tataggaaga acaccagtgg cgaaggcgac tttctggacg aaaactgacg ctgaggcgcg
780

aaagccaggg gagcgaacgg gattagatac cccggtagtc ctggccgtaa acgatgggta
840

ctagggtgtag gaggtatcga ccccttctgt gccggagtta acgc
884

<210> 96

<211> 1561

<212> DNA

<213> Artificial Sequence

<220>

<223> Veillonella_sp_oral_taxon_158.GCF_000183505.MDJKJNHE_01728
16S

ribosomal RNA

<400> 96

ttggagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgaagag cgatggaagc ttgcttctat caatcttagt ggcgaacggg tgagtaacgc
120

gtaatcaacc tgcccttcag agggggacaa cagttggaaa cgactgctaa taccgcatac
180

gatccaacct cggcatcgag gatggatgaa aggtggcctc tatttataag ctatcactga
240

aggaggggat tgcgtctgat tagctagttg gaggggtaac ggcccaccaa ggcaatgatc
300

agtagccggt ctgagaggat gaacggccac attgggactg agacacggcc cagactccta
360

cgggaggcag cagtggggaa tcttccgcaa tggacgaaag tctgacggag caacgccgcg
420

tgagtgatga cggccttcgg gttgtaaagc tctgttaatc gggacgaaag gtcttcttgc
480

gaatagttag aagaattgac ggtaccggaa tagaaagcca cggctaacta cgtgccagca
540

gccgcggtaa tacgtaggtg gcaagcgttg tccggaatta ttgggcgtaa agcgcgcgca
600

ggcggatcag ttagtctgtc ttaaaagttc ggggcttaac cccgtgatgg gatggaaact
660

gctgatctag agtatcggag aggaaagtgg aattcctagt gtagcgggtga aatgcgtaga
720

tattaggaag aacaccagtg gcgaaggcga ctttctggac gaaaactgac gctgaggcgc
780

gaaagccagg ggagcgaacg ggattagata ccccggtagt cctggccgta aacgatgggt
840

actaggtgta ggaggtatcg accccttctg tgccggagtt aacgcaataa gtaccccgcc
900

tggggagtac gaccgcaagg ttgaaactca aaggaattga cgggggcccg cacaagcggg
960

ggagtatgtg gtttaattcg acgcaacgcg aagaacctta ccaggtcttg acattgatgg
1020

acagaactag agatagttcc tcttcttcgg aagccagaaa acaggtgggtg cacggttgtc
1080

gtcagctcgt gtcgtgagat gttgggttaa gtcccgaac gagcgcaacc cctatcttat
1140

gttgccagca cgtaatgggtg ggaactcatg agagactgcc gcagacaatg cggaggaagg
1200

cgggggatgac gtcaaatacat catgcccctt atgacctggg ctacacacgt actacaatgg
1260

gagttaatag acggaagcga gatcgcgaga tggagcaaac ccgagaaaca ctctctcagt
1320

tcggatcgta ggctgcaact cgcctacgtg aagtcggaat cgctagtaat cgcaggtcag
1380

catactgcgg tgaatacgtt cccgggcctt gtacacaccg cccgtcacac cacgaaagtc
1440

ggaagtgcc aaagccgggtg gggtaacctt cgggagccag ccgtctaagg taaagtcgat
1500

gattgggggtg aagtcgtaac aaggtagccg tatcggaagg tgcggctgga tcacctcctt
1560

t
1561

<210> 97

<211> 887

<212> DNA

<213> Artificial Sequence

<220>

<223> Veillonella_sp_oral_taxon_158.GCF_000183505.MDJKJNHE_01900
16S

ribosomal RNA (partial)

<400> 97

ttggagagtt tgatcctggc gtcaggacga acggctggcg gcgtgcttaa cacatgcaag
60

tcgaacgaag agcgatggaa gcttgcttct atcaatctta gtggcgaacg ggtgagtaac
120

gcgtaatcaa cctgcccttc agagggggac aacagttgga aacgactgct aataccgcat
180

acgattcgac ctcggcacgc aggatggatg aaaggtggcc tctatttata agctatcact
240

gaaggagggg attgcgtctg attagctagt tggaggggta acggcccacc aaggcaatga
300

tcagtagccg gtctgagagg atgaacggcc acattgggac tgagacacgg cccagactcc
360

tacgggaggc agcagtgggg aatcttccgc aatggacgaa agtctgacgg agcaacgccg
420

cgtgagtgat gacggccttc gggttgtaaa gctctgttaa tcgggacgaa aggtcctctt
480

gcgaatagtt agaggaattg acggtaccgg aatagaaagc cacggctaac tacgtgccag
540

cagccgcggt aatacgtagg tggcaagcgt tgtccggaat tattgggcgt aaagcgcgcg
600

caggcggatc agttagtctg tcttaaaagt tcggggctta accccgtgat gggatggaaa
660

ctgctgatct agagtatcgg agaggaaagt ggaattccta gtgtagcggg gaaatgcgta
720

gatattagga agaacaccag tggcgaaggc gactttctgg acgaaaactg acgctgaggc
780

gcgaaagcca ggggagcgaa cgggattaga taccgccgta gtcctggccg taaacgatgg
840

gtactaggtg taggaggtat cgaccccttc tgtgccggag ttaacgc
887

<210> 98

<211> 1016

<212> DNA

<213> Artificial Sequence

<220>

<223> Veillonella_sp_oral_taxon_780.GCF_000221605.ANLHGNC_00377
16S

ribosomal RNA (partial)

<400> 98

cttggagagt ttgatcctgg ctcaggacga acgctggcgg cgtgcttaac acatgcaagt
60

cgaacggaca gacagagagc ttgctctctt gaagttagtg gcgaacgggt gagtaacgcg
120

taatcaacct gcccttcaga gggggataac aacgggaaac cgttgctaata accgcgtacg
180

attcataagt ggcacgcgtt gtgaatgaaa ggtggcctct atgtataagc tatcgtgaa
240

ggaggggatt gcgtctgatt agctagttgg aggggtaacg gccaccaag gcaatgatca
300

gtagccggtc tgagaggatg aacggccaca ttgggactga gacacggccc aaactcctac
360

gggaggcagc agtggggaat cttccgcaat ggacgaaagt ctgacggagc aacgccgcgt
420

gagtgatgaa ggtcttcgga ttgtaaagct ctgttaatcg ggacgaaaga gttctgtgtg
480

aataatgcag aaaagtgacg gtaccggaat agaaagccac ggctaactac gtgccagcag
540

ccgcggtaat acgtaggtgg caagcgttgt ccggaattat tgggcgtaaa gcgcgcgcag
600

gcggcctatc cagtctgtct taaaagttcg gggctcaacc ccgtgatggg atggaaacta
 660

gtaggctaga gtatcggaga ggaaagcgga attcctagt tagcggtgaa atgcgtagat
 720

attaggaaga acaccagtgg cgaaggcggc tttctggacg aaaactgacg ctgaggcgcg
 780

aaagccaggg gagcgaacgg gattagatac cccggtagtc ctggccgtaa acgatgggta
 840

ctaggtgtag gaggtatcga ccccttctgt gccggagtta acgcaataag taccgccct
 900

ggggagtacg gtcgcaaggc tgaaactcaa aggaattgac gggggcccgc acaagcggtg
 960

gagtatgtgg ttttaattcga cgcaacgcga agaaccttac caggtcttga cattga
 1016

<210> 99
 <211> 1559
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Veillonella_sp_oral_taxon_780.GCF_000221605.ANLHGNC_00528
 16S
 ribosomal RNA

<400> 99
 ttggagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcttaaca catgcaagtc
 60

gaacggacag acagagagct tgctctcttg aagttagtgg cgaacgggtg agtaacgcgt
 120

aatcaacctg cccttcagag ggggataaca acgggaaacc gttgctaata ccgcgtacga
 180

ttcacaggcg gcatcgcttg tgaatgaaag gtggcctcta tatataagct atcgctgaag
 240

gaggggattg	cgtctgatta	gctagttgga	ggggtaacgg	cccaccaagg	caatgatcag
300					
tagccggtct	gagaggatga	acggccacat	tgggactgag	acacggccca	aactcctacg
360					
ggaggcagca	gtggggaatc	ttccgcaatg	gacgaaagtc	tgacggagca	acgccgcgtg
420					
agtgatgaag	gtcttcggat	tgtaaagctc	tgtaaatcgg	gacgaaagag	ttctgtgtga
480					
ataatgcaga	aaagtgacgg	taccggaata	gaaagccacg	gctaactacg	tgccagcagc
540					
cgcggttaata	cgtaggtggc	aagcgttgtc	cggaattatt	gggcgtaaag	cgcgcgcagg
600					
cggcctatcc	agtctgtctt	aaaagttcgg	ggctcaaccc	cgtgatggga	tggaactag
660					
taggctagag	tatcggagag	gaaagcggaa	ttcctagtgt	agcggtgaaa	tgcgtagata
720					
ttaggaagaa	caccagtggc	gaaggcggct	ttctggacga	aaactgacgc	tgaggcgcgga
780					
aagccagggg	agcgaacggg	attagatacc	ccggtagtcc	tggccgtaaa	cgatgggtac
840					
taggtgtagg	aggtatcgac	cccttctgtg	ccggagttaa	cgcaataagt	acccgcctg
900					
gggagtacgg	tcgcaaggct	gaaactcaaa	ggaattgacg	ggggcccgca	caagcggtagg
960					
agtatgtggt	ttaattcgac	gcaacgcgaa	gaaccttacc	aggtcttgac	attgatggac
1020					
gaaacaagag	attgtttttc	tccttcggga	gccagaaaac	aggtggtgca	cggctgtcgt
1080					
cagctcgtgt	cgtgagatgt	tgggttaagt	cccgcaacga	gcgcaacccc	tatcttatgt
1140					

tgccagcacg taaagggtggg aactcatgag agactgccgc agacaatgcg gaggaaggcg
 1200

gggatgacgt caagtcatca tgccccttat gacctgggct acacacgtac tacaatgggc
 1260

tttaatagag ggaagcgaag ccgcgagggtg gagcaaacc cagaaacaag ctctcagttc
 1320

ggatcgtagg ctgcaactcg cctacgtgaa gtcggaatcg ctagtaatcg caggtcagca
 1380

tactgcggtg aatacgttcc cgggccttgt acacaccgcc cgtcacacca cgaaagtcgg
 1440

aagtacccaa agccgggtggg gtaaccttcg ggagccagcc gtctaaggta aagtcgatga
 1500

ttgggggtgaa gtcgtaacaa ggtagccgta tcggaagggtg cggctggatc acctccttt
 1559

<210> 100
 <211> 1559
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Veillonella_sp_oral_taxon_780.GCF_000221605.ANLHGNC_00834
 16S
 ribosomal RNA

<400> 100
 ttggagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcttaaca catgcaagtc
 60

gaacggacag acagagagct tgctctcttg aagttagtgg cgaacgggtg agtaacgcgt
 120

aatcaacctg cccttcagag ggggataaca acgggaaacc gttgctaata ccgcgtacga
 180

ttcacaggcg gcatcgcttg tgaatgaaag gtggcctcta tatataagct atcgctgaag
 240

gaggggattg cgtctgatta gctagttgga ggggtaacgg cccaccaagg caatgatcag
300

tagccggtct gagaggatga acggccacat tgggactgag acacggccca aactcctacg
360

ggaggcagca gtggggaatc ttccgcaatg gacgaaagta ctgacggagc aacgccgcgt
420

gagtgatgaa ggtcttcgga ttgtaaagct ctgttaatcg ggacgaaaga gttctgtgtg
480

aataatgcag aaaagtgacg gtaccggaat agaaagccac ggctaactac gtgccagcag
540

ccgcggtaat acgtagggtg caagcgttgt ccggaattat tgggcgtaaa gcgcgcgcag
600

gcggcctatc cagtctgtct taaaagttcg gggctcaacc ccgtgatggg atggaaacta
660

gtaggctaga gtatcggaga ggaaagcgga attcctagtg tagcggtgaa atgcgtagat
720

attaggaaga acaccagtgg cgaaggcggc tttctggacg aaaactgacg ctgaggcgcg
780

aaagccaggg gagcgaacgg gattagatac cccggtagtc ctggccgtaa acgatgggta
840

ctagggtgtag gaggtatcga ccccttctgt gccggagtta acgcaataag taccgccct
900

ggggagtacg gtcgcaaggc tgaaactcaa aggaattgac gggggcccgc acaagcggtg
960

gagtatgtgg ttttaattcga cgcaacgcga agaaccttac caggtcttga cattgatgga
1020

cgaagcaaga gattgttttt ctccttcggg agccagaaaa caggtggtgc acggctgtcg
1080

tcagctcgtg tcgtgagatg ttgggttaag tcccgcaacg agcgcaaccc ctatcttatg
1140

ttgccagcac ttcgggtggg aactcatgag agactgccgc agacaatgcg gaggaaggcg
 1200

gggatgacgt caagtcatca tgccccttat gacctgggct acacacgtac tacaatgggc
 1260

tttaatagag ggaagcgaag ccgcgagggtg gagcaaacc cagaaacaag ctctcagttc
 1320

ggatcgtagg ctgcaactcg cctacgtgaa gtcggaatcg ctagtaatcg caggtcagca
 1380

tactgcggtg aatacgttcc cgggccttgt acacaccgcc cgtcacacca cgaaagtcgg
 1440

aagtacccaa agccggtggg gtaaccttcg ggagccagcc gtctaaggta aagtcgatga
 1500

ttggggtgaa gtcgtaacaa ggtagccgta tcggaagggtg cggctggatc acctccttt
 1559

<210> 101
 <211> 1558
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Veillonella_sp_oral_taxon_780.GCF_000221605.ANLHGNC_01072
 16S
 ribosomal RNA

<400> 101
 ttggagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcttaaca catgcaagtc
 60

gaacggacag acagagagct tgctctcttg aagttagtgg cgaacgggtg agtaacgcgt
 120

aatcaacctg cccttcagag ggggataaca acgggaaacc gttgctaata ccgcgtacga
 180

ttcataggcg gcatcgcttg tgaatgaaag gtggcctcta tatataagct atcgctgaag
 240

gaggggattg cgtctgatta gctagttgga ggggtaacgg cccaccaagg caatgatcag
300

tagccggtct gagaggatga acggccacat tgggactgag acacggccca aactcctacg
360

ggaggcagca gtggggaatc ttccgcaatg gacgaaagtc tgacggagca acgccgcgtg
420

agtgatgaag gtcttcggat tgtaaagctc tgттаатсgg gacgaaagag ttctgtgtga
480

ataatgcaga aaagtгacgg taccggaata gaaagccacg gctaactacg tgccagcagc
540

cgcggtataa cgtaggtggc aagcgттgtc cggaattatt gggcgtaaag cgcgcgсagg
600

cggcctatcc agtctgtctt aaaagttcgg ggctcaaccc cgtgatggga tggaaactag
660

taggctagag tatcgгagag gaaagcgгaa ttсctagtgt agcggtgaaa tgcgtagata
720

ttaggaagaa caccagtggc gaaggcgгct ttctggacga aaactгacgc tgaggcgсga
780

aagccagggg agcгаacggg attagatacc ccggtagtcc tggccgtaaa cgatgggtac
840

taggtgtagg aggtatcgac cccttctgtg ccggagttaa cgcaataagt accccgcctg
900

gggagtacgg tcгcaaggct gaaactcaaa ggaattгacg ggggcccгca caagcggtgg
960

agtatgtggt ttaattcgac гcaacгcgaa gaaccttacc aggtcttgac attgatggac
1020

gaaacaagag attgtttttc tccttcggga gccagaaaac aggtggtgca cggctgtcgt
1080

cagctcgtgt cgtгagatgt tgggttaagt cccгcaacga гcгcaacccc tatcttatgt
1140

tgccagcact tcgggtggga actcatgaga gactgccgca gacaatgcgg aggaaggcgg
 1200

ggatgacgtc aagtcacat gcccttatg acctgggcta cacacgtact acaatgggct
 1260

ttaatagagg gaagcgaagc cgcgagggtg agcaaaccac agaaacaagc tctcagttcg
 1320

gatcgtaggc tgcaactcgc ctacgtgaag tcggaatcgc tagtaatcgc aggtcagcat
 1380

actgcggtga atacgttccc gggccttgta cacaccgccc gtcacaccac gaaagtcgga
 1440

agtaccctaaa gccgggtgggg taaccttcgg gagccagccg tctaaggtaa agtcgatgat
 1500

tgggggtgaag tcgtaacaag gtagccgtat cggaagggtg ggctggatca cctccttt
 1558

<210> 102
 <211> 1248
 <212> DNA
 <213> artificial sequence

<220>
 <223> SPC11312_contig000132_1_1248

<400> 102
 ggctcaccaa ggcgacgac agtagccgga ctgagagggt ggccggccac attgggactg
 60

agacacggcc cagactccta cgggaggcag cagtggggaa tattgggcaa tgggcgaaag
 120

cctgaccag caacgccgcg tgaaggaaga aggccctcgg gttgtaaact tcttttgtca
 180

gggacgaagc aagtgacggt acctgacgaa taagccacgg ctaactacgt gccagcagcc
 240

gcggtaatac gtaggtggca agcggttatcc ggatttactg ggtgtaaagg gcgtgtaggc
 300

gggagtgcaa gtcagatgtg aaaactatgg gctcaacca tagcctgcat ttgaaactgt
360

acttcttgag tgatggagag gcaggcggaa ttccctgtgt agcggtgaaa tgcgtagata
420

tagggaggaa caccagtggc gaaggcggcc tgctggacat taactgacgc tgaggcgcga
480

aagcgtgggg agcaaacagg attagatacc ctggtagtcc acgccgtaaa cgatggatac
540

taggtgtggg gggctctgacc ccctccgtgc cgcagttaac acaataagta tcccacctgg
600

ggagtacgat cgcaagggtt aaactcaaag gaattgacgg gggcccgcac aagcggtgga
660

gtatgtggtt taattcgaag caacgcgaag aaccttacca ggacttgaca tcctactaac
720

gaagcagaga tgcataaggt gcccttcggg gaaagtagag acaggtggtg catggttgtc
780

gtcagctcgt gtcgtgagat gttgggttaa gtcccgcac gagcgcaacc cttattgtta
840

gttgctacgc aagagcactc tagcgagact gccgttgaca aaacggagga aggtggggac
900

gacgtcaaat catcatgccc cttatgtcct gggccacaca cgtactacaa tggcgggtcaa
960

cagagggaag caaagccgcg aggtggagca aatccctaaa agccgtccca gttcggattg
1020

caggctgaaa ctgcctgta tgaagtcgga atcgctagta atcgcggatc agcatgccgc
1080

ggtgaatacg ttcccggggc ttgtacacac cgcccgtcac accatgagag tcgggaacac
1140

ccgaagtccg tagcctaaca gcaatggggg cgcgggccgaa ggtgggttcg ataattgggg
1200

tgaagtcgta acaaggtagc cgtatcggaa ggtgcggtg gatcacct
1248

<210> 103

<211> 1491

<212> DNA

<213> artificial sequence

<220>

<223> SPC10925_contig000052_38_1528

<400> 103

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gattctcttc ggagaagagc ggcggacggg tgagtaacgc gtgggtaacc tgccctgtac
120

acacggataa cataccgaaa ggtatgctaa tacgggataa cataagaaat tcgcatgttt
180

ttcttatcaa agctccggcg gtacaggatg gacccgcgtc tgattagcta gttggtgagg
240

taacggctca ccaaggcgac gatcagtagc cgacctgaga gggatgatcg ccacattgga
300

actgagacac ggtccaaact cctacgggag gcagcagtgg ggaatattgc acaatgggcg
360

aaagcctgat gcagcaacgc cgcgtgagcg atgaaggcct tcgggtcgta aagctctgtc
420

ctcaaggaag ataatgacgg tacttgagga ggaagccccg gctaactacg tgccagcagc
480

cgcggttaata cgtagggggc tagcgttatc cggatttact gggcgtaaag ggtgcgtagg
540

cggtctttta agtcaggagt gaaaggctac ggctcaaccg tagtaagctc ttgaaactgg
600

aggacttgag tgcaggagag gagagtggaa ttcctagtgt agcggtgaaa tgcgtagata
660

ttaggaggaa caccagtagc gaaggcggct ctctggactg taactgacgc tgaggcacga
720

aagcgtgggg agcaaacagg attagatacc ctggtagtcc acgccgtaaa cgatgagtac
780

taggtgtcgg gggttacccc cctcgggtgcc gcagctaacg cattaagtac tccgcctggg
840

gagtacgctc gcaagagtga aactcaaagg aattgacggg gacccgcaca agtagcggag
900

catgtggttt aattcgaagc aacgcgaaga accttaccta agcttgacat ccttttgacc
960

gatgcctaata cgcatctttc ccttcgggga cagaagtgc aggtgggtgca tggttgtcgt
1020

cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct tgcctttagt
1080

tgccatcatt aagttgggca ctctagaggg actgccaggg ataacctgga ggaaggtggg
1140

gatgacgtca aatcatcatg ccccttatgc ttagggctac acacgtgcta caatgggtgg
1200

tacagagggc agcgaagtcg tgaggccaag ctaatccctt aaagccattc tcagttcgga
1260

ttgtaggctg aaactcgcct acatgaagct ggagttacta gtaatcgcag atcagaatgc
1320

tgcggtgaat gcgttcccgg gtcttgtaca caccgcccgt cacaccatgg gagttggggg
1380

cgcccgaagc cggctagcta accttttgga agcggtcgtc gaaggtgaaa ccaataactg
1440

gggtgaagtc gtaacaaggt agccgtatcg gaaggtgcgg ctggatcacc t
1491

<210> 104

<211> 1520

<212> DNA

<213> artificial sequence

<220>

<223> SPC11756_contig000082_314_1833

<400> 104

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgaac
60

gaagttacac agaggaagtt ttcggatgga atcagtataa cttagtggcg gacgggtgag
120

taacgcgtgg gaaacctgcc ctgtaccggg ggataacact tagaaatagg tgctaatacc
180

gcataagcgc acggatccgc atggttctgt gtgaaaaact ccggtggtac aggatggtcc
240

cgcgctctgat tagccagttg gcagggtaac ggcctaccaa agcgacgatc agtagccggc
300

ctgagagggt gaacggccac attgggactg agacacggcc caaactccta cgggaggcag
360

cagtggggaa tattgcacaa tgggggaaac cctgatgcag cgacgccgcg tgagtgaaga
420

agtatttcgg tatgtaaagc tctatcagca gggaagaaaa tgacgggtacc tgactaagaa
480

gccccggcta actacgtgcc agcagccgcg gtaatacgta gggggcaagc gttatccgga
540

tttactgggt gtaaaggag cgtagacggc atggcaagcc agatgtgaaa acccagggct
600

caaccttggg attgcatttg gaactgccag gctggagtgc aggagaggta agcggaattc
660

ctagtgtagc ggtgaaatgc gtagatatta ggaggaacac cagtggcgaa ggcggcttac
720

tggactgtaa ctgacgttga ggctcgaaag cgtggggagc aaacaggatt agataccctg
780

gtagtccacg cggtaaacga tgattgctag gtgtaggtgg gtatggaccc atcggtgccg
840

cagctaacgc aataagcaat ccacctgggg agtacgttcg caagaatgaa actcaaagga
900

attgacgggg acccgacaaa gcggtggagc atgtgggttta attcgaagca acgcgaagaa
960

ccttaccaag tcttgacatc ccaatgacgc gcctgtaaag aggtgttccc ttcggggcat
1020

tggagacagg tgggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc
1080

gcaacgagcg caacccttat tcttagtagc cagcaggtag agctgggcac tctaaggaga
1140

ctgccgggga taaccgggag gaaggcgggg atgacgtcaa atcatcatgc cccttatgat
1200

ttgggctaca cacgtgctac aatggcgtaa acaaaggga gcgagacagt gatgtggagc
1260

aaatcccaga aataacgtct cagttcggat tgtagtctgc aactcgacta catgaagctg
1320

gaatcgctag taatcgcgaa tcagcatgtc gcggtgaata cgttcccggg tcttgtaacac
1380

accgcccgtc acaccatggg agttggaaat gcccgaagtc tgtgacctaa ccgaaaggga
1440

ggagcagccg aaggcaggtc tgataactgg ggtgaagtcg taacaaggta gccgtatcgg
1500

a a g g t g c g g c t g g a t c a c c t
1520

<210> 105

<211> 1502

<212> DNA

<213> artificial sequence

<220>

<223> SPC10439_contig000095_88_1589

<400> 105

agagtttgat cctggctcag gacgaacgct ggcggcgcgc ctaacacatg caagtcgaac
60

ggaacttgag agagcttgct ttttcaagtt tagtggcgaa cgggtgagta acgcgtgagt
120

aacctgccct ggagtggggg acaacagttg gaaacgactg ctaataccgc ataagcccac
180

ggcaccgcat ggtactgagg gaaaaggatt tattcgcttc aggatggact cgcgccaat
240

tagctagttg gtgaggtaac ggcccaccaa ggcgacgatt ggtagccgga ctgagaggtt
300

gaacggccac attgggactg agacacggcc cagactccta cgggaggcag cagtggggga
360

tattgcacaa tgggggaaac cctgatgcag cgacgccgcg tggaggaaga aggttttcgg
420

attgtaaact cctgtcgtac gggacgataa tgacgggtacc gtacaagaaa gccacggcta
480

actacgtgcc agcagccgcg gtaaaacgta ggtggcaagc gttgtccgga attactgggt
540

gtaaagggag cgcaggcgga ccggcaagtt ggaagtgaat tctatgggct caaccataa
600

attgctttca aaactgctgg ccttgagtag tgcagaggta ggcggaattc ccggtgtagc
660

ggtggaatgc gtagatatcg ggaggaacac cagtggcgaa ggcggcctac tgggcaccaa
720

ctgacgctga ggctcgaaag catgggtagc aaacaggatt agataccctg gtagtccatg
780

ccgtaaacga tgattactag gtgttgagg attgaccct tcagtgccgc agttaacaca
840

ataagtaatc cacctgggga gtacgaccgc aaggttgaaa ctcaaaggaa ttgacggggg
900

cccgcacaaag cagtggagta tgtggtttta ttcgaagcaa cgcgagaagac cttaccaggt
960

cttgacatcc gatgcatagt gcagagatgc atgaagtcct tcgggacatc gagacaggtg
1020

gtgcatgggt gtcgtcagct cgtgtcgtga gatgttgggt taagtcccgc aacgagcgca
1080

acccttattg ccagttacta cgcaagagga ctctggcgag actgccgttg acaaaacgga
1140

ggaaggtggg gatgacgtca aatcatcatg ccctttatga cctgggctac acacgtacta
1200

caatggcggt taacaaagag aagcaatacc gcgaggtgga gcaaaactca aaaacaacgt
1260

ctcagttcag attgcaggct gcaactcgcc tgcattgaagt cggaattgct agtaatcgcg
1320

gatcagcatg ccgcggtgaa tacgttcccg ggccttgtac acaccgcccg tcacaccatg
1380

agagccgggg ggacccgaag tccgtagtct aaccgcaagg aggacgcggc cgaaggtaaa
1440

actggtgatt ggggtgaagt cgtaacaagg tagccgtatc ggaaggtgcg gctggatcac
1500

c t
1502

<210> 106

<211> 1234

<212> DNA

<213> artificial sequence

<220>

<223> SPC12243_contig000075_330_1563

<400> 106

cgatcagtag ccgacctgag aggggtgaccg gccacattgg gactgagaca cggcccaaac
60

tcctacggga ggcagcagtg gggaaatattg cacaatgggg gaaaccctga tgcagcgacg
120

ccgcgtgagc gaagaagtat ttcgggtatgt aaagctctat cagcagggaa gaagaatgac
180

ggtacctgac taagaagcac cggctaaata cgtgccagca gccgcggtaa tacgtatggt
240

gcaagcgtaa tccggattta ctgggtgtaa agggagcgca ggcggtacgg caagtctgat
300

gtgaaatccc ggggctcaac cccggtactg cattggaaac tgtcggacta gagtgtcggg
360

ggggtaagtg gaattcctag tgtagcgggtg aaatgcgtag atattaggag gaacaccagt
420

ggcgaaggcg gcttactgga cgattactga cgctgaggct cgaaagcgtg gggagcaaac
480

aggattagat accctggtag tccacgccgt aaacgatgaa tactaggtgt cggggagcat
540

tgctcttcgg tgccgcagca aacgcaataa gtattccacc tggggagtag gttcgcaaga
600

atgaaactca aaggaattga cggggacccg cacaagcggg ggagcatgtg gtttaattcg
660

aagcaacgcg aagaacctta ccaagtcttg acatcccact gaccgagtat gtaatgtact
720

ttctcttcgg agcagtgggtg acagggtgggtg catgggttgtc gtcagctcgt gtcgtgagat
780

gttggggttaa gtcccgcaac gagcgcaacc cctattctta gtagccagcg gtttggccgg
840

gcactctagg gagactgccg gggataacct ggaggaaggt ggggatgacg tcaaatacat
900

atgcccctta tgacttgggc tacacacgtg ctacaatggc gtaaacaag ggaagcaatc
960

ccgcgagggg gagcaaactc caaaaataac gtctcagttc ggactgtagt ctgcaactcg
1020

actacacgaa gctggaatcg ctagtaatcg cgaatcagaa tgtcgcggtg aatacgttcc
1080

cggttcttgt acacaccgcc cgtcacacca tgggagttgg taatgcccga agtcagtgac
1140

ccaaccgcaa ggaggagct gccgaaggca ggactgataa ctggggtgaa gtcgtaacaa
1200

g g t a g c c g t a t c g g a a g g t g c g g c t g g a t c a c c t
1234

<210> 107

<211> 1521

<212> DNA

<213> artificial sequence

<220>

<223> SPC10415_contig000001_33168_34688

<400> 107

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

gaagcgctta aacggatttc ttcggattga agttttttgtg actgagcggc ggacgggtga
120

gtaacgcgtg ggtaacctgc ctcatacagg gggataacag ttagaaatgg ctgctaatac
180

cgcataagcg cacaggaccg catgggtctgg tgtgaaaaac tccggtggta tgagatggac
240

ccgcgtctga ttagctagtt ggaggggtaa cggcccacca aggcgacgat cagtagccgg
300

cctgagaggg tgaacggcca cattgggact gagacacggc ccagactcct acgggaggga
360

gcagtgggga atattgcaca atgggggaaa ccctgatgca gcgacgccgc gtgaaggaag
420

aagtatctcg gtatgtaaac ttctatcagc agggaagaaa atgacgggtac ctgactaaga
480

agccccggct aactacgtgc cagcagccgc ggtaatacgt aggggggcaag cgttatccgg
540

atttactggg tgtaaaggga gcgtagacgg aagagcaagt ctgatgtgaa aggctggggc
600

ttaaccccag gactgcattg gaaactgttt ttctagagtg ccggagaggt aagcggaatt
660

cctagtgtag cggtgaaatg cgtagatatt aggaggaaca ccagtggcga aggcggctta
720

ctggacggta actgacgttg aggctcgaaa gcgtggggag caaacaggat tagataccct
780

ggtagtccac gccgtaaacg atgaatacta ggtgtcgggt ggcaaagcca ttcggtgccg
840

cagcaaacgc aataagtatt ccacctgggg agtacgttcg caagaatgaa actcaaagga
900

attgacgggg acccgcacaa gcggtggagc atgtgggtta attcgaagca acgcgaagaa
960

ccttaccaag tcttgacatc cctctgaccg gcccgtaacg gggccttccc ttcggggcag
1020

aggagacagg tgggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc
1080

gcaacgagcg caaccctat ccttagtagc cagcagggtga agctgggcac tctagggaga
1140

ctgccgggga taaccgggag gaaggcgggg acgacgtcaa atcatcatgc cccttatgat
1200

ttgggctaca cacgtgctac aatggcgtaa acaaagggaa gcgagacagc gatgttgagc
1260

aaatcccaaa aataacgtcc cagttcggac tgcagtctgc aactcgactg cacgaagctg
1320

gaatcgctag taatcgcgaa tcagaatgtc gcggtgaata cgttcccggg tcttgtacac
1380

accgcccgtc acaccatggg agtcagtaac gcccgaagtc agtgacccaa ccttatagga
1440

gggagctgcc gaaggcggga ccgataactg ggggtgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t
1521

<210> 108

<211> 1521

<212> DNA

<213> artificial sequence

<220>

<223> SPC10415_contig000002_1030498_1032018

<400> 108

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

gaagcacttg aacggatttc ttcggattga agttttttgtg actgagcggc ggacgggtga
120

gtaacgcgtg ggtaacctgc ctcatacagg gggataacag ttagaaatgg ctgctaatac
180

cgcataagcg cacaggaccg catgggtctgg tgtgaaaaac tccgggtggta tgagatggac
240

ccgcgtctga ttagctagtt ggagggggtaa cggcccacca aggcaacgat cagtagccgg
300

cctgagaggg tgaacggcca cattgggact gagacacggc ccagactcct acgggaggca
360

gcagtgggga atattgcaca atgggggaaa ccctgatgca gcgacgccgc gtgaagggaag
420

aagtatctcg gtatgtaaac ttctatcagc agggaagaaa atgacggtac ctgactaaga
480

agccccggct aactacgtgc cagcagccgc ggtaatacgt agggggcaag cgttatccgg
540

atttactggg tgtaaaggga gcgtagacgg aagagcaagt ctgatgtgaa aggctggggc
600

ttaaccccag gactgcattg gaaactgttt ttctagagtg ccggagaggt aagcggaatt
660

cctagtgtag cggtgaaatg cgtagatatt aggaggaaca ccagtggcga aggcggctta
720

ctggacggta actgacgttg aggctcgaaa gcgtggggag caaacaggat tagataccct
780

ggtagtccac gccgtaaacg atgaatacta ggtgtcgggt ggcaaagcca ttcggtgccg
840

cagcaaacgc aataagtatt ccacctgggg agtacgttcg caagaatgaa actcaaagga
900

attgacgggg acccgcacaa gcggtggagc atgtggttta attcgaagca acgcgaagaa
960

ccttaccaag tcttgacatc cctctgaccg gcccgtaacg gggccttccc ttcggggcag
1020

aggagacagg tgggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc
1080

gcaacgagcg caaccctat ccttagtagc cagcagggtga agctgggcac tctagggaga
1140

ctgccgggga taaccgggag gaaggcgggg acgacgtcaa atcatcatgc cccttatgat
1200

ttgggctaca cacgtgctac aatggcgtaa acaaagggaa gcgagacagc gatgttgagc
1260

aaatcccaaa aataacgtcc cagttcggac tgcagtctgc aactcgactg cacgaagctg
1320

gaatcgctag taatcgcgaa tcagaatgtc gcggtgaata cgttcccggg tcttgtacac
1380

accgcccgtc acaccatggg agtcagtaac gcccgaagtc agtgacccaa ccttatagga
1440

gggagctgcc gaaggcggga ccgataactg ggggtgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t
1521

<210> 109

<211> 1521

<212> DNA

<213> artificial sequence

<220>

<223> SPC10415_contig000001_2643743_2645263

<400> 109

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

gaagcacttg aacggatttc ttcggattga agtttttgtg actgagcggc ggacgggtga
120

gtaacgcgtg ggtaacctgc ctcatacagg gggataacag ttagaaatgg ctgctaatac
180

cgcataagcg cacaggaccg catggtcttg tgtgaaaaac tccggtggta tgagatggac
240

ccgcgtctga ttagctagtt ggaggggtaa cggcccacca aggcgacgat cagtagccgg
300

cctgagaggg tgaacggcca cattgggact gagacacggc ccagactcct acgggaggca
360

gcagtgggga atattgcaca atgggggaaa ccctgatgca gcgacgccgc gtgaaggaag
420

aagtatctcg gtatgtaaac ttctatcagc agggaagaaa atgacggtac ctgactaaga
480

agccccggct aactacgtgc cagcagccgc ggtaatacgt aggggggcaag cgttatccgg
540

atttactggg tgtaaaggga gcgtagacgg aagagcaagt ctgatgtgaa aggctggggc
600

ttaaccccag gactgcattg gaaactgttt ttctagagtg ccggagaggt aagcggaatt
660

cctagtgtag cggtgaaatg cgtagatatt aggaggaaca ccagtggcga aggcggctta
720

ctggacggta actgacgttg aggctcgaaa gcgtggggag caaacaggat tagataccct
780

ggtagtccac gccgtaaacg atgaatacta ggtgtcgggt ggcaaagcca ttcggtgccg
840

cagcaaacgc aataagtatt ccacctgggg agtacgttcg caagaatgaa actcaaagga
900

attgacgggg acccgacaaa gcggtggagc atgtgggtta attcgaagca acgcgaagaa
960

ccttaccaag tcttgacatc cctctgaccg gcccgtaacg gggccttccc ttcggggcag
1020

aggagacagg tgggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc
1080

gcaacgagcg caaccctat ccttagtagc cagcaggtga agctgggcac tctagggaga
1140

ctgccgggga taaccgggag gaaggcgggg acgacgtcaa atcatcatgc cccttatgat
1200

ttgggctaca cacgtgctac aatggcgtaa acaaaggga gcgagacagt gatgttgagc
1260

aaatcccaaa aataacgtcc cagttcggac tgcagtctgc aactcgactg cacgaagctg
1320

gaatcgctag taatcgcgaa tcagaatgtc gcggtgaata cgttcccggg tcttgtagac
1380

accgcccgtc acaccatggg agtcagtaac gcccgaagtc agtgacccaa ccttatagga
1440

gggagctgcc gaaggcggga ccgataactg ggggtgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t
1521

<210> 110

<211> 1521

<212> DNA

<213> artificial sequence

<220>

<223> SPC10415_contig000001_50253_51773

<400> 110

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

gaagcactta agcggatctc ttcggattga aacttatattg actgagcggc ggacgggtga
120

gtaacgcgtg ggtaacctgc ctcatacagg gggataacag ttagaaatgg ctgctaatac
180

cgcataagcg cacaggaccg catgggtctgg tgtgaaaaac tccggtggta tgagatggac
240

ccgcgtctga ttagctagtt ggaggggtaa cggcccacca aggcgacgat cagtagccgg
300

cctgagaggg tgaacggcca cattgggact gagacacggc ccagactcct acgggaggca
360

gcagtgggga atattgcaca atgggggaaa ccctgatgca gcgacgccgc gtgaaggaag
420

aagtatctcg gtatgtaaac ttctatcagc agggaagaaa atgacggtac ctgactaaga
480

agccccggct aactacgtgc cagcagccgc ggtaatacgt agggggcaag cgttatccgg
540

atttactggg tgtaaagggg gcgtagacgg aagagtaagt ctgatgtgaa aggctggggc
600

ttaaccccag gactgcattg gaaactgttt ttctagagtg ccggagaggt aagcggaatt
660

cctagtgtag cggtgaaatg cgtagatatt aggaggaaca ccagtggcga aggcggctta
720

ctggacggta actgacgttg aggctcgaaa gcgtggggag caaacaggat tagataccct
780

ggtagtccac gccgtaaacg atgaatacta ggtgtcgggt ggcaaagcca ttcggtgccg
840

cagcaaacgc aataagtatt ccacctgggg agtacgttcg caagaatgaa actcaaagga
900

attgacgggg acccgcacaa gcggtggagc atgtggttta attcgaagca acgcgaagaa
960

ccttaccaag tcttgacatc cctctgaccg gcccgtaacg gggccttccc ttcggggcag
1020

aggagacagg tgggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc
1080

gcaacgagcg caaccctat ccttagtagc cagcagggtga agctgggcac tctagggaga
1140

ctgccgggga taaccgggag gaaggcgggg acgacgtcaa atcatcatgc cccttatgat
1200

ttgggctaca cacgtgctac aatggcgtaa acaaaggga gcgagacagt gatgttgagc
1260

aaatcccaaa aataacgtcc cagttcggac tgcagtctgc aactcgactg cacgaagctg
1320

gaatcgctag taatcgcgaa tcagaatgtc gcggtgaata cgttcccggg tcttgtacac
1380

accgcccgtc acaccatggg agtcagtaac gcccggaagtc agtgacccaa ccttatagga
1440

gggagctgcc gaaggcggga ccgataactg ggggtgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t
1521

<210> 111

<211> 1521

<212> DNA

<213> artificial sequence

<220>

<223> SPC10415_contig000002_1918626_1920146

<400> 111

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

gaagcgctta aacggatttc ttcggattga agtttttgtg actgagcggc ggacgggtga
120

gtaacgcgtg ggtaacctgc ctcatacagg gggataacag ttagaaatgg ctgctaatac
180

cgcataagcg cacaggaccg catggtcttg tgtgaaaaac tccggtggta tgagatggac
240

ccgcgtctga ttagctagtt ggaggggtaa cggcccacca aggcgacgat cagtagccgg
300

cctgagaggg tgaacggcca cattgggact gagacacggc ccagactcct acgggaggca
360

gcagtgggga atattgcaca atgggggaaa ccctgatgca gcgacgccgc gtgaaggaag
420

aagtatctcg gtatgtaaac ttctatcagc agggaagaaa atgacggtac ctgactaaga
480

agccccggct aactacgtgc cagcagccgc ggtaatacgt agggggcaag cgttatccgg
540

atttactggg tgtaaaggga gcgtagacgg aagagcaagt ctgatgtgaa aggctggggc
600

ttaaccccag gactgcattg gaaactgttt ttctagagtg ccggagaggt aagcggaatt
660

cctagtgtag cgggtgaaatg cgtagatatt aggaggaaca ccagtggcga aggcggctta
720

ctggacggta actgacgttg aggctcgaaa gcgtggggag caaacaggat tagataccct
780

ggtagtccac gccgtaaacg atgaatacta ggtgtcgggt ggcaaagcca ttcggtgccg
840

cagcaaacgc aataagtatt ccacctgggg agtacgttcg caagaatgaa actcaaagga
900

attgacgggg acccgacaaa gcggtggagc atgtggttta attcgaagca acgcgaagaa
960

ccttaccaag tcttgacatc cctctgaccg gcccgtaacg gggccttccc ttcggggcag
1020

aggagacagg tgggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc
1080

gcaacgagcg caaccctat ccttagtagc cagcagggtga agctgggcac tctagggaga
1140

ctgccgggga taaccgggag gaaggcgggg acgacgtcaa atcatcatgc cccttatgat
1200

ttgggctaca cacgtgctac aatggcgtaa acaaaggga gcgagacagc gatgttgagc
1260

aaatcccaaa aataacgtcc cagttcggac tgcagtctgc aactcgactg cacgaagctg
1320

gaatcgctag taatcgcgaa tcagaatgtc gcggtgaata cgttcccggg tcttgtagac
1380

accgcccgtc acaccatggg agtcagtaac gcccggaagtc agtgacccaa ccttttagga
1440

gggagctgcc gaaggcggga ccgataactg ggggtgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g
1521

c t g g a t c a c c

t

<210> 112

<211> 1425

<212> DNA

<213> artificial sequence

<220>

<223> SPC11540_contig000048_1_1425

<400> 112

ggcgaccggc gcacgggtgc gtaacgcgta tgtaacctac ctataacagg ggcataacac
60

tgagaaattg gtactaattc cccataatat tcggagaggc atctctccgg gttgaaaact
120

ccggtgggta tagatggaca tgcgttgtat tagctagttg gtgaggtaac ggctcaccaa
180

ggcaacgata cataggggga ctgagagggt aacccccac actggtactg agacacggac
240

cagactccta cgggaggcag cagtgaggaa tattgggtcaa tggacgcaag tctgaaccag
300

ccatgccgcg tgcaggaaga cggctctatg agttgtaaac tgcttttgta cgagggtaaa
360

ctcacctacg tgtaggtgac tgaaagtatc gtacgaataa ggatcggcta actccgtgcc
420

agcagccgcg gtaatacgga ggattcaagc gttatccgga tttattgggt ttaaagggtg
480

cgtaggcggt ttgataagtt agagggtgaaa tcccggggct taactccgga actgcctcta
540

atactgttag actagagagt agttgcggta ggcggaatgt atggtgtagc ggtgaaatgc
600

ttagagatca tacagaacac cgattgcgaa ggcagcttac caaactatat ctgacgttga
660

ggcacgaaag cgtggggagc aaacaggatt agataccctg gtagtccacg cagtaaacga
720

tgataactcg ttgtcggcga tacacagtcg gtgactaagc gaaagcgata agttatccac
780

ctggggagta cgttcgcaag aatgaaactc aaaggaattg acgggggccc gcacaagcgg
840

aggaacatgt ggtttaattc gatgatacgc gaggaacctt acccgggctt gaaagttact
900

gacgattctg gaaacaggat ttcccttcgg ggcaggaaac taggtgctgc atggttgtcg
960

tcagctcgtg ccgtgaggtg tcgggttaag tcccataacg agcgcaaccc ctaccgttag
1020

ttgccatcag gtcaagctgg gcactctggc gggactgccg gtgtaagccg agaggaaggt
1080

ggggatgacg tcaaatacagc acggccctta cgtccggggc tacacacgtg ttacaatggt
1140

aggtacagag ggtcgctacc ccgcgagggg atgccaatct cgaaagccta tctcagttcg
1200

gattggaggc tgaaacccgc ctccatgaag ttggattcgc tagtaatcgc gcatcagcca
1260

tggcgcggtg aatacgttcc cgggccttgt acacaccgcc cgtcaagcca tggaagctgg
1320

gggtgcctga agttcgtgac cgcaaggagc gacctagggc aaaaccggta actggggcta
1380

agtcgtaaca aggtagccgt accggaaggt gcggctggaa cacct
1425

<210> 113

<211> 1276

<212> DNA

<213> artificial sequence

<220>

<223> PPC00252_contig000033_1_1276

<400> 113

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaatacatg caagtagaac
60

gctgaagctt ggtgcttgca ccgagcggat gagttgcgaa cgggtgagta acgcgtaggt
120

aacctgcctg ttagcggggg ataactattg gaaacgatag ctaataccgc ataacagtcg
180

acattgcatg atgttgattt gaaaggggca aatgctccac taccagatgg acctgcgttg
240

tattagctag ttggtgaggt aacggctcac caaggcgacg atacatagcc gacctgagag
300

ggtgatcggc cacactggga ctgagacacg gccagactc ctacgggagg cagcagtagg
360

gaatcttcgg caatgggggc aaccctgacc gagcaacgcc gcgtgagtga agaaggtttt
420

cggatcgtaa agctctgttg taagagaaga acgagtgtga gagtggaaag ttcacactgt
480

gacggtaact taccagaaag ggacggctaa ctacgtgcca gcagccgcgg taatacgtag
540

gtcccgagcg ttatccggat ttattgggcg taaagcgagc gcaggcggtt agataagtct
600

gaagttaaag gctgtggctt aaccatagta cgctttggaa actgtttaac ttgagtgcag
660

aaggggagag tggaattcca tgtgtagcgg tgaaatgcgt agatatatgg aggaacaccg
720

gtggcgaaag cggctctctg gtctgtaact gacgctgagg ctcgaaagcg tggggagcaa
780

acaggattag ataccctggg agtccacgcc gtaaacgatg agtgctaggt gttgggtcct
840

ttccgggact cagtgccgca gctaacgcat taagcactcc gcctggggag tacgaccgca
900

aggttgaaac tcaaaggaat tgacgggggc ccgcacaagc ggtggagcat gtggtttaat
960

tcgaagcaac gcgaagaacc ttaccaggtc ttgacatccc tctgaccgct ctagagatag
1020

agttttcctt cgggacagag gtgacagggtg gtgcatgggt gtcgtcagct cgtgtcgtga
1080

gatgttgggt taagtcccgc aacgagcgca acccctattg ttagttgcca tcattgagtt
1140

gggcactcta gcgagactgc cggtaataaa ccggaggaag gtggggatga cgtcaaataca
1200

tcatgcccct tatgacctgg gctacacacg tgctacaatg gctggtacaa cgagtcgcga
1260

g t c g g t g a c g g c a a g c
1276

<210> 114

<211> 1513

<212> DNA

<213> artificial sequence

<220>

<223> SPC12479_contig000001_39554_41066

<400> 114

tttagagagt ttgatacctgg ctcaggacga acgctggcgg cgtgcctaac acatgcaagt
60

cgaacggacg agagggagct tgctccctca agttagtggc ggacgggtga gtaacgcgtg
120

agtaacctgc ctttcagagg ggaataacat tctgaaaagg atgctaatac cgcatgacat
180

cgtagtatcg catggtacag cgatcaaagg agcaatccgc tgaaagatgg actcgcgtcc
240

gattagctag ttggcgggat aaaggccac caaggcgacg atcggtagcc ggactgagag
300

gttgatcggc cacattggga ctgagacacg gcccagactc ctacgggagg cagcagtggg
360

ggatattgca caatggggga aaccctgatg cagcaacgcc gcgtgaagga agaaggtctt
420

cggattgtaa acttctgtcc tcaggggaaga taatgacggg acctgaggag gaagctccgg
480

ctaactacgt gccagcagcc gcggtaatat gtagggagcg agcgttgtcc ggatttactg
540

ggtgtaaagg gtgcgtaggc ggatctgcaa gtcagtagtg aaatcccagg gcttaaccct
600

ggaactgcta ttgaaactgt gggctcttgag tgaggtagag gcaggcggaa ttcccgggtg
660

agcggtgaaa tgcgtagaga tcgggaggaa caccagtggc gaaggcggcc tgctgggcct
720

taactgacgc tgaggcacga aagcatgggt agcaaacagg attagatacc ctggtagtcc
780

atgccgtaaa cgatgattac taggtgtggg tggctctgacc ccatccgtgc cggagttaac
840

acaataagta atccacctgg ggagtacggc cgcaagggtg aaactcaaag gaattgacgg
900

gggcccgcac aagcagtgga gtatgtggtt taattcgaag caacgcgaag aaccttacca
960

ggtcttgaca tcctgctaac gaggtagaga tacgttaggt gcccttcggg gaaagcagag
1020

acagggtggg catggttgtc gtcagctcgt gtcgtgagat gttgggttaa gtcccgcaac
1080

gagcgcaacc cctgctatta gttgctacgc aagagcactc taataggact gccgttgaca
1140

aaacggagga aggtggggac gacgtcaaat catcatgccc cttatgacct gggctacaca
1200

cgtactacaa tggccgtcaa cagagagaag caaaactgcg aagtggagca aaactctaaa
1260

aacggtccca gttcggatcg taggctgcaa cccgcctacg tgaagttgga attgctagta
1320

atcgcggatc atcatgccgc ggtgaatacg ttcccggggc ttgtacacac cgcccgtcac
1380

accatgggag ccggtataac ccgaagtcag tagtctaacc gcaaggggga cgctgccgaa
1440

ggtaggattg gcgactgggg tgaagtcgta acaaggtagc cgtatcggaa ggtgcggctg
1500

g a t c a c c t c c t t t
1513

<210> 115

<211> 1497

<212> DNA

<213> artificial sequence

<220>

<223> SPC10661_contig000025_3147_4643

<400> 115

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgaac
60

gattaaagcg ccttcgggcg tgtatagagt ggcgaacggg tgagtaacac gtgaccaacc
120

tacccttctc ttcgggacaa ccttgggaaa ccgaggctaa taccgaatac tccggtgagt
180

gcgcatgcac acgccgggaa agctttcgcg gagaaggatg gggtcgcggc ccatcaggta
240

gacggcgggg tagcggccca ccgtgctttt gacgggtagc cgggttgaga gaccgaccgg
300

ccacattggg actgagatac ggcccagact cctacgggag gcagcagtgg ggaattttgc
360

gcaatggggg aaaccctgac gcagcaacgc cgcgtgcggg atgaaggcct tcgggtcgta
420

aaccgctttc agcaggggaag aaattcgacg gtacctgcag aagaagcccc ggctaactac
480

gtgccagcag ccgcggtaat acgtaggggg cgagcgttat ccggattcat tgggcgtaaa
540

gcgcgcgtag gcggccgcct aagcgggacc tctaaccttg gggctcaacc tcaagccggg
600

ttccgaactg ggtggctcga gtttggtaga ggaagatgga attcccggtg tagcggtgga
660

atgcgcagat atcgggaaga acaccgatgg cgaaggcagt cttctgggcc ataactgacg
720

ctgaggcgcg aaagctaggg gagcaaacag gattagatac cctggtagtc ctagccgtaa
780

acgatgggca ctaggtgtgg ggagatactc tttccgtgcc gaagcaaacg cattaagtgc
840

ccgcctggg gagtacggcc gcaaggctaa aactcaaagg aattgacggg ggcccgcaca
900

agcagcggag catgtggcct aattcgaagc aacgcgaaga accttaccag ggcttgacat
960

gcgcatgaag ccgggggaaac tcggtggccg aaaggagtgc gcgcaggtgg tgcattggctg
1020

tcgtcagctc gtgtcgtgag atgttgggtt aagtcccgca acgagcgcaa cccctgtcct
1080

gtgttgccag cattcagttg gggactcgca ggagactgcc ggcgtcaagc cggaggaagg
1140

tggggacgac gtcaagtcatt catgcccctt atgccctggg ctgcacacgt gctacaattgg
1200

ccggcacaac gggctgctac ctggcgacag gaagcgaatc ccttaaagcc ggtcccagtt
1260

cggatcggag gctgcaaccc gcctccgtga agtcggagtt gctagtaatc gcggatcagc
1320

atgccgcggt gaatacgttc ccgggccttg tacacaccgc ccgtcacacc acccgagtcg
1380

tctgcacccg aagccgccgg ccgaacccat ttgggacgga ggcgtcgaag gtgtggaggg
1440

taaggggggt gaagtcgtaa caaggtagcc gtaccggaag gtgcggctgg atcacct
1497

<210> 116

<211> 1529

<212> DNA

<213> artificial sequence

<220>

<223> SPC12361_contig000049_3877_5405

<400> 116

tatagagagt ttgatcctgg ctcaggacga acgctggcgg cgtgcttaac acatgcaagt
60

cgaacggagc acccttgact gaggtttcgg ccaaatagata ggaatgctta gtggcggact
120

ggtgagtaac gcgtgaggaa cctaccttcc agagggggac aacagttgga aacgactgct
180

aataccgcat gacgcatgac cggggcatcc cgggcatgtc aaagatttta tcgctggaag
240

atggcctcgc gtctgattag ctagatggtg gggtaacagc ccaccatggc gacgatcagt
300

agccggactg agaggttgac cggccacatt gggactgaga tacggcccag actcctacgg
360

gaggcagcag tggggaatat tgggcaatgg acgcaagtct gaccagcaa cgccgcgtga
420

aggaagaagg ctttcggggtt gtaaacttct tttgtcaggg aagagtagaa gacggtacct
480

gacgaataag ccacgggctaa ctacgtgcc a gcagccgcgg taatacgtag gtggcaagcg
540

ttgtccggat ttactgggtg taaagggcgt gcagccgggc cggcaagtca gatgtgaaat
600

ctggaggctt aacctccaaa ctgcatttga aactgtaggt cttgagtacc ggagaggtta
660

tcggaattcc ttgtgtagcg gtgaaatgcg tagatataag gaagaacacc agtggcgaag
720

gcggataact ggacggcaac tgacggtgag gcgcgaaagc gtggggagca aacaggatta
780

gataccctgg tagtccacgc tgtaaacgat ggatactagg tgtgcgggga ctgaccccct
840

gcgtgccgca gttaacacaa taagtatccc acctggggag tacgatcgca aggttgaaac
900

tcaaaggaat tgacgggggc ccgcacaagc ggtggattat gtggtttaat tcgaagcaac
960

gcgaagaacc ttaccagggc ttgacatcct actaacgaag tagagataca tcagggtgccc
1020

ttcggggaaa gtagagacag gtggtgcatg gttgtcgtca gctcgtgtcg tgagatgttg
1080

ggttaagtcc cgcaacgagc gcaacccta ttgttagttg ctacgcaaga gcactctagc
1140

gagactgccg ttgacaaaac ggaggaaggt ggggacgacg tcaaatacgc atgcccctta
1200

tgtcctgggc tacacacgta atacaatggc ggtcaacaga gggaggcaaa gccgcgaggc
1260

agagcaaacc cccaaaagcc gtcccagttc ggatcgcagg ctgcaaccgc cctgcgtgaa
1320

gtcggaatcg ctagtaatcg cggatcagca tgccgcggtg aatacgttcc cgggccttgt
1380

acacaccgcc cgtcacacca tgagagtcgg gaacacccga agtccgtagc ctaaccgcaa
1440

ggagggcgcg gccgaagggtg ggttcgataa ttgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1529

<210> 117

<211> 1520

<212> DNA

<213> artificial sequence

<220>

<223> SPC11087_contig000087_3616_5135

<400> 117

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgaac
60

ggagcacccc tgacggagtt ttcggacaac gaaagggaat gcttagtggc ggacgggtga
120

gtaacgcgtg agtaacctgc cttggagtgg ggaataacag ccggaaacgg ctgctaatac
180

cgcattgatgt atctggatcg catggttctg gataccaaag atttatcgct ctgagatgga
240

ctcgcgtctg attagctagt tggtagaggta atggctcacc aaggcgacga tcagtagccg
300

gactgagagg ttggccggcc acattgggac tgagacacgg cccagactcc tacgggagggc
360

agcagtgggg aatattgggc aatgggcgaa agcctgaccc agcaacgccg cgtgaaggaa
420

gaaggccctc gggttgtaaa cttcttttgt cagggacgaa gcaagtgacg gtacctgacg
480

aataagccac ggctaactac gtgccagcag ccgcggtaat acgtaggtgg caagcgttat
540

ccggatttac tgggtgtaaa gggcgtgtag gcgggagtg c aagtcagatg tgaaaactat
600

gggctcaacc catagcctgc atttgaaact gtacttcttg agtgatggag aggcaggcgg
660

aattccctgt gtagcgggtga aatgcgtaga tatagggagg aacaccagtg gcgaaggcgg
720

cctgctggac attaactgac gctgaggcgc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatggat actaggtgtg ggggggtctga cccctccgt
840

gccgcagtta acacaataag tatcccacct ggggagtagc atcgcaaggt tgaaactcaa
900

aggaattgac gggggcccg c acaagcggtg gagtatgtgg ttttaattcga agcaacgcga
960

agaaccttac caggacttga catcctacta acgaagcaga gatgcataag gtgcccttcg
1020

gggaaagtag agacaggtgg tgcattggttgc tcgtcagctc gtgtcgtgag atgttgggtt
1080

aagtcctgca acgagcgcaa cccttattgt tagttgctac gcaagagcac tctagcgaga
1140

ctgccgttga caaacggag gaaggtgggg acgacgtcaa atcatcatgc cccttatgtc
1200

ctgggccaca cacgtactac aatggcggtc aacagagggga agcaaagccg cgaggtggag
1260

caaatcccta aaagccgtcc cagttcggat tgcaggctga aactcgccctg tatgaagtcg
1320

gaatcgctag taatcgcgga tcagcatgcc gcggtgaata cgttcccggg ccttgtagac
1380

accgcccgtc acaccatgag agtcgggaac acccgaagtc cgtagcctaa cagcaatggg
1440

ggcgcggccg aaggtgggtt cgataattgg ggtgaagtcg taacaaggta gccgtatcgg
1500

a a g g t g c g g c t g g a t c a c c t
1520

<210> 118

<211> 1500

<212> DNA

<213> artificial sequence

<220>

<223> SPC11349_contig000027_38_1537

<400> 118

atttgagagt ttgatcctgg ctcaggatga acgctggcgg cgtagcctaac acatgcaagt
60

cgagcgaacc cttcgggggtg agcggcggac gggtagagtaa cgcgtaggta acctgccctg
120

tacacacgga taacataccg aaaggatatgc taatacggga taacatatga gagtcgcatg
180

gcttttgtat caaagctccg gcggtacagg atggaccgcg gtctgattag ctagttggta
240

aggtaacggc ttaccaaggc aacgatcagt agccgacctg agaggggtgat cggccacatt
300

ggaactgaga cacggtccaa actcctacgg gaggcagcag tggggaatat tgcacaatgg
360

gcgaaagcct gatgcagcaa cgccgcgtga gcgatgaagg ccttcggggtc gttaaagctct
420

gtcctcaagg aagataatga cgggtacttga ggaggaagcc ccggctaact acgtgccagc
480

agccgcggta atacgtaggg ggctagcggt atccggaatt actgggcgta aaggggtcgt
540

aggcgggtctt tcaagccaga agtgaaaggc tacgggtcaa ccgtagtaag cttttggaac
600

tgtaggactt gagtgcagga gaggagagtg gaattcctag tgtagcgggtg aaatgcgtag
660

atattaggag gaacaccagt agcgaaggcg gctctctgga ctgtaactga cgctgaggca
720

cgaaagcgtg gggagcaaac aggattagat accctggtag tccacgccgt aaacgatgag
780

tactaggtgt cgggggttac ccccctcggg gccgcagcta acgcattaag tactccgcct
840

gggaagtacg ctcgcaagag tgaaactcaa aggaattgac ggggacccgc acaagtagcg
900

gagcatgtgg ttttaattcga agcaacgcga agaacccttac ctaagcttga catcccattg
960

acctctccct aatcggagat ttcccttcgg ggacagtggg gacaggtggg gcatggttgt
1020

cgtcagctcg tgtcgtgaga tgttgggtta agtcccgcga cgagcgcgaac ccttgccttt
1080

agttgccagc attaagttgg gcactctaga gggactgccg aggataactc ggaggaaggt
1140

ggggatgacg tcaaatacatc atgcccctta tgcttagggc tacacacgtg ctacaatggg
1200

tggtacagag ggttgccaag ccgtgaggtg gagctaatacc cttaaagcca ttctcagttc
1260

ggattgtagg ctgaaactcg cctacatgaa gctggagtta ctagtaatcg cagatcagaa
1320

tgctgcgggtg aatgcgttcc cgggtcttgt acacaccgcc cgtcacacca tgggagttgg
1380

gggcgcccga agccgggttag ctaacctttt aggaagcggc cgtcgaaggt gaaaccaatg
1440

actggggtga agtcgtaaca aggtagccgt atcggaaggt gcggctggat cacctccttt
1500

<210> 119

<211> 1222

<212> DNA

<213> artificial sequence

<220>

<223> SPC10981_contig000124_25_1246

<400> 119

tgtctcatca tggaaggcgc tgaatttacg gaaaacatta ttaatggcgt cgagcgtccg
60

gttaaagccg ctgaattggt cgcgtttacc ttgcgtgtac gcgcaggaaa cactgacgtt
120

cttactgacg cagaagaaaa cgtgcgtcaa aaattacgtg cagaaggagt gatgtaatgt
180

ctaaaggtaa aaaacgttct ggcgctcgcc ctggtcgtcc gcagccgttg cgaggtacta
240

aaggcaagcg taaaggcgtc cgtcttttgg atgtaggtgg tcaacaattt taattgcagg
300

ggcttcggcc cttacttga ggataaatta tgtctaatat tcaaactggc gccgagcgta
360

tgccgcatga cttttcccat cttggcttcc ttgctgggtca gattggtcgt cttattacca
420

tttcaactac tccggttatc gctggcgact ccttcgagat ggacgccgtt ggcgctctcc
480

gtctttctcc attgcgtcgt ggccttgcta ttgactctac tgtagacatt ttactttttt
540

atgtccctca tcgtcacgtt tatgggtgaac agtggattaa gttcatgaag gatgggtgtta
600

atgccactcc tctcccgact gttaacacta ctggttatat tgaccatgcc gctttttcttg
660

gcacgattaa ccctgatacc aataaaatcc ctaagcattt gtttcagggt tatttgaata
720

tctataacaa ctattttaaa gcgccgtgga tgcctgaccg taccgaggct aaccctaata
780

agcttaatca agatgatgct cgttatgggt tccgttgctg ccatctcaaa aacatttgga
840

ctgctccgct tcctcctgag actgagcttt ctgcgcaaact gacgacttct accacatcta
900

ttgacattat ggggtctgcaa gctgcttatg ctaatttgca tactgaccaa gaacgtgatt
960

acttcatgca gcgttaccat gatggttattt cttcatttgg aggtaaaacc tcttatgacg
1020

ctgacaaccg tcctttactt gtcatgcgct ctaatctctg ggcatctggc tatgatgttg
1080

atggaactga ccaaacgtcg ttaggccagt tttctggctg tgttcaacag acctataaac
1140

attctgtgcc gcgtttcttt gttcctgagc atggcactat gtttactctt gcgcttggtc
1200

g t t t t c c g c c t a c t g c g a c t a a
1222

<210> 120

<211> 1493

<212> DNA

<213> artificial sequence

<220>

<223> SPC10238_contig000001_257098_258590

<400> 120

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gattctcttc ggagaagagc ggcggacggg tgagtaacgc gtgggtaacc tgcctcatac
120

acatggataa cataccgaaa ggtatgctaa tacaggataa cataagagat tcgcatgttt
180

ctcttatcaa agctccggcg gtatgagatg gacccgcgtc tgattagcta gttggtaagg
240

taatggctta ccaaggcgac gatcagtagc cgacctgaga gggatgatcgg ccacattgga
300

actgagacac ggtccaaact cctacgggag gcagcagtgg ggaatattgc acaatgggcg
360

aaagcctgat gcagcaacgc cgcgtgagt atgaaggcct tcgggtcgta aaactctgtc
420

ctcaaggaag ataatgacgg tacttgagga ggaagccccg gctaactacg tgccagcagc
480

cgcggttaata cgtagggggc tagcgttatc cggatttact gggcgtaaag ggtgcgtagg
540

tggtttctta agtcaggagt gaaaggctac ggcttaaccg tagtaagctc ttgaaactgg
600

gaaacttgag tgcaggagag gaaagtggaa ttcctagtgt agcggtgaaa tgcgtagata
660

ttaggaggaa caccagtagc gaaggcggct ttctggactg taactgacac tgaggcacga
720

aagcgtgggg agcaaacagg attagatacc ctggtagtcc acgccgtaaa cgatgagtac
780

taggtgtcgg gggttacccc cctcggtgcc gcagctaacg cattaagtac tccgcctggg
840

gagtacgctc gcaagagtga aactcaaagg aattgacggg gacccgcaca agtagcggag
900

catgtgggtt aattcgaagc aacgcgaaga accttaccta agcttgacat ccttttgacc
960

gatgcctaata cgcatTTTTT ccttcgggga cagaagtgc aggtgggtgca tggttgtcgt
1020

cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct tgcctttagt
1080

tgccagcatt aagttgggca ctctagaggg actgccaggg ataacctgga ggaagggtggg
1140

gatgacgtca aatcatcatg ccccttatgc ttaggggtac acacgtgcta caatgggtgg
1200

tacagagggc agccaagtcg tgaggccgag ctaatccctt aaagccattc tcagttcgga
1260

ttgtaggctg aaactcgcct acatgaagct ggagttacta gtaatcgcag atcagaatgc
1320

tgcggtgaat gcgttcccgg gtcttgtaca caccgcccgt cacaccacgg aagttggggg
1380

cgcccgaagc cacttagcta acccttttgg gaagcgagtg tcgaagggtga aatcaataac
1440

tgggggtgaag tcgtaacaag gtagccgtat cggaagggtgc ggctggatca cct
1493

<210> 121

<211> 1493

<212> DNA

<213> artificial sequence

<220>

<223> SPC10238_contig000001_3705668_3707160

<400> 121

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gattctcttc ggagaagagc ggcggacggg tgagtaacgc gtgggtaacc tgcctcatac
120

acatggataa cataccgaaa ggtatgctaa tacaggataa cataagagat tcgcatgttt
180

ctcttatcaa agctccggcg gtatgagatg gacccgcgtc tgattagcta gttggtaagg
240

taatggctta ccaaggcaac gatcagtagc cgacctgaga gggatgatcgg ccacattgga
300

actgagacac ggtccaaact cctacgggag gcagcagtg ggaatattgc acaatgggcg
360

aaagcctgat gcagcaacgc cgcgtgagtg atgaaggcct tcgggtcgta aaactctgtc
420

ctcaaggaag ataatgacgg tacttgagga ggaagccccg gctaactacg tgccagcagc
480

cgcggtaata cgtagggggc tagcgttatc cggatttact gggcgtaaag ggtgcgtagg
540

tggtttctta agtcaggagt gaaaggctac ggcttaaccg tagtaagctc ttgaaactgg
600

gaaacttgag tgcaggagag gaaagtggaa ttcctagtgt agcggtgaaa tgcgtagata
660

ttaggaggaa caccagtagc gaaggcggct ttctggactg taactgacac tgaggcacga
720

aagcgtgggg agcaaacagg attagatacc ctggtagtcc acgccgtaaa cgatgagtag
780

taggtgtcgg gggttacccc cctcgggtgcc gcagctaacg cattaagtac tccgcctggg
840

gagtacgctc gcaagagtga aactcaaagg aattgacggg gacccgcaca agtagcggag
900

catgtggttt aattcgaagc aacgcgaaga accttaccta agcttgacat ccttttgacc
960

gatgcctaata cgcatTTTTT ccttcgggga cagaagtgac aggtgggtgca tggttgtcgt
1020

cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct tgcctttagt
1080

tgccagcatt aagttgggca ctctagaggg actgccaggg ataacctgga ggaagggtggg
1140

gatgacgtca aatcatcatg ccccttatgc ttagggctac acacgtgcta caatgggtgg
1200

tacagagggc agccaagtcg tgaggccgag ctaatccctt aaagccattc tcagttcgga
1260

ttgtaggctg aaactcgcct acatgaagct ggagttacta gtaatcgcag atcagaatgc
1320

tgcggtgaat gcgttcccgg gtcttgtaca caccgcccgt cacaccacgg aagttggggg
1380

cgcccgaagc cacttagcta acccttttgg gaagcgagtg tcgaagggtga aatcaataac
1440

tgggggtgaag tcgtaacaag gtagccgtat cggaagggtgc ggctggatca cct
1493

<210> 122

<211> 1493

<212> DNA

<213> artificial sequence

<220>

<223> SPC10238_contig000001_163373_164865

<400> 122

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gattctcttc ggagaagagc ggcggacggg tgagtaacgc gtgggtaacc tgcctcatatc
120

acatggataa cataccgaaa ggtatgctaa tacaggataa cataagagat tcgcatgttt
180

ctcttatcaa agctccggcg gtatgagatg gacccgcgtc tgattagcta gttggtaagg
240

taatggctta ccaaggcaac gatcagtagc cgacctgaga gggatgatcgg ccacattgga
300

actgagacac ggtccaaact cctacgggag gcagcagtg ggaatattgc acaatgggagc
360

aaagcctgat gcagcaacgc cgcgtgagtg atgaaggcct tcgggtcgta aaactctgtc
420

ctcaaggaag ataatgacgg tacttgagga ggaagccccg gctaactacg tgccagcagc
480

cgcggttaata cgtagggggc tagcgttatc cggattttact gggcgtaaag ggtgcgtagg
540

tggttttctta agtcaggagt gaaaggctac ggcttaaccg tagtaagctc ttgaaactgg
600

gaaacttgag tgcaggagag gaaagtggaa ttcctagtgt agcggtgaaa tgcgtagata
660

ttaggaggaa caccagtagc gaaggcggct ttctggactg taactgacac tgaggcacga
720

aagcgtgggg agcaaacagg attagatacc ctggtagtcc acgccgtaaa cgatgagtac
780

taggtgtcgg gggttacccc cctcggtgcc gcagctaacg cattaagtac tccgcctggg
840

gagtacgctc gcaagagtga aactcaaagg aattgacggg gacccgcaca agtagcggag
900

catgtggttt aattcgaagc aacgcgaaga accttaccta agcttgacat ccttttgatc
960

gatgcctaata cgcatTTTTc ccttcgggga cagaagtgac aggtggtgca tggttgtcgt
1020

cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct tgcctttagt
1080

tgccagcatt aagttgggca ctctagaggg actgccaggg ataacctgga ggaagggtggg
1140

gatgacgtca aatcatcatg ccccttatgc ttagggctac acacgtgcta caatgggtgg
1200

tacagagggc agccaagtgc tgaggccgag ctaatccctt aaagccattc tcagttcgga
1260

ttgtaggctg aaactcgcct acatgaagct ggagttacta gtaatcgcag atcagaatgc
1320

tgcggtgaat gcgttcccgg gtcttgtaca caccgcccgt cacaccacgg aagttggggg
1380

cgcccgaagc cacttagcta acccttttgg gaagcgagtg tcgaagggtga aatcaataac
1440

tgggggtgaag tcgtaacaag gtagccgtat cggaagggtgc ggctggatca cct
1493

<210> 123

<211> 1493

<212> DNA

<213> artificial sequence

<220>

<223> SPC10238_contig000001_1145729_1147221

<400> 123

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gattcacttc ggtgaagagc ggcggacggg tgagtaacgc gtgggtaacc tgcctcatac
120

acatggataa cataccgaaa ggtatgctaa tacaggataa cataagagat tcgcatgttt
180

ctcttatcaa agctccggcg gtatgagatg gacccgcgtc tgattagcta gttggtaagg
240

taatggctta ccaaggcgac gatcagtagc cgacctgaga gggatgatcgg ccacattgga
300

actgagacac ggtccaaact cctacgggag gcagcagtg ggaatattgc acaatgggcg
360

aaagcctgat gcagcaacgc cgcgtgagtg atgaaggcct tcgggtcgta aaactctgtc
420

ctcaaggaag ataatgacgg tacttgagga ggaagccccg gctaactacg tgccagcagc
480

cgcggttaata cgtagggggc tagcgttatc cggatttact gggcgtaaag ggtgcgtagg
540

tggtttctta agtcaggagt gaaaggctac ggcttaaccg tagtaagctc ttgaaactgg
600

gaaacttgag tgcaggagag gaaagtggaa ttcctagtgt agcggtgaaa tgcgtagata
660

ttaggaggaa caccagtagc gaaggcggct ttctggactg taactgacac tgaggcacga
720

aagcgtgggg agcaaacagg attagatacc ctggtagtcc acgccgtaaa cgatgagtac
780

taggtgtcgg gggttacccc cctcggtgcc gcagctaacg cattaagtac tccgcctggg
840

gagtacgctc gcaagagtga aactcaaagg aattgacggg gacccgcaca agtagcggag
900

catgtggttt aattcgaagc aacgcgaaga accttaccta agcttgacat ccttttgacc
960

gatgcctaata cgcatTTTTc ccttcgggga cagaagtgc aggtgggtgca tggttgtcgt
1020

cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct tgcctttagt
1080

tgccagcatt aagttgggca ctctagaggg actgccaggg ataacctgga ggaaggtggg
1140

gatgacgtca aatcatcatg ccccttatgc ttagggctac acacgtgcta caatgggtgg
1200

tacagagggc agccaagtcg tgaggccgag ctaatccctt aaagccattc tcagttcgga
1260

ttgtaggctg aaactcgcct acatgaagct ggagttacta gtaatcgcag atcagaatgc
1320

tgcggtgaat gcgttcccgg gtcttgtaca caccgcccgt cacaccacgg aagttggggg
1380

cgcccgaagc cacttagcta acccttttgg gaagcgagtg tcgaagggtga aatcaataac
1440

tgggggtgaag tcgtaacaag gtagccgtat cggaagggtgc ggctggatca cct
1493

<210> 124

<211> 1493

<212> DNA

<213> artificial sequence

<220>

<223> SPC10238_contig000001_4119031_4120523

<400> 124

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gattctcttc ggagaagagc ggcggacggg tgagtaacgc gtgggtaacc tgcctcatac
120

acatggataa cataccgaaa ggtatgctaa tacaggataa cataagagat tcgcatgttt
180

ctcttatcaa agctccggcg gtatgagatg gacccgcgtc tgattagcta gttggtaagg
240

taatggctta ccaaggcgac gatcagtagc cgacctgaga gggtgatcgg ccacattgga
300

actgagacac ggtccaaact cctacgggag gcagcagtgg ggaatattgc acaatgggcg
360

aaagcctgat gcagcaacgc cgcgtgagtg atgaaggcct tcggggtcgta aaactctgtc
420

ctcaaggaag ataatgacgg tacttgagga ggaagccccg gctaactacg tgccagcagc
480

cgcggttaata cgtagggggc tagcgttatc cggatttact gggcgtaaag ggtgcgtagg
540

tggtttctta agtcaggagt gaaaggctac ggctcaaccg tagtaagctc ttgaaactgg
600

gaaacttgag tgcaggagag gaaagtggaa ttcctagtgt agcggtgaaa tgcgtagata
660

ttaggaggaa caccagtagc gaaggcggct ttctggactg taactgacac tgaggcacga
720

aagcgtgggg agcaaacagg attagatacc ctggtagtcc acgccgtaaa cgatgagtag
780

taggtgtcgg gggttacccc cctcgggtgcc gcagctaacg cattaagtag tccgcctggg
840

gagtacgctc gcaagagtga aactcaaagg aattgacggg gacccgcaca agtagcggag
900

catgtggttt aattcgaagc aacgcgaaga accttaccta agcttgacat ccttttgacc
960

gatgcctaata cgcatTTTTT ccttcggggga cagaagttag aggtgggtgca tggttgtcgt
1020

cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct tgcctttagt
1080

tgccagcatt aagttgggca ctctagaggg actgccaggg ataacctgga ggaagggtgg
1140

gatgacgtca aatcatcatg ccccttatgc ttagggctac acacgtgcta caatgggtgg
1200

tacagagggc agccaagtcg tgaggccgag ctaatccctt aaagccattc tcagttcgga
1260

ttgtaggctg aaactcgcct acatgaagct ggagttacta gtaatcgcag atcagaatgc
1320

tgcgggtgaat gcgttcccgg gtcttgtaca caccgcccgt cacaccacgg aagttggggg
1380

cgcccgaagc cacttagcta acccttttgg gaagcgagtg tcgaagggtga aatcaataac
1440

tgggggtgaag tcgtaacaag gtagctgtat cggaagggtgc ggctggatca cct
1493

<210> 125
<211> 1493
<212> DNA
<213> artificial sequence

<220>
<223> SPC10238_contig000001_152291_153783

<400> 125
agagtttggat cctgggtcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gattctcttc ggagaagagc ggcggacggg tgagtaacgc gtgggtaacc tgcctcatatc
120

acatggataa cataccgaaa ggtatgctaa tacaggataa tataagagat tcgcatgttt
180

ctcttatcaa agctccggcg gtatgagatg gacccgcgtc tgattagcta gttggtaagg
240

taatggctta ccaaggcgac gatcagtagc cgacctgaga gggatgatcg ccacattgga
300

actgagacac ggtccaaact cctacgggag gcagcagtgg ggaatattgc acaatgggagc
360

aaagcctgat gcagcaacgt cgcgtgagt atgaaggcct tcgggtcgta aaactctgtc
420

ctcaaggaag ataatgacgg tacttgagga ggaagccccg gctaactacg tgccagcagc
480

cgcggttaata cgtagggggc tagcgttatc cggattttact gggcgtaaag ggtgcgtagg
540

tggtttctta agtcaggagt gaaaggctac ggcttaaccg tagtaagctc ttgaaactgg
600

gaaacttgag tgcaggagag gaaagtggaa ttcctagtgt agcggtgaaa tgcgtagata
660

ttaggaggaa caccagtagc gaaggcggct ttctggactg taactgacac tgaggcacga
720

aagcgtgggg agcaaacagg attagatacc ctggtagtcc acgccgtaaa cgatgagtac
780

taggtgtcgg gggttacccc cctcgggtgcc gcagctaacg cattaagtac tccgcctggg
840

gagtacgctc gcaagagtga aactcaaagg aattgacggg gacccgcaca agtagcggag
900

catgtggttt aattcgaagc aacgcgaaga accttaccta agcttgacat ccttttgacc
960

gatgcctaata cgcatttttc ccttcgggga cagaagtac aggtgggtgca tggttgtcgt
1020

cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct tgcctttagt
1080

tgccagcatt aagttgggca ctctagaggg actgccaggg ataacctgga ggaaggtggg
1140

gatgacgtca aatcatcatg ccccttatgc ttagggctac acacgtgcta caatgggtgg
1200

tacagagggc agccaagtcg tgaggccgag ctaatccctt aaagccattc tcagttcgga
1260

ttgtaggctg aaactcgcct acatgaagct ggagttacta gtaatcgcag atcagaatgc
1320

tgcggtgaat gcgttcccgg gtcttgtaca caccgcccgt cacaccacgg aagttggggg
1380

cgcccgaagc cacttagcta acccttttgg gaagcgagtg tcgaagggtga aatcaataac
1440

tgggggtgaag tcgtaacaag gtagccgtat cggaagggtgc ggctggatca cct
1493

<210> 126

<211> 1493

<212> DNA

<213> artificial sequence

<220>

<223> SPC10238_contig000001_9408_10900

<400> 126

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gatttctcttc ggagaagagc ggcggacggg tgagtaacgc gtgggtaacc tgcctcatac
120

acatggataa cataccgaaa ggtatgctaa tacaggataa cataagagat tcgcatgttt
180

ctcttatcaa agctccggcg gtatgagatg gacccgcgtc tgattagcta gttggtaagg
240

taatggctta ccaaggcgac gatcagtagc cgacctgaga gggatgatcg ccacattgga
300

actgagacac ggtccaaact cctacgggag gcagcagtgg ggaatattgc acaatgggcg
360

aaagcctgat gcagcaacgc cgcgtgagt atgaaggcct tcgggtcgta aaactctgtc
420

ctcaaggaag ataatgacgg tacttgagga ggaagccccg gctaactacg tgccagcagc
480

cgcggttaata cgtagggggc tagcgttatc cggatttact gggcgtaaag ggtgcgtagg
540

tggtttctta agtcaggagt gaaaggctac ggcttaaccg tagtaagctc ttgaaactgg
600

gaaacttgag tgcaggagag gaaagtggaa ttcctagtgt agcggtgaaa tgcgtagata
660

ttaggaggaa caccagtagc gaaggcggct ttctggactg taactgacac tgaggcacga
720

aagcgtgggg agcaaacagg attagatacc ctggtagtcc acgccgtaaa cgatgagtac
780

taggtgtcgg gggttacccc cctcggtgcc gcagctaacg cattaagtac tccgcctggg
840

gagtacgctc gcaagagtga aactcaaagg aattgacggg gacccgcaca agtagcggag
900

catgtggttt aattcgaagc aacgcgaaga accttaccta agcttgacat ccttttgacc
960

gatgcctaata cgcatttttc ccttcgggga cagaagtgac aggtgggtgca tggttgtcgt
1020

cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct tgcctttagt
1080

tgccaccatt aagttgggca ctctagaggg actgccaggg ataacctgga ggaaggtggg
1140

gatgacgtca aatcatcatg ccccttatgc ttagggctac acacgtgcta caatgggtgg
1200

tacagagggc agccaagtcg tgaggccgag ctaatccctt aaagccattc tcagttcgga
1260

ttgtaggctg aaactcgcct acatgaagct ggagttacta gtaatcgcag atcagaatgc
1320

tgcggtgaat gcgttcccgg gtcttgtaca caccgcccgt cacaccacgg aagttggggg
1380

cgcccgaagc cacttagcta acccttttgg gaagcgagtg tcgaagggtga aatcaataac
1440

tgggggtgaag tcgtaacaag gtagccgtat cggaagggtgc ggctggatca cct
1493

<210> 127

<211> 1493

<212> DNA

<213> artificial sequence

<220>

<223> SPC10238_contig000001_4125835_4127327

<400> 127

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gattctcttc ggagaagagc ggcggacggg tgagtaacgc gtgggtaacc tgcctcatac
120

acatggataa cataccgaaa ggtatgctaa tacaggataa cataagagat tcgcatgttt
180

ctcttatcaa agctccggcg gtatgagatg gacccgcgtc tgattagcta gttggtaagg
240

taatggctta ccaaggcgac gatcagtagc cgacctgaga gggtgatcgg ccacattgga
300

actgagacac ggtccaaact cctacgggag gcagcagtgg ggaatattgc acaatgggcg
360

aaagcctgat gcagcaacgc cgcgtgagtg atgaaggcct tcgggtcgta aaactctgtc
420

ctcaaggaag ataatgacgg tacttgagga ggaagccccg gctaactacg tgccagcagc
480

cgcggtataa cgtagggggc tagcgttatc cggatttact gggcgtaaag ggtgcgtagg
540

tggtttctta agtcaggagt gaaaggctac ggcttaaccg tagtaagctc ttgaaactgg
600

gaaacttgag tgcaggagag gaaagtggaa ttcctagtgt agcggtgaaa tgcgtagata
660

ttaggaggaa caccagtagc gaaggcggct ttctggactg taactgacac tgaggcacga
720

aagcgtgggg agcaaacagg attagatacc ctggtagtcc acgccgtaaa cgatgagtac
780

taggtgtcgg gggttacccc cctcggtgcc gcagctaacg cattaagtac tccgcctggg
840

gagtacgctc gcaagagtga aactcaaagg aattgacggg gacccgcaca agtagcggag
900

catgtggttt aattcgaagc aacgcgaaga accttaccta agcttgacat ccttttgacc
960

gatgcctaat cgcatttttc ccttcgggga cagaagtgac aggtgggtgca tggttgtcgt
1020

cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct tgcctttagt
1080

tgccagcatt aagttgggca ctctagaggg actgccaggg ataacctgga ggaaggtggg
1140

gatgacgtca aatcatcatg ccccttatgc ttagggctac acacgtgcta caatgggtgg
1200

tacagagggc agccaagtcg tgaggccgag ctaatccctt aaagccattc tcagttcgga
1260

ttgtaggctg aaactcgcct acatgaagct ggagttacta gtaatcgcag atcagaatgc
1320

tgcggtgaat gcgttcccgg gtcttgtaca caccgcccgt cacaccacgg aagttggggg
1380

cgcccgaagc cacttagcta acccttttgg gaagcgagtg tcgaaggtga aatcaataac
1440

tgggggtgaag tcgtaacaag gtagccgtat cggaagggtgc ggctggatca cct
1493

<210> 128

<211> 1493

<212> DNA

<213> artificial sequence

<220>

<223> SPC10238_contig000001_244488_245980

<400> 128

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gattctcttc ggagaagagc ggcggacggg tgagtaacgc gtgggtaacc tgcctcatac
120

acatggataa cataccgaaa ggtatgctaa tacaggataa cataagagat tcgcatgttt
180

ctcttatcaa agctccggcg gtatgagatg gacccgcgctc tgattagcta gttggtaagg
240

taatggctta ccaaggcgac gatcagtagc cgacctgaga gggatgatcgg ccacattgga
300

actgagacac ggtccaaact cctacgggag gcagcagtgg ggaatattgc acaatgggcg
360

aaagcctgat gcagcaacgc cgcgtgagtg atgaaggcct tcgggtcgta aaactctgtc
420

ctcaaggaag ataatgacgg tacttgagga ggaagccccg gctaactacg tgccagcagc
480

cgcggtaata cgtagggggc tagcgttatc cggatttact gggcgtaaag ggtgcgtagg
540

tggtttctta agtcaggagt gaaaggctac ggcttaaccg tagtaagctc ttgaaactgg
600

gaaacttgag tgcaggagag gaaagtggaa ttcctagtgt agcggtgaaa tgcgtagata
660

ttaggaggaa caccagtagc gaaggcggct ttctggactg taactgacac tgaggcacga
720

aagcgtgggg agcaaacagg attagatacc ctggtagtcc acgccgtaaa cgatgagtac
780

taggtgtcgg gggttacccc cctcgggtgcc gcagctaacg cattaagtac tccgcctggg
840

gagtacgctc gcaagagtga aactcaaagg aattgacggg gacccgcaca agtagcggag
900

catgtggttt aattcgaagc aacgcgaaga accttaccta agcttgacat ccttttgacc
960

gatgcctaata cgcatTTTTT ccttcgggga cagaagtgac aggtgggtgca tggttgtcgt
1020

cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct tgcctttagt
1080

tgccagcatt aagttgggca ctctagaggg actgccaggg ataacctgga ggaagggtggg
1140

gatgacgtca aatcatcatg ccccttatgc ttagggctac acacgtgcta caatgggtgg
1200

tacagagggc agccaagtcg tgaggccgag ctaatccctt aaagccattc tcagttcgga
1260

ttgtaggctg aaactcgcct acatgaagct ggagttacta gtaatcgcag atcagaatgc
1320

tgcggtgaat gcgttcccgg gtcttgtaca caccgcccgt cacaccacgg aagttggggg
1380

cgcccgaagc cacttagcta acccttttgg gaagcgagtg tcgaagggtga aatcaataac
1440

tggggtgaag tcgtaacaag gtagccgtat cggaagggtgc ggctggatca cct
1493

<210> 129

<211> 1493

<212> DNA

<213> artificial sequence

<220>

<223> SPC10238_contig000001_136397_137889

<400> 129

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gattctcttc ggagaagagc ggcggacggg tgagtaacgc gtgggtaacc tgcctcatac
120

acatggataa cataccgaaa ggtatgctaa tacaggataa cataagagat tcgcatgttt
180

ctcttatcaa agctccggcg gtatgagatg gacccgcgtc tgattagcta gttggtaagg
240

taatggctta ccaaggcgac gatcagtagc cgacctgaga gggtgatcgg ccacattgga
300

actgagacac ggtccaaact cctacgggag gcagcagtgg ggaatattgc acaatgggcg
360

aaagcctgat gcagcaacgc cgcgtgagt atgaaggcct tcgggtcgta aaactctgtc
420

ctcaaggaag ataatgacgg tacttgagga ggaagccccg gctaactacg tgccagcagc
480

cgcggtaata cgtagggggc tagcgttatc cggatttact gggcgtaaag ggtgcgtagg
540

tggtttctta agtcaggagt gaaaggctac ggcttaaccg tagtaagctc ttgaaactgg
600

gaaacttgag tgcaggagag gaaagtggaa ttcctagtgt agcggtgaaa tgcgtagata
660

ttaggaggaa caccagtagc gaaggcggct ttctggactg taactgacac tgaggcacga
720

aagcgtgggg agcaaacagg attagatacc ctggtagtcc acgccgtaaa cgatgagtac
780

taggtgtcgg gggttacccc cctcgggtgcc gcagctaacg cattaagtac tccgcctggg
840

gagtacgctc gcaagagtga aactcaaagg aattgacggg gacccgcaca agtagcggag
900

catgtggttt aattcgaagc aacgcgaaga accttaccta agcttgacat ccttttgacc
960

gatgcctaata cgcatTTTTT ccttcgggga cagaagtgac aggtggtgca tggttgtcgt
1020

cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct tgcctttagt
1080

tgccagcatt aagttgggca ctctagaggg actgccaggg ataacctgga ggaagggtggg
1140

gatgacgtca aatcatcatg ccccttatgc ttagggctac acacgtgcta caatgggtgg
1200

tacagagggc agccaagtcg tgaggccgag ctaatccctt aaagccattc tcagttcgga
1260

ttgtaggctg aaactcgcct acatgaagct ggagttacta gtaatcgcag atcagaatgc
1320

tgcggtgaat gcgttcccgg gtcttgtaca caccgcccgt cacaccacgg aagttggggg
1380

cgcccgaagc cacttagcta acccttttgg gaagcgagtg tcgaagggtga aatcaataac
1440

tgggggtgaag tcgtaacaag gtagccgtat cggaagggtgc ggctggatca cct
1493

<210> 130

<211> 1493

<212> DNA

<213> artificial sequence

<220>

<223> SPC10238_contig000001_4008480_4009972

<400> 130

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gattctcttc ggagaagagc ggcggacggg tgagtaacgc gtgggtaacc tgcctcatac
120

acatggataa cataccgaaa ggtatgctaa tacaggataa cataagagat tcgcatgttt
180

ctcttatcaa agctccggcg gtatgagatg gacccgcgtc tgattagcta gttggtaagg
240

taatggctta ccaaggcgac gatcagtagc cgacctgaga gggatgatcg ccacattgga
300

actgagacac ggtccaaact cctacgggag gcagcagtg ggaatattgc acaatgggcg
360

aaagcctgat gcagcaacgc cgcgtgagtg atgaaggcct tcgggtcgta aaactctgtc
420

ctcaaggaag ataatgacgg tacttgagga ggaagccccg gctaactacg tgccagcagc
480

cgcggttaata cgtagggggc tagcgttatc cggatttact gggcgtaaag ggtgcgtagg
540

tggtttctta agtcaggagt gaaaggctac ggctcaaccg tagtaagctc ttgaaactgg
600

gaaacttgag tgcaggagag gaaagtggaa ttcctagtgt agcggtgaaa tgcgtagata
660

ttaggaggaa caccagtagc gaaggcggct ttctggactg taactgacac tgaggcacga
720

aagcgtgggg agcaaacagg attagatacc ctggtagtcc acgccgtaaa cgatgagtac
780

taggtgtcgg gggttacccc cctcgggtgcc gcagctaacg cattaagtac tccgcctggg
840

gagtacgctc gcaagagtga aactcaaagg aattgacggg gacccgcaca agtagcggag
900

catgtggttt aattcgaagc aacgcgaaga accttaccta agcttgacat ccttttgacc
960

gatgcctaata cgcatTTTTT ccttcggggga cagaagtgac aggtgggtgca tggttgtcgt
1020

cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct tgcctttagt
1080

tgccagcatt aagttgggca ctctagaggg actgccaggg ataacctgga ggaaggtggg
1140

gatgacgtca aatcatcatg ccccttatgc ttagggctac acacgtgcta caatgggtgg
1200

tacagagggc agccaagtcg tgaggccgag ctaatccctt aaagccattc tcagttcgga
1260

ttgtaggctg aaactcgcct acatgaagct ggagttacta gtaatcgcag atcagaatgc
1320

tgcggtgaat gcgttcccgg gtcttgtaca caccgcccgt cacaccacgg aagttggggg
1380

cgcccgaagc cacttagcta acccttttgg gaagcgagtg tcgaagggtga aatcaataac
1440

tgggggtgaag tcgtaacaag gtagccgtat cggaagggtgc ggctggatca cct
1493

<210> 131

<211> 1493

<212> DNA

<213> artificial sequence

<220>

<223> SPC10238_contig000001_250978_252470

<400> 131

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gattctcttc ggagaagagc ggcggacggg tgagtaacgc gtgggtaacc tgcctcatac
120

acatggataa cataccgaaa ggtatgctaa tacaggataa cataagagat tcgcatgttt
180

ctcttatcaa agctccggcg gtatgagatg gacccgcgtc tgattagcta gttggtaagg
240

taatggctta ccaaggcgac gatcagtagc cgacctgaga gggtgatcgg ccacattgga
300

actgagacac ggtccaaact cctacgggag gcagcagtgg ggaatattgc acaatgggcg
360

aaagcctgat gcagcaacgc cgcgtgagtg atgaaggcct tcgggtcgta aaactctgtc
420

ctcaaggaag ataatgacgg tacttgagga ggaagccccg gctaactacg tgccagcagc
480

cgcggttaata cgtagggggc tagcgttatc cggatttact gggcgtaaag ggtgcgtagg
540

tggtttctta agtcaggagt gaaagactac ggcttaaccg tagtaagctc ttgaaactgg
600

gaaacttgag tgcaggagag gaaagtggaa ttcctagtgt agcggtgaaa tgcgtagata
660

ttaggaggaa caccagtagc gaaggcggct ttctggactg taactgacac tgaggcacga
720

aagcgtgggg agcaaacagg attagatacc ctggtagtcc acgccgtaaa cgatgagtac
780

taggtgtcgg gggttacccc cctcgggtgcc gcagctaacg cattaagtac tccgcctggg
840

gagtacgctc gcaagagtga aactcaaagg aattgacggg gacccgcaca agtagcggag
900

catgtggttt aattcgaagc aacgcgaaga accttaccta agcttgacat ccttttgacc
960

gatgcctaata cgcatTTTTT ccttcgggga cagaagtgac aggtggtgca tggttgtcgt
1020

cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct tgcctttagt
1080

tgccagcatt aagttgggca ctctagaggg actgccaggg ataacctgga ggaagggtggg
1140

gatgacgtca aatcatcatg ccccttatgc ttagggctac acacgtgcta caatgggtgg
1200

tacagagggc agccaagtcg tgaggccgag ctaatccctt aaagccattc tcagttcgga
1260

ttgtaggctg aaactcgcct acatgaagct ggagttacta gtaatcgcag atcagaatgc
1320

tgcggtgaat gcgttcccgg gtcttgtaca caccgcccggt cacaccacgg aagttggggg
1380

cgcccgaagc cacttagcta acccttttgg gaagcgagtg tcgaagggtga aatcaataac
1440

tgggggtgaag tcgtaacaag gtagccgtat cggaagggtgc ggctggatca cct
1493

<210> 132

<211> 1521

<212> DNA

<213> artificial sequence

<220>

<223> SPC10987_contig000001_289767_291287

<400> 132

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

gaagcgcttt acttagattt cttcggattg aagagttttg cgactgagcg gcggacgggt
120

gagtaacgcg tgggtaacct gcctcataca gggggataac agttagaaat gactgctaata
180

accgcataag accacagtac cgcattggtac cgtgggaaaa actccggtgg tatgagatgg
240

acccgcgtct gattagctag ttggtaaggt aacggcttac caaggcgacg atcagtagcc
300

gacctgagag ggtgaccggc cacattggga ctgagacacg gcccaaactc ctacgggagg
360

cagcagtggg gaatattgca caatggggga aaccctgatg cagcgacgcc gcgtgaagga
420

tgaagtattt cggtatgtaa acttctatca gcaggggaaga aaatgacggg acctgactaa
480

gaagccccgg ctaactacgt gccagcagcc gcggtaatac gtagggggca agcgttatcc
540

ggatttactg ggtgtaaagg gagcgtagac gggtatgtaa gtctgatgtg aaaaccggg
600

gctcaacccc gggactgcat tggaaactat gtaactagag tgtcggagag gtaagtggaa
660

ttcctagtgt agcggtgaaa tgcgtagata ttaggaggaa caccagtggc gaaggcggct
720

tactggacga tgactgacgt tgaggctcga aagcgtgggg agcaaacagg attagatacc
780

ctggtagtcc acgccgtaaa cgatgcatac taggtgtcgg gtggcaaagc cattcgggtgc
840

cgcagcaaac gcaataagta tgccacctgg ggagtacgtt cgcaagaatg aaactcaaag
900

gaattgacgg ggacccgcac aagcgggtgga gcatgtgggt taattcgaag caacgcgaag
960

aaccttacct gctcttgaca tccccctgac cggcgcgtaa tgggtgccttt ccttcgggac
1020

aggggagaca ggtggtgcat ggttgtcgtc agctcgtgtc gtgagatgtt gggttaagtc
1080

ccgcaacgag cgcaaccctt atctttagta gccagcgggt cggccggggca ctctagagag
1140

actgccaggg ataacctgga ggaagggtggg gatgacgtca aatcatcatg ccccttatga
1200

gcagggctac acacgtgcta caatggcgta aacaaaggga ggcgaagccg cgaggtggag
1260

caaatcccaa aaataacgtc tcagttcgga ttgtagtctg caactcgact acatgaagct
1320

ggaatcgcta gtaatcgca atcagaatgt cgcgggtgaat acgttcccgg gtcttgtaca
1380

caccgcccgt cacaccatgg gagttggtaa cggccgaagt cagtgaccca accgtaagga
1440

gggagctgcc gaagggtggga ccgataactg ggggtgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t
1521

<210> 133
<211> 1521
<212> DNA
<213> artificial sequence

<220>

<223> SPC10987_contig000001_3915138_3916658

<400> 133

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

gaagcgcttt acttagattt cttcggattg aagagttttg cgactgagcg gcggacgggt
120

gagtaacgcg tgggtaacct gcctcataca gggggacaac agttagaaat gactgctaata
180

accgcataag accacgggtac cgcattgggtac agtgggaaaa actccgggtgg tatgagatgg
240

acccgcgtct gattagctag ttggtaaggt aacggcttac caaggcgacg atcagtagcc
300

gacctgagag ggtgaccggc cacattggga ctgagacacg gcccaaactc ctacgggagg
360

cagcagtggg gaatattgca caatggggga aaccctgatg cagcgacgcc gcgtgaagga
420

tgaagtattt cggtatgtaa acttctatca gcagggaaga aaatgacggg acctgactaa
480

gaagccccgg ctaactacgt gccagcagcc gcggtaatac gtagggggca agcggtatcc
540

ggatttactg ggtgtaaagg gagcgtagac gggtatgtaa gtctgatgtg aaaacccggg
600

gctcaacccc gggactgcat tggaaactat gtaactagag tgctcgagag gtaagtggaa
660

ttcctagtgt agcggtgaaa tgcgtagata ttaggaggaa caccagtggc gaaggcggct
720

tactggacga tgactgacgt tgaggctcga aagcgtgggg agcaaacagg attagatacc
780

ctggtagtcc acgccgtaaa cgatgcatac taggtgtcgg gtggcaaagc cattcggtgc
840

cgcagcaaac gcaataagta tgccacctgg ggagtacgtt cgcaagaatg aaactcaaag
900

gaattgacgg ggacccgcac aagcgggtgga gcatgtgggt taattcgaag caacgcgaag
960

aaccttacct gctcttgaca tccccctgac cggcgcgtaa tgggtgccttt ccttcgggac
1020

aggggagaca ggtggtgcat ggttgtcgtc agctcgtgtc gtgagatgtt gggttaagtc
1080

ccgcaacgag cgcaaccctt atcttttagta gccagcgggt cggccgggca ctctagagag
1140

actgccaggg ataacctgga ggaagggtgg gatgacgtca aatcatcatg ccccttatga
1200

gcaggggctac acacgtgcta caatggcgta aacaaaggga ggcgaagccg cgaggtggag
1260

caaatcccaa aaataacgtc tcagttcgga ttgtagtctg caactcgact acatgaagct
1320

ggaatcgcta gtaatcgcta atcagaatgt cgcgggtgaat acgttcccgg gtcttgtaca
1380

caccgcccgt cacaccatgg gagttggtaa cggccgaagt cagtgacca accgtaagga
1440

gggagctgcc gaagggtggga ccgataactg ggggtgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t
1521

<210> 134

<211> 1521

<212> DNA

<213> artificial sequence

<220>

<223> SPC10987_contig000001_3927984_3929504

<400> 134

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

gaagcgcttt acttagattt cttcggattg aagagttttg cgactgagcg gcggacgggt
120

gagtaacgcg tgggtaacct gcctcataca gggggataac agttagaaat gactgctaata
180

accgcataag accacggtac cgcattggtac agtgggaaaa actccggtgg tatgagatgg
240

acccgcgtct gattagctag ttggtaaggt aacggccttac caaggcgacg atcagtagcc
300

gacctgagag ggtgaccggc cacattggga ctgagacacg gcccaaactc ctacgggagg
360

cagcagtggg gaatattgca caatggggga aaccctgatg cagcgacgcc gcgtgaagga
420

tgaagtattt cggtatgtaa acttctatca gcagggaaga aaatgacggg acctgactaa
480

gaagccccgg ctaactacgt gccagcagcc gcggtaatac gtagggggca agcgttatcc
540

ggatttactg ggtgtaaagg gagcgtagac gggtatgtaa gtctgatgtg aaaacccggg
600

gctcaacccc gggactgcat tggaaactat gtaactagag tgtcggagag gtaagtggaa
660

ttcctagtgt agcggtgaaa tgcgtagata ttaggaggaa caccagtggc gaaggcggct
720

tactggacga tgactgacgt tgaggctcga aagcgtgggg agcaaacagg attagatacc
780

ctggtagtcc acgccgtaaa cgatgcatac taggtgtcgg gtggcaaagc cattcgggtgc
840

cgcagcaaac gcaataagta tgccacctgg ggagtacgtt cgcaagaatg aaactcaaag
900

gaattgacgg ggacccgcac aagcgggtgga gcatgtgggtt taattcgaag caacgcgaag
960

aaccttacct gctcttgaca tccccctgac cggcgcgtaa tggtgccttt ccttcgggac
1020

aggggagaca ggtggtgcat ggttgtcgtc agctcgtgtc gtgagatgtt gggttaagtc
1080

ccgcaacgag cgcaaccctt atcttttagta gccagcgggtt cggccgggca ctctagagag
1140

actgccaggg ataacctgga ggaaggtggg gatgacgtca aatcatcatg ccccttatga
1200

gcagggctac acacgtgcta caatggcgta aacaaaggga ggcgaagccg cgaggtggag
1260

caaatcccaa aaataacgtc tcagttcgga ttgtagtctg caactcgact acatgaagct
1320

ggaatcgcta gtaatcgcgga atcagaatgt cgcggtgaat acgttcccgg gtcttgtaca
1380

caccgcccgt cacaccatgg gagttggtaa cggccgaagt cagtgacca accgtaagga
1440

gggagctgcc gaaggtggga ccgataactg ggggtgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t
1521

<210> 135

<211> 1521

<212> DNA

<213> artificial sequence

<220>

<223> SPC10987_contig000001_4550032_4551552

<400> 135

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

gaagcacttt acttagatth cttcggaatg aagagtgttg tgactgagcg gcggacgggt
120

gagtaacgcg tgggtaacct gcctcataca gggggataac agttagaaat gactgctaata
180

accgcataag accacggtac cgcattggtac agtgggaaaa actccggtgg tatgagatgg
240

acccgcgtct gattagctag ttggtaaggt aacggcttac caaggcgacg atcagtagcc
300

gacctgagag ggtgaccggc cacattggga ctgagacacg gcccaaactc ctacgggagg
360

cagcagtggg gaatattgca caatggggga aaccctgatg cagcgacgcc gcgtgaagga
420

tgaagtatth cggatatgtaa acttctatca gcagggaaga aaatgacggg acctgactaa
480

gaagccccgg ctaactacgt gccagcagcc gcggtaatac gtagggggca agcgttatcc
540

ggatttactg ggtgtaaagg gagcgtagac gggttatgtaa gtctgatgtg aaaacccggg
600

gctcaacccc gggactgcat tggaaactat gtaactagag tgctcgagag gtaagtggaa
660

ttcctagtgt agcggtgaaa tgcgtagata ttaggaggaa caccagtggc gaaggcggct
720

tactggacga tgactgacgt tgaggctcga aagcgtgggg agcaaacagg attagatacc
780

ctggtagtcc acgccgtaaa cgatgcatac taggtgtcgg gtggcaaagc cattcgggtg
840

cgcagcaaac gcaataagta tgccacctgg ggagtacgtt cgcaagaatg aaactcaaag
900

gaattgacgg ggacccgcac aagcgggtgga gcatgtgggt taattcgaag caacgcgaag
960

aaccttacct gctcttgaca tccccctgac cggcgcgtaa tgggtgccttt ccttcgggac
1020

aggggagaca ggtggtgcat ggttgctcgtc agctcgtgtc gtgagatggt gggttaagtc
1080

ccgcaacgag cgcaaccctt atcttttagta gccagcgggt cggccgggca ctctagagag
1140

actgccaggg ataacctgga ggaagggtggg gatgacgtca aatcatcatg ccccttatga
1200

gcagggctac acacgtgcta caatggcgta aacaaaggga ggcgaagccg cgagggtggag
1260

caaatcccaa aaataacgtc tcagttcgga ttgtagtctg caactcgact acatgaagct
1320

ggaatcgcta gtaatcgcgga atcagaatgt cgcgggtgaat acgttcccgg gtctttgtaca
1380

caccgcccgt cacaccatgg gagttggtaa cgcccgaagt cagtgacca accgtaagga
1440

gggagctgcc gaagggtggga ccgataactg ggggtgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t
1521

<210> 136

<211> 1515

<212> DNA

<213> artificial sequence

<220>

<223> SPC10298_contig000063_1456_2970

<400> 136

aggggttcgat tctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgaac
60

gggatccatc aggctttgct tgggtggtgag agtggcgaac gggtgagtaa tgcgtgaccg
120

acctgccccca tacaccggaa tagctcctgg aaacgggtgg taatgccgga tgctccggcc
180

tgccgcatgg tgggctggga aagattgtat cggtatggga tggggtcgcg tcctatcagg
240

tagtcggcgg ggtaacggcc caccgagcct acgacgggta gccggcctga gagggcgacc
300

ggccacattg ggactgagat acggcccaga ctcctacggg aggcagcagt ggggaatatt
360

gcacaatggg cgcaagcctg atgcagcgac gccgcgtgcg ggatgacggc cttcggggttg
420

taaaccgctt ttgatcggga gcaagccttc gggtgagtgt acctttcgaa taagcaccgg
480

ctaactacgt gccagcagcc gcggtaatac gtaggggtgca agcgttatcc ggaattattg
540

ggcgtaaagg gctcgtaggc ggttcgtcgc gtccgggtgtg aaagtccatc gcttaacggg
600

ggatctgcgc cgggtacggg cgggctggag tgcggtaggg gagactggaa ttcccgggtgt
660

aacgggtggaa tgtgtagata tcgggaagaa caccaatggc gaaggcagggt ctctgggccc
720

ttactgacgc tgaggagcga aagcgtgggg agcgaacagg attagatacc ctggtagtcc
780

acgccgtaaa cgggtggatgc tggatgtggg gcccgttcca cgggttccgt gtcggagcta
840

acgcgttaag catcccgccct ggggagtagc gccgcaaggc taaaactcaa agaaattgac
900

gggggcccgc acaagcggcg gagcatgcgg attaattcga tgcaacgcga agaaccttac
960

ctgggcttga catgttcccg accgctccag agatggggct tcccttcggg gcggggtcac
1020

aggtggtgca tggtcgtcgt cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga
1080

gcgcaaccct cgccctgtgt tgccagcacg tcatgggtggg aactcacggg ggaccgccgg
1140

ggtcaactcg gaggaagggt gggatgacgt cagatcatca tgccccttac gtccagggt
1200

tcacgcatgc tacaatggcc ggtacaacgg gatgcgacac ggcgacgtgg agcggatccc
1260

tgaaaaccgg tctcagttcg gattggagtc tgcaaccgga ctccatgaag gcggagtcgc
1320

tagtaatcgc ggatcagcaa cgccgcggtg aatgcgttcc cgggccttgt acacaccgcc
1380

cgtcaagtca tgaaagtggg tagcaccgga agccgggtggc ctaacctttt tggatggagc
1440

cgtctaaggt gagactcgtg attgggacta agtcgtaaca aggtagccgt accggaaggt
1500

g c g g c t g g a t c a c c t
1515

<210> 137

<211> 1504

<212> DNA

<213> artificial sequence

<220>

<223> SPC10155_contig000001_3767013_3768516

<400> 137

agagtttgat cctggctcag gacgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gagaggagtt ccttcgggaa caaatctagc ggcggacggg tgagtaacac gtgggcaacc
120

tgccttgtag aggggaatag ccttcgaaa ggaagattaa taccgcataa cattacattt
180

tcgcatgaag aagtaattaa aggagcaatc cgctacaaga tgggcccgcg gcgcattagc
240

tagttggtga ggtaacggct caccaaggcg acgatgcgta gccgacctga gagggtgatc
300

ggccacattg ggactgagac acggcccaga ctcctacggg aggcagcagt ggggaatatt
360

gcacaatggg ggaaaccctg atgcagcaac gccgcgtgag tgatgaaggt tttcggatcg
420

taaagctctg tcttcaggga cgataatgac ggtacctgag gaggaagcca cggctaacta
480

cgtgccagca gccgcggtaa tacgtagggt gcgagcgttg tccggattta ctgggcgtaa
540

agggagcgta ggcggatttt taagtgagat gtgaaatacc cgggctcaac ttgggtgctg
600

catttcaaac tggaagtcta gagtgcagga gaggagagtg gaattcctag tgtagcgggtg
660

aaatgcgtag agattaggaa gaacaccagt ggcgaaggcg actctctgga ctgtaactga
720

cgctgaggct cgaaagcgtg gggagcaaac aggattagat accctggtag tccacgccgt
780

aaacgatgaa tactagggtgt aggggttgtc atgacctctg tgccgccgca aacgcattaa
840

gtattccgcc tggggagtac ggtcgcaaga ttaaaactca aaggaattga cgggggcccg
900

cacaagcagc ggagcatgtg gtttaattcg aagcaacgcg aagaacctta cctagacttg
960

acatctcctg cattactctt aatcgaggaa gtcccttcgg ggacaggatg acaggtggtg
1020

catggttgtc gtcagctcgt gtcgtgagat gttgggttaa gtcccgcaac gagcgcaacc
1080

cttattgtta gttgctacca tttagttgag cactctagcg agactgcccg ggtaaacgg
1140

gaggaagggtg gggatgacgt caaatcatca tgccccttat gtctagggct acacacgtgc
1200

tacaatggca agtacaaaga gatgcgatac cgcgagggtgg agctaaacta taaaacttgt
1260

ctcagttcgg attgtaggct gaaactcgcc tacatgaagc tggagttgct agtaatcgcg
1320

aatcagaatg tcgcggtgaa tacgttcccg ggccttgtac acaccgcccg tcacaccatg
1380

agagttggca atacccaaag ttcgtgagct aacccgtaag ggaggcagcg acctaaggta
1440

gggtcagcga ttgggggtgaa gtcgtaacaa ggtagccgta ggagaacctg cggctggatc
1500

a c c t
1504

<210> 138

<211> 1504

<212> DNA

<213> artificial sequence

<220>

<223> SPC10155_contig000001_3732405_3733908

<400> 138

agagtttgat cctggctcag gacgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gagaggagtt ccttcgggaa caaatctagc ggcggacggg tgagtaacac gtgggcaacc
120

tgcttgtag aggggaatag ccttccgaaa ggaagattaa taccgcataa tattacattt
180

tcgcatgaag aagtaattaa aggagcaatc cgctacaaga tgggcccgcg gcgcattagc
240

tagttggtga ggtaacggct caccaaggcg acgatgcgta gccgacctga gagggtgatc
300

ggccacattg ggactgagac acggcccaga ctcctacggg aggcagcagt ggggaatatt
360

gcacaatggg gggaaccctg atgcagcaac gccgcgtgag tgatgaagggt tttcggatcg
420

taaagctctg tcttcagggg cgataatgac ggtacctgag gaggaagcca cggctaacta
480

cgtgccagca gccgcggtaa tacgtagggt gcgagcgttg tccggattta ctgggcgtaa
540

agggagcgtg ggcggatttt taagtgagat gtgaaatacc cgggctcaac ttgggtgctg
600

catttcaaac tggaagtcta gagtgcagga gaggagagtg gaattcctag tgtagcgggtg
660

aaatgcgtag agattaggaa gaacaccagt ggcgaaggcg actctctgga ctgtaactga
720

cgctgaggct cgaaagcgtg gggagcaaac aggattagat accctggtag tccacgccgt
780

aaacgatgaa tactagggtgt aggggttgtc atgacctctg tgccgccgca aacgcattaa
840

gtattccgcc tggggagtac ggtcgcaaga ttaaaactca aaggaattga cgggggcccg
900

cacaagcagc ggagcatgtg gtttaattcg aagcaacgcg aagaacctta cctagacttg
960

acatctcctg cattactctt aatcgaggaa gtcccttcgg ggacaggatg acagggtggtg
1020

catggttgtc gtcagctcgt gtcgtgagat gttgggttaa gtcccgaac gagcgcaacc
1080

cttattgtta gttgctacca tttagttgag cactctagcg agactgcccg ggtaaccgg
1140

gaggaagggtg gggatgacgt caaatcatca tgccccttat gtctagggct acacacgtgc
1200

tacaatggca agtacaaaga gatgcgatac cgcgagggtgg agctaaacta taaaacttgt
1260

ctcagttcgg attgtaggct gaaactcgcc tacatgaagc tggagttgct agtaatcgcg
1320

aatcagaatg tcgcggtgaa tacgttcccg ggccttgtag acaccgcccg tcacaccatg
1380

agagttggca atacccaaag ttcgtgagct aacccgtaag ggaggcagcg acctaaggta
1440

gggtcagcga ttgggggtgaa gtcgtaacaa ggtagccgta ggagaacctg cggctggatc
1500

a c c t
1504

<210> 139

<211> 1504

<212> DNA

<213> artificial sequence

<220>

<223> SPC10155_contig000001_3898283_3899786

<400> 139

agagtttgat cctggctcag gacgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gagaggagtt ccttcgggaa caaatctagc ggcggacggg tgagtaacac gtgggcaacc
120

tgcctttagt aggggaatag ccttccgaaa ggaagattaa taccgcataa cattacattt
180

tcgcatgaag aagtaattaa aggagcaatc cgctacaaga tgggcccgcg gcgcattagc
240

tagttggtga ggtaacggct caccaaggcg acgatgcgta gccgacctga gagggtgatc
300

ggccacattg ggactgagac acggcccaga ctcctacggg aggcagcagt ggggaatatt
360

gcacaatggg ggaaaccctg atgcagcaac gccgcgtgag tgatgaagggt tttcggatcg
420

taaagctctg tcttcaggga cgataatgac ggtacctgag gaggaagcca cggctaacta
480

cgtgccagca gccgcggtaa tacgtagggtg gcgagcgttg tccggattta ctgggcgtaa
540

agggagcgta ggcggatttt taagtgagat gtgaaatacc cgggctcaac ttgggtgctg
600

catttcaaac tggaagtcta gagtgcagga gaggagagtg gaattcctag tgtagcggtg
660

aaatgcgtag agattaggaa gaacaccagt ggcgaaggcg actctctgga ctgtaactga
720

cgctgaggct cgaaagcgtg gggagcaaac aggattagat accctggtag tccacgccgt
780

aaacgatgaa tactagggtgt aggggttgtc atgacctctg tgccgccgca aacgcattaa
840

gtattccgcc tggggagtac ggtcgcaaga ttaaaactca aaggaattga cgggggcccg
900

cacaagcagc ggagcatgtg gtttaattcg aagcaacgcg aagaacctta cctagacttg
960

acatctcctg cattactctt aatcgaggaa gtcccttcgg ggacaggatg acaggtggtg
1020

catggttgtc gtcagctcgt gtcgtgagat gttgggttaa gtcccgcaac gagcgcaacc
1080

cttattgtta gttgctacca tttagttgag cactctagcg agactgcccg ggtaaccgg
1140

gaggaagggtg gggatgacgt caaatcatca tgccccttat gtctagggct acacacgtgc
1200

tacaatggca agtacaaaga gatgcgatac cgcgagggtgg agctaaacta taaaacttgt
1260

ctcagttcgg attgtaggct gaaactcgcc tacatgaagc tggagttgct agtaatcgcg
1320

aatcagaatg tcgcggtgaa tacgttcccg ggccttgtag acaccgcccg tcacaccatg
1380

agagttggca atacccaaag ttcgtgagct aacccgtaag ggaggcagcg acctaaggta
1440

gggtcagcga ttgggggtgaa gtcgtaacaa ggtagccgta ggagaacctg cggctggatc
1500

a c c t
1504

<210> 140

<211> 1504

<212> DNA

<213> artificial sequence

<220>

<223> SPC10155_contig000001_3576937_3578440

<400> 140

agagtttgat cctggctcag gacgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gagaggagtt ccttcgggaa caaatctagc ggcggacggg tgagtaacac gtgggcaacc
120

tgccctttag aggggaatag ccttcgaaa ggaagattaa taccgcataa cattacattt
180

tcgcatgaag aagtaattaa aggagcaatc cgctacaaga tgggcccgcg gcgcattagc
240

tagttggtga ggtaacggct caccaaggcg acgatgcgta gccgacctga gagggtgatc
300

ggccacattg ggactgagac acggcccaga ctcctacggg aggcagcagt ggggaatatt
360

gcacaatggg ggaaaccctg atgcagcaac gccgcgtgag tgatgaagggt tttcggatcg
420

taaagctctg tcttcaggga cgataatgac ggtacctgag gaggaagcca cggctaacta
480

cgtgccagca gccgcggtaa tacgtagggt gcgagcggtg tccggattta ctgggcgtaa
540

agggagcgtg ggcggatttt taagtgagat gtgaaatacc cgggctcaac ttgggtgctg
600

catttcaaac tggaagtcta gagtgcagga gaggagagtg gaattcctag tgtagcggtg
660

aaatgcgtag agattaggaa gaacaccagt ggcgaaggcg actctctgga ctgtaactga
720

cgctgaggct cgaaagcgtg gggagcaaac aggattagat accctggtag tccacgccgt
780

aaacgatgaa tactaggtgt aggggttgtc atgacctctg tgccgccgca aacgcattaa
840

gtattccgcc tggggagtac ggtcgcaaga ttaaaactca aaggaattga cgggggcccg
900

cacaagcagc ggagcatgtg gtttaattcg aagcaacgcg aagaacctta cctagacttg
960

acatctcctg cattactctt aatcgaggaa gtcccttcgg ggacaggatg acagggtggtg
1020

catggttgtc gtcagctcgt gtcgtgagat gttgggttaa gtcccgcaac gagcgcaacc
1080

cttattgtta gttgctacca tttagttgag cactctagcg agactgcccg ggttaaccgg
1140

gaggaaggtg gggatgacgt caaatcatca tgccccttat gtctagggct acacacgtgc
1200

tacaatggca agtacaaaga gatgcgatac cgcgagggtg agctaaacta taaaacttgt
1260

ctcagttcgg attgtaggct gaaactcgcc tacatgaagc tggagttgct agtaatcgcg
1320

aatcagaatg tcgcggtgaa tacgttcccg ggccttgtag acaccgcccg tcacaccatg
1380

agagttggca atacccaaag ttcgtgagct aacccgtaag ggaggcagcg acctaaggta
1440

gggtcagcga ttgggggtgaa gtcgtaacaa ggtagccgta ggagaacctg cggctggatc
1500

a c c t
1504

<210> 141

<211> 1504

<212> DNA

<213> artificial sequence

<220>

<223> SPC10155_contig000001_3723510_3725013

<400> 141

agagtttgat cctggctcag gacgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gagaggagtt ccttcgggaa caaatctagc ggcggacggg tgagtaacac gtgggcaacc
120

tgccttgtag aggggaatag ccttccgaaa ggaagattaa taccgcataa cattacattt
180

tcgcatgaag aagtaattaa aggagcaatc cgctacaaga tgggcccgcg gcgcattagc
240

tagttggtga ggtaacggct caccaaggcg acgatgcgta gccgacctga gaggggtgatc
300

ggccacattg ggactgagac acggcccaga ctcctacggg aggcagcagt ggggaatatt
360

gcacaatggg ggaaaccctg atgcagcaac gccgcgtgag tgatgaagggt tttcggatcg
420

taaagctctg tcttcaggga cgataatgac ggtacctgag gaggaagcca cggctaacta
480

cgtgccagca gccgcggtaa tacgtagggtg gcgagcggtg tccggattta ctgggcgtaa
540

agggagcgta ggcggatttt taagtgagat gtgaaatacc cgggctcaac ttgggtgctg
600

catttcaaac tggaagtcta gagtgcagga gaggagagtg gaattcctag tgtagcgggtg
660

aaatgcgtag agattaggaa gaacaccagt ggcgaaggcg actctctgga ctgtaactga
720

cgctgaggct cgaaagcgtg gggagcaaac aggattagat accctggtag tccacgccgt
780

aaacgatgaa tactagggtgt aggggttgtc atgacctctg tgccgccgca aacgcattaa
840

gtattccgcc tggggagtac ggtcgcaaga ttaaaactca aaggaattga cgggggcccg
900

cacaagcagc ggagcatgtg gtttaattcg aagcaacgcg aagaacctta cctagacttg
960

acatctcctg cattactctt aatcgaggaa gtcccttcgg ggacaggatg acagggtggtg
1020

catggttgtc gtcagctcgt gtcgtgagat gttgggttaa gtcccgcac gagcgcaacc
1080

cttattgtta gttgctacca tttagttgag cactctagcg agactgcccg ggttaaccgg
1140

gaggaagggtg gggatgacgt caaatcatca tgccccttat gtctaggggt acacacgtgc
1200

tacaatggca agtacaaaga gatgcgatac cgcgaggtgg agctaaacta taaaacttgt
1260

ctcagttcgg attgtaggct gaaactcgcc tacatgaagc tggagttgct agtaatcgcg
1320

aatcagaatg tcgcggtgaa tacgttcccg ggccttgtag acaccgcccg tcacaccatg
1380

agagttggca atacccaaag ttcgtgagct aacccgtaag ggaggcagcg acctaaggta
1440

gggtcagcga ttggggtgaa gtcgtaacaa ggtagccgta ggagaacctg cggctggatc
1500

a c c t
1504

<210> 142

<211> 1504

<212> DNA

<213> artificial sequence

<220>

<223> SPC10155_contig000001_3582542_3584045

<400> 142

agagtttgat cctggctcag gacgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gagaggagtt ccttcgggaa caaatctagc ggcggacggg tgagtaacac gtgggcaacc
120

tgccttgtag aggggaatag ccttcgaaa ggaagattaa taccgcataa cattacattt
180

tcgcatgaag aagtaattaa aggagcaatc cgctacaaga tgggcccgcg gcgcattagc
240

tagttggtga ggtaacggct caccaaggcg acgatgcgta gccgacctga gagggtgatc
300

ggccacattg ggactgagac acggcccaga ctccctacggg aggcagcagt ggggaatatt
360

gcacaatggg ggaaaccctg atgcagcaac gccgcgtgag tgatgaaggt tttcggatcg
420

taaagctctg tcttcaggga cgataatgac ggtacctgag gaggaagcca cggctaacta
480

cgtgccagca gccgcggtaa tacgtagggtg gcgagcgttg tccggattta ctgggcgtaa
540

agggagcgta ggcggatttt taagtgagat gtgaaatacc cgggctcaac ttgggtgctg
600

catttcaaac tggaagtcta gagtgcagga gaggagagtg gaattcctag tgtagcgggtg
660

aaatgcgtag agattaggaa gaacaccagt ggcgaaggcg actctctgga ctgtaactga
720

cgctgaggct cgaaagcgtg gggagcaaac aggattagat accctggtag tccacgccgt
780

aaacgatgaa tactagggtgt aggggttgtc atgacctctg tgccgccgca aacgcattaa
840

gtattccgcc tggggagtac ggtcgcaaga ttaaaactca aaggaattga cgggggcccg
900

cacaagcagc ggagcatgtg gtttaattcg aagcaacgcg aagaacctta cctagacttg
960

acatctcctg cattactctt aatcgaggaa gtcccttcgg ggacaggatg acagggtggtg
1020

catggttgtc gtcagctcgt gtcgtgagat gttgggttaa gtcccgcaac gagcgcaacc
1080

cttattgtta gttgctacca tttagttgag cactctagcg agactgcccg ggttaaccgg
1140

gaggaagggtg gggatgacgt caaatcatca tgccccttat gtctagggtc acacacgtgc
1200

tacaatggca agtacaaaga gatgcgatac cgcgagggtg agctaaacta taaaacttgt
1260

ctcagttcgg attgtaggct gaaactcgcc tacatgaagc tggagttgct agtaatcgcg
1320

aatcagaatg tcgcggtgaa tacgttcccg ggccttgtag acaccgcccg tcacaccatg
1380

agagttggca atacccaaag ttcgtgagct aacccgtaag ggaggcagcg acctaaggta
1440

gggtcagcga ttgggggtgaa gtcgtaacaa ggtagccgta ggagaacctg cggctggatc
1500

a c c t
1504

<210> 143

<211> 1504

<212> DNA

<213> artificial sequence

<220>

<223> SPC10155_contig000001_3742972_3744475

<400> 143

agagtttgat cctggctcag gacgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gagaggagtt ccttcgggaa caaatctagc ggcggacggg tgagtaacac gtgggcaacc
120

tgccctttag aggggaatag ccttcgaaa ggaagattaa taccgcataa tattacattt
180

tcgcatgaag aagtaattaa aggagcaatc cgctacaaga tgggcccgcg gcgcattagc
240

tagttggtga ggtaacggct caccaaggcg acgatgcgta gccgacctga gagggtagtc
300

ggccacattg ggactgagac acggcccaga ctcctacggg aggagcagct ggggaatatt
360

gcacaatggg gggaaccctg atgcagcaac gccgcgtgag tgatgaaggt tttcggatcg
420

taaagctctg tcttcagggg cgataatgac ggtacctgag gaggaagcca cggctaacta
480

cgtgccagca gccgcggtaa tacgtagggtg gcgagcggtg tccggattta ctgggcgtaa
540

agggagcgta ggcggatttt taagtgagat gtgaaatacc cgggctcaac ttgggtgctg
600

catttcaaac tggaagtcta gagtgcagga gaggagagtg gaattcctag tgtagcgggtg
660

aaatgcgtag agattaggaa gaacaccagt ggcgaaggcg actctctgga ctgtaactga
720

cgctgaggct cgaaagcggtg gggagcaaac aggattagat accctggtag tccacgccgt
780

aaacgatgaa tactagggtgt aggggttgtc atgacctctg tgccgccgca aacgcattaa
840

gtattccgcc tggggaggtac ggtcgcaaga ttaaaactca aaggaattga cgggggcccg
900

cacaagcagc ggagcatgtg gtttaattcg aagcaacgcg aagaacctta cctagacttg
960

acatctcctg cattactctt aatcgaggaa gtcccttcgg ggacaggatg acagggtggtg
1020

catggttgtc gtcagctcgt gtcgtgagat gttgggttaa gtcccgcac gagcgcaacc
1080

cttattgtta gttgctacca tttagttgag cactctagcg agactgcccg ggttaaccgg
1140

gaggaagggtg gggatgacgt caaatcatca tgccccttat gtctagggtc acacacgtgc
1200

tacaatggca agtacaaaga gatgcgatac cgcgagggtg agctaaacta taaaacttgt
1260

ctcagttcgg attgtaggct gaaactcgcc tacatgaagc tggagttgct agtaatcgcg
1320

aatcagaatg tcgcggtgaa tacgttcccg ggccttgtac acaccgcccg tcacaccatg
1380

agagttggca atacccaaag ttcgtgagct aacccgtaag ggaggcagcg acctaaggta
1440

gggtcagcga ttgggggtgaa gtcgtaacaa ggtagccgta ggagaacctg cggctggatc
1500

a c c t
1504

<210> 144

<211> 1504

<212> DNA

<213> artificial sequence

<220>

<223> SPC10155_contig000001_3707915_3709418

<400> 144

agagtttgat cctggctcag gacgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gagaggagtt ccttcgggaa caaatctagc ggcggacggg tgagtaacac gtgggcaacc
120

tgccttgtag aggggaatag ccttccgaaa ggaagattaa taccgcataa cattacattt
180

tcgcatgaag aagtaattaa aggagcaatc cgctacaaga tgggcccgcg gcgcattagc
240

tagttggtga ggtaacggct caccaaggcg acgatgcgta gccgacctga gaggggtgatc
300

ggccacattg ggactgagac acggcccaga ctcctacggg aggcagcagt ggggaatatt
360

gcacaatggg ggaaaccctg atgcagcaac gccgcgtgag tgatgaaggt tttcggatcg
420

taaagctctg tcttcaggga cgataatgac ggtacctgag gaggaagcca cggctaacta
480

cgtgccagca gccgcggtaa tacgtagggtg gcgagcgttg tccggattta ctgggcgtaa
540

agggagcgta ggcggatttt taagtgagat gtgaaatacc cgggctcaac ttgggtgctg
600

catttcaaac tggaagtcta gagtgcagga gaggagagtg gaattcctag tgtagcgggtg
660

aaatgcgtag agattaggaa gaacaccagt ggcgaaggcg actctctgga ctgtaactga
720

cgctgaggct cgaaagcgtg gggagcaaac aggattagat accctggtag tccacgccgt
780

aaacgatgaa tactagggtgt aggggttgtc atgacctctg tgccgccgca aacgcattaa
840

gtattccgcc tggggagtac ggtcgcaaga ttaaaactca aaggaattga cgggggcccg
900

cacaagcagc ggagcatgtg gtttaattcg aagcaacgcg aagaacctta cctagacttg
960

acatctcctg cattactctt aatcgaggaa gtcccttcgg ggacaggatg acagggtggtg
1020

catggttgtc gtcagctcgt gtcgtgagat gttgggttaa gtcccgcac gagcgcaacc
1080

cttattgtta gttgctacca tttagttgag cactctagcg agactgcccg ggттаaccgg
1140

gaggaagggtg gggatgacgt caaatcatca tgccccttat gtctagggct acacacgtgc
1200

tacaatggca agtacaaaga gatgcgatac cgcgagggtg agctaaacta taaaacttgt
1260

ctcagttcgg attgtaggct gaaactcgcc tacatgaagc tggagttgct agtaatcgcg
1320

aatcagaatg tcgcggtgaa tacgttcccg ggccttgtag acaccgcccg tcacaccatg
1380

agagttggca atacccaaag ttcgtgagct aacccgtaag ggaggcagcg acctaaggta
1440

gggtcagcga ttgggggtgaa gtcgtaacaa ggtagccgta ggagaacctg cggctggatc
1500

a c c t
1504

<210> 145

<211> 1504

<212> DNA

<213> artificial sequence

<220>

<223> SPC10155_contig000001_3345069_3346572

<400> 145

agagtttgat cctggctcag gacgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gagaggagtt ccttcgggaa caaatctagc ggcggcacggg tgagtaacac gtgggcaacc
120

tgcccttgtag aggggaatag ccttcgaaa ggaagattaa taccgcataa cattacattt
180

tcgcatgaag aagtaattaa aggagcaatc cgctacaaga tgggcccgcg gcgcattagc
240

tagttggtga ggtaacggct caccaaggcg acgatgcgta gccgacctga gagggtgatc
300

ggccacattg ggactgagac acggcccaga ctccctacggg aggcagcagt ggggaatatt
360

gcacaatggg ggaaaccctg atgcagcaac gccgcgtgag tgatgaaggt tttcggatcg
420

taaagctctg tcttcagggg cgataatgac ggtacctgag gaggaagcca cggctaacta
480

cgtgccagca gccgcggtaa tacgtaggtg gcgagcgttg tccggattta ctgggcgtaa
540

agggagcgtg ggcggatttt taagtgagat gtgaaatacc cgggctcaac ttgggtgctg
600

catttcaaac tggaagtcta gagtgcagga gaggagagtg gaattcctag tgtagcggtg
660

aaatgcgtag agattaggaa gaacaccagt ggcgaaggcg actctctgga ctgtaactga
720

cgctgaggct cgaaagcgtg gggagcaaac aggattagat accctggtag tccacgccgt
780

aaacgatgaa tactaggtgt aggggttgtc atgacctctg tgccgccgca aacgcattaa
840

gtattccgcc tggggagtac ggtcgcaaga ttaaaactca aaggaattga cgggggccccg
900

cacaagcagc ggagcatgtg gtttaattcg aagcaacgcg aagaacctta cctagacttg
960

acatctcctg cactactctt aatcgaggaa gtcccttcgg ggacaggatg acagggtggtg
1020

catggttgtc gtcagctcgt gtcgtgagat gttgggttaa gtcccgcaac gagcgcaacc
1080

cttattgtta gttgctacca tttagttgag cactctagcg agactgccccg ggttaaccgg
1140

gaggaagggtg gggatgacgt caaatcatca tgccccttat gtctagggct acacacgtgc
1200

tacaatggca agtacaaaga gatgcgatac cgcgagggtg agctaaacta taaaacttgt
1260

ctcagttcgg attgtaggct gaaactcgcc tacatgaagc tggagttgct agtaatcgcg
1320

aatcagaatg tcgcggtgaa tacgttccccg ggccttgtac acaccgccccg tcacaccatg
1380

agagttggca atacccaaag ttcgtgagct aacccgtaag ggaggcagcg acctaaggta
1440

gggtcagcga ttgggggtgaa gtcgtaacaa ggtagccgta ggagaacctg cggctggatc
1500

a c c t
1504

<210> 146

<211> 1504

<212> DNA

<213> artificial sequence

<220>

<223> SPC10155_contig000001_3748710_3750213

<400> 146

agagtttgat cctggctcag gacgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gagaggagtt ccttcgggaa caaatctagc ggcggacggg tgagtaacac gtgggcaacc
120

tgccttgtag aggggaatag ccttccgaaa ggaagattaa taccgcataa tattacattt
180

tcgcatgaag aagtaattaa aggagcaatc cgctacaaga tgggcccgcg gcgcattagc
240

tagttggtga ggtaacggct caccaaggcg acgatgcgta gccgacctga gagggtgatc
300

ggccacattg ggactgagac acggcccaga ctcttacggg aggcagcagt ggggaatatt
360

gcacaatggg ggaaaccctg atgcagcaac gccgcgtgag tgatgaagggt tttcgggatcg
420

taaagctctg tcttcaggga cgataatgac ggtacctgag gaggaagcca cggctaacta
480

cgtgccagca gccgcggtaa tacgtaggtg gcgagcgttg tccggattta ctgggcgtaa
540

agggagcgtg ggcggatttt taagtgagat gtgaaatacc cgggctcaac ttgggtgctg
600

catttcaaac tggaagtcta gagtgcagga gaggagagtg gaattcctag tgtagcgggtg
660

aaatgcgtag agattaggaa gaacaccagt ggcgaaggcg actctctgga ctgtaactga
720

cgctgaggct cgaaagcgtg gggagcaaac aggattagat accctggtag tccacgccgt
780

aaacgatgaa tactaggtgt aggggttgtc atgacctctg tgccgccgca aacgcattaa
840

gtattccgcc tggggagtag ggtcgcaaga ttaaaactca aaggaattga cgggggcccg
900

cacaagcagc ggagcatgtg gtttaattcg aagcaacgcg aagaacctta cctagacttg
960

acatctcctg cattactctt aatcgaggaa gtcccttcgg ggacaggatg acaggtgggtg
1020

catggttgtc gtcagctcgt gtcgtgagat gttgggttaa gtcccgcac gagcgcaacc
1080

cttattgtta gttgctacca tttagttgag cactctagcg agactgcccg ggttaaccgg
1140

gaggaagggtg gggatgacgt caaatcatca tgccccttat gtctaggggt acacacgtgc
1200

tacaatggca agtacaaaga gatgcgatac cgcgagggtg agctaaacta taaaacttgt
1260

ctcagttcgg attgtaggct gaaactcgcc tacatgaagc tggagttgct agtaatcgcg
1320

aatcagaatg tcgcggtgaa tacgttcccg ggccttgtac acaccgcccg tcacaccatg
1380

agagttggca atacccaaag ttcgtgagct aaccgtaag ggaggcagcg acctaaggta
1440

gggtcagcga ttgggggtgaa gtcgtaacaa ggtagccgta ggagaacctg cggctggatc
1500

a c c t
1504

<210> 147
<211> 1524
<212> DNA
<213> artificial sequence

<220>
<223> SPC12282_contig000074_165_1688

<400> 147
agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgaac
60

gaagcataag gaacggatta tttcggtaag aagtacttta tgactgagtg gcggacgggt
120

gagtaacgcg tggataacct gcctcataca gggggataac agttagaaat gactgctaata
180

accgcataag cgcacagtgc tgcattggcac agtgtgaaaa gctccggcgg tatgagatgg
240

atccgcgttt gattagctag ttggtggggt aaaggcctac caaggcgacg atcaatagcc
300

gacctgagag ggtgaccggc cacattggga ctgagacacg gcccaaactc ctacgggagg
360

cagcagtggg gaatattgca caatggggga aaccctgatg cagcgacgcc gcgtgaagga
420

agaagtattt cggtatgtaa acttctatca gcagggaaga aaatgacggg acctgactaa
480

gaagccccgg ctaattacgt gccagcagcc gcggtaatac gtaaggggca agcggttatcc
540

ggatttactg ggtgtaaagg gagcgtagac ggcagtgcaa gtctgatgtg aaagccccggg
600

gctcaacccc gggactgcat tggaaactgt gcagctagag tgctcgagag gtaagtggaa
660

ttcctagtgt agcgggtgaaa tgcgtagata ttaggaggaa caccagtggc gaaggcggct
720

tactggacga taactgacgt tgaggctcga aagcgtgggg agcaaacagg attagatacc
780

ctggtagtcc acgccgtaaa cgatgaatac taggtgtcgg gcgccaaagg cgttcgggtgc
840

cgcagcaaac gcaataagta ttccacctgg ggagtacgtt cgcaagaatg aaactcaaag
900

gaattgacgg ggacccgcac aagcgggtgga gcatgtgggt taattcgaag caacgcgaag
960

aaccttacca agtcttgaca tctgcctgac cgggtccgtaa caggaccctt ccttcgggac
1020

aggcaagaca ggtgggtgcat ggttgtcgtc agctcgtgtc gtgagatgtt gggttaagtc
1080

ccgcaacgag cgcaaccctt atccttagta gccagcaggt agagctgggc actctagggg
1140

gactgccagg gacaacctgg aggaagggtg ggatgacgtc aaatcatcat gccccattatg
1200

atttgggcta cacacgtgct acaatggcgt aaacaaaggg aggcgaaggg gtgacctgga
1260

gcaaatccca aaaataacgt ctcagttcgg attgtagtct gcaactcgac tacatgaagc
1320

tggaatcgct agtaatcgcg aatcagaatg tcgcgggtgaa tacgttcccg ggtcttgtac
1380

acaccgcccg tcacaccatg ggagtcggat atgcccgaag ccggtgaccg aacccgaaag
1440

ggaaggagcc gtcgaagggt gagccgataa ctgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t
1524

<210> 148
<211> 1520
<212> DNA
<213> artificial sequence

<220>
<223> SPC10358_contig000001_444754_446273

<400> 148
agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgaac
60

ggggtgctca tgacggagga ttcgtccaac ggattgagtt acctagtggc ggacgggtga
120

gtaacgcgtg aggaacctgc cttggagagg ggaataacac tccgaaagga gtgctaatac
180

cgcgatgatgc agttgggtcg catggctctg actgccaaag atttatcgct ctgagatggc
240

ctcgcgtctg attagctagt aggcggggta acggcccacc taggcgacga tcagtagccg
300

gactgagagg ttgaccggcc acattgggac tgagacacgg cccagactcc tacgggaggc
360

agcagtgggg aatattgggc aatgggcgca agcctgaccc agcaacgccg cgtgaaggaa
420

gaaggctttc gggttgtaaa cttcttttgt cggggacgaa acaaatgacg gtacccgacg
480

aataagccac ggctaactac gtgccagcag ccgcggtaat acgtaggtgg caagcgttat
540

ccggattttac tgggtgtaaa gggcgtgtag gcgggattgc aagtcagatg tgaaaactgg
600

gggctcaacc tccagcctgc atttgaaact gtagttcttg agtgctggag aggcaatcgg
660

aattccgtgt gtagcgggtga aatgcgtaga tatacggagg aacaccagtg gcgaaggcgg
720

attgctggac agtaactgac gctgaggcgc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatggat actaggtgtg ggggggtctga cccctccgt
840

gccgcagtta acacaataag tatcccacct ggggagtagc atcgcaagggt tgaaactcaa
900

aggaattgac gggggccccgc acaagcgggtg gagtatgtgg ttttaattcga agcaacgcga
960

agaaccttac cagggttga catcccacta acgaagcaga gatgcattag gtgcccttcg
1020

gggaaagtgg agacaggtgg tgcattggtg tcgtcagctc gtgtcgtgag atgttgggtt
1080

aagtcccgca acgagcgcaa cccttattgt tagttgctac gcaagagcac tctagcgaga
1140

ctgccgttga caaaacggag gaaggtgggg acgacgtcaa atcatcatgc cccttatgtc
1200

ctgggccaca cacgtactac aatggtgggtt aacagaggga ggcaataaccg cgaggtggag
1260

caaatcccta aaagccatcc cagttcggat tgcaggctga aaccgcctg tatgaagttg
1320

gaatcgctag taatcgcgga tcagcatgcc gcggtgaata cgttcccggg ccttgtagac
1380

accgcccgtc acaccatgag agtcgggaac acccgaagtc cgtagcctaa ccgcaaggag
1440

ggcgcgccg aaggtgggtt cgataattgg ggtgaagtcg taacaaggta gccgtatcgg
1500

a a g g t g c g g c t g g a t c a c c t
1520

<210> 149

<211> 1520

<212> DNA

<213> artificial sequence

<220>

<223> SPC10358_contig000003_43721_45240

<400> 149

agagttttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgaac
60

ggggtgctca tgacggagga ttcgtccaac ggattgagtt acctagtggc ggacgggtga
120

gtaacgcgtg aggaacctgc cttggagagg ggaataacac tccgaaagga gtgctaatac
180

cgcattgatgc agttgggtcg catggctctg actgccaaag atttatcgct ctgagatggc
240

ctcgcgtctg attagctagt aggcggggta acggcccacc taggcgacga tcagtagccg
300

gactgagagg ttgaccggcc acattgggac tgagacacgg cccagactcc tacgggaggg
360

agcagtgggg aatattgggc aatgggcgca agcctgaccc agcaacgccg cgtgaaggaa
420

gaaggctttc gggttgtaaa cttcttttgt cggggacgaa acaaattgacg gtacccgacg
480

aataagccac ggctaactac gtgccagcag ccgcggtaat acgtagggtgg caagcgttat
540

ccggattttac tgggtgtaaa gggcgtgtag gcgggattgc aagtcagatg tgaaaactgg
600

gggctcaacc tccagcctgc atttgaaact gtagttcttg agtgctggag aggcaatcgg
660

aattccgtgt gtagcggtga aatgcgtaga tatacggagg aacaccagtg gcgaaggcgg
720

attgctggac agtaactgac gctgaggcgc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatggat actaggtgtg gggggtctga cccctccgt
840

gccgcagtta acacaataag tatcccacct ggggagtagc atcgcaaggc tgaaactcaa
900

aggaattgac gggggcccgcc acaagcggcg gagtatgtgg ttttaattcga agcaacgcga
960

agaaccttac cagggtctga catcccacta acgaagcaga gatgcattag gtgcccttcg
1020

gggaaagtgg agacaggtgg tgcattggtg tcgtcagctc gtgtcgtgag atgttgggtt
1080

aagtcctgca acgagcgcaa cccttattgt tagttgctac gcaagagcac tctagcgaga
1140

ctgccgttga caaacgggag gaaggtgggg acgacgtcaa atcatcatgc cccttatgtc
1200

ctgggccaca cacgtactac aatggtggtt aacagaggga ggcaataacc cgaggtggag
1260

caaatcccta aaagccatcc cagttcggat tgcaggctga aaccgcctg tatgaagttg
1320

gaatcgctag taatcgcgga tcagcatgcc gcggtgaata cgttcccggt ccttgtagac
1380

accgcccgtc acaccatgag agtcgggaac acccgaagtc cgtagcctaa ccgcaaggag
1440

ggcgcgcccg aaggtgggtt cgataattgg ggtgaagtcg taacaaggta gccgtatcgg
1500

a a g g t g c g g c t g g a t c a c c t
1520

<210> 150

<211> 1520

<212> DNA

<213> artificial sequence

<220>

<223> SPC10358_contig000003_37474_38993

<400> 150

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgaac
60

ggggtgctca tgacggagga ttcgtccaac ggattgagtt acctagtggc ggacgggtga
120

gtaacgcgtg aggaacctgc cttggagagg ggaataacac tccgaaagga gtgctaatac
180

cgcattgatgc agttgggtcg catggctctg actgccaaag atttatcgct ctgagatggc
240

ctcgcgtctg attagctagt aggcggggta acggcccacc taggcgacga tcagtagccg
300

gactgagagg ttgaccggcc acattgggac tgagacacgg cccagactcc tacgggagggc
360

agcagtgggg aatattgggc aatgggcgca agcctgacct agcaacgccg cgtgaaggaa
420

gaaggctttc gggttgtaaa cttcttttgt cggggacgaa acaaatgacg gtacccgacg
480

aataagccac ggctaactac gtgccagcag ccgcggtaat acgtagggtg caagcgttat
540

ccggatttac tgggtgtaaa gggcgtgtag gcgggattgc aagtcagatg tgaaaactgg
600

gggctcaacc tccagcctgc atttgaaact gtagttcttg agtgctggag aggcaatcgg
660

aattccgtgt gtagcgggtga aatgcgtaga tatacggagg aacaccagtg gcgaaggcgg
720

attgctggac agtaactgac gctgaggcgc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatggat actagggtgtg gggggctctga cccctccgt
840

gccgcagtta acacaataag tatcccacct ggggagtagc atcgcaaggt tgaaactcaa
900

aggaattgac gggggcccg cacaagcgggt gagtatgtgg ttttaattcga agcaacgcga
960

agaaccttac cagggttga catcccacta acgaagcaga gatgcattag gtgcccttcg
1020

gggaaagtgg agacaggtgg tgcattggtg tcgtcagctc gtgtcgtgag atgttgggtt
1080

aagtcccgca acgagcgcaa cccttattgt tagttgctac gcaagagcac tctagcgaga
1140

ctgccgttga caaacggag gaaggtgggg acgacgtcaa atcatcatgc cccttatgtc
1200

ctgggccaca cacgtactac aatggtggtt aacagaggga ggcaataaccg cgaggtggag
1260

caaatcccta aaagccatcc cagttcggat tgcaggctga aaccgcctg tatgaagttg
1320

gaatcgctag taatcgcgga tcagcatgcc gcggtgaata cgttcccggg ccttgtagac
1380

accgcccgtc acaccatgag agtcgggaac acccgaagtc cgtagcctaa ccgcaaggag
1440

ggcgcgcccg aaggtgggtt cgataattgg ggtgaagtcg taacaaggta gccgtatcgg
1500

a a g g t g c g g c t g g a t c a c c t
1520

<210> 151

<211> 1515

<212> DNA

<213> artificial sequence

<220>

<223> SPC10015_contig000090_331_1845

<400> 151

agagtttggat cctgggtcag gatgaacgct agctacaggc ttaacacatg caagtcgagg
60

ggcagcatga acttagcttg ctaagtttga tggcgaccgg cgcacggggtg agtaacacgt
120

atccaacctg ccgatgactc ggggatagcc tttcgaaaga aagattaata cccgatggca
180

taattcttcc gcatggtaga attattaaag aatttcggtc atcgatgggg atgcgttcca
240

ttaggttggt ggcggggtaa cggcccacca agccttcgat ggataggggt tctgagagga
300

aggtcccca cattggaact gagacacggt ccaaactcct acgggaggga gcagtgagga
360

atattggtca atggacgaga gtctgaacca gccaagtagc gtgaaggatg actgccctat
420

gggttgtaaa cttcttttat acgggaataa agtgaggcac gtgtgccttt ttgtatgtac
480

cgtatgaata aggatcggct aactccgtgc cagcagccgc ggtaatacgg aggatccgag
540

cgttatccgg atttattggg tttaaaggga gcgtaggcgg acgcttaagt cagttgtgaa
600

agtttgcggc tcaaccgtaa aattgcagtt gatactgggt gtcttgagta cagtagaggc
660

aggcggaatt cgtggtgtag cggtgaaatg cttagatata acgaagaact ccgattgcga
720

aggcagcctg ctggactgta actgacgctg atgctcgaaa gtgtgggtat caaacaggat
780

tagataccct ggtagtccac acagtaaacg atgaatactc gctgtttgcg atatacagta
840

agcggccaag cgaaagcggt aagtattcca cctggggagt acgccggcaa cggtgaaact
900

caaaggaatt gacgggggcc cgcacaagcg gaggaacatg tggtttaatt cgatgatacg
960

cgaggaacct taccggggct tgaattgcaa ctgaatgatg tggagacatg tcagccgcaa
1020

ggcagttgtg aagggtgctgc atgggttgctg tcagctcgtg ccgtgaggtg tcggcttaag
1080

tgccataacg agcgcaaccc ttatcgatag ttaccatcag gttatgctgg ggactctgtc
1140

gagactgccg tcgtaagatg tgaggaaggt ggggatgacg tcaaatacagc acggccctta
1200

cgtccggggc tacacacgtg ttacaatggg ggggtacagaa ggcagctaca cggcgacgtg
1260

atgctaattc ctaaagcctc tctcagttcg gattggagtc tgcaaccgga ctccatgaag
1320

ctggattcgc tagtaatcgc gcatcagcca cggcgcggtg aatacgttcc cgggccttgt
1380

acacaccgcc cgtcaagcca tgaaagccgg gggtagctga agtgcgtaac cgcaaggagc
1440

gccctagggt aaaactggtg attggggcta agtcgtaaca aggtagccgt accggaaggt
1500

g c g g c t g g a a c a c c t
1515

<210> 152

<211> 1351

<212> DNA

<213> artificial sequence

<220>

<223> SPC12350_contig000179_630_1980

<400> 152

aataccgcat aagaccgaag cgccgcatgg cgcagcggcc aaagccccgg cgggtgcaaga
60

tgggccccgcg tctgattagg tggttggcgg ggtaacggcc caccaagccg acgatcagta
120

gccgacctga gagggtgacc ggccacattg ggactgagac acggcccaga ctcttacggg
180

aggcagcagt ggggaatatt gcacaatggg ggaaaccctg atgcagcgac gccgcgtgaa
240

ggatgaagta tttcgggtatg taaacttcta tcagcaggga agaagatgac ggtacctgac
300

taagaagccc cggctaacta cgtgccagca gccgcggtaa tacgtagggg gcaagcgтта
360

tccggatttta ctgggtgtaa agggagcgtg gacggcgatg caagccagat gtgaaagccc
420

ggggctcaac cccgggactg catttggaac tgcgtggctg gagtgtcgga gaggcaggcg
480

gaattcctag tgtagcggtg aaatgcgtag atattaggag gaacaccagt ggcgaaggcg
540

gcctgctgga cgatgactga cgttgaggct cgaaagcgtg gggagcaaac aggattagat
600

accctggtag tccacgccgt aaacgatgac tactaggtgt cgggtggcaa ggccattcgg
660

tgccgcagca aacgcaataa gtagtccacc tggggagtac gttcgcaaga atgaaactca
720

aaggaattga cggggacccg cacaagcggт gtagcatgtg gtttaattcg aagcaacgcg
780

aagaacctta cctgatcttg acatcccgat gccaaagcgc gtaacgcgct ctttcttcgg
840

aacatcggtg acaggtggтg catggttgtc gtcagctcgt gtcgtgagat gttgggttaa
900

gtcccgcAAC gagcgcaacc cctatcttca gtagccagca tttcggatgg gcactctgga
960

gagactgcc a gggacaacct ggaggaaggt ggggatgacg tcaaatacat atgcccctta
1020

tgaccagggc tacacacgtg ctacaatggc gtaaacaag ggaggcgaac ccgcgaggg
1080

gggcaaatac caaaaataac gtctcagttc ggattgtagt ctgcaactcg actacatgaa
1140

gctggaatcg ctagtaatcg cgaatcagaa tgtcgcggtg aatacgttcc cgggtcttgt
1200

acacaccgcc cgtcacacca tgggagtcag taacgcccga agccggtgac ccaaccgcga
1260

agggagggag ccgtcgaagg tgggaccgat aactgggggtg aagtcgtaac aaggtagccg
1320

t a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1351

<210> 153

<211> 1451

<212> DNA

<213> artificial sequence

<220>

<223> SPC10632_contig000114_5_1455

<400> 153

acggattgga gcttgctcca tgaagttagt ggcggacggg tgagtaacgc gtgggtaacc
60

tgccctatgc aggggggataa cgtttgga aa cgaacgctaa taccgcataa cctagttggt
120

tcgcatgaac cgactagcaa agatttttatc ggcataggat ggacccgcgt tggattagct
180

agttggtgag ataacagccc accaaggcaa cgatccatag ccggcctgag aggggtgaacg
240

gccacactgg gactgagaca cggcccagac tcctacggga ggcagcagtg gggaatatgg
300

cacaatgggc gcaagcctga tgcagcgacg ccgcgtagaag gatgaaggtc ttcggatcgt
360

aaacttctat cagcagggaa gaaaccatga cggtagctga ctaagaagcc ccggctaact
420

acgtgccagc agccgcggta atacgtaggg ggcaagcggt atccggaatt actgggtgta
480

aagggtgcgt aggcggcgat ttaagtcaga tgtgaaaact cagggctcaa ccttgagact
540

gcatctgaaa ctgagttgct agagtgcagg agaggaaagc ggaattccga gtgtagcggg
600

gaaatgcgta gagattcgga ggaacaccag tagcgaaggc ggctttctgg actgtaactg
660

acgctgaggc acgaaagcgt ggggagcgaa caggattaga taccctggta gtccacgccg
720

taaacgatga atactagggtg tcggggccta cgggtctcgg tgccgcagct aacgcattaa
780

gtattccacc tgggaagtac gaccgcaagg ttgaaactca aaggaattga cggggacccg
840

cacaagcggg ggagcatgtg gtttaattcg aagcaacgcg aagaacctta cctaaacttg
900

acatcctttt gaccggaggg taatgcctcc ctactagct tgctagtgcg aaagtgcag
960

gtggtgcatg gttgtcgtca gctcgtgtcg tgagatgttg ggttaagtcc cgcaacgagc
1020

gcaacccta tctttagtag ccatcattaa gttgggcact ctagagagac tgccagggat
1080

aacctggagg aagggtgggga tgacgtcaaa tcatcatgcc ccttatgttt agggctacac
1140

acgtgctaca atgggtgcta caaagggaag caaatccgcg aggccgagca aatctcaaaa
1200

aagcactccc agttcggatt gtagtctgca actcgactac atgaagttgg aatcgctagt
1260

aatcgcgaaat cagaatgtcg cgggtgaatac gttcccgggt cttgtacaca ccgcccgtca
1320

caccatggga gttggggggg cccaacgcca gtgacctaac ccgcaaggga aggagctgtc
1380

taaggcaaaa ccaatgactg ggggtgaagtc gtaacaagggt agccgtatcg gaagggtcgg
1440

c t g g a t c a c c t
1451

<210> 154

<211> 1519

<212> DNA

<213> artificial sequence

<220>

<223> SPC10976_contig000001_2695226_2696744

<400> 154

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

ggagtattta aacggaagtc ttcggatgga agtttggata cttagcggcg gacgggtgag
120

taacgcgtgg gcaacctgcc ccataccggg ggataacagc cagaaatggc tgctaatacc
180

gcataagcgc acagcgcctc atggcgcggt gtgaaaaact ccggtggtat gggatgggcc
240

cgcgctctgat taggtagttg gcggggtaac ggcccaccaa gccgacgatc agtagccgac
300

ctgagagggt gaccggccac attgggactg agacacggcc caaactccta cgggaggcag
360

cagtggggaa tattgcacaa tgggggaaac cctgatgcag cgacgccgcg tgagcgaaga
420

agtatttcgg tatgtaaagc tctatcagca gggaagaaaa tgacggtacc tgactaagaa
480

gccccggcta actacgtgcc agcagccgcg gtaatacgtg gggggcaagc gttatccgga
540

tttactgggt gtaaagggag cgtagacggc caggcaagtc tgatgtgaaa ggcaggggct
600

caacccttg actgcattgg aaactgtcag gctggagtgc cggagaggta agcgggaattc
660

ctagtgtagc ggtgaaatgc gtagatatta ggaggaacac cagtggcgaa ggcggcttac
720

tggacggtaa ctgacgttga tgctcgaaag cgtggggagc aaacaggatt agataccctg
780

gtagtccacg ccgtaaacga tgaatactag gtgtcggggg gcaaagccct tcggtgccgc
840

cgcaaacgca ttaagtattc cacctgggga gtacgttcgc aagaatgaaa ctcaaaggaa
900

ttgacgggga cccgcacaag cggtaggagca tgtggtttta ttcgaagcaa cgcaagaac
960

cttaccaagc cttgacatcc cattgaagcc agagtaacgt ctgacggcct tcgggacaat
1020

ggagacaggt ggtgcatggt tgctcgtcagc tcgtgtcgtg agatgttggg ttaagtcccg
1080

caacgagcgc aacccttattc ttcagtagcc agcacgcgat ggtgggcact ctggagagac
1140

tgccagggac aacctggagg aaggtgggga tgacgtcaaa tcatcatgcc ccttatggct
1200

tgggctacac acgtgctaca atggcgtaaa cagaggggaag cagccctgcg aaggtgagcg
1260

aatcccaaaa ataacgtctc agttcggatt gtagtctgca actcgactac atgaagctgg
1320

aatcgctagt aatcgcggaat cagaatgtcg cgggtgaatac gttcccgggt cttgtacaca
1380

ccgcccgtca caccatggga gtcagtaacg cccgaagtca gtgacctaac cgaaaggaag
1440

gagctgccga aggcgggact ggtaactggg gtgaagtcgt aacaaggtag ccgtatcgga
1500

a g g t g c g g c t g g a t c a c c t
1519

<210> 155

<211> 1519

<212> DNA

<213> artificial sequence

<220>

<223> SPC10976_contig000001_1266138_1267656

<400> 155

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

ggagtgttta accggaagtc ttcggatgga aggttagata tttagcggcg gacgggtgag
120

taacgcgtgg gcaacctgcc ccataccggg ggataacagc cagaaatggc tgctaatacc
180

gcataagcgc acagcgcctc atggcgcggt gtgaaaaact ccggtggtat gggatgggccc
240

cgcgctctgat taggtagttg gcgggggtaac ggcccaccaa gccgacgac agtagccgac
300

ctgagaggggt gaccggccac attgggactg agacacggcc caaactccta cgggaggcag
360

cagtggggaa tattgcacaa tgggggaaac cctgatgcag cgacgccgcg tgagcgaaga
420

agtatttcgg tatgtaaagc tctatcagca gggaagaaaa tgacgggtacc tgactaagaa
480

gccccggcta 540	actacgtgcc	agcagccgcg	gtaatacgtg	gggggcaagc	gttatccgga
tttactgggt 600	gtaaagggag	cgtagacggc	caggcaagtc	tgatgtgaaa	ggcaggggct
caacccttg 660	actgcattgg	aaactgtcag	gctggagtgc	cggagaggta	agcggaattc
ctagtgtagc 720	ggtgaaatgc	gtagatatta	ggaggaacac	cagtggcgaa	ggcggccttac
tggacggtaa 780	ctgacgttga	tgctcgaaag	cgtggggagc	aaacaggatt	agataccctg
gtagtccacg 840	ccgtaaacga	tgaatactag	gtgtcggggg	gcaaagccct	tcggtgccgc
tgcaaacgca 900	ttaagtattc	cacctgggga	gtacgttcgc	aagaatgaaa	ctcaaaggaa
ttgacgggga 960	ccgcacaag	cggaggagca	tgtggtttaa	ttcgaagcaa	cgcgaagaac
cttaccaagc 1020	cttgacatcc	cattgaagcc	agagtaacgt	ctgacggcct	tcgggacaat
ggagacaggt 1080	ggtgcatggt	tgctcgtcagc	tcgtgtcgtg	agatggtggg	ttaagtcccg
caacgagcgc 1140	aacccttatc	ttcagtagcc	agcacgcaga	ggtgggcact	ctggagagac
tgccagggac 1200	aacctggagg	aaggtgggga	tgacgtcaaa	tcatcatgcc	ccttatggct
tgggctacac 1260	acgtgctaca	atggcgtaaa	cagaggggaag	cagccctgcg	aaggtgagcg
aatcccaaaa 1320	ataacgtctc	agttcggatt	gtagtctgca	actcgactac	atgaagctgg
aatcgctagt 1380	aatcgcgaa	cagaatgtcg	cggatgaatac	gttcccgggt	cttgtaacaca

ccgcccgtca caccatggga gtcagtaacg cccgaagtca gtgacctaac cgaaaggaag
1440

gagctgccga aggcgggact ggtaactggg gtgaagtcgt aacaaggtag ccgtatcgga
1500

a g g t g c g g c t g g a t c a c c t
1519

<210> 156

<211> 1519

<212> DNA

<213> artificial sequence

<220>

<223> SPC10976_contig000001_1728168_1729686

<400> 156

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

ggagtattta aacggaagtc ttcggatgga agtttgata cttagcggcg gacgggtgag
120

taacgcgtgg gcaacctgcc ccataccggg ggataacagc cagaaatggc tgctaatacc
180

gcataagcgc acagcgcctc atggcgcggt gtgaaaaact ccggtggtat gggatgggcc
240

cgcgtctgat taggtagttg gcggggtaac ggcccaccaa gccgacgac agtagccgac
300

ctgagagggt gaccggccac attgggactg agacacggcc caaactccta cgggaggcag
360

cagtggggaa tattgcacaa tgggggaaac cctgatgcag cgacgccgcg tgagcgaaga
420

agtatttcgg tatgtaaagc tctatcagca gggaagaaaa tgacgggtacc tgactaagaa
480

gccccggcta actacgtgcc agcagccgcg gtaatacgta gggggcaagc gttatccgga
540

tttactgggt gtaaagggag cgtagacggc caggcaagtc tgatgtgaaa ggcaggggct
600

caacccttg actgcattgg aaactgtcag gctggagtg cggagaggta agcgggaattc
660

ctagtgtagc ggtgaaatgc gtagatatta ggaggaacac cagtggcgaa ggcggcttac
720

tggacggtaa ctgacgttga tgctcgaaag cgtggggagc aaacaggatt agataccctg
780

gtagtccacg ccgtaaacga tgaatactag gtgtcggggg gcaaagccct tcggtgccgc
840

cgcaaacgca ttaagtattc cacctgggga gtacgttcgc aagaatgaaa ctcaaaggaa
900

ttgacgggga cccgcacaag cgggtggagca tgtggtttta ttcgaagcaa cgcgagaac
960

cttaccaagc cttgacatcc cattgaagcc agagtaacgt ctgacggcct tcgggacaat
1020

ggagacaggt ggtgcatggg tgtcgtcagc tcgtgtcgtg agatgttggg ttaagtcccg
1080

caacgagcgc aacccttatc ttcagtagcc agcacgcgat ggtgggcact ctggagagac
1140

tgccagggac aacctggagg aaggtgggga tgacgtcaaa tcatcatgcc cttatggct
1200

tgggctacac acgtgctaca atggcgtaaa cagaggggaag cagccctgcg aaggtgagcg
1260

aatcccaaaa ataacgtctc agttcggatt gtagtctgca actcgactac atgaagctgg
1320

aatcgctagt aatcgcgaat cagaatgtcg cgggtgaatac gttcccgggt cttgtacaca
1380

ccgcccgtca caccatggga gtcagtaacg cccgaagtca gtgacctaac cgaaaggaag
1440

gagctgccga aggcgggact ggtaactggg gtgaagtcgt aacaaggtag ccgtatcgga
1500

a g g t g c g g c t
1519

g g a t c a c c t

<210> 157

<211> 1519

<212> DNA

<213> artificial sequence

<220>

<223> SPC10976_contig000001_4132045_4133563

<400> 157

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

ggagtattta accggaagtc ttcggatgga aagttagata cttagcggcg gacgggtgag
120

taacgcgtgg gcaacctgcc ccataccggg ggataacagc cagaaatggc tgctaatacc
180

gcataagcgc acagcgcccc atggcgcggt gtgaaaaatt ccggtggtat gggatgggcc
240

cgcgctctgat taggtagttg gcggggtaac ggcccaccaa gccgacgatc agtagccgac
300

ctgagaggggt gaccggccac attgggactg agacacggcc caaactccta cgggaggcag
360

cagtggggaa tattgcacaa tgggggaaac cctgatgcag cgacgccgcg tgagcgaaga
420

agtatttcgg tatgtaaagc tctatcagca gggaagaaaa tgacgggtacc tgactaagaa
480

gccccggcta actacgtgcc agcagccgcg gtaatacgta gggggcaagc gttatccgga
540

tttactgggt gtaaagggag cgtagacggc caggcaagtc tgatgtgaaa ggcaggggct
600

caaccctgg actgcattgg aaactgtcag gctggagtgc cggagaggta agcgggaattc
660

ctagtgtagc ggtgaaatgc gtagatatta ggaggaacac cagtggcgaa ggcggcttac
720

tggacggtaa ctgacgttga tgctcgaaag cgtggggagc aaacaggatt agataccctg
780

gtagtccacg ccgtaaacga tgaatactag gtgtcggggg gcaaagccct tcggtgccgc
840

cgcaaacgca ttaagtattc cacctgggga gtacgttcgc aagaatgaaa ctcaaaggaa
900

ttgacgggga cccgcacaag cgggtggagca tgtggtttta ttcgaagcaa cgcaagaac
960

cttaccaagc cttgacatcc cattgaagcc agagtaacgt ctgggggcct tcgggacaat
1020

ggagacaggt ggtgcatggt tgctgctcagc tcgtgtcgtg agatgttggg ttaagtcccg
1080

caacgagcgc aacccttattc ttcagtagcc agcacgcgat ggtgggcact ctggagagac
1140

tgccagggac aacctggagg aaggtgggga tgacgtcaaa tcatcatgcc ccttatggct
1200

tgggctacac acgtgctaca atggcgtaaa cagagggaag cagccctgcg aaggtgagcg
1260

aatcccaaaa ataacgtctc agttcggatt gtagtctgca actcgactac atgaagctgg
1320

aatcgctagt aatcgcgaaat cagaatgtcg cgggtgaatac gttcccgggt cttgtacaca
1380

ccgcccgtca caccatggga gtcagtaacg cccgaagtca gtgacctaac cgaaaggaag
1440

gagctgccga aggcgggact ggtaactggg gtgaagtcgt aacaaggtag ccgtatcgga
1500

a g g t g c g g c t
1519

g g a t c a c c t

<210> 158
<211> 1519
<212> DNA
<213> artificial sequence

<220>
<223> SPC10976_contig000001_401628_403146

<400> 158
agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

ggagtatcta aacggaagtc ttcggatgga aggttagata cttagcggcg gacgggtgag
120

taacgcgtgg gcaacctgcc ccataccggg ggataacagc cagaaatggc tgctaatacc
180

gcataagcgc acagcgcccc atggcgcggt gtgaaaaatt ccggtggtat gggatgggcc
240

cgcgtctgat taggtagttag gcggggtaac ggcccaccaa gccgacgac agtagccgac
300

ctgagagggg gaccggccac attgggactg agacacggcc caaactccta cgggaggcag
360

cagtggggaa tattgcacaa tgggggaaac cctgatgcag cgacgccgcg tgagcgaaga
420

agtatttcgg tatgtaaagc tctatcagca gggaagaaaa tgacgggtacc tgactaagaa
480

gccccggcta actacgtgcc agcagccgcg gtaatacgta gggggcaagc gttatccgga
540

tttactgggt gtaaagggag cgtagacggc caggcaagtc tgatgtgaaa ggcaggggct
600

caacccttgg actgcattgg aaactgtcag gctggagtgc cggagaggta agcggaattc
660

ctagtgtagc ggtgaaatgc gtagatatta ggaggaacac cagtggcgaa ggcggcttac
720

tggacggtaa ctgacgttga tgctcgaaag cgtggggagc aaacaggatt agataccctg
780

gtagtccacg ccgtaaacga tgaatactag gtgtcggggg gcaaagccct tcggtgccgc
840

cgcaaacgca ttaagtattc cacctgggga gtacgttcgc aagaatgaaa ctcaaaggaa
900

ttgacgggga cccgcacaag cgggtggagca tgttggtttaa ttcgaagcaa cgcaagaac
960

cttaccaagc cttgacatcc cattgaagcc agagtaacgt ctgacggcct tcgggacaat
1020

ggagacaggt ggtgcatggt tgtcgtcagc tcgtgtcgtg agatgttggg ttaagtcccg
1080

caacgagcgc aacccttata ttcagtagcc agcacgcaga ggtgggcact ctggagagac
1140

tgccagggac aacctggagg aaggtgggga tgacgtcaaa tcatcatgcc ccttatggct
1200

tgggctacac acgtgctaca atggcgtaaa cagaggggaag cagccctgcg aaggtgagcg
1260

aatcccaaaa ataacgtctc agttcggatt gtagtctgca actcgactac atgaagctgg
1320

aatcgctagt aatcgcgaat cagaatgtcg cgggtgaatac gttcccgggt cttgtacaca
1380

ccgcccgtca caccatggga gtcagtaacg cccgaagtca gtgacctaac cgaaaggaag
1440

gagctgccga aggcggggact ggtaactggg gtgaagtcgt aacaaggtag ccgtatcgga
1500

a g g t g c g g c t
1519

g g a t c a c c t

<210> 159
<211> 1444
<212> DNA
<213> artificial sequence

<220>
<223> SPC11397_contig000266_5_1448

<400> 159
gaagtttttcg gatggattct gagatgactg agtggcggac gggtgagtaa cacgtggata
60

acctgcctca cactggggga caacagttag aaatgactgc taataccgca taagcgcaca
120

gtaccgcatg gtacagtgtg aaaaactccg gtggtgtgag atggatccgc gtctgattag
180

ccagttggcg gggtaacggc ccaccaaagc gacgatcagt agccgacctg agaggggtgac
240

cggccacatt gggactgaga cacggcccaa actcctacgg gaggcagcag tggggaatat
300

tgcacaatgg gcgaaagcct gatgcagcga cgccgcgtga gtgaagaagt atttcggtat
360

gtaaagctct atcagcaggg aagataatga cggtacctga ctaagaagcc ccggctaact
420

acgtgccagc agccgcggta atacgtaggg ggcaagcggt atccggattt actgggtgta
480

aagggagcgt agacggcatg gcaagtctga agtgaaaacc cagggctcaa ccctgggact
540

gctttggaaa ctgtcaagct agagtgcagg agaggtaagt ggaattccta gtgtagcggg
600

gaaatgcgta gatattagga ggaacaccag tggcgaaggc ggcttactgg actgtaactg
660

acgttgaggc tcgaaagcgt ggggagcaaa caggattaga taccctggta gtccacgccg
720

taaacgatga gtgctaggtg ttgggggggca aagcccttcg gtgccgtcgc aaacgcaata
780

agcactccac ctgggggagta cgttcgcaag aatgaaactc aaaggaattg acgggggaccc
840

gcacaagcgg tggagcatgt ggtttaattc gaagcaacgc gaagaacctt accaagtctt
900

gacatcccc tgaccggcgt gtaacggcgc ctttccttcg ggacagggga gacagggtggt
960

gcatggttgt cgtcagctcg tgtcgtgaga tggtgggtta agtcccgcga cgagcgcaac
1020

ccttatcctt agtagccagc attaagatgg gcactctagg gagactgcca gggacaacct
1080

ggaggaaggt ggggatgacg tcaaatcatc atgcccctta tgatttgggc tacacacgtg
1140

ctacaatggc gtaaacaag ggaagcgacc ctgcgaaggt gagcaaactc caaaaataac
1200

gtcccagttc ggactgtagt ctgcaaccgg actacacgaa gctggaatcg ctagtaatcg
1260

cgaatcagaa tgtcgcggtg aatacgttcc cgggtcttgt acacaccgcc cgtcacacca
1320

tgggagtcag caacgcccga agtcagtgac ccaaccgaaa ggagggagct gccgaaggcg
1380

gggcaggtaa ctggggtgaa gtcgtaacaa ggtagccgta tcggaagggtg cggctggatc
1440

a c c t
1444

<210> 160

<211> 1222

<212> DNA

<213> artificial sequence

<220>

<223> SPC10959_contig000059_1_1222

<400> 160

acctgagagg gtgaccggcc acattgggac tgagacacgg cccaaactcc tacgggaggg
60

agcagtgggg aatattgcac aatgggggaa accctgatgc agcgacgccg cgtgagcgaa
120

gaagtatttc ggtatgtaaa gctctatcag cagggaagaa gaaatgacgg tacctgacta
180

agaagcaccg gctaaatacg tgccagcagc cgcggtaata cgtatgggtgc aagcgttatc
240

cggatttact ggggtgtaaag ggagcgcagg cggtagcgga agtctgatgt gaaagcccgg
300

ggctcaaccc cggtagtgca ttggaaactg tcggactaga gtgtcggagg ggtaagtgga
360

attcctagtg tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcggc
420

ttactggacg attactgacg ctgaggctcg aaagcgtggg gagcaaacag gattagatac
480

cctggtagtc cacgccgtaa acgatgaata ctaggtgtcg gggagcattg ctcttcgggtg
540

ccgcagcaaa cgcaataagt attccacctg gggagtacgt tcgcaagaat gaaactcaaa
600

ggaattgacg gggacccgca caagcgggtg agcatgtggt ttaattcgaa gcaacgcgaa
660

gaaccttacc aagtcttgac atcccgatga cagaacatgt aatgtgtttt ctcttcggag
720

catcggtgac aggtgggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
780

cccgcaacga gcgcaacccc tattcttagt agccagcggg taagccgggc actctagggg
840

gactgccagg gataacctgg aggaagggtg ggatgacgtc aaatcatcat gccccttatg
900

acttgggcta cacacgtgct acaatggcgt aaacaaaggg aagcgagcct gcgaggggga
960

gcaaattctca aaaataacgt ctcagttcgg actgcagtct gcaactcgac tgcacgaagc
1020

tggaatcgct agtaatcgcg aatcagaatg tcgcggtgaa tacgttcccg ggtcttgtac
1080

acaccgcccc tcacaccatg ggagttggta atgcccgaag tcagtgacct aaccgcaagg
1140

agggagctgc cgaaggcagg atcgataact ggggtgaagt cgtaacaagg tagccgtatc
1200

g g a a g g t g c g g c t g g a t c a c c t
1222

<210> 161

<211> 1518

<212> DNA

<213> artificial sequence

<220>

<223> SPC10972_contig000006_21109_22626

<400> 161

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

ggagtattta accggaagtc ttcggatgga aagttagata cttagcggcg gacgggtgag
120

taacgcgtgg gcaacctgcc ccataccggg ggataacagc cagaaatggc tgctaatacc
180

gcataagcgc acagcgcccc atggcgcggt gtgaaaattc cgggtggtatg ggatgggccc
240

gcgtctgatt aggtagttag cggggtaacg gccaccaag ccgacgatca gtagccgacc
300

tgagaggggtg accggccaca ttgggactga gacacggccc aaactcctac gggagggcagc
360

agtggggaat attgcacaat gggggaaacc ctgatgcagc gacgccgcgt gagcgaagaa
420

gtatttcggt atgtaaagct ctatcagcag ggaagaaaat gacggtacct gactaagaag
480

ccccggctaa ctacgtgccca gcagccgcgg taatacgtag ggggcaagcg ttatccggat
540

ttactgggtg taaagggagc gtagacggcc aggcaagtct gatgtgaaag gcaggggctc
600

aacccttggga ctgcattgga aactgtcagg ctggagtgcc ggagaggtaa gcggaattcc
660

tagtgtagcg gtgaaatgcg tagatattag gaggaacacc agtggcgaag gcggcttact
720

ggacggtaac tgacgttgat gctcgaaagc gtgggggagca aacaggatta gataccctgg
780

tagtccacgc cgtaaacgat gaatactagg tgtcggggggg caaagccctt cggtgccgcc
840

gcaaacgcat taagtattcc acctggggag tacgttcgca agaatgaaac tcaaaggaat
900

tgacggggac ccgcacaagc ggtggagcat gtggttttaat tcgaagcaac gcgaagaacc
960

ttaccaagcc ttgacatccc attgaagcca gagtaacgtc tgggggcctt cgggacaatg
1020

gagacaggtg gtgcatggtt gtcgtcagct cgtgtcgtga gatgttgggt taagtcccgc
1080

aacgagcgca acccttatct tcagtagcca gcacgcgatg gtgggcactc tggagagact
1140

gccagggaca acctggagga aggtggggat gacgtcaaata catcatgccc cttatggctt
1200

gggctacaca cgtgctacaa tggcgtaaac agagggaagc agccctgcga aggtgagcga
1260

atcccaaaaa taacgtctca gttcggattg tagtctgcaa ctcgactaca tgaagctgga
1320

atcgctagta atcgcgaaatc agaatgtcgc ggtgaatacg ttcccggggtc ttgtacacac
1380

cgcccgtcac accatgggag tcagtaacgc ccgaagtcag tgacctaaccc gaaaggaagg
1440

agctgccgaa ggcgggactg gtaactgggg tgaagtcgta acaaggtagc cgtatcggaa
1500

g g t g c g g c t g g a t c a c c t
1518

<210> 162

<211> 1517

<212> DNA

<213> artificial sequence

<220>

<223> SPC10972_contig000001_1615363_1616879

<400> 162

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

ggagtgttta accggaagtc ttcggatgga aggttagata tttagcggcg gacgggtgag
120

taacgcgtgg gcaacctgcc ccataccggg ggataacagc cagaaatggc tgctaatacc
180

gcataagcgc acagcgcctc atggcgcggt gtgaaaaact ccggtggtat gggatgggcc
240

cgcgctctgat taggtagttg gcggggtaac ggcccaccaa gccgacgatc agtagccgac
300

ctgagaggggt gaccggccac attgggactg agacacggcc caaactccta cgggaggcag
360

cagtggggaa tattgcacaa tgggggaaac cctgatgcag cgacgccgcg tgagcgaaga
420

agtatttcgg tatgtaaagc tctatcagca gggaagaaaa tgacggtacc tgactaagaa
480

gccccggcta actacgtgcc agcagccgcg gtaatacgtg gggggcaagc gttatccgga
540

tttactgggt gtaaaggag cgtagacggc caggcaagtc tgatgtgaaa ggcaggggct
600

caacccttg actgcattgg aaactgtcag gctggagtgc cggagaggta agcggaattc
660

ctagtgtagc ggtgaaatgc gtagatatta ggaggaacac cagtggcgaa ggcggcttac
720

tggacggtaa ctgacgttga tgctcgaaag cgtggggagc aaacaggatt agataccctg
780

gtagtccacg ccgtaaacga tgaatactag gtgtcggggg caaagccctt cggtgccgct
840

gcaaacgcat taagtattcc acctggggag tacgttcgca agaataaaac tcaaaggaat
900

tgacggggac ccgcacaagc ggtggagcat gtggtttaat tcgaagcaac gcgaagaacc
960

ttaccaagcc ttgacatccc attgaagcca gagtaacgtc tgacggcctt cgggacaatg
1020

gagacagggt gtgcatgggt gtcgtcagct cgtgtcgtga gatgttgggt taagtcccgc
1080

aacgagcgca acccttatct tcagtagcca gcacgcagag gtgggcactc tggagagact
1140

gccagggaca acctggagga aggtggggat gacgtcaaata catcatgccc ttatggcttg
1200

ggctacacac gtgctacaat ggcgtaaaca gaggggaagca gccctgcgaa ggtgagcgaa
1260

tcccaaaaat aacgtctcag ttcggattgt agtctgcaac tcgactacat gaagctggaa
1320

tcgctagtaa tcgcgaatca gaatgtcgcg gtgaatacgt tcccgggtct tgtacacacc
1380

gcccgtcaca ccatgggagt cagtaacgcc cgaagtcagt gacctaaccg aaaggaagga
1440

gctgccgaag gcgggactgg taactgggggt gaagtcgtaa caaggtagcc gtatcggaag
1500

g t g c g g c t g g a t c a c c t
1517

<210> 163

<211> 1519

<212> DNA

<213> artificial sequence

<220>

<223> SPC10972_contig000001_2077101_2078619

<400> 163

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

ggagtattta aacggaagtc ttcggatgga agtttggata cttagcggcg gacgggtgag
120

taacgcgtgg gcaacctgcc ccataccggg ggataacagc cagaaatggc tgctaatacc
180

gcataagcgc acagcgcctc atggcgcggt gtgaaaaact ccggtggtat gggatgggcc
240

cgcgctctgat taggtagttg gcggggtaac ggcccaccaa gccgacgac agtagccgac
300

ctgagagggt gaccggccac attgggactg agacacggcc caaactccta cgggaggcag
360

cagtggggaa tattgcacaa tgggggaaac cctgatgcag cgacgccgcg tgagcgaaga
420

agtatttcgg tatgtaaagc tctatcagca gggaagaaaa tgacggtacc tgactaagaa
480

gccccggcta actacgtgcc agcagccgcg gtaatacgta gggggcaagc gttatccgga
540

tttactgggt gtaaagggag cgtagacggc caggcaagtc tgatgtgaaa ggcaggggct
600

caaccctgg actgcattgg aaactgtcag gctggagtgc cggagaggta agcgggaattc
660

ctagtgtagc ggtgaaatgc gtagatatta ggaggaacac cagtggcgaa ggcggcttac
720

tggacggtaa ctgacgttga tgctcgaaag cgtggggagc aaacaggatt agataccctg
780

gtagtccacg ccgtaaacga tgaatactag gtgtcggggg gcaaagccct tcggtgccgc
840

cgcaaacgca ttaagtattc cacctgggga gtacgttcgc aagaatgaaa ctcaaaggaa
900

ttgacgggga cccgcacaag cggtaggagca tgtggtttta ttcgaagcaa cgcaagaac
960

cttaccaagc cttgacatcc cattgaagcc agagtaacgt ctgacggcct tcgggacaat
1020

ggagacaggt ggtgcatggt tgctcgtcagc tcgtgtcgtg agatgttggg ttaagtcccg
1080

caacgagcgc aacccttattc ttcagtagcc agcacgcgat ggtgggcact ctggagagac
1140

tgccagggac aacctggagg aaggtgggga tgacgtcaaa tcatcatgcc ccttatggct
1200

tgggctacac acgtgctaca atggcgtaaa cagaggggaag cagccctgcg aaggtgagcg
1260

aatcccaaaa ataacgtctc agttcggatt gtagtctgca actcgactac atgaagctgg
1320

aatcgctagt aatcgcggaat cagaatgtcg cgggtgaatac gttcccgggt cttgtacaca
1380

ccgcccgtca caccatggga gtcagtaacg cccgaagtca gtgacctaac cgaaaggaag
1440

gagctgccga aggcgggact ggtaactggg gtgaagtcgt aacaaggtag ccgtatcgga
1500

a g g t g c g g c t g g a t c a c c t
1519

<210> 164

<211> 1518

<212> DNA

<213> artificial sequence

<220>

<223> SPC10972_contig000001_3043729_3045246

<400> 164

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

ggagtattta aacggaagtc ttcggatgga agtttgata cttagcggcg gacgggtgag
120

taacgcgtgg gcaacctgcc ccataccggg ggataacagc cagaaatggc tgctaatacc
180

gcataagcgc acagcgcctc atggcgcggt gtgaaaaact ccggtggtat gggatgggccc
240

cgcgctctgat taggtagttg gcggggtaac ggcccaccaa gccgacgac agtagccgac
300

ctgagaggggt gaccggccac attgggactg agacacggcc caaactccta cgggaggcag
360

cagtggggaa tattgcacaa tgggggaaac cctgatgcag cgacgccgcg tgagcgaaga
420

agtatttcgg tatgtaaagc tctatcagca gggaagaaaa tgacggtacc tgactaagaa
480

gccccggcta actacgtgcc agcagccgcg gtaatacgta gggggcaagc gttatccgga
540

tttactgggt gtaaagggag cgtagacggc caggcaagtc tgatgtgaaa ggcaggggct
600

caacccttg actgcattgg aaactgtcag gctggagtgc cggagaggta agcggaattc
660

ctagtgtagc ggtgaaatgc gtagatatta ggaggaacac cagtggcgaa ggcggcttac
720

tggacggtaa ctgacgttga tgctcgaaag cgtggggagc aaacaggatt agataccctg
780

gtagtccacg ccgtaaacga tgaatactag gtgtcggggg caaagccctt cggtgccgcc
840

gcaaacgcat taagtattcc acctggggag tacgttcgca agaataaaac tcaaaggaat
900

tgacggggac ccgcacaagc ggtggagcat gtggtttaat tcgaagcaac gcgaagaacc
960

ttaccaagcc ttgacatccc attgaagcca gagtaacgtc tgacggcctt cgggacaatg
1020

gagacaggtg gtgcatgggt gtcgtcagct cgtgtcgtga gatgttgggt taagtcccgc
1080

aacgagcgca acccttatct tcagtagcca gcacgcgatg gtgggcactc tggagagact
1140

gccagggaca acctggagga aggtggggat gacgtcaaata catcatgccc cttatggctt
1200

gggctacaca cgtgctacaa tggcgtaaag agaggggaagc agccctgcga aggtgagcga
1260

atcccaaaaa taacgtctca gttcggattg tagtctgcaa ctcgactaca tgaagctgga
1320

atcgctagta atcgcgaaatc agaatagtcgc ggtgaataacg ttcccggggtc ttgtacacac
1380

cgcccgtcac accatgggag tcagtaacgc ccgaagtcag tgacctaac gaaaggaagg
1440

agctgccgaa ggcgggactg gtaactgggg tgaagtcgta acaaggtagc cgtatcggaa
1500

g g t g c g g c t g g a t c a c c t
1518

<210> 165

<211> 1515

<212> DNA

<213> artificial sequence

<220>

<223> SPC10972_contig000002_269204_270718

<400> 165

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

ggagtatcta aacggaagtc ttcggatgga aggttagata cttagcgcgg acgggtgagt
120

aacgcgtggg caacctgccc cataccgggg gataacagcc agaatggct gctaataccg
180

cataagcgca cagcgcccca tggcgcggtg tgaaaaattc cggtggtatg ggatgggccc
240

gcgtctgatt aggtagttgg cggggtaacg gccaccaag ccgacgatca gtagccgacc
300

tgagaggggtg accggccaca ttgggactga gacacggccc aaactcctac gggaggcagc
360

agtggggaat attgcacaat gggggaaacc ctgatgcagc gacgccgcgt gagcgaagaa
420

gtatttcggt atgtaaagct ctatcagcag ggaagaaaat gacggtacct gactaagaag
480

ccccggctaa ctacgtgcc a gcagccgcgg taatacgtag gggcaagcgt tatccggatt
540

tactgggtgt 600	aaagggagcg	tagacggcca	ggcaagtctg	atgtgaaagg	caggggctca
acccctggac 660	tgcattggaa	actgtcaggc	tggagtgccg	gagaggtaag	cggaattcct
agtgtagcgg 720	tgaaatgcgt	agatattagg	aggaacacca	gtggcgaagg	cggcttactg
gacggtaact 780	gacgttgatg	ctcgaaagcg	tgggagcaaa	caggattaga	taccctggta
gtccacgccg 840	taaacgatga	atactaggtg	tcggggggca	aagcccttcg	gtgccgccgc
aaacgcatta 900	agtattccac	ctggggagta	cgttcgcaag	aatgaaactc	aaaggaattg
acggggaccc 960	gcacaagcgg	tggagcatgt	ggtttaattc	gaagcaacgc	gaagaacctt
accaagcctt 1020	gacatcccat	tgaagccaga	gtaacgtctg	acggccttcg	ggacaatgga
gacaggtggg 1080	gcatggttgt	cgtcagctcg	tgtcgtgaga	tggtgggtta	agtcccgcaa
cgagcgcaac 1140	ccttatcttc	agtagccagc	acgcagaggt	gggcactctg	gagagactgc
cagggacaac 1200	ctggaggaag	gtggggatga	cgtcaaatac	tcatgcccct	tatggcttgg
gctacacacg 1260	tgctacaatg	gcgtaaacag	aggggaagcag	ccctgcgaag	gtgagcgaat
cccaaaataa 1320	cgtctcagtt	cggattgtag	tctgcaactc	gactacatga	agctggaatc
gctagtaatc 1380	gcgaatcaga	atgtcgcggg	gaatacgttc	ccgggtcttg	tacacaccgc
ccgtcacacc 1440	atgggagtcg	gtaacgcccg	aagtcagtga	cctaaccgaa	aggaaggagc

tgccgaaggc gggactggta actgggggtga agtcgtaaca aggtagccgt atcggaaggt
1500

g c g g c t g g a t c a c c t
1515

<210> 166

<211> 1502

<212> DNA

<213> artificial sequence

<220>

<223> SPC10793_contig000001_53305_54806

<400> 166

agagtttgat cctggctcag gacgaacgct ggcggcatgc ctaacacatg caagtcgagc
60

gagtggagtt cttcgggaaca aagctagcgg cggacgggtg agtaacacgt gggcaacctg
120

cctcatagag gggaatagcc tcccgaagg gagattaata ccgcataaga ttgtagcttc
180

gcatgaagta gcaattaaag gagcaatccg ctatgagatg ggcccgcggc gcattagcta
240

gttggtgagg taacgggtca ccaaggcgac gatgcgtagc cgacctgaga gggtgatcgg
300

ccacattggg actgagacac ggcccagact cctacgggag gcagcagtgg ggaatattgc
360

acaatggggg aaaccctgat gcagcaatgc cgcgtgagtg atgacggcct tcgggttgta
420

aagctctgtc ttcggggacg ataatgacgg tacccgagga ggaagccacg gctaactacg
480

tgccagcagc cgcggtaata cgtaggtggc aagcgttgtc cggatttact gggcgtaaag
540

ggagcgtagg cggattttta agtgagatgt gaaatacccg ggcttaactt gggtgctgca
600

tttcaaactg gaagtctaga gtgcaggaga ggagaaggga attcctagt tagcggtgaa
660

atgcgtagag attaggaaga acaccagtgg cgaaggcgct tctctggact gtaactgacg
720

ctgaggctcg aaagcgtggg gagcaaacag gattagatac cctggtagtc cacgccgtaa
780

acgatgaata ctaggtgtag gggttgtcat gacctctgtg ccgccgctaa cgcattaagt
840

attccgcctg gggagtacgg tcgcaagatt aaaactcaaa ggaattgacg ggggcccgca
900

caagcagcgg agcatgtggt ttaattcgaa gcaacgcgaa gaaccttacc tagacttgac
960

atctcctgaa ttacccgtaa ctggggaagt cgcttcggcg acaggaagac aggtggtgca
1020

tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct
1080

tattgttagt tgctaccatt tagttgagca ctctagcgag actgcccggg ttaaccggga
1140

ggaagggtggg gatgacgtca aatcatcatg ccccttatgt ctagggctac acacgtgcta
1200

caatggcaag tacaaagaga agcaagaccg cgagggtggag caaaactcaa aaacttgtct
1260

cagttcggat tgtaggctga aactcgccta catgaagctg gagttgctag taatcgcgaa
1320

tcagcatgtc gcggtgaata cgttcccggg ccttgtagac accgcccgtc acaccatgag
1380

agttggcaat acccaaagtg cgtgatctaa ctcgcaagag aggaagcgcc ctaaggtagg
1440

gtcagcgatt ggggtgaagt cgtaacaagg tagccgtagg agaacctgcg gctggatcac
1500

c
1502

t

<210> 167
<211> 1502
<212> DNA
<213> artificial sequence

<220>
<223> SPC10793_contig000001_3886923_3888424

<400> 167
agagtttgat cctggctcag gacgaacgct ggcggcatgc ctaacacatg caagtcgagc
60

gagtggagtt cttcggagca aagctagcgg cggacgggtg agtaacacgt gggcaacctg
120

cctcatagag gggaatagcc tcccgaagg gagattaata ccgcataaga ttgtagcttc
180

gcatgaagta gcaattaaag gagtaatccg ctatgagatg ggcccgcggc gcattagcta
240

gttggtgagg taacggctca ccaaggcgac gatgcgtagc cgacctgaga gggtgatcgg
300

ccacattggg actgagacac ggcccagact actacgggag gcagcagtgg ggaatattgc
360

acaatggggg aaaccctgat gcagcaatgc cgcgtgagtg atgacggcct tcgggttgta
420

aagctctgtc ttcggggacg ataatgacgg tacccgagga ggaagccacg gctaactacg
480

tgccagcagc cgcggtaata cgtaggtggc aagcgttgtc cggatttact gggcgtaaag
540

ggagcgtagg cggattttta agtgagatgt gaaatacccg ggcttaactt gggtgctgca
600

tttcaaactg gaagtctaga gtgcaggaga ggagaaggga attcctagtg tagcggtgaa
660

atgcgtagag attaggaaga acaccagtgg cgaaggcgct tctctggact gtaactgacg
720

ctgaggctcg aaagcgtggg gagcaaacag gattagatac cctggtagtc cacgccgtaa
780

acgatgaata ctaggtgtag gggttgtcat gacctctgtg ccgccgctaa cgcattaagt
840

attccgcctg gggagtacgg tcgcaagatt aaaactcaaa ggaattgacg ggggcccgca
900

caagcagcgg agcatgtggt ttaattcgaa gcaacgcgaa gaaccttacc tagacttgac
960

atctcctgaa ttacccgtaa ctggggaagt cgcttcggcg acaggaagac aggtggtgca
1020

tggttgctcg cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct
1080

tattgttagt tgctatcatt tagttgagca ctctagcgag actgcccggg ttaaccggga
1140

ggaagggtggg gatgacgtca aatcatcatg ccccttatgt ctagggctac acacgtgcta
1200

caatggcaag taaaaagaga agcaagaccg cgagggtggag caaaactcaa aaacttgtct
1260

cagttcggat tgtaggctga aactcgccta catgaagctg gagttgctag taatcgcgaa
1320

tcagcatgtc gcggtgaata cgttcccggg ccttgtagac accgcccgtc acaccatgag
1380

agttggcaat acccaaagtg cgtgatctaa ctcgcaagag aggaagcgcc ctaaggtagg
1440

gtcagcgatt ggggtgaagt cgtaacaagg tagccgtagg agaacctgcg gctggatcac
1500

c t
1502

<210> 168
<211> 1502
<212> DNA
<213> artificial sequence

<220>
<223> SPC10793_contig000001_19167_20668

<400> 168
agagtttgat cctggctcag gacgaacgct ggcggcatgc ctaacacatg caagtcgagc
60

gagtggagtt cttcggaaca aagctagcgg cggacgggtg agtaacacgt gggcaacctg
120

cctcatagag gggaatagcc tcccgaagg gagattaata ccgcataaga ttgtagcttc
180

gcatgaagta gcaattaaag gagcaatccg ctatgagatg ggcccgcggc gcattagcta
240

gttggtgagg taacggctca ccaaggcgac gatgcgtagc cgacctgaga gggatgatcgg
300

ccacattggg actgagacac ggcccagact cctacgggag gcagcagtgg ggaatattgc
360

acaatggggg aaaccctgat gcagcaatgc cgcgtgagtg atgacggcct tcggggttgta
420

aagctctgtc ttcggggacg ataatgacgg tacccgagga ggaagccacg gctaactacg
480

tgccagcagc cgcggtaata cgtaggtggc aagcgttgtc cggattttact gggcgtaaag
540

ggagcgtagg cggattttta agtgagatgt gaaatacccg ggcttaactt gggtgctgca
600

tttcaaactg gaagtctaga gtgcaggaga ggagaaggga attcctagtg tagcggtgaa
660

atgcgtagag attaggaaga acaccagtgg cgaaggcgct tctctggact gtaactgacg
720

ctgaggctcg aaagcgtggg gagcaaacag gattagatac cctggtagtc cacgccgtaa
780

acgatgaata ctaggtgtag gggttgtcat gacctctgtg ccgccgctaa cgcattaagt
840

attccgcctg gggagtacgg tcgcaagatt aaaactcaaa ggaattgacg ggggcccgcgca
900

caagcagcgg agcatgtggg ttaattcgaa gcaacgcgaa gaaccttacc tagacttgac
960

atctcctgaa ttacccgtaa ctggggaagt cgcttcggcg acaggaagac aggtggtgca
1020

tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct
1080

tattgttagt tgctaccatt tagttgagca ctctagcgag actgcccggg ttaaccggga
1140

ggaaggtggg gatgacgtca aatcatcatg ccccttatgt ctagggctac acacgtgcta
1200

caatggcaag tacaaagaga agcaagaccg cgaggtggag caaaactcaa aaacttgtct
1260

cagttcggat tgtaggctga aactcgccta catgaagctg gagttgctag taatcgcgaa
1320

tcagcatgtc gcggtgaata cgttcccggg ccttgtacac accgcccgtc acaccatgag
1380

agttggcaat acccaaagtg cgtgatctaa ctcgcaagag aggaagcgcc ctaaggtagg
1440

gtcagcgatt ggggtgaagt cgtaacaagg tagccgtagg agaacctgcg gctggatcac
1500

c t
1502

<210> 169

<211> 1502

<212> DNA

<213> artificial sequence

<220>

<223> SPC10793_contig000001_4445065_4446566

<400> 169

agagtttgat cctggctcag gacgaacgct ggcggcatgc ctaacacatg caagtcgagc
60

gagtggagtt cttcggaaca aagctagcgg cggacgggtg agtaacacgt gggcaacctg
120

cctcatagag gggaatagcc tcccgaagg gagattaata ccgcataaga ttgtagcttc
180

gcatgaagta gcaattaaag gagcaatccg ctatgagatg ggcccgcggc gcattagcta
240

gttggtgagg taacggctca ccaaggcgac gatgcgtagc cgacctgaga gggtgatcgg
300

ccacattggg actgagacac ggcccagact cctacgggag gcagcagtgg ggaatattgc
360

acaatggggg aaaccctgat gcagcaatgc cgcgtgagtg atgacggcct tcgggttgta
420

aagctctgtc ttcggggacg ataatgacgg tacccgagga ggaagccacg gctaactacg
480

tgccagcagc cgcggttaata cgtaggtggc aagcgttgtc cggatttact gggcgtaaag
540

ggagcgtagg cggattttta agtgagatgt gaaatacccg ggcttaactt gggtgctgca
600

tttcaaactg gaagtctaga gtgcaggaga ggagaaggga attcctagtg tagcggtgaa
660

atgcgtagag attaggaaga acaccagtgg cgaaggcgct tctctggact gtaactgacg
720

ctgaggctcg aaagcgtggg gagcaaacag gattagatac cctggtagtc cacgccgtaa
780

acgatgaata ctaggtgtag gggttgtcat gacctctgtg ccgccgctaa cgcattaagt
840

attccgcctg gggagtacgg tgcgaagatt aaaactcaaa ggaattgacg ggggcccgcg
900

caagcagcgg agcatgtggt ttaattcgaa gcaacgcgaa gaaccttacc tagacttgac
960

atctcctgaa ttacccgtaa ctgggggaagt cgcttcggcg acaggaagac aggtggtgca
1020

tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct
1080

tattgttagt tgctaccatt tagttgagca ctctagcgag actgcccggg ttaaccggga
1140

ggaaggtggg gatgacgtca aatcatcatg ccccttatgt ctagggctac acacgtgcta
1200

caatggcaag tacaaagaga agcaagaccg cgaggtggag caaaactcaa aaacttgtct
1260

cagttcggat tgtaggctga aactcgccta catgaagctg gagttgctag taatcgcgaa
1320

tcagcatgtc gcggtgaata cgttcccggg ccttgtagac accgcccgtc acaccatgag
1380

agttggcaat acccaaagtg cgtgatctaa ctcgcaagag aggaagcgcc ctaaggtagg
1440

gtcagcgatt ggggtgaagt cgtaacaagg tagccgtagg agaacctgcg gctggatcac
1500

c t
1502

<210> 170

<211> 1502

<212> DNA

<213> artificial sequence

<220>

<223> SPC10793_contig000001_4325802_4327303

<400> 170

agagtttgat cctggctcag gacgaacgct ggcggcatgc ctaacacatg caagtcgagc
60

gagttgatct cttcggagtg aagctagcgg cggacgggtg agtaacacgt gggcaacctg
120

cctcatagag gggaatagcc tcccgaagg gagattaata ccgcataaga ttgtagcttc
180

gcatgaagta gcaattaaag gagcaatccg ctatgagatg ggcccgcggc gcattagcta
240

gttggtgagg taacggctca ccaaggcgac gatgcgtagc cgacctgaga gggtgatcgg
300

ccacattggg actgagacac ggcccagact cctacgggag gcagcagtgg ggaatattgc
360

acaatggggg aaaccctgat gcagcaatgc cgcgtgagtg atgacggcct tcgggttgta
420

aagctctgtc ttcggggacg ataatgacgg tacccgagga ggaagccacg gctaactacg
480

tgccagcagc cgcggtaata cgtaggtggc aagcgttgtc cggatttact gggcgtaaag
540

ggagcgtagg cggattttta agtgagatgt gaaatacccg ggcttaactt gggtgctgca
600

tttcaaactg gaagtctaga gtgcaggaga ggagaaggga attcctagtg tagcggtgaa
660

atgcgtagag attaggaaga acaccagtgg cgaaggcgct tctctggact gtaactgacg
720

ctgaggctcg aaagcgtggg gagcaaacag gattagatac cctggtagtc cacgccgtaa
780

acgatgaata ctaggtgtag gggttgtcat gacctctgtg ccgccgctaa cgcattaagt
840

attccgcctg gggagtacgg tcgcaagatt aaaactcaaa ggaattgacg ggggcccgc
900

caagcagcgg agcatgtggt ttaattcgaa gcaacgcgaa gaaccttacc tagacttgac
960

atctcctgaa ttacccgtaa ctgggggaagt cgcttcggcg acaggaagac aggtggtgca
1020

tggttgctcg cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct
1080

tattgttagt tgctaccatt tagttgagca ctctagcgag actgcccggg ttaaccggga
1140

ggaaggtggg gatgacgtca aatcatcatg ccccttatgt ctagggctac acacgtgcta
1200

caatggcaag tacaaagaga agcaagaccg cgaggtggag caaaactcaa aaacttgtct
1260

cagttcggat tgtaggctga aactcgccta catgaagctg gagttgctag taatcgcgaa
1320

tcagcatgtc gcggtgaata cgttcccggg ccttgtacac accgcccgtc acaccatgag
1380

agttggcaat acccaaagtg cgtgatctaa ctcgcaagag aggaagcgcc ctaaggtagg
1440

gtcagcgatt ggggtgaagt cgtaacaagg tagccgtagg agaacctgcg gctggatcac
1500

c t
1502

<210> 171

<211> 1502

<212> DNA

<213> artificial sequence

<220>

<223> SPC10793_contig000001_11472_12973

<400> 171

agagtttgat cctggctcag gacgaacgct ggcggcatgc ctaacacatg caagtcgagc
60

gagtggagtt cttcgggaaca aagctagcgg cggacgggtg agtaacacgt gggcaacctg
120

cctcatagag gggaatagcc tcccgaagg gagattaata ccgcataaga ttgtagcttc
180

gcatgaagta gcaattaaag gagcaatccg ctatgagatg ggcccgcggc gcattagcta
240

gttggtgagg taacggctca ccaaggcgac gatgcgtagc cgacctgaga gggtgatcgg
300

ccacattggg actgagacac ggcccagact cctacgggag gcagcagtgg ggaatattgc
360

acaatggggg aaaccctgat gcagcaatgc cgcgtagagt atgacggcct tcgggttgta
420

aagctctgtc ttcggggacg ataatgacgg tacccgagga ggaagccacg gctaactacg
480

tgccagcagc cgcggttaata cgtaggtggc aagcgttgtc cggatttact gggcgtaaag
540

ggagcgtagg cggattttta agtgagatgt gaaatacccg ggcttaactt gggtgctgca
600

tttcaaactg gaagtctaga gtgcaggaga ggagaaggga attcctagtg tagcggtgaa
660

atgcgtagag attaggaaga acaccagtgg cgaaggcgct tctctggact gtaactgacg
720

ctgaggctcg aaagcgtggg gagcaaacag gattagatac cctggtagtc cacgccgtaa
780

acgatgaata ctaggtgtag gggttgtcat gacctctgtg ccgccgctaa cgcattaagt
840

attccgcctg gggagtacgg tcgcaagatt aaaactcaaa ggaattgacg ggggcccgca
900

caagcagcgg agcatgtggt ttaattcgaa gcaacgcgaa gaaccttacc tagacttgac
960

atctcctgaa ttacccgtaa ctggggaagt cgcttcggcg acaggaagac aggtggtgca
1020

tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct
1080

tattgttagt tgctaccatt tagttgagca ctctagcgag actgcccggg ttaaccggga
1140

ggaaggtggg gatgacgtca aatcatcatg ccccttatgt ctagggctac acacgtgcta
1200

caatggcaag tacaaagaga agcaagaccg cgaggtggag caaaactcaa aaacttgtct
1260

cagttcggat tgtaggctga aactcgccta catgaagctg gagttgctag taatcgcgaa
1320

tcagcatgtc gcggtgaata cgttcccggg ccttgtagac accgcccgtc acaccatgag
1380

agttggcaat acccaaagtg cgtgatctaa ctcgcaagag aggaagcgcc ctaaggtagg
1440

gtcagcgatt ggggtgaagt cgtaacaagg tagccgtagg agaacctgcg gctggatcac
1500

c t
1502

<210> 172

<211> 1502

<212> DNA

<213> artificial sequence

<220>

<223> SPC10793_contig000001_4331616_4333117

<400> 172

agagtttgat cctggctcag gacgaacgct ggcggcatgc ctaacacatg caagtcgagc
60

gagttgatct cttcggagtg aagctagcgg cggacgggtg agtaacacgt gggcaacctg
120

cctcatagag gggaaatagcc tcccgaagg gagattaata ccgcataaga ttgtagcttc
180

gcatgaagta gcaattaaag gagcaatccg ctatgagatg ggcccgcggc gcattagcta
240

gttggtgagg taacgggtca ccaaggcgac gatgcgtagc cgacctgaga gggtgatcgg
300

ccacattggg actgagacac ggcccagact cctacgggag gcagcagtgg ggaatattgc
360

acaatggggg aaaccctgat gcagcaatgc cgcgtgagt atgacggcct tcgggttgta
420

aagctctgtc ttcggggacg ataatgacgg tatccgagga ggaagccacg gctaactacg
480

tgccagcagc cgcggttaata cgtaggtggc aagcgttgtc cggatttact gggcgtaaag
540

ggagcgtagg cggattttta agtgagatgt gaaatacccg ggcttaactt gggtgctgca
600

tttcaaactg gaagtctaga gtgcaggaga ggagaaggga attcctagt tagcggtgaa
660

atgcgtagag attaggaaga acaccagtgg cgaaggcgct tctctggact gtaactgacg
720

ctgaggctcg aaagcgtggg aagcaaacag gattagatac cctggtagtc cacgccgtaa
780

acgatgaata ctaggtgtag gggttgtcat gacctctgtg ccgccgctaa cgcattaagt
840

attccgcctg gggagtacgg tcgcaagatt aaaactcaaa ggaattgacg ggggcccgca
900

caagcagcgg agcatgtggt ttaattcgaa gcaacgcgaa gaaccttacc tagacttgac
960

atctcctgaa ttacccgtaa ctggggaagt cgcttcggcg acaggaagac aggtggtgca
1020

tggttgctgt cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct
1080

tattgttagt tgctaccatt tagttgagca ctctagcgag actgcccggg ttaaccggga
1140

ggaagggtggg gatgacgtca aatcatcatg ccccttatgt ctagggctac acacgtgcta
1200

caatggcaag tacaagaga agcaagaccg cgagggtggag caaaactcaa aaacttgtct
1260

cagttcggat tgtaggctga aactcgccta catgaagctg gagttgctag taatcgcgaa
1320

tcagcatgtc gcggtgaata cgttcccggg ccttgtagac accgcccgtc acaccatgag
1380

agttggcaat acccaaagtg cgtgatctaa ctcgcaagag aggaagcgcc ctaaggtagg
1440

gtcagcgatt ggggtgaagt cgtaacaagg tagccgtagg agaacctgcg gctggatcac
1500

c t
1502

<210> 173

<211> 1500

<212> DNA

<213> artificial sequence

<220>

<223> SPC10793_contig000001_4453833_4455332

<400> 173

agagtttgat cctggctcag gacgaacgct ggcggcatgc ctaacacatg caagtcgagc
60

gagtggagtt cttcggaaca aagctagcgg cggacgggtg agtaacacgt gggcaacctg
120

cctcatagag gggaatagcc tcccgaagg gagattaata ccgcataaga ttgtagcttc
180

gcatgaagta gcaattaaag gagcaatccg ctatgagatg ggcccgcggc gcattagcta
240

gttggtgagg taacgggtca ccaaggcgac gatgcgtagc cgacctgaga gggtgatcgg
300

ccacattggg actgagacac ggcccagact cctacgggag gcagcagtgg ggaatattgc
360

acaatggggg aaaccctgat gcagcaatgc cgcgtgagtg atgacggcct tcggggttgta
420

aagctctgtc ttcggggacg ataatgacgg tacccgagga ggaagccacg gctaactacg
480

tgccagcagc cgcggtaata cgtaggtggc aagcgttgtc cggatttact gggcgtaaag
540

ggagcgtagg cggattttta agtgagatgt gaaatacccg ggcttaactt gggtgctgca
600

tttcaaactg gaagtctaga gtgcaggaga ggagaaggga attcctagtg tagcggtgaa
660

atgcgtagag attaggaaga acaccagtgg cgaaggcgct tctctggact gtaactgacg
720

ctgaggctcg aaagcgtggg gagcaaacag gattagatac cctggtagtc caccgccgtaa
780

acgatgaata ctaggtgtag gggttgtcat gacctctgtg ccgccgctaa cgcattaagt
840

attccgcctg gggagtacgg tcgcaagatt aaaactcaaa ggaattgacg ggggcccgca
900

caagcagcgg agcatgtggg ttaattcgaa gcaacgcgaa gaaccttacc tagacttgac
960

atctcctgaa ttacccgtaa ctggggaagt cgcttcggcg acaggaagac aggtggtgca
1020

tggttgctcgt cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct
1080

tattgttagt tgctaccatt tagttgagca ctctagcgag actgcccggg ttaaccggga
1140

ggaaggtggg gatgacgtca aatcatcatg ccccttatgt ctagggctac acacgtgcta
1200

caatggcaag tacaaagaga agcaagaccg cgaggtggag caaaactcaa aaacttgtct
1260

cagttcggat tgtaggctga aactcgccta catgaagctg gagttgctag taatcgcgaa
1320

tcagcatgtc gcggtgaata cgttcccggg ccttgtacac accgccgtca caccatgaga
1380

gttggaata cccaaagtgc gtgatctaac tcgcaagaga ggaagcgccc taaggtaggg
1440

tcagcgattg ggggtgaagtc gtaacaaggt agccgtagga gaactgcggc tggatcacct
1500

<210> 174

<211> 1502

<212> DNA

<213> artificial sequence

<220>

<223> SPC10793_contig000001_33702_35203

<400> 174

agagtttgat cctggctcag gacgaacgct ggcggcatgc ctaacacatg caagtcgagc
60

gagtggagtt cttcggaaca aagctagcgg cggacgggtg agtaacacgt gggcaacctg
120

cctcatagag gggaatagcc tcccgaagagg gagattaata ccgcataaga ttgtagcttc
180

gcatgaagta gcaattaaag gagcaatccg ctatgagatg ggcccgcggc gcattagcta
240

gttggtgagg	taacggctca	ccaaggcgac	gatgcgtagc	cgacctgaga	gggtgatcgg
300					
ccacattggg	actgagacac	ggcccagact	cctacgggag	gcagcagtgg	ggaatattgc
360					
acaatggggg	aaaccctgat	gcagcaatgc	cgcgtagagt	atgacggcct	tagggttgta
420					
aagctctgtc	ttcggggacg	ataatgacgg	tacccgagga	ggaagccacg	gctaactacg
480					
tgccagcagc	cgcggttaata	cgtaggtggc	aagcgttgtc	cggattttact	gggcgtaaag
540					
ggagcgtagg	cggattttta	agtgagatgt	gaaatacccg	ggcttaactt	gggtgctgca
600					
tttcaaactg	gaagtctaga	gtgcaggaga	ggagaaggga	attcctagt	tagcggtgaa
660					
atgcgtagag	attaggaaga	acaccagtgg	cgaaggcgct	tctctggact	gtaactgacg
720					
ctgaggctcg	aaagcgtagg	gagcaaacag	gattagatac	cctggtagtc	cacgccgtaa
780					
acgatgaata	ctaggtgtag	gggttggtcat	gacctctgtg	ccgccgctaa	cgcattaagt
840					
attccgcctg	gggagtacgg	tcgcaagatt	aaaactcaaa	ggaattgacg	ggggcccgcg
900					
caagcagcgg	agcatgtggt	ttaattcgaa	gcaacgcgaa	gaaccttacc	tagacttgac
960					
atctcctgaa	ttaccgcgta	ctgggggaagt	cgcttcggcg	acaggaagac	aggtggtgca
1020					
tggttgctcg	cagctcgtgt	cgtgagatgt	tgggttaagt	cccgcaacga	gcgcaaccct
1080					
tattgttagt	tgctaccatt	tagttgagca	ctctagcgag	actgcccggg	ttaaccggga
1140					

ggaaggtggg gatgacgtca aatcatcatg ccccttatgt ctagggctac acacgtgcta
1200

caatggcaag tacaaagaga agcaagaccg cgaggtggag caaaactcaa aaacttgtct
1260

cagttcggat tgtaggctga aactcgccta catgaagctg gagttgctag taatcgcgaa
1320

tcagcatgtc gcggtgaata cgttcccggg ccttgtagac accgcccgtc acaccatgag
1380

agttggcaat acccaaagtg cgtgatctaa ctcgcaagag aggaagcgcc ctaaggtagg
1440

gtcagcgatt ggggtgaagt cgtaacaagg tagccgtagg agaacctgcg gctggatcac
1500

c **t**
1502

<210> 175

<211> 1502

<212> DNA

<213> artificial sequence

<220>

<223> SPC10793_contig000001_5518_7019

<400> 175

agagtttgat cctggctcag gacgaacgct ggcggcatgc ctaacacatg caagtcgagc
60

gagtggagtt cttcgggaaca aagctagcgg cggacgggtg agtaacacgt gggcaacctg
120

cctcatagag gggaatagcc tcccgaagagg gagattaata ccgcataaga ttgtagcttc
180

gcatgaagta gcaattaaag gagcaatccg ctatgagatg ggcccgcggc gcattagcta
240

gttggtgagg taacggctca ccaaggcgac gatgcgtagc cgacctgaga gggatgatcgg
300

ccacattggg actgagacac ggcccagact cctacgggag gcagcagtgg ggaatattgc
360

acaatggggg aaaccctgat gcagcaatgc cgcgtgagtg atgacggcct tcgggttgta
420

aagctctgtc ttcggggacg ataatgacgg tacccgagga ggaagccacg gctaactacg
480

tgccagcagc cgcggtaata cgtaggtggc aagcgttgct cggatttact gggcgtaaag
540

ggagcgtagg cggattttta agtgagatgt gaaatacccg ggcttaactt gggtgctgca
600

tttcaaactg gaagtctaga gtgcaggaga ggagaaggga attcctagtg tagcggtgaa
660

atgcgtagag attaggaaga acaccagtgg cgaaggcgct tctctggact gtaactgacg
720

ctgaggctcg aaagcgtggg gagcaaacag gattagatac cctggtagtc cacgccgtaa
780

acgatgaata ctaggtgtag gggttgtcat gacctctgtg ccgccgctaa cgcattaagt
840

attccgcctg gggagtacgg tcgcaagatt aaaactcaaa ggaattgacg ggggcccgca
900

caagcagcgg agcatgtggt ttaattcgaa gcaacgcgaa gaaccttacc tagacttgac
960

atctcctgaa ttacccgtaa ctggggaagt cgcttcggcg acaggaagac aggtggtgca
1020

tggttgctgt cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct
1080

tattgttagt tgctaccatt tagttgagca ctctagcgag actgcccggg ttaaccggga
1140

ggaagggtggg gatgacgtca aatcatcatg ccccttatgt ctagggctac acacgtgcta
1200

caatggcaag tacaaagaga agcaagaccg cgaggtggag caaaactcaa aaacttgtct
1260

cagttcggat tgtaggctga aactcgccta catgaagctg gagttgctag taatcgcgaa
1320

tcagcatgtc gcggtgaata cgttcccggg ccttgtacac accgcccgtc acaccatgag
1380

agttggcaat acccaaagtg cgtgatctaa ctcgcaagag aggaagcgcc ctaaggtagg
1440

gtcagcgatt ggggtgaagt cgtaacaagg tagccgtagg agaacctgcg gctggatcac
1500

c t
1502

<210> 176

<211> 1502

<212> DNA

<213> artificial sequence

<220>

<223> SPC10793_contig000001_4153338_4154839

<400> 176

agagtttgat cctggctcag gacgaacgct ggcggcatgc ctaacacatg caagtcgagc
60

gagttgatct cttcggagtg aagctagcgg cggacgggtg agtaacacgt gggcaacctg
120

cctcatagag gggaatagcc tcccgaagg gagattaata ccgcataaga ttgtagcttc
180

gcatgaagca gcaattaaag gagcaatccg ctatgagatg ggcccgcggc gcattagcta
240

gttggtgagg taacggctca ccaaggcgac gatgcgtagc cgacctgaga gggtgatcgg
300

ccacattggg actgagacac ggcccagact cctacgggag gcagcagtgg ggaatattgc
360

acaatggggg aaaccctgat gcagcaatgc cgcgtgagtg atgacggcct tcgggttgta
420

aagctctgtc ttcggggacg ataatgacgg tacccgagga ggaagccacg gctaactacg
480

tgccagcagc cgcggtaata cgtagggtggc aagcgttgtc cggattttact gggcgtaaag
540

ggagcgtagg cggatttttta agtgagatgt gaaatacccg ggcttaactt gggtgctgca
600

tttcaaactg gaagtctaga gtgcaggaga ggagaaggga attcctagtg tagcggtgaa
660

atgcgtagag attaggaaga acaccagtgg cgaaggcgct tctctggact gtaactgacg
720

ctgaggatcg aaagcgtggg gagcaaacag gattagatac cctggtagtc cacgccgtaa
780

acgatgaata ctaggtgtag gggttgtcat gacctctgtg ccgccgctaa cgcattaagt
840

attccgcctg gggagtacgg tcgcaagatt aaaactcaaa ggaattgacg ggggcccgca
900

caagcagcgg agcatgtggt ttaattcgaa gcaacgcgaa gaaccttacc tagacttgac
960

atctcctgaa ttacccgtaa ctggggaagt cgcttcggcg acaggaagac aggtggtgca
1020

tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct
1080

tattgttagt tgctaccatt tagttgagca ctctagcgag actaccggg ttaaccggga
1140

ggaagggtggg gatgacgtca aatcatcatg ccccttatgt ctagggctac acacgtgcta
1200

caatggcaag taaaaagaga agcaagaccg cgagggtggag caaaactcaa aaacttgtct
1260

cagttcggat tgtaggctga aactcgccta catgaagctg gagttgctag taatcgcgaa
1320

tcagcatgtc gcggtgaata cgttcccggg ccttgtacac accgcccgtc acaccatgag
1380

agttggcaat acccaaagtg cgtgatctaa ctcgcaagag aggaagcgcc ctaaggtagg
1440

gtcagcgatt ggggtgaagt cgtaacaagg tagccgtagg agaacctgcg gctggatcac
1500

c t
1502

<210> 177

<211> 1502

<212> DNA

<213> artificial sequence

<220>

<223> SPC10793_contig000001_39710_41211

<400> 177

agagtttgat cctggctcag gacgaacgct ggcggcatgc ctaacacatg caagtcgagc
60

gagtggagtt cttcggaaca aagctagcgg cggacgggtg agtaacacgt gggcaacctg
120

cctcatagag gggaatagcc tcccgaagg gagattaata ccgcataaga ttgtagcttc
180

gcatgaagta gcaattaaag gagcaatccg ctatgagatg ggcccgcggc gcattagcta
240

gttggtgagg taacggctca ccaaggcgac gatgcgtagc cgacctgaga gggatgatcg
300

ccacattggg actgagacac ggcccagact cctacgggag gcagcagtgg ggaatattgc
360

acaatggggg aaaccctgat gcagcaatgc cgcgtgagtg atgacggcct tcgggttgta
420

aagctctgtc ttcggggacg ataatgacgg tacccgagga ggaagccacg gctaactacg
480

tgccagcagc cgcggttaata cgtaggtggc aagcgttgtc cggatttact gggcgtaaag
540

ggagcgtagg cggattttta agtgagatgt gaaatacccg ggcttaactt gggtgctgca
600

tttcaaactg gaagtctaga gtgcaggaga ggagaaggga attcctagtg tagcggtgaa
660

atgcgtagag attaggaaga acaccagtgg cgaaggcgct tctctggatt gtaactgacg
720

ctgaggctcg aaagcgtggg gagcaaacag gattagatac cctggtagtc caccgccgtaa
780

acgatgaata ctaggtgtag gggttgtcat gacctctgtg ccgccgctaa cgcattaagt
840

attccgcctg gggagtacgg tcgcaagatt aaaactcaaa ggaattgacg ggggcccgcg
900

caagcagcgg agcatgtggg ttaattcgaa gcaacgcgaa gaaccttacc tagacttgac
960

atctcctgaa ttaccgcgtg ctgggggaagt cgcttcggcg acaggaagac aggtggtgca
1020

tggttgctcg cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaaccct
1080

tattgttagt tgctaccatt tagttgagca ctctagcgag actgcccggg ttaaccggga
1140

ggaagggtgg gatgacgtca aatcatcatg ccccttatgt ctagggctac acacgtgcta
1200

caatggcaag tacaaagaga agcaagaccg cgagggtggag caaaactcaa aaacttgtct
1260

cagttcggat tgtaggctga aactcgccta catgaagctg gagttgctag taatcgcgaa
1320

tcagcatgtc gcggtgaata cgttcccggg ccttgtacac accgcccgtc acaccatgag
1380

agttggcaat acccaaagtg cgtgatctaa ctcgcaagag aggaagcgcc ctaaggtagg
1440

gtcagcgatt ggggtgaagt cgtaacaagg tagccgtagg agaacctgcg gctggatcac
1500

c t
1502

<210> 178

<211> 1513

<212> DNA

<213> artificial sequence

<220>

<223> SPC10953_contig000133_3754_5266

<400> 178

agagtttgat cctggctcag gacgaacgct ggcggcgcgcg ctaacacatg caagtcgaac
60

ggagcttacg ttttgaagtt ttcggatgga tgaatgtaag cttagtggcg gacgggtgag
120

taacacgtga gcaacctgcc tttcagaggg ggataacagc cggaaacggc tgctaatacc
180

gcatgatgtt gcggggggcac atgcccctgc aaccaaagga gcaatccgct gaaagatggg
240

ctcgcgtccg attagccagt tggcggggta acggcccacc aaagcgacga tcggtagccg
300

gactgagagg ttgaacggcc acattgggac tgagacacgg cccagactcc tacgggagggc
360

agcagtgggg gatattgcac aatgggcgaa agcctgatgc agcgacgccg cgtgagggaa
420

gacggtcttc ggattgtaaa cctctgtctt tggggaagaa aatgacggta cccaaagagg
480

aagctccggc taactacgtg ccagcagccg cggtaatacg tagggagcaa gcgttgtccg
540

gaattactgg gtgtaaaggg agcgtaggcg ggatggcaag tagaatgtta aatccatcgg
600

ctcaaccggt ggctgcgttc taaactgccg ttcttgagtg aagtagaggc aggcggaatt
660

cctagtgtag cggtgaaatg cgtagatatt aggaggaaca ccagtggcga aggcggcctg
720

ctgggcttta actgacgctg aggctcgaaa gcgtggggag caaacaggat tagataccct
780

ggtagtccac gccgtaaacg atgattacta ggtgtggggg gactgacccc ttccgtgccg
840

cagttaacac aataagtaat ccacctgggg agtacggccg caaggttgaa actcaaagga
900

attgacgggg gcccgacaaa gcagtggagt atgtgggtta attcgaagca acgcgaagaa
960

ccttaccagg tcttgacatc ggatgcatag cctagagata ggtgaagccc ttcggggcat
1020

ccagacaggt ggtgcatggg tgtcgtcagc tcgtgtcgtg agatgttggg ttaagtcccg
1080

caacgagcgc aacccttatt attagttgct acgcaagagc actctaataga gactgccgtt
1140

gacaaaacgg aggaagggtg ggatgacgtc aaatcatcat gcccttatg acctgggcta
1200

cacacgtact acaatggcac taaaacagag ggcggcgaca ccgcgagggtg aagcgaatcc
1260

cgaaaaagtg tctcagttca gattgcaggc tgcaaccgcg ctgcatgaag tcggaattgc
1320

tagtaatcgc ggatcagcat gccgcgggtga atacgttccc gggccttgta cacaccgccc
1380

gtcacacccat gggagtcggt aacacccgaa gccagtagcc taaccgcaag gggggcgctg
1440

tcgaagggtgg gattgatgac tgggggtgaag tcgtaacaag gtagccgtat cggaagggtgc
1500

g g c t g g a t c a c c t
1513

<210> 179

<211> 1519

<212> DNA

<213> artificial sequence

<220>

<223> SPC12346_contig000053_23_1541

<400> 179

agagtttgat cctggctcag gatgaacgct ggcggcgctgc ctaacacatg caagtcgaac
60

gaagcgattt aacggaagtt ttcggatgga agttgaattg actgagtggc ggacgggtga
120

gtaacgcgtg ggtaacctgc cttgtactgg gggacaacag ttagaaatga ctgctaatac
180

cgcataagcg cacagtatcg catgatacag tgtgaaaaac tccggtggta caagatggac
240

ccgcgtctga ttagctagtt ggtaaggtaa cggcttacca aggcgacgat cagtagccga
300

cctgagaggg tgaccggcca cattgggact gagacacggc ccaaactcct acgggaggca
360

gcagtgggga atattgcaca atgggcgaaa gcctgatgca gcgacgccgc gtgagtgaag
420

aagtatttcg gtatgtaaag ctctatcagc agggaagaaa atgacggtac ctgactaaga
480

agccccggct aactacgtgc cagcagccgc ggtaatacgt agggggcaag cgttatccgg
540

atttactggg tgtaaagggg gcgtagacgg taaagcaagt ctgaagtgaa agcccgcggc
600

tcaactgcgg gactgctttg gaaactgttt aactggagtg tcggagaggt aagtggaatt
660

cctagtgtag cggtgaaatg cgtagatatt aggaggaaca ccagtggcga aggcgactta
720

ctggacgata actgacgttg aggctcgaaa gcgtggggag caaacaggat tagataccct
780

ggtagtccac gccgtaaacg atgaatacta ggtgttgggg agcaaagctc ttcggtgccg
840

tcgcaaacgc agtaagtatt ccacctgggg agtacgttcg caagaatgaa actcaaagga
900

attgacgggg acccgcacaa gcggtggagc atgtgggtta attcgaagca acgcgaagaa
960

ccttaccagg tcttgacatc gatccgacgg gggagtaacg tccccttccc ttcggggcgg
1020

agaagacagg tgggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc
1080

gcaacgagcg caacccttat tctaagtagc cagcgggttcg gccgggaact cttgggagac
1140

tgccagggat aacctggagg aaggtgggga tgacgtcaaa tcatcatgcc cttatgatc
1200

tgggctacac acgtgctaca atggcgtaaa caaagagaag caagaccgcg aggtggagca
1260

aatctcaaaa ataacgtctc agttcggact gcaggctgca actcgcctgc acgaagctgg
1320

aatcgctagt aatcgcgaaat cagaatgtcg cgggtgaatac gttcccgggt cttgtacaca
1380

ccgcccgtca caccatggga gtcagtaacg cccgaagtca gtgacccaac cgcaaggagg
1440

gagctgccga aggcgggacc gataactggg gtgaagtcgt aacaaggtag ccgtatcgga
1500

a g g t g c g g c t g g a t c a c c t
1519

<210> 180

<211> 1519

<212> DNA

<213> artificial sequence

<220>

<223> SPC12346_contig000042_33808_35326

<400> 180

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgaac
60

gaagcgattt aacggaagtt ttcggatgga agttgaattg actgagtggc ggacgggtga
120

gtaacgcgtg ggtaacctgc cttgtactgg gggacaacag ttagaaatga ctgctaatac
180

cgcataagcg cacagtatcg catgatacag tgtgaaaaac tccggtggta caagatggac
240

ccgcgtctga ttagctagtt ggtaaggtaa cggcttacca aggcgacgat cagtagccga
300

cctgagaggg tgaccggcca cattgggact gagacacggc ccaaactcct acgggaggga
360

gcagtgggga atattgcaca atgggcgaaa gcctgatgca gcgacgccgc gtgagtgaag
420

aagtatttcg gtatgtaaag ctctatcagc agggaagaaa atgacggtac ctgactaaga
480

agccccggct aactacgtgc cagcagccgc ggtaatacgt agggggcaag cgttatccgg
540

atttactggg tgtaaaggga gcgtagacgg taaagcaagt ctgaagtgaag agccccgggc
600

tcaactgcgg gactgctttg gaaactgttt aactggagtg tcggagaggt aagtggaatt
660

cctagtgtag cggtgaaatg cgtagatatt aggaggaaca ccagtggcga aggcgactta
720

ctggacgata actgacgttg aggctcgaaa gcgtggggag caaacaggat tagataccct
780

ggtagtccac gccgtaaacg atgaatacta ggtgttgggg agcaaagctc ttcggtgccg
840

tcgcaaacgc agtaagtatt ccacctgggg agtacgttcg caagaatgaa actcaaagga
900

attgacgggg acccgacaaa gcggtggagc atgtggttta attcgaagca acgcgaagaa
960

ccttaccagg tcttgacatc gatccgacgg gggagtaacg tccccttccc ttcggggcgg
1020

agaagacagg tgggtgcatg ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc
1080

gcaacgagcg caacccttat tctaagtagc cagcgggttcg gccgggaact cttgggagac
1140

tgccagggat aacctggagg aaggtgggga tgacgtcaaa tcatcatgcc ccttatgatc
1200

tgggctacac acgtgctaca atggcgtaaa caaagagaag caagaccgcg aggtggagca
1260

aatctcaaaa ataacgtctc agttcggact gcaggctgca actcgcctgc acgaagctgg
1320

aatcgctagt aatcgcgaaat cagaatgtcg cggatgaatac gttcccgggt cttgtacaca
1380

ccgcccgtca caccatggga gtcagtaacg cccgaagtca gtgacccaac cgcaaggagg
1440

gagctgccga aggcggggacc gataactggg gtgaagtcgt aacaaggtag ccgtatcgga
1500

a g g t g c g g c t
1519

g g a t c a c c t

<210> 181
<211> 1529
<212> DNA
<213> artificial sequence

<220>
<223> SPC12466_contig000035_19449_20977

<400> 181
tattgagagt ttgatacctgg ctcaggatga acgctggcgg cgtgcttaac acatgcaagt
60

cgaacggagt gctcatgaca gaggattcgt ccaatggagt gagttactta gtggcggacg
120

ggtgagtaac gcgtgagtaa cctgccttgg agtggggaat aacagggtgga aacatctgct
180

aataccgcat gatgcagttg agtcgcatgg ctctgactgc caaagattta tcgctctgag
240

atggactcgc gtctgattag ctagttggcg gggtaacggc ccaccaaggc gacgatcagt
300

agccggactg agaggttggc cggccacatt gggactgaga cacggcccag actcctacgg
360

gaggcagcag tggggaatat tgggcaatgg gcgcaagcct gacccagcaa cgccgcgtga
420

aggaagaagg ctttcggggt gttaaacttct tttctcaggg acgaagcaag tgacgggtacc
480

tgaggaataa gccacggcta actacgtgcc agcagccgcg gtaatacgta ggtggcaagc
540

gttatccgga tttactgggt gttaaaggcg tgtaggcggg actgcaagtc agatgtgaaa
600

accacgggct caacctgtgg cctgcatttg aaactgtagt tcttgagtac tggagaggca
660

gacggaattc ctagtgtagc ggtgaaatgc gtagatatta ggaggaacac cagtggcgaa
720

ggcgggtctgc tggacagcaa ctgacgctga ggcgcgaaag cgtgggggagc aaacaggatt
780

agataccctg gtagtccacg ctgtaaacga tggatactag gtgtggggggg tctgaccccc
840

tccgtgccgc agttaacaca ataagtatcc cacctgggga gtacgatcgc aaggttgaaa
900

ctcaaaggaa ttgacggggg cccgcacaag cgggtggagta tgtgggtttaa ttcgaagcaa
960

cgcgaagaac cttaccaggg cttgacatcc cgctgaccgg tgtagagata cacctttccc
1020

ttcggggaca gcggtgacag gtggtgcatg gttgtcgtca gctcgtgtcg tgagatgttg
1080

ggttaagtcc cgcaacgagc gcaacccta ttgttagttg ctacgcaaga gcactctagc
1140

gagactgccg ttgacaaaac ggaggaaggt ggggacgacg tcaaatacgc atgcccctta
1200

tgtcctgggc cacacacgta ctacaatggt ggtcaacaga gggaagcaat cccgcgagga
1260

ggagcaaacc cctaaaagcc atcccagttc ggattgcagg ctgcaactcg cctgtatgaa
1320

gttggaatcg ctagtaatcg cggatcagca tgccgcggtg aatacgttcc cgggccttgt
1380

acacaccgcc cgtcacacca tgagagtcgg gaacacccga agtccgtagc ctaaccgcaa
1440

ggggggcgcg gccgaagggt ggttcgataa ttgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1529

<210> 182
<211> 1268
<212> DNA
<213> artificial sequence

<220>
<223> SPC10449_contig000131_1_1268

<400> 182
gttggcgggg taacggccca ccaagactac gatggatagg ggttctgaga ggaagggtccc
60

ccacattgga actgagacac ggtccaaact cctacgggag gcagcagtga ggaatattgg
120

tcaatggacg agagtctgaa ccagccaagt agcgtgaagg atgactgccc tatggggttgt
180

aaacttcttt tatatgggaa taaagtattc cacgtgtggg attttgtatg taccatatga
240

ataaggatcg gctaactccg tgccagcagc cgcggttaata cggaggatcc gagcggtatc
300

cggattttatt gggtttaaag ggagcgtagg tggattgtta agtcagttgt gaaagtttgc
360

ggctcaaccg taaaattgca gttgaaactg gcagtccttga gtacagtaga ggtgggcgga
420

attcgtggtg tagcggtgaa atgcttagat atcacgaaga actccgattg cgaaggcagc
480

tcactagact gcaactgaca ctgatgctcg aaagtgtggg tatcaaacag gattagatac
540

cctggtagtc cacacagtaa acgatgaata ctcgctgttt gcgatataca gtaagcggcc
600

aagcgaaagc attaagtatt ccacctgggg agtacgccgg caacggtgaa actcaaagga
660

attgacgggg gcccgcacaa gcggaggaac atgtggttta attcgatgat acgcgaggaa
720

ccttaccg gcttaaattg caaatgaata atctggaaac aggttagccg caaggcattt
780

gtgaagggtgc tgcattggttgc tcgtcagctc gtgccgtgag gtgtcggcctt aagtgccata
840

acgagcgcaa cccttatctt tagttactaa caggatcatgc tgaggactct agagagactg
900

ccgtcgtgtaag atgtgaggaa ggtgggggatg acgtcaaatac agcacggccc ttacgtccgg
960

ggctacacac gtgtttacaat ggggggtaca gaaggcagct acctggcgac aggatgctaa
1020

tcccaaaaac ctctctcagt tcggatcgaa gtctgcaacc cgacttcgtg aagctggatt
1080

cgctagtaat cgcgcatcag ccatggcgcg gtgaatacgt tcccgggcct tgtacacacc
1140

gcccgtcaag ccatgaaagc cgggggtacc tgaagtacgt aaccgcaagg agcgtcctag
1200

ggtaaaactg gtaattgggg ctaagtcgta acaaggtagc cgtaccggaa ggtgcggctg
1260

g a a c a c c t
1268

<210> 183

<211> 1292

<212> DNA

<213> artificial sequence

<220>

<223> SPC10448_contig000077_43_1334

<400> 183

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgaac
60

gaagcaatta aaggaagttt tcggatggaa tttgattgac tgagtggcgg acgggtgagt
120

aacgcgtgga taacctgcct cacactgggg gataacagtt agaaatgact gctaataccg
180

cataagcgca cagtaccgca tgggtacgggtg tgaaaaactc cgggtggtgtg agatgggatcc
240

gcgtctgatt agccagttgg cgggggtaacg gcccaccaa gcgacgatca gtagccgacc
300

tgagaggggtg accggccaca ttggggactga gacacggccc aaactcctac gggagggcagc
360

agtggggaat attgcacaat gggcgaaagc ctgatgcagc gacgccgcgt gagtgaagaa
420

gtatttcgggt atgtaaagct ctatcagcag ggaagaaaat gacgggtacct gactaagaag
480

ccccggctaa ctacgtgccca gcagccgcgg taatacgtag ggggcaagcg ttatccggat
540

ttactgggtg taaagggagc gtagacggcg aagcaagtct gaagtgaaaa cccagggctc
600

aaccctggga ctgctttgga aactgttttg ctagagtgtc ggagaggtaa gtggaattcc
660

tagtgtagcg gtgaaatgcg tagatattag gaggaacacc agtggcgaag gcggcttact
720

ggacgataac tgacgttgag gctcgaaagc gtgggggagca aacaggatta gataccctgg
780

tagtccacgc cgtaaacgat gaatgctagg tgttgggggg caaagccctt cggtgccgtc
840

gcaaacgcag taagcattcc acctggggag tacgttcgca agaatgaaac tcaaaggaat
900

tgacgggggac ccgcacaagc ggtggagcat gtggttttaat tcgaagcaac gcgaagaacc
960

ttaccaagtc ttgacatcct cttgaccggc gtgtaacggc gccttccctt cggggcaaga
1020

gagacaggtg gtgcatggtt gtcgtcagct cgtgtcgtga gatgttgggt taagtcccgc
1080

aacgagcgca acccttatcc ttagtagcca gcaggtagag ctgggcactc tagggagact
1140

gccagggata acctggagga aggtggggat gacgtcaaat catcatgccc cttatgattt
1200

gggctacaca cgtgctacaa tggcgtaaac aaagggaagc aagacagtga tgtggagcaa
1260

a t c c c a a a a a t a a c g t c c c a g t t c g g a c t g t a
1292

<210> 184

<211> 1622

<212> DNA

<213> artificial sequence

<220>

<223> SPC11648_contig000104_2234_3855

<400> 184

tttagagagt ttgatcctgg ctcaggacga acgctggcgg cgtgcctaac acatgcaagt
60

cgaacggagt taagcccgac accgattggt gaggggaaga acggcgcaaa acaaaacttt
120

taaaaggcag agatgccggg aaaaggattg ggaagcaacg aggcgcagga ggacactcaa
180

caatgggtgt tggacttaac ttagtggcgg acgggtgagt aacgcgtgag taacctgcct
240

ttcagagggg gataacgttt ggaaacgaac gctaataccg catgacatac cggagtcaca
300

tggccctggt atcaaaggag caatccgctg aaagatggac tcgcgtccga ttagctagtt
360

ggcggggtaa aggcccacca aggcgacgat cggtagccgg actgagaggt tgaacggcca
420

cattgggact 480	gagacacggc	ccagactcct	acgggaggca	gcagtggggg	atattgcaca
atgggggaaa 540	ccctgatgca	gcaacgccgc	gtgagggaag	aaggttttcg	gattgtaaac
ctctgtcctt 600	agtgaagata	atgacggtag	ctaaggagga	agctccggct	aactacgtgc
cagcagccgc 660	ggtaatacgt	agggagcgag	cgttgtccgg	atttactggg	tgtaaagggg
gcgtaggcgg 720	caaggcaagt	cagcagtgaa	atccatgggc	ttaacccatg	acgtgctggt
gaaactgttt 780	tgcttgagtg	aagtagaggc	aggcggaatt	cccgggtgtag	cggtgaaatg
cgtagagatc 840	gggaggaaca	ccagtggcga	aggcggcctg	ctgggcttta	actgacgctg
atgcacgaaa 900	gtgtgggtag	caaacaggat	tagataccct	ggtagtccac	accgtaaacg
atgattacta 960	gggtgtggggg	gtctgacccc	ctccgtgccg	gagttaacac	aataagtaat
ccacctgggg 1020	agtacggccg	caaggttgaa	actcaaagga	attgacgggg	gcccgcacaa
gcagtggagt 1080	atgtgggttta	attcgaagca	acgcgaagaa	ccttaccagg	tcttgacatc
caactaacga 1140	ggtagagata	cattaggtgc	ccttcgggga	aagttgagac	aggtggtgca
tggttgtcgt 1200	cagctcgtgt	cgtgagatgt	tgggttaagt	cccgcaacga	gcgcaaccct
tgtgattagt 1260	tgctacgcaa	gagcactcta	atcagactgc	cgttgacaaa	acggaggaag
gtggggacga 1320	cgtcaaatca	tcatgcccct	tatgacctgg	gctacacacg	tactacaatg

gccgtaaaca gagggaagca aagccgcgag gcggagcaaa accctaaaag cggctctcagt
1380

tcggatcgca ggctgcaacc cgcctgcgtg aagtcggaat tgctagtaat cgcggatcag
1440

catgccgcgg tgaatacgtt cccgggcctt gtacacaccg cccgtcacac catgggagcc
1500

ggtaataccc gaagtcagta gtctaacctt ttaggaggac gctgccgaag gtaggattgg
1560

cgactgggggt gaagtcgtaa caaggtagcc gtatcggaag gtgcggctgg atcacctcct
1620

t t
1622

<210> 185

<211> 1513

<212> DNA

<213> artificial sequence

<220>

<223> SPC12359_contig000126_32_1544

<400> 185

tattgagagt ttgatcctgg ctcaggacga acgctggcgg cgtgcctaac acatgcaagt
60

cgagcgatga agttccttcg ggaacggatt agcggcggac gggtgagtaa cacgtgggca
120

acctgcctta tagaggggaa tagccttcg aaaggaagat taataccgca taagattgta
180

gcttcgcatg aagtagcaat taaaggagca atccgctata agatgggccc gcggcgcatt
240

agctagttagg tgaggtaacg gctcaccaag gcgacgatgc gtagccgacc tgagagggtg
300

atcggccaca ttgggactga gacacggccc agactcctac gggaggcagc agtggggaat
360

attgcacaat 420	gggggaaacc	ctgatgcagc	aacgccgcgt	gagtgatgac	ggccttcggg
ttgtaaagct 480	ctgtcctttgg	ggacgataat	gacgggtaccc	aaggaggaag	ccacggctaa
ctacgtgcca 540	gcagccgcgg	taatacgtag	gtggcaagcg	ttgtccggat	ttactgggcg
taaagggagc 600	gtaggcggat	ttttaagtgg	gatgtgaaat	acccgggctc	aacctgggtg
ctgcattcca 660	aactggaaat	ctagagtgca	ggaggggaaa	gtggaattcc	tagtgtagcg
gtgaaatgcg 720	tagagattag	gaagaacacc	agtggcgaag	gcgactttct	ggactgtaac
tgacgctgag 780	gctcgaaagc	gtgggggagca	aacaggatta	gataccctgg	tagtccacgc
cgtaaacgat 840	gaatactagg	tgtagggggtt	gtcatgacct	ctgtgccgcc	gctaacgcat
taagtattcc 900	gcctgggggag	tacggtcgca	agattaaaac	tcaaaggaat	tgacgggggc
ccgcacaagt 960	agcggagcat	gtggtttaat	tcgaagcaac	gcgaagaacc	ttacctagac
ttgacatctc 1020	ctgaattacc	atgtaatgtg	ggaagtcctt	tcgggggacag	gaagacaggt
ggatgcatggt 1080	tgtcgtcagc	tcgtgtcgtg	agatgttggg	ttaagtcccg	caacgagcgc
aacccttatt 1140	gttagttgct	accatttagt	tgagcactct	agcgagactg	cccgggttaa
ccgggaggaa 1200	ggtaggggatg	acgtcaaatc	atcatgcccc	ttatgtctag	ggctacacac
gtgctacaat 1260	ggccgggtaca	acgagatgca	ataccgtgag	gtggagcaaa	actataaaac

cggtctcagt tcggattgta ggctgaaact cgcctacatg aagctggagt tactagtaat
1320

cgcgaatcag aatgtcgcgg tgaatacgtt cccgggcctt gtacacaccg cccgtcacac
1380

catgagagtt ggcaataccc aaagttggtg atctaaccg taagggagga agccacctaa
1440

ggtaggggtca gcgattgggg tgaagtcgta acaaggtagc cgtaggagaa cctgcggctg
1500

g a t c a c c t c c t t t
1513

<210> 186

<211> 1278

<212> DNA

<213> artificial sequence

<220>

<223> SPC12239_contig000069_1_1278

<400> 186

gttggtaggg taacggccta ccaaggcgac gatgcgtagc cgacctgaga gggtgaccgg
60

ccacactggg actgagacac ggcccagact cctacgggag gcagcagtag ggaattttcg
120

gcaatggggg aaaccctgac cgagcaacgc cgcgtgaagg aagaagtaat tcgttatgta
180

aacttctgtc atagaggaag aacggtggat atagggaatg atatccaagt gacggtactc
240

tataagaaag ccacggctaa ctacgtgcc a gcagccgcgg taatacgtag gtggcgagcg
300

ttatccggaa ttattgggcg taaagaggga gcaggcggca ctaaggggtct gtggtgaaag
360

atcgaagctt aacttcggta agccatggaa accgtagagc tagagtgtgt gagaggatcg
420

tggaattcca tgtgtagcgg tgaaatgcgt agatatatgg aggaacacca gtggcgaagg
480

cgacgatctg gcgcataact gacgctcagt cccgaaagcg tggggagcaa ataggattag
540

ataccctagt agtccacgcc gtaaacgatg agtactaagt gttgggagtc aaatctcagt
600

gctgcagtta acgcaataag tactccgcct gagtagtacg ttcgcaagaa tgaaactcaa
660

aggaattgac gggggcccgcc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
720

agaaccttac caggtcttga catcgatcta aaggctccag agatggagag atagctatag
780

agaagacagg tgggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc
840

gcaacgagcg caaccctgt tgccagttgc cagcattaag ttggggactc tggcgagact
900

gccggtgaca agccggagga aggcggggat gacgtcaaata catcatgccc cttatgacct
960

gggctacaca cgtgctacaa tggacagagc agaggggaagc gaagccgcga ggtggagcga
1020

aacccataaa actgttctca gttcggactg cagtctgcaa ctcgactgca cgaagatgga
1080

atcgctagta atcgcgaaatc agcatgtcgc ggtgaatacg ttctcggggc ttgtacacac
1140

cgcccgtcac accatgagag tcggtaacac ccgaagccgg tggcctaacc gcaaggaagg
1200

agctgtctaa ggtgggactg atgattgggg tgaagtcgta acaaggatat cctacgggaa
1260

c g t g g g g a t g
1278

g a t c a c c t

<210> 187
<211> 1527
<212> DNA
<213> artificial sequence

<220>
<223> SPC12585_contig000079_149_1675

<400> 187
tcagagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgggaaa cctttttattg aagcttcggc agatttagct ggtttctagt ggcggacggg
120

tgagtaacgc gtgggtaacc tgccttatac aggggggataa caaccagaaa tggttgctaa
180

taccgcataa gcgcacagga ccgcatggtc cgggtgtgaaa aactccgggtg gtataagatg
240

gacccgcggt ggattagcta gttggcaggg taacggccta ccaaggcgac gatccatagc
300

cggcctgaga ggggtgaacgg ccacattggg actgagacac ggcccagact cctacggggag
360

gcagcagtgg ggaatattgc acaatggggg aaaccctgat gcagcgacgc cgcgtgaagg
420

aagaagtatc tcggtatgta aacttctatc agcagggaag atagtgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggtaata cgtagggggc aagcgttatc
540

cggatttact ggggtgtaaag ggagcgtaga cggactggca agtctgatgt gaaaggcggg
600

ggctcaaccc ctggactgca ttggaaactg ttagtcttga gtgccggaga ggtaagcgga
660

attcctagtg tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcggc
720

ttactggacg gtaactgacg ttgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgaata ctaggtgttg gggagcaaag ctcttcggtg
840

ccgccgcaaa cgcattaagt attccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg gggacccgca caagcgggtg agcatgtggt ttaattcgaa gcaacgcgaa
960

gaaccttacc aagtcttgac atccctctga ccgactctta accgagtctt tccttcggga
1020

caggggagac aggtggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaacccc tatccccagt agccagcggg tcggccgggc actctgagga
1140

gactgccagg gataacctgg aggaaggcgg ggatgacgtc aaatcatcat gccccttatg
1200

atttgggcta cacacgtgct acaatggcgt aaacaaaggg aagcaagcct gcgaaggtaa
1260

gcaaatccca aaaataacgt cccagttcgg actgcagtct gcaactcgac tgcacgaagc
1320

tggaatcgct agtaatcgcg gatcagaatg ccgcggtgaa tacgttcccg ggtcttgtac
1380

acaccgcccg tcacaccatg ggagtcagta acgcccgaag tcagtgacct aactgcaaag
1440

aaggagctgc cgaaggcggg accgatgact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g g c t g g a t c a c c t c c t t t
1527

<210> 188

<211> 1530

<212> DNA

<213> artificial sequence

<220>

<223> PPC00224_contig000169_16_1545

<400> 188

agagtttgat catggctcag attgaacgct ggcggcaggc ctaacacatg caagtcgaac
60

ggtaacagga agcagcttgc ttctttgctg acgagtggcg gacgggtgag taatgtctgg
120

gaaactgcct gatggagggg gataactact ggaaacggta gctaataccg cataacgtcg
180

caagaccaa gagggggacc ttcgggcctc ttgccatcgg atgtgcccag atgggattag
240

ctagtaggtg gggtaacggc tcacctaggc gacgatccct agctgggtctg agaggatgac
300

cagccacact ggaactgaga cacgggtccag actcctacgg gaggcagcag tggggaatat
360

tgcacaatgg gcgcaagcct gatgcagcca tgccgcgtgt atgaagaagg ccttcggggtt
420

gtaaagtact ttcagcgggg aggaagggag taaagttaat acctttgctc attgacgtta
480

ccgcgagaag aagcaccggc taactccgtg ccagcagccg cggtataacg gaggggtgcaa
540

gcgttaatcg gaattactgg gcgtaaagcg cacgcaggcg gtttggttaag tcagatgtga
600

aatccccggg ctcaacctgg gaactgcacg tgatactggc aagcttgagt ctcgtagagg
660

ggggtagaat tccaggtgta gcggtgaaat gcgtagagat ctggaggaat accggtggcg
720

aaggcggccc cctggacgaa gactgacgct caggtgcgaa agcgtgggga gcaaacagga
780

ttagataccc tggtagtcca cgccgtaaac gatgtcgact tggaggttgt gcccttgagg
840

cgtggcttcc ggagctaacg cgттааgтсg accgcctggg gagtacggcc gcaaggttaa
900

aactcaaатg аатtgacggg ggccccgcaca agcggтggag catgtggттt аатtcgatgc
960

aacgcgaaga accttacctg gtcttgacat ccacggaagt тttcagagat gggттtgtgc
1020

cttcgggaac tgtgagacag gtgctgcatg gctgtcgтca gctcgtgttg tgaaatgttg
1080

ggттааgтсc cgcaacgagc gcaaccctta tcctттgttg ccagcggтсc ggccgggaac
1140

tcaaaggaga ctgccagtga taaactggag gaaggтgggg atgacgtcaa gтcatcatgg
1200

cccttacgac cagggctaca cacgtgctac аатggcgcat аcaaagagaa gcgacctcgc
1260

gagagcaagc ggacctcata аagtgcgtcg tagtccggat tggagtctgc аactcgactc
1320

catgaagtcg gaatcgctag таатсgtgga tcagaatgcc acggтgaata cgttcccggg
1380

ccttgтacac accgcccgtc acaccatggg agтgggttgс aaaagaagta ggtagcttaa
1440

ccttcgggag ggcgcttacc actттgtgat tcatgactgg ggtgaagtcg тааcaaggta
1500

a c c g t a g g g g a a c c t g c g g t t g g a t c a c c t
1530

<210> 189

<211> 1540

<212> DNA

<213> artificial sequence

<220>

<223> SPC12130_contig000074_41_1580

<400> 189

tatgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcctaaca catgcaagtc
60

gagcgaggggt ttgctcagta ttgagtattc taagactaga atgttcaatt ctgagcaaaa
120

ccaagcggcg gacgggtgag taacgcgtgg gtaacctgcc ctatacacat ggataacata
180

ctgaaaagtt tactaataca tgataatata tatttgcggc atcgagata tatcaaagtg
240

ttagcggtat aggatggacc cgcgtctgat tagctagttg gtgagataac tgcccaccaa
300

ggcgacgac agtagccgac ctgagaggggt gatcggccac attggaactg agacacggtc
360

caaactccta cgggaggcag cagtggggaa tattgcacaa tgggcgaaag cctgatgcag
420

caacgccgcg tgaacgatga aggtcttcgg atcgtaaagt tctgttgcag gggaagataa
480

tgacgggtacc ctgtgaggaa gccccggcta actacgtgcc agcagccgcg gtaatacgta
540

gggggctagc gttatccgga ttactgggc gttaaagggtg cgtaggtggc ccttcaagtc
600

ggtggttaaa ggctacggct caaccgtagt aagccgccga aactggagga cttgagtgca
660

ggagaggaaa gtggaattcc cagtgtagcg gtgaaatgcg tagatattgg gaggaacacc
720

agtagcgaag gcggctttct ggactgcaac tgacactgag gcacgaaagc gtgggtagca
780

aacaggatta gataccctgg tagtccacgc tgtaaacgat gagtactagg tgtcgggggt
840

tacccccctc ggtgccgcag ctaacgcatt aagtactccg cctggggagt acgcacgcaa
900

gtgtgaaact caaaggaatt gacggggacc cgcacaagta gcggagcatg tggtttaatt
960

cgaagcaacg cgaagaacct tacctaagct tgacatccct cggacagggtg tttaatcaca
1020

cccttccttc gggactgagg tgacagggtg tgcatggttg tcgtcagctc gtgtcgtgag
1080

atgttgggtt aagtcccgca acgagcgcaa cccttgtctt tagttgccag cattcagttg
1140

ggcactctag agagactgcc agggataacc tggaggaagg tggggatgac gtcaaatacat
1200

catgcccctt atgcttaggg ctacacacgt gctacaatgg gtggtacaga gggttgccaa
1260

accgtgaggt ggagccaatc ccttaaagcc attctcagtt cggattgtag gctgaaactc
1320

gcctacatga agctggagtt actagtaatc gcagatcaga atgctgcggt gaatgcgttc
1380

ccgggtcttg tacacaccgc ccgtcacacc acgggagtcg gaaacacccg aagccgatta
1440

tccaaccgca aggaggaagt cgtcgaaggt ggcgtcgata actgggggtga agtcgtaaca
1500

aggtagccgt atcggaaggt gcggctggat cacctccttt
1540

<210> 190

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> SPC10202_contig000001_85910_87437

<400> 190

agagtttgat cctggctcag gatgaacgct ggcggcatgc ctaatacatg caagtcgaac
60

gaagtttcga ggaagcttgc ttccaaagag acttagtggc gaacgggtga gtaacacgta
120

ggtaacctgc ccatgtgtcc gggataactg ctggaaacgg tagctaaaac cggataggta
180

tacagagcgc atgctcagta tattaaagcg cccttcaagg cgtgaacatg gatggacctg
240

cggcgcatta gctagttggc gaggtaacgg cccaccaagg caatgatgcg tagccggcct
300

gagagggtaa acggccacat tgggactgag acacggccca aactcctacg ggaggcagca
360

gtagggaatt ttcgtcaatg ggggaaaccc tgaacgagca atgccgcgtg agtgaagaag
420

gtcttcggat cgtaaagctc tgttgtaagt gaagaacggc tcatagagga aatgctatgg
480

gagtgacggc agcttaccag aaagccacgg ctaactacgt gccagcagcc gcggtaatac
540

gtaggtggca agcgttatcc ggaatcattg ggcgtaaagg gtgcgtaggt ggcgtactaa
600

gtctgtagta aaaggcaatg gctcaaccat tgtaagctat ggaaactggc atgctggagt
660

gcagaagagg gcgatggaat tccatgtgta gcggtaaaat gcgtagatat atggagggaac
720

accagtggcg aaggcggctc cctgggtctgt aactgacact gaggcacgaa agcgtgggga
780

gcaaatagga ttagataccc tagtagtcca cgccgtaaac gatgagaact aagtgttgga
840

ggaattcagt gctgcagtta acgcaataag ttctccgcct ggggagtatg cacgcaagtg
900

tgaaactcaa aggaattgac gggggcccg c acaagcgggtg gagtatgtgg ttttaattcga
960

agcaacgcga agaaccttac caggccttga catggaaaca aataccctag agataggggg
1020

ataattatgg atcacacagg tgggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg
1080

gttaagtccc gcaacgagcg caacccttgt cgcattgttac cagcatcaag ttggggactc
1140

atgcgagact gccggtgaca aaccggagga aggtggggat gacgtcaa at catcatgccc
1200

cttatggcct gggctacaca cgtactacaa tggcgaccac aaagagcagc gacacagtga
1260

tgtgaagcga atctcataaa ggtcgtctca gttcggattg aagtctgcaa ctcgacttca
1320

tgaagtcgga atcgctagta atcgcagatc agcatgctgc ggtgaatacg ttctcgggcc
1380

ttgtacacac cgcccgtcaa accatgggag tcagtaatac ccgaagccgg tggcataacc
1440

gtaaggagtg agccgtcgaa ggtaggaccg atgactgggg ttaagtcgta acaaggatc
1500

c c t a c g g g a a c g t g g g g a t g g a t c a c c t
1528

<210> 191

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> SPC10202_contig000001_2111098_2112625

<400> 191

agagtttgat cctggctcag gatgaacgct ggcggcatgc ctaatacatg caagtcgaac
60

gaagtttcga ggaagcttgc ttccaaagag acttagtggc gaacgggtga gtaacacgta
120

ggtaacctgc ccatgtgtcc gggataactg ctggaaacgg tagctaaaac cggataggta
180

tacagagcgc atgctcagta tattaagcg cccttcaagg cgtgaacatg gatggacctg
240

cggcgcatta gctagttagt gaggtaacgg cccaccaagg caatgatgcg tagccggcct
300

gagagggtaa acggccacat tgggactgag acacggccca aactcctacg ggaggcagca
360

gtagggaatt ttcgtcaatg ggggaaaccc tgaacgagca atgccgctg agtgaagaag
420

gtcttcggat cgtaaagctc tggtgtaagt gaagaacggc tcatagagga aatgctatgg
480

gagtgcgggt agcttaccag aaagccacgg ctaactacgt gccagcagcc gcggtataac
540

gtagggtggca agcggttatcc ggaatcattg ggcgtaaagg gtgcgtaggt ggcgtactaa
600

gtctgtagta aaaggcaatg gctcaaccat tgtaagctat ggaaactgggt atgctggagt
660

gcagaagagg gcgatggaat tccatgtgta gcggtaaaat gcgtagatat atggaggaac
720

accagtggcg aaggcggtcg cctgggtctgt aactgacact gaggcacgaa agcgtgggga
780

gcaaatagga ttagataccc tagtagtcca cgccgtaaac gatgagaact aagtgttgga
840

gaaattcagt gctgcagtta acgcaataag ttctccgcct ggggagtatg cacgcaagtg
900

tgaaactcaa aggaattgac gggggcccg cacaagcgggtg gagtatgtgg tttaattcga
960

agcaacgcga agaaccttac caggccttga catggaaaca aataccctag agataggggg
1020

ataattatgg atcacacagg tgggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg
1080

gttaagtccc gcaacgagcg caacccttgt cgcattgttac cagcatcaag ttggggactc
1140

atgcgagact gccggtgaca aaccggagga aggtggggat gacgtcaaata catcatgccc
1200

cttatggcct gggctacaca cgtactacaa tggcgaccac aaagagcagc gacacagtga
1260

tgtgaagcga atctcataaa ggccgtctca gttcggattg aagtctgcaa ctcgacttca
1320

tgaagtcgga atcgctagta atcgcagatc agcatgctgc ggtgaatacg ttctcgggcc
1380

ttgtacacac cgcccgtcaa accatgggag tcagtaatac ccgaagccgg tggcataacc
1440

gtaaggagtg agccgtcgaa ggtaggaccg atgactgggg ttaagtcgta acaaggatc
1500

c c t a c g g g a a c g t g g g g a t g g a t c a c c t
1528

<210> 192

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> SPC10202_contig000001_2696331_2697858

<400> 192

agagtttgat cctggctcag gatgaacgct ggcggcatgc ctaatacatg caagtcgaac
60

gaagtttcga ggaagcttgc ttccaaagag acttagtggc gaacgggtga gtaacacgta
120

ggtaacctgc 180	ccatgtgtcc	gggataactg	ctggaaacgg	tagctaaaac	cggataggta
tacagagcgc 240	atgctcagta	tattaaagcg	cccttcaagg	cgtgaacatg	gatggacctg
cggcgcatta 300	gctagttggt	gaggtaacgg	cccaccaagg	caatgatgcg	tagccggcct
gagagggtaa 360	acggccacat	tgggactgag	acacggccca	aactcctacg	ggaggcagca
gtagggaatt 420	ttcgtcaatg	ggggaaaccc	tgaacgagca	atgccgctg	agtgaagaag
gtcttcggat 480	cgtaaagctc	tgttgtaagt	gaagaacggc	tcatagagga	aatgctatgg
gagtgcggt 540	agcttaccag	aaagccacgg	ctaactacgt	gccagcagcc	gcggtaatac
gtaggtggca 600	agcgttatcc	ggaatcattg	ggcgtaaagg	gtgcgtaggt	ggcgtaactaa
gtctgtagta 660	aaaggcaatg	gctcaaccat	tgtaagctat	ggaaactggg	atgctggagt
gcagaagagg 720	gcgatggaat	tccatgtgta	gcggtaaaat	gcgtagatat	atggagggaac
accagtggcg 780	aaggcggtcg	cctgggtctgt	aactgacact	gaggcacgaa	agcgtgggga
gcaaatagga 840	ttagataccc	tagtagtcca	cgccgtaaac	gatgagaact	aagtgttgga
ggaattcagt 900	gctgcagtta	acgcaataag	ttctccgcct	ggggagtatg	cacgcaagtg
tgaaactcaa 960	aggaattgac	gggggcccgc	acaagcgggtg	gagtatgtgg	tttaattcga
agcaacgcga 1020	agaaccttac	caggccttga	catggaaaca	aataccctag	agataggggg

ataattatgg atcacacagg tgggtgcatgg ttgtcgtcag ctcgtgtcgt gagatggttg
1080

gttaagtcct gcaacgagcg caacccttgt cgcatgttac cagcatcaag ttggggactc
1140

atgcgagact gccggtgaca aaccggagga aggtggggat gacgtcaa atcatgccc
1200

cttatggcct gggctacaca cgtactacaa tggcgaccac aaagagcagc gacacagtga
1260

tgtgaagcga atctcataaa ggctcgtctca gttcggattg aagtctgcaa ctcgacttca
1320

tgaagtcgga atcgctagta atcgcgatc agcatgctgc ggtgaatacg ttctcgggcc
1380

ttgtacacac cgcccgtcaa accatgggag tcagtaatac ccgaagccgg tggcataacc
1440

gtaaggagtg agccgtcgaa ggtaggaccg atgactgggg ttaagtcgta acaaggatc
1500

c c t a c g g g a a c g t g g g g a t g g a t c a c c t
1528

<210> 193

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> SPC10202_contig000001_4180544_4182071

<400> 193

agagtttgat cctggctcag gatgaacgct ggcggcatgc ctaatacatg caagtcgaac
60

gaagtttcga ggaagcttgc ttccaaagag acttagtggc gaacgggtga gtaacacgta
120

ggtaacctgc ccatgtgtcc gggataactg ctggaaacgg tagctaaaac cggataggta
180

tacagagcgc	atgctcagta	tattaaagcg	cccatcaagg	cgtgaacatg	gatggacctg
240					
cggcgcatta	gctagttggt	gaggtaacgg	cccaccaagg	cgatgatgcg	tagccggcct
300					
gagagggtaa	acggccacat	tgggactgag	acacggccca	aactcctacg	ggaggcagca
360					
gtagggaatt	ttcgtcaatg	ggggaaaccc	tgaacgagca	atgccgcgtg	agtgaagaag
420					
gtcttcggat	cgtaaagctc	tgttgtaagt	gaagaacggc	tcatagagga	aatgctatgg
480					
gagtgcagg	agcttaccag	aaagccacgg	ctaactacgt	gccagcagcc	gcggtaatac
540					
gtaggtggca	agcgttatcc	ggaatcattg	ggcgtaaagg	gtgcgtaggt	ggcgtaactaa
600					
gtctgtagta	aaaggcaatg	gctcaaccat	tgtaagctat	ggaaactggg	atgctggagt
660					
gcagaagagg	gcgatggaat	tccatgtgta	gcggtaaaat	gcgtagatat	atggaggaac
720					
accagtggcg	aaggcggtcg	cctgggtctgt	aactgacact	gaggcacgaa	agcgtgggga
780					
gcaaatagga	ttagataccc	tagtagtcca	cgccgtaaac	gatgagaact	aagtgttgga
840					
ggaattcagt	gctgcagtta	acgcaataag	ttctccgcct	ggggagtatg	cacgcaagtg
900					
tgaaactcaa	aggaattgac	gggggccccg	acaagcgggtg	gagtatgtgg	tttaattcga
960					
agcaacgcga	agaaccttac	caggccttga	catggaaaca	aataccctag	agataggggg
1020					
ataattatgg	atcacacagg	tggtgcatgg	ttgtcgtcag	ctcgtgtcgt	gagatgttgg
1080					

gttaagtcct gcaacgagcg caacccttgt cgcatgttac cagcatcaag ttggggactc
1140

atgcgagact gccggtgaca aaccggagga aggtggggat gacgtcaa catcatgccc
1200

cttatggcct gggctacaca cgtactacaa tggcgaccac aaagagcagc gacacagtga
1260

tgtgaagcga atctcataaa ggtcgtctca gttcggattg aagtctgcaa ctgcacttca
1320

tgaagtcgga atcgctagta atcgagatc agcatgctgc ggtgaatacg ttctcgggcc
1380

ttgtacacac cgcccgtcaa accatgggag tcagtaatac ccgaagccgg tggcataacc
1440

gcaaggagtg agccgtcgaa ggtaggaccg atgactgggg ttaagtcgta acaaggatc
1500

c c t a c g g g a a c g t g g g g a t g g a t c a c c t
1528

<210> 194

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> SPC10202_contig000001_1756783_1758310

<400> 194

agagtttgat cctggctcag gatgaacgct ggcggcatgc ctaatacatg caagtcgaac
60

gaagactcta ggaagcttgc ttccaaagag acttagtggc gaacgggtga gtaacacgta
120

ggtaacctgc ccatgtgtcc gggataactg ctggaaacgg tagctaaaac cggataggta
180

tacagagcgc atgctcagta tattaaagcg cccttcaagg cgtgaacatg gatggacctg
240

cggcgcatta gctagttggt gaggtaacgg cccaccaagg caatgatgcg tagccggcct
300

gagagggtaa acggccacat tgggactgag acacggccca aactcctacg ggaggcagca
360

gtagggaatt ttcgtcaatg ggggaaaccc tgaacgagca atgccgcgtg agtgaagaag
420

gtcttcggat cgtaaagctc tggtgtaagt gaagaacggc tcatagagga aatgctatgg
480

gagtgacggt agcttaccag aaagccacgg ctaactacgt gccagcagcc gcggtaatac
540

gtaggtggca agcggttatcc ggaatcattg ggcgtaaagg gtgcgtaggt ggcgtactaa
600

gtctgtagta aaaggcaatg gctcaaccat tgtaagctat ggaaactggt atgctggagt
660

gcagaagagg gcgatggaat tccatgtgta gcggtaaaat gcgtagatat atggaggaac
720

accagtggcg aaggcgggtcg cctgggtctgt aactgacact gaggcacgaa agcgtgggga
780

gcaaatagga ttagataccc tagtagtcca cgccgtaaac gatgagaact aagtgttgga
840

ggaattcagt gctgcagtta acgcaataag ttctccgcct ggggagtatg cacgcaagtg
900

tgaaactcaa aggaattgac gggggcccgc acaagcgggtg gagtatgtgg tttaatcga
960

agcaacgcga agaaccttac caggccttga catggaaaca aataccctag agataggggg
1020

ataattatgg atcacacagg tgggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg
1080

gttaagtccc gcaacgagcg caacccttgt cgcattgttac cagcatcaag ttggggactc
1140

atgcgagact gccggtgaca aaccggagga aggtggggat gacgtcaa catcatgccc
1200

cttatggcct gggctacaca cgtactacaa tggcgaccac aaagagcagc gacacagtga
1260

tgtgaagcga atctcataaa ggtcgtctca gttcggattg aagtctgcaa ctcgacttca
1320

tgaagtcgga atcgctagta atcgcagatc agcatgctgc ggtgaatacg ttctcggggc
1380

ttgtacacac cgcccgtcaa accatgggag tcagtaatac ccgaagccgg tggcataacc
1440

gtaaggagtg agccgtcgaa ggtaggaccg atgactgggg ttaagtcgta acaaggatc
1500

c c t a c g g g a a c g t g g g g a t g g a t c a c c t
1528

<210> 195

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> SPC12358_contig000113_48_1575

<400> 195

agagtttgat cctggctcag gatgaacgct ggcggcatgc ctaatacatg caagtcgaac
60

gaagtttcga ggaagcttgc ttccaaagag acttagtggc gaacgggtga gtaacacgta
120

ggtaacctgc ccatgtgtcc gggataactg ctggaaacgg tagctaaaac cggataggta
180

tacagagcgc atgctcagta tattaagcg cccatcaagg cgtgaacatg gatggacctg
240

cggcgcatta gctagttggg gaggtaacgg cccaccaagg cgatgatgcg tagccggcct
300

gagagggtaa acggccacat tgggactgag acacggccca aactcctacg ggaggcagca
360

gtagggaatt ttcgtcaatg ggggaaaccc tgaacgagca atgccgcgtg agtgaagaag
420

gtcttcggat cgtaaagctc tgttgtaagt gaagaacggc tcatagagga aatgctatgg
480

gagtgacggg agcttaccag aaagccacgg ctaactacgt gccagcagcc gcggtaatac
540

gtaggtggca agcggttatcc ggaatcattg ggcgtaaagg gtgcgtaggt ggcgtactaa
600

gtctgtagta aaaggcaatg gctcaaccat tgtaagctat ggaaactggg atgctggagt
660

gcagaagagg gcgatggaat tccatgtgta gcggtaaaat gcgtagatat atggaggaac
720

accagtggcg aaggcggtcg cctgggtctgt aactgacact gaggcacgaa agcgtgggga
780

gcaaatagga ttagataccc tagtagtcca cgccgtaaac gatgagaact aagtgttgga
840

ggaattcagt gctgcagtta acgcaataag ttctccgcct ggggagtatg cacgcaagtg
900

tgaaactcaa aggaattgac gggggcccgc acaagcgggtg gagtatgtgg tttaattcga
960

agcaacgcga agaaccttac caggccttga catggatgca aaggctctag agatagagag
1020

ataattatgg atcacacagg tgggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg
1080

gttaagtccc gcaacgagcg caacccttgt cgcatgttac cagcatcaag ttggggactc
1140

atgcgagact gccggtgaca aaccggagga aggtggggat gacgtcaaat catcatgccc
1200

cttatggcct gggctacaca cgtactacaa tggcgaccac aaagagcagc gacacagtga
1260

tgtgaagcga atctcataaa ggtcgtctca gttcggattg aagtctgcaa ctcgacttca
1320

tgaagtcgga atcgctagta atcgcagatc agcatgctgc ggtgaatacg ttctcggggc
1380

ttgtacacac cgcccgtcaa accatgggag tcagtaatac ccgaagccgg tggcataacc
1440

gcaaggagtg agccgtcgaa ggtaggaccg atgactgggg ttaagtcgta acaaggatc
1500

c c t a c g g g a a c g t g g g g a t g g a t c a c c t
1528

<210> 196

<211> 1368

<212> DNA

<213> artificial sequence

<220>

<223> SPC10184_contig000160_13_1380

<400> 196

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgaac
60

gggaaatatt tcattgagac ttcggtggat ttgatctatt tctagtggcg gacgggtgag
120

taacgcgtgg gtaacctgcc ttatacaggg ggataacagt cagaaatggc tgctaatacc
180

gcataagcgc acagagctgc atggctcagt gtgaaaaact ccggtggtat aagatggacc
240

cgcgttggat tagctagttg gtggggtaac ggcccaccaa ggcgacgac catagccggc
300

ctgagagggg gaacggccac attgggactg agacacggcc cagactccta cgggaggcag
360

cagtggggaa tattgcacaa tgggggaaac cctgatgcag cgacgccgcg tgaaggaaga
420

agtatctcgg tatgtaaact tctatcagca gggaagatag tgacgggtacc tgactaagaa
480

gccccggcta actacgtgcc agcagccgcg gtaatacgtg gggggcaagc gttatccgga
540

tttactgggt gtaaaggag cgtagacgggt gtggcaagtc tgatgtgaaa ggcatgggct
600

caacctgtgg actgcattgg aaactgtcat acttgagtgc cggaggggta agcggaattc
660

ctagtgtagc ggtgaaatgc gtagatatta ggaggaacac cagtggcgaa ggcggcttac
720

tggacggtaa ctgacgttga ggctcgaaag cgtggggagc aaacaggatt agataccctg
780

gtagtccacg ccgtaaacga tgaatactag gtgtcgggtg gcagagccat tcggtgccgt
840

cgcaaacgca gtaagtattc cacctgggga gtacgttcgc aagaatgaaa ctcaaaggaa
900

ttgacgggga cccgcacaag cgggtggagca tgtgggtttaa ttcgaagcaa cgcgagaac
960

cttaccaagt cttgacatcc gcctgaccga tccttaaccg gatctttcct tcgggacagg
1020

cgagacaggt ggtgcatgggt tgtcgtcagc tcgtgtcgtg agatgttggg ttaagtcccg
1080

caacgagcgc aaccctatc ctcagtagcc agcatttaag gtgggcactc tggggagact
1140

gccagggata acctggagga aggcggggat gacgtcaaata catcatgccc cttatgattt
1200

gggctacaca cgtgctacaa tggcgtaaac aaagggaagc gagattgtga gatggagcaa
1260

atcccaaaaa taacgtccca gttcggactg tagtctgcaa cccgactaca cgaagctgga
1320

atcgctagta atcgcggatc agaatgccgc ggtgaatacg ttcccggg
1368

<210> 197

<211> 1522

<212> DNA

<213> artificial sequence

<220>

<223> SPC11276_contig000182_58_1579

<400> 197

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgaac
60

gaagcgatta ggatgaagtt ttcggatgga ttcctggttg actgagtggc ggacgggtga
120

gtaacgcgtg gataacctgc ctcacactgg gggataacag ttagaaatgg ctgctaatac
180

cgcataagcg cacagtaccg catggtacgg tgtgaaaaac ccagggtggtg tgagatggat
240

ccgcgtctga ttagccagtt ggcggggtaa cggcccacca aagcgacgat cagtagccga
300

cctgagaggg tgaccggcca cattgggact gagacacggc ccaaactcct acgggaggga
360

gcagtgggga atattgcaca atgggcggaa gcctgatgca gcgacgccgc gtgagtgaag
420

aagtatctcg gtatgtaaag ctctatcagc agggaagaaa atgacggtac ctgactaaga
480

agccccggct aactacgtgc cagcagccgc ggtaatacgt agggggcaag cgttatccgg
540

atttactggg tgtaaaggga gcgtagacgg cgacgcaagt ctggagtgaag agccccgggc
600

ccaaccccgg gactgctttg gaaactgtgc tgctggagtg caggagaggt aagtggaatt
660

cctagtgtag cggtgaaatg cgtagatatt aggaggaaca ccagtggcga aggcggctta
720

ctggactgta actgacgttg aggctcgaaa gcgtggggag caaacaggat tagataccct
780

ggtagtccac gccgtaaacg atgaatgcta ggtgtcgggg ggcaaagccc ttcggtgccg
840

ccgctaacgc aataagcatt ccacctgggg agtacgttcg caagaatgaa actcaaagga
900

attgacgggg acccgacaaa gcggtggagc atgtggttta attcgaagca acgcgaagaa
960

ccttaccaag tcttgacatc cccctgaccg gcgcgtaacg gtgcccttcc ttcgggacag
1020

gggagacagg tgggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc
1080

gcaacgagcg caacccttat ccttagtagc cagcacgtcg tgggtgggcac tctagggaga
1140

ctgccaggga taacctggag gaagggtgggg atgacgtcaa atcatcatgc cccttatgat
1200

ttgggctaca cacgtgctac aatggcgtaa acaaagggag gcgaccctgc gaaggtaagc
1260

aaatcccaaa aataacgtcc cagttcggac tgtagtctgc aacccgacta cacgaagctg
1320

gaatcgctag taatcgcgga tcagaatgcc gcggtgaata cgttcccggg tcttgtagac
1380

accgcccgtc acaccatggg agtcagcaac gcccggaagtc agtgacccaa ccttaacagg
1440

agggagctgc cgaaggcggg gcaggtaact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g
1522

g c t g g a t c a c

c t

<210> 198

<211> 1519

<212> DNA

<213> artificial sequence

<220>

<223> SPC11483_contig000110_42_1560

<400> 198

atgaagagtt tgatcctggc tcaggatgaa cgctagctac aggcttaaca catgcaagtc
60

gaggggcatc aggggtgtagc aatacacccgc tggcgaccgg cgcacggggtg agtaacacgt
120

atccaacctg ccctttactc ggggatagcc tttcgaaaga aagattaata cccgatggta
180

taacatgacc tcctgggtttt gttattaaag aatttcggta gaggatgggg atgcgttcca
240

ttaggcagtt ggcggggtaa cggcccacca aaccttcgat ggataggggt tctgagagga
300

aggtcccca cattggaact gagacacggt ccaaactcct acgggaggca gcagtgagga
360

atattgggtca atgggcgaga gcctgaacca gccaagtagc gtgaaggatg accgccctat
420

gggttgtaaa cttctttttat atgggaataa agtttgccac gtgtggcatt ttgtatgtac
480

catatgaata aggatcggct aactccgtgc cagcagccgc ggtaatacgg aggatccgag
540

cgttatccgg atttattggg tttaaaggga gcgtaggtgg acatgtaagt cagttgtgaa
600

agtttgcggc tcaaccgtaa aattgcagtt gatactgcgt gtcttgagta cagtagaggt
660

gggcggaatt cgtggtgtag cggtgaaatg cttagatatc acgaagaact ccgattgcga
720

aggcagctca ctggactgca actgacactg atgctcgaaa gtgtgggtat caaacaggat
780

tagataccct ggtagtccac acagtaaacg atgaatactc gctgtttgcg atatacagta
840

agcggccaag cgaaagcatt aagtattcca cctggggagt acgccggcaa cggtgaaact
900

caaaggaatt gacggggggcc cgcacaagcg gaggaacatg tggtttaatt cgatgatacg
960

cgaggaacct taccggggct taaattgcaa atgaatatgc cggaaacggc atagccgcaa
1020

ggcatttgtg aagggtgctgc atggttgtcg tcagctcgtg ccgtgaggtg tcggcctaag
1080

tgccataacg agcgcaaccc ttatcttcag ttactaacag gttatgctga ggactctgga
1140

gagactgccg tcgtaagatg tgaggaaggt ggggatgacg tcaaatacagc acggccctta
1200

cgtccggggc tacacacgtg ttacaatggg gggtacagaa ggccgctaca cagcgatgtg
1260

atgccaatcc ctaaagcccc tctcagttcg gatcgaagtc tgcaaccgga cttcgtgaag
1320

ctggattcgc tagtaatcgc gcatcagcca cggcgcggtg aatacgttcc cgggccttgt
1380

acacaccgcc cgtcaagcca tgggagccgg gggtagctga agtacgtaac cgcaaggagc
1440

gtcctagggt aaaactgggt actggggcta agtcgtaaca aggtagccgt accggaaggt
1500

g c g g c t g g a a
1519

c a c c t c c t t

<210> 199
<211> 1514
<212> DNA
<213> artificial sequence

<220>
<223> SPC12268_contig000031_3847_5360

<400> 199
agagtttgat cctggctcag gacgaacgct gtcggcgcgc ctaacacatg caagtcgaac
60

gaagttgctt tgaatgaatt cttcgggaagg aatttgattc aacttagtgg cggacgggtg
120

agtaacgcgt gagtaacctg cctttcagag ggggataacg tctggaaacg gacgctaata
180

ccgcataaca tattggtttc gcatggagct gatatacaag gagcaatccg ctgaaagatg
240

gactcgcgtc caattagcta gttggtgagg taacggccca ccaaggcgac gattggtagc
300

cggactgaga gggtgaacgg ccacattggg actgagacac ggcccagact cctacgggag
360

gcagcagtgg ggaatattgc acaatggggg aaaccctgat gcagcgacgc cgagtgaggg
420

aagaaggttt tcggattgta aacctctgtc cttggtgaag ataatgacgg taaccaagga
480

ggaagctacg gctaactacg tgccagcagc cgcggttaata cgtaggtagc gagcgttgct
540

cggaattact ggggtgtaaag ggagcgtagg cgggattgca agttgaatgt taaatctatg
600

ggctcaaccc atagccgcgt tcaaaactgc agttcttgag tgaagtagag gcaggcggaa
660

ttcctagtgt agcggtgaaa tgcgtaaata ttaggaggaa caccagtggc gaaggcggcc
720

tgctgggctt taactgacgc tgaggctcga aagcgtgggt agcaaacagg attagatacc
780

ctggtagtcc acgctgtaaa cgatgattac taggtgtggg gggactgacc ccttccgtgc
840

cggagttaac acaataagta atccacctgg ggagtacgac cgcaagggtg aaactcaaag
900

gaattgacgg gggcccgcac aagcagtgga gtatgtggtt taattcgaag caacgcgaag
960

aaccttacca ggtcttgaca tccggtgcat agcctagaga taggtgaagc ccttcggggc
1020

accgagacag gtggtgcatg gttgtcgtca gctcgtgtcg tgagatgttg ggttaagtcc
1080

cgcaacgagc gcaaccctta cgtttagttg ctacgcaaga gcactctaga cggactgccg
1140

ttgacaaaac ggaggaaggt ggggatgacg tcaaatacgc atgcccctta tgacctgggc
1200

tacacacgta ctacaatggc tattaacaga gggaagcaag atggtgacat ggagcaaacc
1260

cctaaaaata gtctcagttc ggattgcagg ctgcaaccgc cctgcatgaa gccggaattg
1320

ctagtaatcg cggatcagca tgccgcggtg aatacgttcc cgggccttgt acacaccgcc
1380

cgtcacacca tgagagttgg caacacccga agccgatagt ctaaccgcaa gggggacgtc
1440

gtcgaagggtg gggttgatga ttgggggtgaa gtcgtaacaa ggtagccgta tcggaagggtg
1500

c g g c t g g a t c a c c t
1514

<210> 200

<211> 1522

<212> DNA

<213> artificial sequence

<220>

<223> SPC10325_contig000001_273394_274915

<400> 200

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgaac
60

gaagcaatta aaatgaagtt ttcggatgga tttttaattg actgagtggc ggacgggtga
120

gtaacgcgtg gataacctgc ctcacactgg gggataacag ttagaaatga ctgctaatac
180

cgcataagcg cacagtaccg catggtacag tgtgaaaaac tccggtggtg tgagatggat
240

ccgcgtctga ttagccagtt ggcggggtaa cggcccacca aagcgacgat cagtagccga
300

cctgagaggg tgaccggcca cattgggact gagacacggc ccaaactcct acgggaggca
360

gcagtgggga atattgcaca atgggcgaaa gcctgatgca gcgacgccgc gtgagtgaag
420

aagtatttcg gtatgtaaag ctctatcagc agggaagaaa atgacggtac ctgactaaga
480

agccccggct aactacgtgc cagcagccgc ggtaatacgt agggggcaag cgttatccgg
540

atttactggg tgtaaaggga gcgtagacgg cgaagcaagt ctgaagtgaa aaccacagggc
600

tcaaccctgg gactgctttg gaaactgttt tgctagagtg tcggagaggt aagtggaatt
660

cctagtgtag cggtgaaatg cgtagatatt aggaggaaca ccagtggcga aggcggctta
720

ctggacgata actgacgttg aggctcgaaa gcgtggggag caaacaggat tagataccct
780

ggtagtccac gccgtaaacg atgaatgcta ggtgttgggg ggcaaagccc ttcggtgccg
840

tcgcaaacgc agtaagcatt ccacctgggg agtacgttcg caagaatgaa actcaaagga
900

attgacgggg acccgacaaa gcggtggagc atgtgggtta attcgaagca acgcgaagaa
960

ccttaccaag tcttgacatc ctcttgaccg gcgtgtaacg gcgccttccc ttcggggcaa
1020

gagagacagg tgggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc
1080

gcaacgagcg caacccttat ccttagtagc cagcaggtag agctggggcac tctagggaga
1140

ctgccaggga taacctggag gaaggtgggg atgacgtcaa atcatcatgc cccttatgat
1200

ttgggctaca cacgtgctac aatggcgtaa acaaagggag gcaagacagt gatgtggagc
1260

aaatcccaaa aataacgtcc cagttcggac tgtagtctgc aacccgacta cacgaagctg
1320

gaatcgctag taatcgcgaa tcagaatgtc gcggtgaata cgttcccggg tcttgtagac
1380

accgcccgtc acaccatggg agtcagcaac gcccgaagtc agtgacccaa ctcgcaagag
1440

agggagctgc cgaaggcggg gcaggtaact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g g c t g g a t c a c c t
1522

<210> 201

<211> 1522

<212> DNA

<213> artificial sequence

<220>

<223> SPC10325_contig000001_4697788_4699309

<400> 201

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgaac
60

gaagcaatta aaatgaagtt ttcggatgga tttttaattg actgagtggc ggacgggtga
120

gtaacgcgtg gataacctgc ctcacactgg gggataacag ttagaaatga ctgctaatac
180

cgcataagcg cacagtaccg catggtacgg tgtgaaaaac tccggtggtg tgagatggat
240

ccgcgtctga ttagccagtt ggcggggtaa cggcccacca aagcgacgat cagtagccga
300

cctgagaggg tgaccggcca cattgggact gagacacggc ccaaactcct acgggaggca
360

gcagtgggga atattgcaca atgggcgaaa gcctgatgca gcgacgccgc gtgagtgaag
420

aagtatttcg gtatgtaaag ctctatcagc agggaagaaa atgacggtac ctgactaaga
480

agccccggct aactacgtgc cagcagccgc ggtaatacgt agggggcaag cgttatccgg
540

atttactggg tgtaaaggga gcgtagacgg cgaagcaagt ctgaagtga aaccagggc
600

tcaaccctgg gactgctttg gaaactgttt tgctagagtg tcggagaggt aagtggaatt
660

cctagtgtag cggtgaaatg cgtagatatt aggaggaaca ccagtggcga aggcggctta
720

ctggacgata actgacgttg aggctcgaaa gcgtggggag caaacaggat tagataccct
780

ggtagtccac gccgtaaacg atgaatgcta ggtgttgggg ggcaaagccc ttcggtgccg
840

tcgcaaacgc agtaagcatt ccacctgggg agtacgttcg caagaatgaa actcaaagga
900

attgacgggg acccgacaaa gcggtggagc atgtggttta attcgaagca acgcgaagaa
960

ccttaccaag tcttgacatc ctcttgaccg gcgtgtaacg gcgccttccc ttcggggcaa
1020

gagagacagg tgggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc
1080

gcaacgagcg caacccttat ccttagtagc cagcaggtaa agctgggcac tctagggaga
1140

ctgccaggga taacctggag gaaggtgggg atgacgtcaa atcatcatgc cccttatgat
1200

ttgggctaca cacgtgctac aatggcgtaa acaaagggaa gcaagacagt gatgtggagc
1260

aaatcccaaa aataacgtcc cagttcggac tgtagtctgc aacccgacta cacgaagctg
1320

gaatcgctag taatcgcgaa tcagaatgtc gcggtgaata cgttcccggg tcttgtaacac
1380

accgcccgtc acaccatggg agtcagcaac gcccgaagtc agtgacccaa ctcgcaagag
1440

agggagctgc cgaaggcggg gcaggtaact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g g c t g g a t c a c c t
1522

<210> 202

<211> 1522

<212> DNA

<213> artificial sequence

<220>

<223> SPC10325_contig000001_4836438_4837959

<400> 202

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgaac
60

gaagcaatta aaatgaagtt ttcggatgga tttttaattg actgagtggc ggacgggtga
120

gtaacgcgtg gataacctgc ctcacactgg gggataacag ttagaaatga ctgctaatac
180

cgcataagcg cacagtaccg catggtacgg tgtgaaaaac tccggtggtg tgagatggat
240

ccgcgtctga ttagccagtt ggcggggtaa cggcccacca aagcgacgat cagtagccga
300

cctgagaggg tgaccggcca cattgggact gagacacggc ccaaactcct acgggaggga
360

gcagtgggga atattgcaca atgggcgaaa gcctgatgca gcgacgccgc gtgagtgaag
420

aagtatttcg gtatgtaaag ctctatcagc agggaagaaa atgacggtac ctgactaaga
480

agccccggct aactacgtgc cagcagccgc ggtaatacgt agggggcaag cgttatccgg
540

atttactggg tgtaaaggga gcgtagacgg cgaagcaagt ctgaagtga aaccaggga
600

tcaaccctgg gactgctttg gaaactgttt tgctagagtg tcggagaggt aagtggaatt
660

cctagtgtag cggtgaaatg cgtagatatt aggaggaaca ccagtggcga aggcggctta
720

ctggacgata actgacgttg aggctcgaaa gcgtggggag caaacaggat tagataccct
780

ggtagtccac gccgtaaacg atgaatgcta ggtgttgggg ggcaaagccc ttcggtgccg
840

tcgcaaacgc agtaagcatt ccacctgggg agtacgttcg caagaatgaa actcaaagga
900

attgacgggg acccgacaaa gcggtggagc atgtggttta attcgaagca acgcgaagaa
960

ccttaccaag tcttgacatc ctcttgaccg gcgtgtaacg gcgccttccc ttcggggcaa
1020

gagagacagg tgggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc
1080

gcaacgagcg caacccttat ccttagtagc cagcaggtaa agctggggcac tctagggaga
1140

ctgccaggga taacctggag gaagggtgggg atgacgtcaa atcatcatgc cccttatgat
1200

ttgggctaca cacgtgctac aatggcgtaa acaaaggga gcaagacagt gatgtggagc
1260

aaatcccaaa aataacgtcc cagttcggac tgtagtctgc aacccgacta cacgaagctg
1320

gaatcgctag taatcgcgaa tcagaatgtc gcggtgaata cgttcccggg tcttgtacac
1380

accgcccgtc acaccatggg agtcagcaac gcccgaagtc agtgacccaa ctcgcaagag
1440

agggagctgc cgaaggcggg gcaggtaact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g g c t g g a t c a c c t
1522

<210> 203

<211> 1520

<212> DNA

<213> artificial sequence

<220>

<223> SPC10325_contig000001_282201_283720

<400> 203

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgaac
60

gaagcaattg aaggaagttt tcggatggaa ttcgattgac tgagtggcgg acgggtgagt
120

aacgcgtgga taacctgcct cacactgggg gataacagtt agaaatgact gctaataccg
180

cataagcgca cagtaccgca tggtagagtg tgaaaaactc cggtaggtgtg agatggatcc
240

gcgtctgatt agccagttgg cggggtaacg gccacacaaa gcgacgatca gtagccgacc
300

tgagaggggtg accggccaca ttgggactga gacacggccc aaactcctac gggaggcagc
360

agtggggaat attgcacaat gggcgaaagc ctgatgcagc gacgccgcgt gagtgaagaa
420

gtatttcggt atgtaaagct ctatcagcag ggaagaaaat gacggtacct gactaagaag
480

ccccggctaa ctacgtgccg gcagccgcgg taatacgtag ggggcaagcg ttatccggat
540

ttactgggtg taaaggggagc gtagacggcg aagcaagtct gaagtgaaaa cccaggggctc
600

aaccctggga ctgctttgga aactgttttg ctagagtgtc ggagaggtaa gtggaattcc
660

tagtgtagcg gtgaaatgcg tagatattag gaggaacacc agtggcgaag gcggcttact
720

ggacgataac tgacgttgag gctcgaaagc gtgggggagca aacaggatta gataccctgg
780

tagtccacgc cgtaaacgat gaatgctagg tgttgggggg caaagccctt cggtgccgtc
840

gcaaacgcag taagcattcc acctggggag tacgttcgca agaataaac tcaaaggaat
900

tgacggggac ccgcacaagc ggtggagcat gtggtttaat tcgaagcaac gcgaagaacc
960

ttaccaagtc ttgacatcct cttgaccggc gtgtaacggc gccttccctt cggggcaaga
1020

gagacaggtg gtgcatgggt gtcgtcagct cgtgtcgtga gatgttgggt taagtcccgc
1080

aacgagcgca acccttatcc ttagtagcca gcaggtagag ctgggcactc tagggagact
1140

gccagggata acctggagga aggtggggat gacgtcaaata catcatgccc cttatgattt
1200

gggctacaca cgtgctacaa tggcgtaaac aaaggggaagc aagacagtga tgtggagcaa
1260

atcccaaaaa taacgtccca gttcggactg tagtctgcaa cccgactaca cgaagctgga
1320

atcgctagta atcgcgaaatc agaatgtcgc ggtgaatacg ttcccgggtc ttgtacacac
1380

cgcccgtcac accatgggag tcagcaacgc ccgaagtcag tgaccaact cgcaagagag
1440

ggagctgccg aaggcggggc aggttaactgg ggtgaagtcg taacaaggta gccgtatcgg
1500

a a g g t g c g g c t g g a t c a c c t
1520

<210> 204

<211> 1520

<212> DNA

<213> artificial sequence

<220>

<223> SPC10325_contig000002_474680_476199

<400> 204

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ctaacacatg caagtcgaac
60

gaagcaattg aaggaagttt tcggatggaa ttcgattgac tgagtggcgg acgggtgagt
120

aacgcgtgga	taacctgcct	cacactgggg	gataacagtt	agaaatgact	gctaataccg
180					
cataagcgca	cagtaccgca	tggtacagtg	tgaaaaactc	cggtggtgtg	agatggatcc
240					
gcgtctgatt	agccagttgg	cggggtaacg	gcccaccaa	gcgacgatca	gtagccgacc
300					
tgagaggggtg	accggccaca	ttgggactga	gacacggccc	aaactcctac	gggaggcagc
360					
agtggggaat	attgcacaat	gggcgaaagc	ctgatgcagc	gacgccgcgt	gagtgaagaa
420					
gtatttcggt	atgtaaagct	ctatcagcag	ggaagaaaat	gacggtacct	gactaagaag
480					
ccccggctaa	ctacgtgcc	gcagccgcgg	taatacgtag	ggggcaagcg	ttatccggat
540					
ttactgggtg	taaagggagc	gtagacggcg	aagcaagtct	gaagtgaaaa	cccagggctc
600					
aaccctggga	ctgctttgga	aactgttttg	ctagagtgtc	ggagaggtaa	gtggaattcc
660					
tagtgtagcg	gtgaaatgcg	tagatattag	gaggaacacc	agtggcgaag	gcggcttact
720					
ggacgataac	tgacgttgag	gctcgaaagc	gtggggagca	aacaggatta	gataccctgg
780					
tagtccacgc	cgtaaacgat	gaatgctagg	tgttgggggg	caaagccctt	cggtgccgtc
840					
gcaaacgcag	taagcattcc	acctggggag	tacgttcgca	agaatgaaac	tcaaaggaat
900					
tgacggggac	ccgcacaagc	ggtggagcat	gtggtttaat	tcgaagcaac	gcgaagaacc
960					
ttaccaagtc	ttgacatcct	cttgaccggc	gtgtaacggc	gccttccttt	cggggcaaga
1020					

gagacaggtg gtgcatggtt gtcgtcagct cgtgtcgtga gatgttgggt taagtcccgc
1080

aacgagcgca acccttatcc ttagtagcca gcaggtagag ctgggcactc tagggagact
1140

gccagggata acctggagga aggtggggat gacgtcaaat catcatgccc cttatgattt
1200

gggctacaca cgtgctacaa tggcgtaaac aaaggggaagc aagacagtga tgtggagcaa
1260

atcccaaaaa taacgtccca gttcggactg tagtctgcaa cccgactaca cgaagctgga
1320

atcgctagta atcgcgaatc agaatgtcgc ggtgaatacg ttcccgggtc ttgtacacac
1380

cgcccgtcac accatgggag tcagcaacgc ccgaagtcag tgacccaact cgcaagagag
1440

ggagctgccg aaggcggggc aggtaactgg ggtgaagtcg taacaaggta gccgtatcgg
1500

a a g g t g c g g c **t g g a t c a c c t**
1520

<210> 205

<211> 1521

<212> DNA

<213> artificial sequence

<220>

<223> SPC11090_contig000003_1033803_1035323

<400> 205

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

gaagcacttt acttagattht cttcggattg aagagtgttg tgactgagcg gcggacgggt
120

gagtaacgcg tgggtaacct gcctcataca gggggataac agttagaaat gactgctaata
180

accgtataag accacggtgc cgcattggcac agtggtaaaa actccggtgg tatgagatgg
240

acccgcgtct gattagcttg ttggtaaggt aacggcttac caaggcgacg atcagtagcc
300

gacctgagag ggtgaccggc cacattggga ctgagacacg gcccaaactc ctacgggagg
360

cagcagtggg gaatatgtca caatggggga aaccctgatg cagcgacgcc gcgtgaagga
420

tgaagtatth cggtatgtaa acttctatca gcagggaaga aaatgacggg acctgactaa
480

gaagccccgg ctaactacgt gccagcagcc gcggtaatac gtagggggca agcgttatcc
540

ggatttactg ggtgtaaagg gagcgtagac ggtgatgcaa gtctgatgtg aaaacccggg
600

gctcaacccc gggactgcat tggaaactgt gtgactagag tgtcggagag gtaagtggaa
660

ttcctagtgt agcgggtgaaa tgcgtagata ttaggaggaa caccagtggc gaaggcggct
720

tactggacga tgactgacgt tgaggctcga aagcgtgggg agcaaacagg attagatacc
780

ctggtagtcc acgccgtaaa cgatgaatac taggtgtcgg gtggcaaagc cattcgggtgc
840

cgcagcaaac gcagtaagta ttccacctgg ggagtacggt cgcaagaatg aaactcaaag
900

gaattgacgg ggacccgcac aagcgggtgga gcatgtgggt taattcgaag caacgcgaag
960

aaccttacct gctcttgaca tcccgtgac cggccagtaa tgtggccttc ccttcggggc
1020

agtggagaca ggtggtgcat ggttgtcgtc agctcgtgtc gtgagatgtt gggttaagtc
1080

ccgcaacgag cgcaaccctt atcttttagta gccagcggtc aggccgggca ctctagagag
1140

actgccaggg ataacctgga ggaagggtggg gatgacgtca aatcatcatg ccccttatga
1200

gcagggctac acacgtgcta caatggcgta aacaaaggga agcaatactg tgaagtggag
1260

caaatcccaa aaataacgtc tcagttcgga ttgtagtctg caactcgact acatgaagct
1320

ggaatcgcta gtaatcgcgga atcagaatgt cgcggtgaat acgttcccgg gtcttgtaca
1380

caccgcccgt cacaccatgg gagttggtaa cgcccgaagt cagtgacca accgcaagga
1440

gggagctgcc gaagggtggga ccgataactg ggggtgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t
1521

<210> 206

<211> 1521

<212> DNA

<213> artificial sequence

<220>

<223> SPC11090_contig000002_1861746_1863266

<400> 206

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

gaagcacttt actttgatatt cttcggaatg aagagtgttg tgactgagcg gcggacgggt
120

gagtaacgcg tgggtaacct gcctcataca gggggataac agttagaaat gactgcta
180

accgtataag accacagtgc cgcattggcac ggtggtaaaa actccgggtg tatgagatgg
240

acccgcgtct gattagcttg ttggtaaggt aacggcttac caaggcgacg atcagtagcc
300

gacctgagag ggtgaccggc cacattggga ctgagacacg gcccaaactc ctacgggagg
360

cagcagtggg gaatattgca caatggggga aaccctgatg cagcgacgcc gcgtgaagga
420

tgaagtatth cggtatgtaa acttctatca gcagggaaga aaatgacggg acctgactaa
480

gaagccccgg ctaactacgt gccagcagcc gcggtaatac gtagggggca agcgttatcc
540

ggatttactg ggtgtaaagg gagcgtagac ggtaatgcaa gtctgatgtg aaaacccggg
600

gctcaacccc gggactgcat tggaaactgt gtgactagag tgtcggagag gtaagtggaa
660

ttcctagtgt agcggtgaaa tgcgtagata ttaggaggaa caccagtggc gaaggcggct
720

tactggacga tgactgacgt tgaggctcga aagcgtgggg agcaaacagg attagatacc
780

ctggtagtcc acgccgtaaa cgatgaatac taggtgtcgg gtggcaaagc cattcgggtgc
840

cgcagcaaac gcagtaagta ttccacctgg ggagtacgtt cgcaagaatg aaactcaaag
900

gaattgacgg ggacccgcac aagcggtgga gcatgtgggt taattcgaag caacgcgaag
960

aaccttacct gctcttgaca tcccgtgac cggccagtaa tgtggccttc ccttcggggc
1020

agtggagaca ggtgggtgcat ggttgtcgtc agctcgtgtc gtgagatgtt gggttaagtc
1080

ccgcaacgag cgcaaccctt atcttttagta gccagcggtc aggccgggca ctctagagag
1140

actgccaggg ataacctgga ggaagggtggg gatgacgtca aatcatcatg ccccttatga
1200

gcaggggtac acacgtgcta caatggcgta aacaaaggga ggcaatactg tgaagtggag
1260

caaatcccaa aaataacgtc tcagttcgga ttgtagtctg caactcgact acatgaagct
1320

ggaatcgcta gtaatcgcg aacagaatgt cgcgggtgaat acgttcccgg gtcttgtaca
1380

caccgcccgt cacaccatgg gagttggtaa cgcccgaagt cagtgacca accgcaagga
1440

gggagctgcc gaagggtggga ccgataactg ggggtgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t
1521

<210> 207

<211> 1521

<212> DNA

<213> artificial sequence

<220>

<223> SPC11090_contig000003_979811_981331

<400> 207

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

gaagcacttt acttagattt cttcggattg aagagtgttg tgactgagcg gcggacgggt
120

gagtaacgcg tgggtaacct gcctcataca gggggataac agttagaaat gactgctaata
180

accgtataag accacgggtgc cgcattggcac agtggtataaa actccgggtgg tatgagatgg
240

acccgcgtct gattagcttg ttggtaaggt aacggcctac caaggcgacg atcagtagcc
300

gacctgagag ggtgaccggc cacattggga ctgagacacg gccc aaactc ctacgggagg
360

cagcagtggg gaatattgca caatggggga aaccctgatg cagcgacgcc gcgtgaagga
420

tgaagtattt cgggtacgtaa acttctatca gcaggggaaga aaatgacggg acctgactaa
480

gaagccccgg ctaactacgt gccagcagcc gcggtaatac gtaggggggca agcgttatcc
540

ggatttactg ggtgtaaagg gagcgtagac ggtgatgcaa gtctgatgtg aaaacccggg
600

gctcaacccc gggactgcat tggaaactgt gtgactagag tgtcggagag gtaagtggaa
660

ttcctagtgt agcggtgaaa tgcgtagata ttaggaggaa caccagtggc gaaggcggct
720

tactggacga tgactgacgt tgaggctcga aagcgtgggg agcaaacagg attagatacc
780

ctggtagtcc acgccgtaaa cgatgaatac taggtgtcgg gtggcaaagc cattcgggtgc
840

cgcagcaaac gcagtaagta ttccacctgg ggagtacgtt cgcaagaatg aaactcaaag
900

gaattgacgg ggacccgcac aagcgggtgga gcatgtgggt taattcgaag caacgcgaag
960

aaccttacct gctcttgaca tcccgtgac cggccagtaa tgtggccttc ccttcggggc
1020

agtggagaca ggtggtgcat ggttgtcgtc agctcgtgtc gtgagatgtt gggttaagtc
1080

ccgcaacgag cgcaaccctt atcttttagta gccagcggtc aggccggggca ctctagagag
1140

actgccaggg ataacctgga ggaagggtgg gatgacgtca aatcatcatg ccccttatga
1200

gcagggctac acacgtgcta caatggcgta aacaaaggga ggcaatactg tgaagtggag
1260

caaatcccaa aaataacgtc tcagttcgga ttgtagtctg caactcgact acatgaagct
1320

ggaatcgcta gtaatcgcgga atcagaatgt cgcgggtgaat acgttcccgg gtcttgtaca
1380

caccgcccgt cacaccatgg gagttggtaa cgcccgaagt cagtgaccca accgcaagga
1440

gggagctgcc gaaggtggga ccgataactg ggggtgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t
1521

<210> 208

<211> 1522

<212> DNA

<213> artificial sequence

<220>

<223> SPC11090_contig000003_1005010_1006531

<400> 208

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

gaagcacaat actcaagatt tcttcggatt gaagagtgtt gtgactgagc ggcggacggg
120

tgagtaacgc gtgggtaacc tgcctcatac aggggggataa cagttagaaa tgactgctaa
180

taccgtataa gaccacagtg ccgcatggca cagtggtaaa aactccggtg gtatgagatg
240

gacccgcgtc tgattagctt gttggtaagg taacggctta ccaaggcgac gatcagtagc
300

cgacctgaga ggggtgaccgg ccacattggg actgagacac ggcccaaact cctacgggag
360

gcagcagtgg ggaatattgc acaatggggg aaaccctgat gcagcgacgc cgcgtgaagg
420

atgaagtatt tcggtatgta aacttctatc agcaggggaag aaaatgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggtaata cgtagggggc aagcgttata
540

cggatttact ggggtgtaaag ggagcgtaga cggatgatgca agtctgatgt gaaaacccgg
600

ggctcaaccc cgggactgca ttggaaactg tgtgactaga gtgtcggaga ggtaagtgga
660

attcctagtg tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcggc
720

ttactggacg atgactgacg ttgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgaata ctaggtgtcg ggtggcaaag ccattcgggtg
840

ccgcagcaaa cgcagtaagt attccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg gggacccgca caagcgggtgg agcatgtggt ttaattcgaa gcaacgcgaa
960

gaaccttacc tgctcttgac atcccgtga ccggccagta atgtggcctt cccttcgggg
1020

cagtggagac aggtggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaaccct tatctttagt agccagcggc ttggccgggc actctagaga
1140

gactgccagg gataacctgg aggaagggtg ggatgacgtc aaatcatcat gcccttatg
1200

agcagggcta cacacgtgct acaatggcgt aaacaaaggg aggcaatact gtgaagtgga
1260

gcaaattccca aaaataacgt ctcagttcgg attgtagtct gcaactcgac tacatgaagc
1320

tggaatcgct agtaatcgcg aatcagaatg tcgcggtgaa tacgttcccg ggtcttgtac
1380

acaccgcccg tcacaccatg ggagttggta acgcccgaag tcagtgaccc aaccgcaagg
1440

agggagctgc cgaagggtggg accgataact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g g c t g g a t c a c c t
1522

<210> 209

<211> 1521

<212> DNA

<213> artificial sequence

<220>

<223> SPC11090_contig000002_872151_873671

<400> 209

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

gaagcacttt acttagattt cttcggattg aagagtgttg tgactgagcg gcggacgggt
120

gagtaacgcg tgggtaacct gcctcataca gggggataac agttagaaat gactgctaata
180

accgtataag accacgggtgc cgcattggcac agtggtataaa actccgggtgg tatgagatgg
240

acccgcgtct gattagctag ttggtaggggt aacggccttac caaggcgacg atcagtagcc
300

gacctgagag ggtgaccggc cacattggga ctgagacacg gcccaaactc ctacgggagg
360

cagcagtggg gaatattgca caatggggga aaccctgatg cagcgacgcc gcgtgaagga
420

tgaagtattt 480	cggtatgtaa	acttctatca	gcagggaaga	aatgacggt	acctgactaa
gaagccccgg 540	ctaactacgt	gccagcagcc	gcggtaatac	gtagggggca	agcgttatcc
ggatttactg 600	ggtgtaaagg	gagcgtagac	ggtgatgcaa	gtctgatgtg	aaaacccggg
gctcaacccc 660	gggactgcat	tggaaactgt	gtgactagag	tgtcggagag	gtaagtggaa
ttcctagtgt 720	agcggtgaaa	tgcgtagata	ttaggaggaa	caccagtggc	gaaggcggct
tactggacga 780	tgactgacgt	tgaggctcga	aagcgtgggg	agcaaacagg	attagatacc
ctggtagtcc 840	acgccgtaaa	cgatgaatac	taggtgtcgg	gtggcaaagc	cattcgggtgc
cgcagcaaac 900	gcagtaagta	ttccacctgg	ggagtacgtt	cgcaagaatg	aaactcaaag
gaattgacgg 960	ggacccgcac	aagcggtgga	gcatgtgggt	taattcgaag	caacgcgaag
aaccttacct 1020	gctcttgaca	tcccgtgac	cggccagtaa	tgtggccttc	ccttcggggc
agtggagaca 1080	ggtggtgcat	ggttgtcgtc	agctcgtgtc	gtgagatggt	gggttaagtc
ccgcaacgag 1140	cgcaaccctt	atctttagta	gccagcggtc	aggccgggca	ctctagagag
actgccaggg 1200	ataacctgga	ggaagggtgg	gatgacgtca	aatcatcatg	ccccttatga
gcagggctac 1260	acacgtgcta	caatggcgta	aacaaaggga	ggcaatactg	tgaagtggag
caaatcccaa 1320	aaataacgtc	tcagttcgga	ttgtagtctg	caactcgact	acatgaagct

ggaatcgcta gtaatcgcg atcagaatgt cgcggtgaat acgttcccgg gtcttgtaca
1380

caccgcccgt cacaccatgg gagttggtaa cgcccgaagt cagtgaccca accgcaagga
1440

gggagctgcc gaagggtggga ccgataactg ggggtgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t
1521

<210> 210

<211> 1515

<212> DNA

<213> artificial sequence

<220>

<223> SPC12429_contig000124_3871_5385

<400> 210

aattaagagt ttgatcctgg ctcaggatga acgctggcgg cgtgcctaac acatgcaagt
60

cgagcgagaa gccattgact gaaacttcgg tagaaggata tgggtggaaag cggcggacgg
120

gtgagtaacg cgtaggcaac ctgcccctta cagagggata gccattggaa acgatgatta
180

aaacctcata acgcatcccc cccacatgga ggggaagcca aagattcatc ggtaagggat
240

gggcctgcgt ctgattagct tggtggcggg gtaacggccc accaaggcga cgatcagtag
300

ccgacctgag agggatgatcg gccacattgg aactgagaca cgggtccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggc gaaagcctga tgcagcaacg ccgcgtgagg
420

gatgaaggcc ttcgggtcgt aaacctctgt ccttggggaa gaaacaaatg acggtaccca
480

tggaggaagc cccggctaac tacgtgccag cagccgcggt aatacgtagg gggcgagcgt
540

tatccggaat tattgggcgt aaagagtgcg taggtgggta cctaagcgca ggggtctaagg
600

caatggctca accattgttc gccctgcgaa ctgggctact tgagtgcagg agaggaaagc
660

ggaattccta gtgtagcggg gaaatgcgta gatattagga ggaacaccag tggcgaaggc
720

ggctttctgg actgttactg aactgaggc acgaaagcgt ggggagcaaa caggattaga
780

taccctggta gtccacgccg taaacgatga gcactagggtg tcggggccgc aaggcttcgg
840

tgccgcagtt aacgcattaa gtgctccgcc tggggagtagc gcacgcaagt gtgaaactca
900

aaggaattga cggggacccg cacaagcagc ggagcatgtg gtttaattcg aagcaacgcg
960

aagaacctta ccaggacttg acatcccact gacagatccc taaccggatc cttcttcgga
1020

cagtggagac aggtgggtgca tgggtgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaaccct tgccattagt tgccatcatt cagttgggca ctctaattgg
1140

actgccgggg acaactcgga ggaagggtggg gatgacgtca aatcatcatg ccccttatgt
1200

tctgggctac acacgtgcta caatggccgg tacagcaaga agcaaaaccg cgagggtggag
1260

caaattctca aaaccgggtcc cagttcggac tgcagggtga aaccgcctg cacgaagccg
1320

gagttgctag taatcgtgga tcagaatgcc acggtgaatg cgttcccggg tcttgtagac
1380

accgcccgtc acaccatgga agttgggggt gcccgaagcc ggcagggaaa tatgctgtct
1440

aaggcaaaac caatgactgg ggtgaagtcg taacaaggta gccgtatcgg aagggtcggc
1500

t g g a t c a c c t c c t t t
1515

<210> 211

<211> 1218

<212> DNA

<213> artificial sequence

<220>

<223> SPC12299_contig000098_1_1218

<400> 211

gatcattaaa gttgggatac aacacggatg gatgagctta tggcgtatta gctagtaggt
60

gaggtaacgg ctcacctagg cgatgatacg tagccgacct gagaggggtga ccggccacat
120

tgggactgag acacggccca aactcctacg ggaggcagca gtagggaatt ttcggcaatg
180

ggcgaaagcc tgaccgagca acgccgcgtg agtgaagaag gccttcgggt tgtaaagctc
240

tgttgtgaag gaagaacggc tcatacaggg aatgggtatgg gagtgcgggt actttaccag
300

aaagccacgg ctaactacgt gccagcagcc gcggtaatac gtaggtggcg agcgttatcc
360

ggaattattg ggcgtaaagg gtgcgcaggc ggttttttaa gtttaagggtg aaagcgtggg
420

gcttaacccc atatagcctt agaaactgag agactagagt acaggagagg gcaatggaat
480

tccatgtgta gcggtaaaat gcgtagatat atggaggaac accagtggcg aaggcggttg
540

cctggcctgt aactgacgct catgcacgaa agcgtgggga gcaaatagga ttagataccc
600

tagtagtcca cgccgtaaac gatgagaact aagtgttggg gaaactcagt gctgcagtta
660

acgcaataag ttctccgcct ggggagtatg cacgcaagtg tgaaactcaa aggaattgac
720

gggggcccgc acaagcgggtg gagtatgttg ttttaattcga cgcaacgcga agaaccttac
780

caggtcttga catcccctgc aaagacatag agatatgttg gaggttatca gggagacagg
840

tggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc gcaacgagcg
900

caacccttgt ctttagttac taacattgag ttgaggactc tagagagact gccggtgaca
960

aaccggagga aggtggggat gacgtcaaata catcatgccc cttatgacct gggctacaca
1020

cgtactacaa tggcggatac aacgagaagc aagacagtga tgtggagcaa aactcagaaa
1080

gtccgtctca gttcggattg aagtctgcaa cccgacttca tgaagccgga atcgctagta
1140

atcgcggatc agcatgccgc ggtgaatacg ttctcggggc ttgtacacac cgcccgtcaa
1200

a c c a t g a g a g t t g g c a a t
1218

<210> 212

<211> 1548

<212> DNA

<213> artificial sequence

<220>

<223> SPC12435_contig000067_173_1720

<400> 212

tttagagagt ttgatacctgg ctcaggacga acgctggcgg cgtgcctaac acatgcaagt
60

cgaacggagt taaattcgac acccgagtat ccggccggga ggcggggtgc tgggggttgg
120

atttaactta gtggcggacg ggtgagtaac gcgtgagtaa cctgcctttc agagggggat
180

aacgttctga aaagaacgct aataccgcat aacatcaatt tatcgcatga taggttgatc
240

aaaggagcaa tccgctggaa gatggactcg cgtccgatta gctagttggc ggggtaacgg
300

cccaccaaag cgacgatcgg tagccggact gagaggttga acggccacat tgggactgag
360

acacggccca gactcctacg ggaggcagca gtgggggata ttgcacaatg ggggaaaccc
420

tgatgcagca acgccgcgtg agggaagaag gttttcggat tgtaaacctc tgttcttagt
480

gacgataatg acggtagcta aggagaaagc tccggctaac tacgtgccag cagccgcggt
540

aatacgtagg gagcgagcgt tgtccggatt tactgggtgt aaaggggtgcg taggcggcga
600

ggcaagtcag gcgtgaaatc tatgggctta acccataaac tgcgcttgaa actgtcttgc
660

ttgagtgaag tagaggtagg cggaattccc ggtgtagcgg tgaaatgcgt agagatcggg
720

aggaacacca gtggcgaagg cggcctactg ggctttaact gacgctgaag cacgaaagca
780

tgggtagcaa acaggattag ataccctggg agtccatgcc gtaaacgatg attactaggt
840

gtgggggggtc tgaccccctc cgtgccgcag ttaacacaat aagtaatcca cctggggagt
900

acggccgcaa ggttgaaact caaaggaatt gacgggggcc cgcacaagca gtggagtatg
960

tggtttaatt cgaagcaacg cgaagaacct taccaggtct tgacatccgt ctaacgaagc
1020

agagatgcat taggtgccct tcgggggaaag gcgagacagg tggatgcatgg ttgtcgtcag
1080

ctcgtgtcgt gagatgttgg gttaagtccc gcaacgagcg caacccttgt ttctagttgc
1140

tacgcaagag cactctagag agactgccgt tgacaaaacg gaggaagggtg gggacgacgt
1200

caaatcatca tgccccttat gacctgggcc acacacgtac tacaatggct gtaaacagag
1260

ggaagcaaag ccgcgaggcg gagcaaaacc ctaaaagcag tcccagttcg gatcgcaggc
1320

tgcaaccgcg ctgctgaag tcggaattgc tagtaatcgc ggatcagcat gccgcggtga
1380

atacgttccc gggccttgta cacaccgccc gtcacaccat gggagccggt aatacccgaa
1440

gccagtagtt caaccgcaag gagagcgctg tcgaaggtag gattggcgac tgggggtgaag
1500

tcgtaacaag gtagccgtat cggaagggtgc ggctggatca cctccttt
1548

<210> 213

<211> 1207

<212> DNA

<213> artificial sequence

<220>

<223> SPC10686_contig000097_1_1207

<400> 213

cacattggaa ctgagacacg gtccaaactc ctacgggagg cagcagtgag gaatattggt
60

caatggacga	gagtctgaac	cagccaagta	gcgtgaagga	tgactgccct	atggggtgta
120					
aacttctttt	atacgggaat	aaagttagcc	acgtgtgggt	ttttgtatgt	accgtatgaa
180					
taaggatcgg	ctaactccgt	gccagcagcc	gcggtaatac	ggaggatccg	agcgttatcc
240					
ggattttattg	ggtttaaagg	gagcgtaggc	gggttggttaa	gtcagttgtg	aaagtttgcg
300					
gctcaaccgt	aaaattgcag	ttgatactgg	cgaccttgag	tgcaacagag	gtaggcggaa
360					
ttcgtgggtgt	agcggtgaaa	tgcttagata	tcacgaagaa	ctccgattgc	gaaggcagct
420					
tactggattg	taactgacgc	tgatgctcga	aagtgtgggt	atcaaacagg	attagatacc
480					
ctggtagtcc	acacagtaaa	cgatgaatac	tcgctgttgg	cgatatacgg	tcagcggcca
540					
agcgaaagca	ttaagtattc	cacctgggga	gtacgccggc	aacggtgaaa	ctcaaaggaa
600					
ttgacggggg	cccgcacaag	cggaggaaca	tgtgggtttaa	ttcgatgata	cgcgagggaac
660					
cttaccggg	cttaaattgc	aactgacgga	atcggaacg	gttctttctt	cggacagttg
720					
tgaagggtgct	gcatggttgt	cgtcagctcg	tgccgtgagg	tgtcggctta	agtgccataa
780					
cgagcgcaac	ccttacgggt	agttaccatc	aggttatgct	ggggactcta	cccggactgc
840					
cgtcgtaaga	tgtgaggaag	gtggggatga	cgtcaaataca	gcacggccct	tacgtccggg
900					
gctacacacg	tgttacaatg	gggggtacag	aaggcagcta	cacggcgacg	tggtgctaata
960					

cccaaaagcc tctctcagtt cggattggag tctgcaaccc gactccatga agctggattc
1020

gctagtaatc gcgcatacagc cacggcgcgg tgaatacgtt cccgggcctt gtacacaccg
1080

cccgtaagc catgaaagcc ggggggtacct gaagtacgta accgcgagga gcgtcctagg
1140

gtaaaactgg tgattggggc taagtcgtaa caaggtagcc gtaccggaag gtgctgctgg
1200

a a c a c c t
1207

<210> 214

<211> 1520

<212> DNA

<213> artificial sequence

<220>

<223> SPC10848_contig000001_396103_397622

<400> 214

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgaac
60

ggggtgctca tgacggagga ttcgtccaac ggattgagtt acctagtggc ggacgggtga
120

gtaacgcgtg aggaacctgc cttggagagg ggaataaacac tccgaaagga gtgctaatac
180

cgcatagatgc agttgggtcg catggctctg actgccaaag atttatcgct ctgagatggc
240

ctcgcgtctg attagctagt aggcggggta acggcccacc taggcgacga tcagtagccg
300

gactgagagg ttgaccggcc acattgggac tgagacacgg cccagactcc tacgggaggc
360

agcagtgggg aatattgggc aatgggcgca agcctgaccc agcaacgccg cgtgaaggaa
420

gaaggctttc 480	gggttgtaaa	cttcttttgt	cggggacgaa	acaaatgacg	gtacccgacg
aataagccac 540	ggctaactac	gtgccagcag	ccgcggtaat	acgtagggtg	caagcgttat
ccggatttac 600	tgggtgtaaa	gggcgtgtag	gcgggattgc	aagtcagatg	tgaaaactgg
gggctcaacc 660	tccagcctgc	atttgaaact	gtagttcttg	agtgcaggag	aggcaatcgg
aattccgtgt 720	gtagcgggtga	aatgcgtaga	tatacggagg	aacaccagt	gcgaaggcgg
attgctggac 780	agtaactgac	gctgaggcgc	gaaagcgtgg	ggagcaaaca	ggattagata
ccctggtagt 840	ccacgccgta	aacgatggat	actagggtgtg	gggggtctga	ccccctccgt
gccgcagtta 900	acacaataag	tatcccacct	ggggagtagc	atcgcaaggt	tgaaactcaa
aggaattgac 960	gggggcccgc	acaagcgggtg	gagtatgtgg	tttaattcga	agcaacgcga
agaaccttac 1020	cagggttga	catcccacta	acgaagcaga	gatgcattag	gtgcccttcg
gggaaagtgg 1080	agacaggtgg	tgcattggtg	tcgtcagctc	gtgtcgtgag	atgttgggtt
aagtcccga 1140	acgagcgcaa	cccttattgt	tagttgctac	gcaagagcac	tctagcgaga
ctgccgttga 1200	caaaacggag	gaagggtggg	acgacgtcaa	atcatcatgc	cccttatgtc
ctgggccaca 1260	cacgtactac	aatggtgggt	aacagaggga	ggcaataaccg	cgagggtggag
caaatcccta 1320	aaagccatcc	cagttcggat	tgcaggctga	aaccgcctg	tatgaagtgt

gaatcgctag taatcgcgga tcagcatgcc gcggtgaata cgttcccggg ccttgtacac
1380

accgcccgtc acaccatgag agtcgggaac acccgaagtc cgtagcctaa ccgcaaggag
1440

ggcgcggccg aaggtgggtt cgataattgg ggtgaagtcg taacaaggta gccgtatcgg
1500

a a g g t g c g g c t g g a t c a c c t
1520

<210> 215

<211> 1520

<212> DNA

<213> artificial sequence

<220>

<223> SPC10848_contig000001_1682546_1684065

<400> 215

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgaac
60

ggggtgctca tgacggagga ttcgtccaac ggattgagtt acctagtggc ggacgggtga
120

gtaacgcgtg aggaacctgc cttggagagg ggaataacac tccgaaagga gtgctaatac
180

cgcattgatgc agttgggtcg catggctctg actgccaaag atttatcgct ctgagatggc
240

ctcgcgtctg attagctagt aggcggggta acggcccacc taggcgacga tcagtagccg
300

gactgagagg ttgaccggcc acattgggac tgagacacgg cccagactcc tacgggagggc
360

agcagtgggg aatattgggc aatgggcgca agcctgacct agcaacgccg cgtgaaggaa
420

gaaggctttc gggttgtaaa cttcttttgt cggggacgaa acaaattgacg gtacccgacg
480

aataagccac ggctaactac gtgccagcag ccgcggtaat acgtagggtgg caagcgttat
540

ccggattttac tgggtgtaaa gggcgtgtag gcgggattgc aagtcagatg tgaaaactgg
600

gggctcaacc tccagcctgc atttgaaact gtagttcttg agtgctggag aggcaatcgg
660

aattccgtgt gtagcgggtga aatgcgtaga tatacggagg aacaccagtg gcgaaggcgg
720

attgctggac agtaactgac gctgaggcgc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatggat actagggtgtg ggggggtctga cccctccgt
840

gccgcagtta acacaataag tatcccacct ggggagtagc atcgcaaggt tgaaactcaa
900

aggaattgac gggggcccgcc acaagcgggtg gagtatgtgg ttttaattcga agcaacgcga
960

agaaccttac cagggcttga catcccacta acgaagcaga gatgcattag gtgcccttcg
1020

gggaaagtgg agacaggtgg tgcattggtt tcgtcagctc gtgtcgtgag atgttgggtt
1080

aagtcctgca acgagcgcaa cccttattgt tagttgctac gcaagagcac tctagcgaga
1140

ctgccgttga caaacggag gaaggtgggg acgacgtcaa atcatcatgc cccttatgtc
1200

ctgggccaca cacgtactac aatggtgggtt aacagagggga ggcaataaccg cgaggtggag
1260

caaatcccta aaagccatcc cagttcggat tgcaggctga aaccgcctg tatgaagttg
1320

gaatcgctag taatcgcgga tcagcatgcc gcggtgaata cgttcccggt ccttgtagac
1380

accgcccgtc acaccatgag agtcgggaac acccgaagtc cgtagcctaa ccgcaaggag
1440

ggcgcggccg aaggtgggtt cgataattgg ggtgaagtcg taacaaggta gccgtatcgg
1500

a a g g t g c g g c t g g a t c a c c t
1520

<210> 216

<211> 1520

<212> DNA

<213> artificial sequence

<220>

<223> SPC10848_contig000001_1688793_1690312

<400> 216

agagtttgat cctggctcag gatgaacgct ggcgggcgtgc ttaacacatg caagtcgaac
60

ggggtgctca tgacggagga ttcgtccaac ggattgagtt acctagtggc ggacgggtga
120

gtaacgcgtg aggaacctgc cttggagagg ggaataacac tccgaaagga gtgctaatac
180

cgcatgatgc agttgggtcg catggctctg actgccaaag atttatcgct ctgagatggc
240

ctcgcgtctg attagctagt aggcggggta acggcccacc taggcgacga tcagtagccg
300

gactgagagg ttgaccggcc acattgggac tgagacacgg cccagactcc tacgggagggc
360

agcagtgggg aatattgggc aatgggcgca agcctgaccc agcaacgccg cgtgaaggaa
420

gaaggctttc gggttgtaaa cttcttttgt cggggacgaa acaaatgacg gtacccgacg
480

aataagccac ggctaactac gtgccagcag ccgcggtaat acgtaggtgg caagcgttat
540

ccggattttac tgggtgtaaa gggcgtgtag gcgggattgc aagtcagatg tgaaaactgg
600

gggctcaacc tccagcctgc atttgaaact gtagttcttg agtgctggag aggcaatcgg
660

aattccgtgt gtagcgggtga aatgcgtaga tatacggagg aacaccagtg gcgaaggcgg
720

attgctggac agtaactgac gctgaggcgc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatggat actaggtgtg ggggggtctga cccctccgt
840

gccgcagtta acacaataag tatcccacct ggggagtagc atcgcaaggt tgaaactcaa
900

aggaattgac gggggcccgc acaagcgggtg gagtatgtgg ttttaattcga agcaacgcga
960

agaaccttac cagggcttga catcccacta acgaagcaga gatgcattag gtgcccttcg
1020

gggaaagtgg agacagggtg tgcattgggtg tcgtcagctc gtgtcgtgag atgttgggtt
1080

aagtcccgca acgagcgcaa cccttattgt tagttgctac gcaagagcac tctagcgaga
1140

ctgccgttga caaaacggag gaagggtgggg acgacgtcaa atcatcatgc cccttatgtc
1200

ctgggccaca cacgtactac aatgggtggtt aacagaggga ggcaataaccg cgagggtggag
1260

caaatcccta aaagccatcc cagttcggat tgcaggctga aaccgcctg tatgaagttg
1320

gaatcgctag taatcgcgga tcagcatgcc gcggtgaata cgttcccggg ccttgtacac
1380

accgcccgtc acaccatgag agtcgggaac acccgaagtc cgtagcctaa ccgcaaggag
1440

ggcgcggccg aaggtgggtt cgataattgg ggtgaagtcg taacaaggta gccgtatcgg
1500

a a g g t g c g g c t g g a t c a c c t
1520

<210> 217

<211> 1516

<212> DNA

<213> artificial sequence

<220>

<223> SPC10681_contig000083_11287_12802

<400> 217

agagtttgat cctggctcag gacgaacgct ggcggcgcgc ctaacacatg caagtcgaac
60

ggagctgttt tctctgaagt tttcggatgg aagagagttc agcttagtgg cgaacgggtg
120

agtaacacgt gagcaacctg cctttcagtg ggggacaaca tttggaaacg aatgctaata
180

ccgcataaga ccacagtgtc gcatggcaca ggggtcaaag gatttatccg ctgaaagatg
240

ggctcgcgtc cgattagcta gatggtgagg taacggccca ccatggcgac gatcggttagc
300

cggactgaga gggtgaacgg ccacattggg actgagacac ggcccagact cctacgggag
360

gcagcagtgg ggaatattgc acaatggggg aaaccctgat gcagcgacgc cgcgtggagg
420

aagaaggtct tcggattgta aactcctgtc ccaggggacg ataatgacgg taccctggga
480

ggaagcaccg gctaactacg tgccagcagc cgcggtaaaa cgtaggggtgc aagcgttgtc
540

cggaattact ggggtgtaaag ggagcgcagg cggattggca agttgggagt gaaatctatg
600

ggctcaaccc ataaattgct ttcaaaactg tcagtccttga gtggtgtaga ggtaggcgga
660

attcccgggtg tagcgggtgga atgcgtagat atcgggagga acaccagtgg cgaaggcggc
720

ctactgggca ctaactgacg ctgaggctcg aaagcatggg tagcaaacag gattagatac
780

cctggtagtc catgccgtaa acgatgatta ctaggtgtgg gaggattgac cccttccgtg
840

ccgcagttaa cacaataagt aatccacctg gggagtacga ccgcaaggtt gaaactcaaa
900

ggaattgacg ggggcccgca caagcagtgg agtatgtggt ttaattcgaa gcaacgcgaa
960

gaaccttacc aggtcttgac atcggatgca tacctaagag attagggaag tccttcggga
1020

catccagaca ggtggtgcat ggttgtcgtc agctcgtgtc gtgagatgtt gggttaagtc
1080

ccgcaacgag cgcaaccctt atcgttagtt actacgcaag aggactctag cgagactgcc
1140

gttgacaaaa cggaggaagg tggggatgac gtcaaatacat catgcccttt atgacctggg
1200

ctacacacgt actacaatgg ctattaacag agagaagcga taccgcgagg tggagcaaac
1260

ctcacaaaaa tagtctcagt tcggatcgca ggctgcaacc cgcctgcgtg aagccggaat
1320

tgctagtaat cgcggatcag catgccgcgg tgaatacgtt cccgggcctt gtacacaccg
1380

cccgtcacac catgagagcc ggggggaccc gaagtcggta gtctaaccgt aaggaggacg
1440

ccgccgaagg taaaactggg gattgggggtg aagtcgtaac aaggtagccg tatcggaagg
1500

t g c g g c t g g a
1516

t c a c c t

<210> 218
<211> 1354
<212> DNA
<213> artificial sequence

<220>
<223> SPC10247_cons

<400> 218
tccttcggga gtggattagc ggcggacggg tgagtaacac gtgggtaacc tgcctcatag
60

aggggaatag cctttcgaaa ggaagattaa taccgcataa gattgtagta ccgcatggta
120

cagcaattaa aggagtaatc cgctatgaga tggacccgcg tcgcattagc tagttgggtga
180

ggtaacggct caccaaggcg acgatgcgta gccgacctga gaggggtgatc ggccacattg
240

ggactgagac acggcccaga ctccctacggg aggcagcagt ggggaatatt gcacaatggg
300

ggaaaccctg atgcagcaac gccgcgtgag tgatgacggg cttcggattg taaagctctg
360

tcttttaggga cgataatgac ggtacctaa gaggaagcca cggctaacta cgtgccagca
420

gccgcggtaa tacgtaggtg gcaagcggtg tccggattta ctgggcgtaa agggagcgta
480

ggtggatatt taagtgggat gtgaaatacc cgggcttaac ctggggtgctg cattccaaac
540

tggatatcta gagtgcagga gaggaaagga gaattcctag tgtagcgggtg aaatgcgtag
600

agattaggaa gaataccagt ggcgaaggcg cctttctgga ctgtaactga cactgaggct
660

cgaaagcgtg gggagcaaac aggattagat accctggtag tccacgccgt aaacgatgaa
720

tactaggtgt aggggttgtc atgacctctg tgccgccgct aacgcattaa gtattccgcc
780

tggggagtac ggtcgcaaga ttaaaactca aaggaattga cgggggcccg cacaagcagc
840

ggagcatgtg gtttaattcg aagcaacgcg aagaacctta cctagacttg acatctcctg
900

aattactctg taatggagga agccacttcg gtggcaggaa gacagggtgt gcatggttgt
960

cgtcagctcg tgtcgtgaga tgttgggtta agtcccgcga cgagcgcaac ccttattgtt
1020

agttgctacc atttagttga gcactctagc gagactgccc gggttaaccg ggaggaaggt
1080

ggggatgacg tcaaatacatc atgcccctta tgtctagggc tacacacgtg ctacaatggt
1140

cggtacaatg agatgcaacc tcgcgagagt gagcaaaact ataaaaccga tctcagttcg
1200

gattgtaggc tgaaactcgc ctacatgaag ctggagttgc tagtaatcgc gaatcagaat
1260

gtcgcggtga atacgttccc gggccttgta cacaccgccc gtcacaccat gagagttggc
1320

a a t a c c c a a a g t t c g t g a g c t a a c c g c a a g g a g g
1354

<210> 219

<211> 1338

<212> DNA

<213> artificial sequence

<220>

<223> SPC10606_cons

<220>

<221> misc_feature

<222> (917)..(917)

<223> n is a, c, g, or t

<400> 219

cttgctccat gaagtttagtg gcggacgggt gagtaacgcg tgggtaacct gccctatgca
60

gggggataac gtttggaac gaacgctaata accgcataac ctagttgggt cgcatgaacc
120

gactagcaaa gattttatcg gcataggatg gacccgcgtt ggattagcta gttggtgaga
180

taacagccca ccaaggcaac gatccatagc cggcctgaga ggggtgaacgg ccacactggg
240

actgagacac ggcccagact cctacgggag gcagcagtgg ggaatattgc acaatgggcg
300

caagcctgat gcagcgacgc cgcgtgaagg atgaaggctt tcggatcgta aacttctatc
360

agcaggggaag aaaccatgac ggtacctgac taagaagccc cggctaacta cgtgccagca
420

gccgcggtaa tacgtagggg gcaagcgtaa tccggaatta ctgggtgtaa aggggtgcgta
480

ggcggcgatt taagtcagat gtgaaaactc agggctcaac cttgagactg catctgaaac
540

tgagttgcta gagtgcagga gaggaaagcg gaattccgag tgtagcgggtg aaatgcgtag
600

agattcggag gaacaccagt agcgaaggcg gctttctgga ctgtaactga cgctgaggca
660

cgaaagcgtg gggagcgaac aggattagat accctggtag tccacgccgt aaacgatgaa
720

tactaggtgt cggggcttac gggctctcgggt gccgcagcta acgcattaag tattccacct
780

gggaagtacg accgcaaggt tgaaactcaa aggaattgac ggggacccgc acaagcggtg
840

gagcatgtgg tttaattcga agcaacgcga agaacccttac ctaaacttga catccctttt
900

gaccggacgg taatgcnttc ttcactagct tgctagtgcg aaagtgacag gtggtgcatg
960

gttgctcgtca gctcgtgtcg tgagatgttg ggtaagtcc cgcaacgagc gcaacccta
1020

tcttttagtag ccatcattca gttgggcact ctagagagac tgccagggat aacctggagg
1080

aagggtgggga tgacgtcaaa tcatcatgcc ccttatgttt agggctacac acgtgctaca
1140

atgggtgcta caaagggaag caaatccgcg aggccgagca aatctcaaaa aagcactccc
1200

agttcggatt gtagtctgca actcgactac atgaagttgg aatcgctagt aatcgcgaa
1260

cagaatgtcg cgggtgaatac gttcccgggt cttgtacaca ccgcccgtca caccatggga
1320

g t t g g g g g g g c c c a a c g c
1338

<210> 220

<211> 1370

<212> DNA

<213> artificial sequence

<220>

<223> SPC11092_cons

<220>

<221> misc_feature

<222> (22)..(22)

<223> n is a, c, g, or t

<400> 220

gagcgagaag ccattgactg anacttcggt gagaaggata tgggtggaaag cggcggacgg
60

gtgagtaacg cgtaggcaac ctgcccctta cagagggata gccattggaa acgatgatta
120

aaacctcata acgcatcccc cccacatgga ggggatgcca aagattcatc ggtaagggat
180

gggcctgcgt ctgattagct tggttgcggg gtaacggccc accaaggcga cgatcagtag
240

ccgacctgag agggatgatcg gccacattgg aactgagaca cggtcctaac tcctacggga
300

ggcagcagtg gggaatattg cacaatgggc gaaagcctga tgcagcaacg ccgcgtgagg
360

gatgaaggcc ttcgggtcgt aaacctctgt ccttggggaa gaaacaaatg acggtaccca
420

tggaggaagc cccggctaac tacgtgccag cagccgcggt aatacgtagg gggcgagcgt
480

tatccggaat tattgggcgt aaagagtgcg taggtgggta cctaagcgca gggctctaagg
540

caatggctca accattgttc gccctgcgaa ctgggctact tgagtgcagg agaggaaagc
600

ggaattccta gtgtagcggg gaaatgcgta gatattagga ggaacaccag tggcgaaggc
660

ggctttctgg actgttactg aactgaggc acgaaagcgt ggggagcaaa caggattaga
720

taccctggta gtccacgccg taaacgatga gcactaggtg tcggggccgc aaggcttcgg
780

tgccgcagtt aacgcattaa gtgctccgcc tggggagtag gcacgcaagt gtgaaactca
840

aaggaattga cggggacccg cacaagcagc ggagcatgtg gtttaattcg aagcaacgcg
900

aagaacctta ccaggacttg acatcccact gacagatccc taaccggatc cttcttcgga
960

cagtggagac aggtggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1020

cccgcaacga gcgcaaccct tgccattagt tgccatcatt cagttgggca ctctaattggg
1080

actgccgggg acaactcgga ggaagggtggg gatgacgtca aatcatcatg ccccttatgt
1140

tctgggctac acacgtgcta caatggccgg tacagcaaga agcaaaaccg cgagggtggag
1200

caaatctcaa aaaccggtcc cagttcggac tgcaggctga aaccgcctg cacgaagccg
1260

gagttgctag taatcgtgga tcagaatgcc acggtgaatg cgttcccggg tcttgtagac
1320

accgcccgtc acaccatgga agttgggggt gcccgaagcc ggcagggaaa
1370

<210> 221

<211> 1355

<212> DNA

<213> artificial sequence

<220>

<223> SPC11116_cons

<220>

<221> misc_feature

<222> (938)..(942)

<223> n is a, c, g, or t

<400> 221

ccttcgggggt ggattagcgg cggacgggtg agtaacacgt gggtaacctg ccttgtagag
60

ggggatagcc ttccgaaagg aagattaata ccgcataaca tctttttatc gcatggtaga
120

aagatcaaag	gagcaatccg	ctacaagatg	gacccgcggc	gcattagcta	gttggtgagg
180					
taacggctca	ccaaggcgac	gatgcgtagc	cgacctgaga	gggtgatcgg	ccacattgga
240					
actgagacac	ggtccagact	cctacgggag	gcagcagtgg	ggaatattgc	gcaatggggg
300					
aaaccctgac	gcagcaacgc	cgcggtgaatg	aagaaggcct	tagggttgta	aagttctgtt
360					
tacggggacg	ataatgacgg	tacccgtagg	ggaagccacg	gctaactacg	tgccagcagc
420					
cgcggttaata	cgtaggtggc	aagcgttgtc	cggattttact	gggcgtaaag	gatgcgtagg
480					
cggatgttta	agtgagatgt	gaaatacccg	ggctcaactt	gggtgctgca	tttcaaactg
540					
gacatctaga	gtgcggggaga	ggaaagcgga	attcctagtg	tagcggtgaa	atgcgtagag
600					
attaggaaga	acaccagtgg	cgaaggcggc	tttctggacc	gtaactgacg	ctgaggcatg
660					
aaagcgtggg	gagcaaacag	gattagatac	cctggtagtc	cacgccgtaa	acgatgaata
720					
ctaggtgtag	gaggtatcga	ctccttctgt	gccgcagtta	acacaataag	tattccgcct
780					
gggaagtacg	atcgcaagat	taaaactcaa	aggaattgac	gggggcccgc	acaagcagcg
840					
gagcatgtgg	tttaattcga	agcaacgcga	agaaccttac	ctagacttga	catctcctga
900					
attaccctta	atcgggggaag	cccttcgggg	caggaagnnn	nnacagggtgg	tgcatggttg
960					
tcgtcagctc	gtgtcgtgag	atgttggggtt	aagtcccgca	acgagcgcaa	cccttatcat
1020					

tagttgctac cattaagttg agcactctag tgagactgcc acggttaacg tggaggaagg
1080

tgggggatgac gtcaaatacat catgcccctt atgtctaggg ctacacacgt gctacaatgg
1140

tgaatacaaaa tagatgcaat accgcgaggt ggagccaaac tataaaattc atcccagttc
1200

ggattgcagt ctgaaactcg actgcatgaa gccggagttg ctagtaatcg cgaatcagca
1260

tgtcgcggtg aatacgttcc cgggccttgt acacaccgcc cgtcacacca tgagagctgg
1320

t a a c a c c c g a a g t c c g t g a g g t a a c c g c a a g g a g c
1355

<210> 222

<211> 1374

<212> DNA

<213> artificial sequence

<220>

<223> SPC11222_cons

<220>

<221> misc_feature

<222> (908)..(908)

<223> n is a, c, g, or t

<220>

<221> misc_feature

<222> (914)..(916)

<223> n is a, c, g, or t

<220>

<221> misc_feature

<222> (918)..(920)

<223> n is a, c, g, or t

<220>

<221> misc_feature
<222> (933)..(936)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (939)..(939)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (958)..(958)
<223> n is a, c, g, or t

<400> 222
agtttttcgga tggaatcggg ataacttagt ggcggacggg tgagtaacgc gtgggaaacc
60

tgccctgtac cgggggataa cacttagaaa tgggtgctaa taccgcataa gcgcacggaa
120

ccgcatgggt gtgtgtgaaa aactccgggt gtacaggatg gtcccgcgtc tgattagcca
180

gttggcaggg taacggccta ccaaagcgac gatcagtagc cggcctgaga ggggtgaacgg
240

ccacattggg actgagacac ggcccaaact cctacgggag gcagcagtgg ggaatattgc
300

acaatggggg aaaccctgat gcagcgacgc cgcgtgagtg aagaagtatt tcggtatgta
360

aagctctatc agcagggaag aaaatgacgg tacctgacta agaagccccg gctaactacg
420

tgccagcagc cgcggtaata cgtagggggc aagcgttatc cggatttact ggggtgtaaag
480

ggagcgtaga cggcatggca agccagatgt gaaaaccag ggctcaacct tgggattgca
540

tttggaactg ccaggctgga gtgcaggaga ggtaagcgga attcctagt tagcggtgaa
600

atgcgtagat attaggagga acaccagtgg cgaaggcggc ttactggact gtaactgacg
660

ttgaggctcg aaagcgtggg gagcaaacag gattagatac cctggtagtc cacgcggtaa
720

acgatgattg ctaggtgtag gtgggtatgg acccatcggg gccgcagcta acgcaataag
780

caatccacct ggggagtacg ttcgcaagaa tgaaactcaa aggaattgac ggggacccgc
840

acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga agaaccttac caagtcttga
900

catccccnct gacnnncnnn atatcttgta aannnngana gggcttgccc ttcggganca
960

agggagacag gtggtgcatg gttgtcgtca gctcgtgtcg tgagatgttg gggttaagtc
1020

ccgcaacgag cgcaaccctt attcttagta gccagcaggt aaagctgggc actctaagga
1080

gactgccggg gataaccgga aggaaggcgg ggatgacgtc aaatcatcat gcccttatg
1140

atttgggcta cacacgtgct acaatggcgt aaacaaaggg aagcgagaca gtgatgtgga
1200

gcaaatccca gaaataacgt ctcagttcgg attgtagtct gcaactcgac tacatgaagc
1260

tggaatcgct agtaatcgcg aatcagcatg tcgcggtgaa tacgttcccg ggtcttgtag
1320

acaccgcccc tcacaccatg ggagttggaa atgcccgaag tctgtgacct aacc
1374

<210> 223

<211> 1351

<212> DNA

<213> artificial sequence

<220>

<223> SPC12117_1705171A02_cons

<220>

<221> misc_feature

<222> (22)..(22)

<223> n is a, c, g, or t

<400> 223

aagaggagct tgctcctcgg ancagtggcg gacgggtgag taacacgtga gcaacctggc
60

tctaagaggg ggacaacagt tggaaacgac tgctaatacc gcataacgta tcgggatggc
120

atcttcctga taccaaagat tttatcgctt agagatgggc tcgcgtctga ttagatagtt
180

ggcggggtaa cggcccacca agtcgacgat cagtagccgg actgagaggt tgaacggcca
240

cattgggact gagacacggc ccagactcct acgggaggca gcagtggggg atattggaca
300

atgggggcaa ccctgatcca gcgacgccgc gtgagggaag aaggttttcg gattgtaaac
360

ctctgttgac ggagaaaaaa atgatgggat ccgtttagaa agccacggct aactacgtgc
420

cagcagccgc ggtaatacgt aggtggcaag cgttgtccgg aattactggg tgtaaaggga
480

gtgtaggcgg gatatcaagt cagaagtga aattacgggc tcaactcgta acctgctttt
540

gaaactgaca ttcttgagtg aagtagaggc aagcggaatt cctagtgtag cggtgaaatg
600

cgtagatatt aggaggaaca ccagtggcga aggcggcttg ctgggctttt actgacgctg
660

aggctcgaaa gcgtggggag caaacaggat tagataccct ggtagtccac gccgtaaacg
720

atgattacta ggtgtggggg gattgacccc ttccgtgccg gagtaaacac aataagtaat
780

ccacctgggg agtacgaccg caaggttgaa actcaaagga attgacgggg gcccgacaaa
840

gcagtggagt atgtggttta attcgacgca acgcgaagaa ccttaccagg tcttgacatc
900

gagtgaccgc ctaagagatt aggctttccc ttcggggaca caaagacagg tgggtgcatgg
960

ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc gcaacgagcg caacccttat
1020

cattagttgc tacgcaagag cactctaata agactgccgt tgacaaaacg gaggaagggtg
1080

gggatgacgt caaatcatca tgccctttat gacctgggct acacacgtac tacaatggcg
1140

tttaacaaag agaagcaaag ccgcgaggca gagcaaattc ccaaaaaacg tctcagttcg
1200

gattgtaggc tgcaactcgc ctacatgaag tcggaattgc tagtaatcgt aggtcagcat
1260

actacggtga atacgttccc gggccttgta cacaccgccc gtcaaaccat gagagttggc
1320

a a c a c c c g a a g t c g g t a g t c t a a c c g c a a g g
1351

<210> 224

<211> 1378

<212> DNA

<213> artificial sequence

<220>

<223> SPC12242_1803146D05_cons

<220>

<221> misc_feature
<222> (20)..(21)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (27)..(27)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (35)..(35)
<223> n is a, c, g, or t

<400> 224
tcgagcgaag cacttatgan nagattncct cggantgatc catttgtgac tgagcggcgg
60

acgggtgagt aacgcgtgag taacctgcct catacagggg aataacagtt agaaatgact
120

gctaattgccg cataagcgca cagggccaca tggctctggtg tgaaaaactc cggtggtatg
180

agatggactc gcgtctgatt agctggttgg tgaggtaacg gcccaccaag gcgacgatca
240

gtagccggcc tgagaggggtg aacggccaca ttgggactga gacacggccc aaactcctac
300

gggaggcagc agtgggggaat attgcacaat gggggaaacc ctgatgcagc gacgccgcgt
360

gagtgaagaa gtatttcggt atgtaaagct ctatcagcag ggaagaaaat gacggtacct
420

gactaagaag ccccggtctaa ctacgtgccg gcagccgcgg taatacgtag ggggcaagcg
480

ttatccggat ttactgggtg taaagggagc gtagacggct ttgcaagtct gacgtgaaaa
540

tccggggctc aaccccggaa ctgcgttggg aactgtgagg cttgagtgcc ggagaggtaa
600

gcggaattcc tagtgtagcg gtgaaatgcg tagatattag gaggaacacc agtggcgaag
660

gcggcttact ggacggcaac tgacgttgag gctcgaaagc gtggggagca aacaggatta
720

gataccctgg tagtccacgc cgtaaacgat gaatactagg tgttggggga caaagtcctt
780

cggtgccgcc gcaaacgcat taagtattcc acctggggag tacgttcgca agaatgaaac
840

tcaaaggaat tgacggggac ccgcacaagc ggtggagcat gtggtttaat tcgaagcaac
900

gcgaagaacc ttaccaagtc ttgacatcga ttcgacggga ctgtaatgag tcctttccct
960

tcggggacga agaagacagg tgggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg
1020

gttaagtccc gcaacgagcg caacccttat tttcagtagc cagcaagtga agttgggcac
1080

tctggagaga ctgccaggga caacctggag gaaggtgggg atgacgtcaa atcatcatgc
1140

cccttatgac ttgggctaca cacgtgctac aatggcgtaa acaaaggga gcagccctgt
1200

gaaggtgagc aaatcccaaa aataacgtct cagttcggat tgtagtctgc aactcgacta
1260

catgaagctg gaatcgctag taatcgcgaa tcagaatgtc gcggtgaata cgttcccggg
1320

tcttgtacac accgcccgtc acaccatggg agtcggtaac gcccgaagtc agtgaccc
1378

<210> 225

<211> 1374

<212> DNA

<213> artificial sequence

<220>

<223> SPC12380_1805184E01_cons

<220>

<221> misc_feature

<222> (20)..(20)

<223> n is a, c, g, or t

<400> 225

cgacgaagca ctttattacn atttcttcgg aatgacgatt taggtgactg agtggcggac
60

gggtgagtaa cgcgtaggta acctgcctta tacaggggga taacagttag aaatgactgc
120

taataaccgca taagcgcaca ggattgcatg atctgggtgtg aaaaactccg gtggtataag
180

atggaccgcg gtctgattag ctggttgggtg aggtaacggc ccaccaaggc gacgatcagt
240

agccgacctg agaggggtgac cggccacatt gggactgaga cacggcccaa actcctacgg
300

gaggcagcag tggggaatat tgcacaatgg gggaaaccct gatgcagcga cgccgcgtga
360

gcgaagaagt atttcggtat gtaaagctct atcagcaggg aagaaaaaaaa tgacggtacc
420

tgactaaaaa gccccggcta actacgtgcc agcagccgcg gtaatacgtg gggggcaagc
480

gttatccgga ttactgggt gtaaaggag cgagggcggt gcggcaagtc tgatgtgaaa
540

gcccggggct caaccccggt actgcattgg aaactgtcgt acttgagtat cggagaggta
600

agtggaattc ctagtgtagc ggtgaaatgc gtagatatta ggaggaacac cagtggcgaa
660

ggcggcttac tggacgataa ctgacgctga ggctcgaaag cgtggggagc aaacaggatt
720

agataccctg gtagtccacg ccgtaaacga tgaatactag gtgtcggggg acatagtcct
780

tcggtgccgc agcaaacgca ataagtattc cacctgggga gtacgttcgc aagaatgaaa
840

ctcaaaggaa ttgacgggga cccgcacaag cgggtggagca tgtgggtttaa ttcgaagcaa
900

cgcgaagaac cttaccaagt cttgacatcc cggtgacaaa gtatgtaatg tactctttct
960

tcggaacacc ggtgacaggt ggtgcatggt tgtcgtcagc tcgtgtcgtg agatgttggg
1020

ttaagtcccg caacgagcgc aaccctgtt cttagtagcc agcgggttcgg ccgggcactc
1080

tagggagact gccagggata acctggagga aggcggggat gacgtcaa at catcatgccc
1140

cttatgactt gggctacaca cgtgctacaa tggcgtaa ac aaaggggaagc gaaaagggtga
1200

cttctagcaa atccccaaaa taacgtccca gttcggactg tagtctgcaa ctcgactaca
1260

cgaagctgga atcgctagta atcgcgaa tc agaatgtcgc ggtgaatacg ttccccgggtc
1320

ttgtacacac cgcccgtcac accatgggag tcggggaatgc ccgaagccgg tgac
1374

<210> 226

<211> 1383

<212> DNA

<213> artificial sequence

<220>

<223> SPC12410_1806011E07_cons

<400> 226

gtcgaacgaa gcattttgaa tgaagttttc ggatggattt tagagagtga ctgagtggcg
60

gacgggtgag taacacgtgg ataacctgcc tcacactggg ggacaacagt tagaaatgac
120

tgctaatacc gcataagcgc acagtaccgc atggtacagt gtgaaaaact ccggtggtgt
180

gagatggatc cgcgtctgat tagccagttg gcggggtaac ggcccaccaa agcgacgatc
240

agtagccgac ctgagagggg gaccggccac attgggactg agacacggcc caaactccta
300

cgggaggcag cagtggggaa tattgcacaa tgggcgaaag cctgatgcag cgacgccgcg
360

tgagtgaaga agtatttcgg tatgtaaagc tctatcagca gggaagataa tgacggtacc
420

tgactaagaa gccccggcta actacgtgcc agcagccgcg gtaatacgta gggggcaagc
480

gttatccgga tttactgggt gttaaaggag cgtagacggc atggcaagtc tgaagtgaag
540

accagggct caaccctggg actgctttgg aaactgtcaa gctagagtgc aggagaggta
600

agtggaattc ctagtgtagc ggtgaaatgc gtagatatta ggaggaacac cagtggcgaa
660

ggcggcttac tggactgtaa ctgacgttga ggctcgaaag cgtggggagc aaacaggatt
720

agataccctg gtagtccacg ccgtaaacga tgagtgctag gtgttggggg gcaaagccct
780

tcggtgccgt cgcaaacgca ataagcactc cacctgggga gtacgttcgc aagaatgaaa
840

ctcaaaggaa ttgacgggga cccgcacaag cgggtggagca tgtggtttaa ttcgaagcaa
900

cgcgaagaac cttaccaagt cttgacatcc ttttgaccgg cgtgtaacgg cgcctttcct
960

tcgggacaag agagacaggt ggtgcatggt tgtcgtcagc tcgtgtcgtg agatgttggg
1020

ttaagtcccg caacgagcgc aacccttata cttagtagcc agcattaaga tgggcactct
1080

agggagactg ccagggacaa cctggaggaa ggtgggggatg acgtcaaata atcatgcccc
1140

ttatgatttg ggctacacac gtgctacaat ggcgtaaaca aagggaagcg accctgcgaa
1200

ggtgagcaaa tctcaaaaat aacgtcccag ttcggactgt agtctgcaac ccgactacac
1260

gaagctggaa tcgctagtaa tcgcgaatca gaatgtcgcg gtgaatacgt tcccgggtct
1320

tgtacacacc gcccgtcaca ccatgggagt cagcaacgcc cgaagtcagt gacccaactc
1380

g c a
1383

<210> 227
<211> 1341
<212> DNA
<213> artificial sequence

<220>
<223> PPC00248

<220>
<221> misc_feature
<222> (28)..(29)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (32)..(32)
<223> n is a, c, g, or t

<220>

<221> misc_feature

<222> (35)..(35)

<223> n is a, c, g, or t

<220>

<221> misc_feature

<222> (1330)..(1331)

<223> n is a, c, g, or t

<400> 227

tcgcttccgg gtgagagtgg cgaacggnng antantgcgt gaccgacctg ccccatacac
60

cggaatagct cctggaaacg ggtggtaatg ccggatgctc cggttggatg catgtccttc
120

cgggaaagat tccatcggtg tgggatgggg tcgcgtccta tcagcttgat ggcggggtaa
180

cgggccacca tggcttcgac gggtagccgg cctgagaggg cgaccggcca cattgggact
240

gagatacggc ccagactcct acgggaggca gcagtgggga atattgcaca atgggcgcaa
300

gcctgatgca gcgacgccgc gtgcgggatg gaggccttcg gggtgtaaac cgcttttgat
360

cgggagcaag cccttcgggg tgagtgtacc tttcgaataa gcaccggcta actacgtgcc
420

acagccgcgg aatactgggg agcgttatcc ggaattattg ggcgtaaagg gctcgtaggc
480

ggttcgtcgc gtccgggtgtg aaagcccatc gcttaacggt gggctctgcgc cgggtacggg
540

cgggctggag tgcggtaggg gagactggaa ttcccgggtg aacgggtggaa tgtgtagata
600

tcgggaagaa caccaatggc gaaggcaggt ctctgggccg tcaactgacgc tgaggagcga
660

aagcgtgggg agcgaacagg attagatacc ctggtagtcc acgccgtaaa cgggtggatgc
720

tggaatgtggg gcccggttcca cggggttccgt gtcggactaa cgcgttaagc atcccgccctg
780

ggagtacggc cgcaaggcta aaactcaaag aaattgacgg gggcccgcac aagcggcgga
840

gcatgcggat tagtgcgatg caacgcgaag aaatttacct gggcttgaca tgttcccgac
900

ggccgtagag atatggcctc ccttcggggc gggttcacag gtggtgcatg gtcgtcgtca
960

gctcgtgtcg tgagatgttg ggttaagtcc cgcaacgagc gcaaccctcg ccctgtgttg
1020

ccagcacgtc atggtgggaa ctcacggggg accgccgggg tcaactcgga ggaaggtggg
1080

gatgacgtca gatcatcatg ccccttacgt ccaggggcttc acgcatgcta caatggccgg
1140

tacagcggga tgcgacatgg cgacatggag cggatccctg aaaaccggtc tcagttcgga
1200

ttggagtctg caacccgact ccatgaaggc ggagtcgcta gtaatcgcgg atcagcaacg
1260

ccgcggtgaa tgcgttcccg ggccttgtag acaccgcccg tcaagtcatg aaagtgggca
1320

g c a c c c g a a n n c g g t g g c c t a
1341

<210> 228

<211> 1511

<212> DNA

<213> artificial sequence

<220>

<223> >GCA_900066985|GJCOKCDC_01860 16S ribosomal RNA

<400> 228

atgagagttc gatcctggct caggataaac gctggcggcg tgcttaacac atgcaagtcg
60

aacgaagttt 120	ttcttttcggg	aggaacttag	tggcggacgg	gtgagtaacg	cgtgggtaac
ctgccctgta 180	caggggggaca	acagctggaa	acggctgcta	ataccgcata	agcccttagc
actgcatggg 240	gcatagggaa	aaggagcaat	ccggtacagg	atggacccgc	gtctgattag
ccagttggca 300	gggtaacggc	ctaccaaagc	gacgatcagt	agccgatctg	agaggatgta
cggccacatt 360	gggactgaga	cacggcccag	actcctacgg	gaggcagcag	tggggaatat
tgcacaatgg 420	aggaaactct	gatgcagcga	cgccgcgtga	gtgaagaagt	atttcggtat
gtaaagctct 480	atcagcaggg	aagaaaatga	cggtacctga	ctaagaagca	ccggctaaat
acgtgccagc 540	agccgcggta	atacgtatgg	tgcaagcggt	atccggatgt	actgggtgta
aagggagcgt 600	aggtggcaag	gcaagccaga	agtgaaaacc	cggggctcaa	ccgcgggatt
gcttttggaa 660	ctgtcatgct	agagtgcagg	aggggtgagc	ggaattccta	gtgtagcggg
gaaatgcgta 720	gatattagga	ggaacaccgg	aggcgaaggc	ggctcactgg	actgtaactg
acactgaggc 780	tcgaaagcgt	ggggagcaaa	caggattaga	taccctggta	gtccacgcgg
taaacgatga 840	atactagatg	tcgggtagca	aagctactcg	gtgtcgtcgc	aaacgcaata
agtattccac 900	ctggggagta	cgttcgcaag	aatgaaactc	aaaggaattg	acggggaccc
gcacaagcgg 960	tggagcatgt	ggtttaattc	gaagcaacgc	gaagaacctt	acctgctctt

gacatcccat tcgatagagg gtaatgcctc tagcccttcg ggggaatgga gacaggtggt
1020

gcatggttgt cgtcagctcg tgtcgtgaga tggtgggtta agtcccgcaa cgagcgcaac
1080

ccttattgtc agtagccagc aggtgaagct gggcactctg atgagactgc cggggataac
1140

ccggaggaag gtgggggatga cgtcaaataca tcatgcccct tatgagcagg gctacacacg
1200

tgctacaatg gcgtaaacag agggaagcga aggagtgatc cggagcaaat ctcaaaaata
1260

acgtctcagt tcggattgta gtctgcaact cgactacatg aagctggaat cgctagtaat
1320

cgagatcag aatgctgcgg tgaatacgtt cccgggtctt gtacacaccg cccgtcacac
1380

catgggagtc ggtaatgccc gaagtcagtg actcaaccga aaggagagag ctgccgaagg
1440

caggactggt aactgggggtg aagtcgtaac aaggtagccg tatcggaagg tgcggctgga
1500

t c a c c t c c t t t
1511

<210> 229

<211> 981

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000332875|NAGOKMPI_00536 16S ribosomal RNA (partial)

<400> 229

acctaccctg tacaggggga taacagtcag aaatgactgc taataccgca taagaccaca
60

gcaccgcatg gtgcaggggt aaaaactccg gtggtacagg atggaccgc gtctgattag
120

ctggttggtg aggtaacggc tcaccaaggc gacgatcagt agccggcttg agagagtgaa
180

cggccacatt gggactgaga cacggcccaa actcctacgg gaggcagcag tggggaatat
240

tgcacaatgg gggaaaccct gatgcagcga cgccgcgtga gtgaagaagt atctcggtat
300

gtaaagctct atcagcaggg aagaaaatga cggtagctga ctaagaagcc ccggctaact
360

acgtgccagc agccgcggta atacgtaggg ggcaagcggt atccggaatt actgggtgta
420

aaggggtcgt aggtggtatg gcaagtcaga agtgaaaacc cagggcctta ctctgggact
480

gcttttgaaa ctgtcagact ggagtgcagg agaggtaagc ggaattccta gtgtagcggg
540

gaaatgcgta gatattagga ggaacatcag tggcgaaggc ggcttactgg actgaaactg
600

acactgaggc acgaaagcgt ggggagcaaa caggattaga taccctggta gtccacgccg
660

taaacgatga atactaggtg tcggggccgt agaggcttcg gtgccgcagc caacgcagta
720

agtattccac ctggggagta cgttcgcaag aatgaaactc aaaggaattg acggggaccc
780

gcacaagcgg tggagcatgt ggtttaattc gaagcaacgc gaagaacctt acctggtctt
840

gacatccttc tgaccggtcc ttaaccggac ctttccttcg ggacaggaga gacaggtggt
900

gcatggttgt cgtcagctcg tgtcgtgaga tggtgggtta agtcccgcaa cgagcgcaac
960

c c c t a t c t t t
981

a g t a g c c a g c

a

<210> 230
<211> 1521
<212> DNA
<213> artificial sequence

<220>

<223> >GCF_000154565|LGGPEELJ_00246 16S ribosomal RNA

<400> 230

caaagagttt gatcctggct caggacgaac gctggcggcg cgcctaacac atgcaagtcg
60

aacggagctt acgttttgaa gttttcggat ggatgaatgt aagcttagtg gcggacgggt
120

gagtaacacg tgagcaacct gcctttcaga gggggataac agccggaaac ggctgctaata
180

accgcatgat gttgcggggg cacatgcccc tgcaaccaaaggagcaatcc gctgaaagat
240

gggctcgcgt ccgattagcc agttggcggg gtaacggccc accaaagcga cgatcggttag
300

ccggactgag aggttgaacg gccacattgg gactgagaca cggcccagac tcctacggga
360

ggcagcagtg ggggatattg cacaatgggc gaaagcctga tgcagcgacg ccgcgtgagg
420

gaagacggtc ttcggattgt aaacctctgt ctttggggaa gaaaatgacg gtacccaaag
480

aggaagctcc ggctaactac gtgccagcag ccgcggtaat acgtagggag caagcgttgt
540

ccggaattac tgggtgtaaa gggagcgtag gcgggatggc aagtagaatg ttaaattccat
600

cggctcaacc ggtggctgcg ttctaaactg ccgttcttga gtgaagtaga ggcaggcgga
660

attcctagtg tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcggc
720

ctgctgggct ttaactgacg ctgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgatta ctaggtgtgg ggggactgac cccttccgtg
840

ccgcagttaa cacaataagt aatccacctg gggagtacgg ccgcaagggtt gaaactcaaa
900

ggaattgacg ggggcccgca caagcagtgg agtatgtggt ttaattcgaa gcaacgcgaa
960

gaaccttacc aggtcttgac atcggatgca tagcctagag atagggtgaag cccttcgggg
1020

catccagaca ggtggtgcat ggttgtcgtc agctcgtgtc gtgagatgtt gggttaagtc
1080

ccgcaacgag cgcaaccctt attattagtt gctacgcaag agcactctaa tgagactgcc
1140

gttgacaaaa cggaggaagg tggggatgac gtcaaatcat catgcccctt atgacctggg
1200

ctacacacgt actacaatgg cactaaaaca gagggcgggc acaccgcgag gtgaagcgaa
1260

tcccgaaaaa gtgtctcagt tcagattgca ggctgcaacc cgcctgcatg aagtcggaat
1320

tgctagtaat cgcggatcag catgccgcgg tgaatacgtt cccgggcctt gtacacaccg
1380

cccgtcacac catgggagtc ggtaacaccc gaagccagta gcctaaccgc aagggggggc
1440

ctgtcgaagg tgggattgat gactgggggtg aagtcgtaac aaggtagccg tatcggaagg
1500

t g c g g c t g g a t c a c c t c c t t t
1521

<210> 231

<211> 1023

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000154565|LGGPEELJ_03488 16S ribosomal RNA (partial)

<400> 231

tcaaagagtt tgatcctggc tcaggacgaa cgctggcggc gcgcctaaca catgcaagtc
60

gaacggagct tacgttttga agtttttcgga tggatgaatg taagcttagt ggcggacggg
120

tgagtaacac gtgagcaacc tgcctttcag aggggggataa cagccggaaa cggctgctaa
180

taccgcatga tgttgcgggg gcacatgcc ctgcaaccaa aggagcaatc cgctgaaaga
240

tgggctcgcg tccgattagc cagttggcgg ggtaacggcc caccaaagcg acgatcggta
300

gccggactga gaggttgaac ggccacattg ggactgagac acggcccaga ctcttacggg
360

aggcagcagt gggggatatt gcacaatggg cgaaagcctg atgcagcgac gccgcgtgag
420

ggaagacggt cttcggattg taaacctctg tctttgggga agaaaatgac ggtacccaaa
480

gaggaagctc cggctaacta cgtgccagca gccgcggtaa tacgtaggga gcaagcgttg
540

tccggaatta ctgggtgtaa agggagcgta ggcgggatgg caagtagaat gttaaatacca
600

tcggctcaac cggtggtgc gttctaaact gccgttcttg agtgaagtag aggcaggcgg
660

aattcctagt gtagcggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cctgctgggc tttaactgac gctgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta acgatgatta ctaggtgtgg ggggactgac cccttccgtg
840

ccgcagttaa cacataagta atccacctgg ggagtacggc cgcaggtgaa ctcaaggatt
900

gacggggccc gcacagcagt gagtatgtgg tttatcgagc acgcgagact acagtctgac
960

atcgatgcat agctagagat agtgagccct cgggcatcca gacagggtggg tgcattgggtg
1020

t c g
1023

<210> 232

<211> 1521

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000154565|LGGPEELJ_03644 16S ribosomal RNA

<400> 232

caaagagttt gatcctggct caggacgaac gctggcggcg cgcctaacac atgcaagtcg
60

aacggagctt acgttttgaa gttttcggat ggatgaatgt aagcttagtg gcggacgggt
120

gagtaacacg tgagcaacct gcctttcaga gggggataac agccggaaac ggctgctaata
180

accgcatgat gttgcggggg cacatgcccc tgcaaccaaaggagcaatcc gctgaaagat
240

gggctcgcgt ccgattagcc agttggcggg gtaacggccc accaaagcga cgatcggttag
300

ccggactgag aggttgaacg gccacattgg gactgagaca cggcccagac tcctacggga
360

ggcagcagtg ggggatattg cacaatgggc gaaagcctga tgcagcgacg ccgcgtgagg
420

gaagacggtc ttcggattgt aaacctctgt ctttggggaa gaaaatgacg gtacccaaag
480

aggaagctcc ggctaactac gtgccagcag ccgcggtaat acgtagggag caagcgttgt
540

ccggaattac tgggtgtaaa gggagcgtag gcgggatggc aagtagaatg ttaaattccat
600

gggtcaacc ggtggctgcg ttctaaactg ccgttcttga gtgaagtaga ggcaggcgga
660

attcctagtg tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcggc
720

ctgctgggct ttaactgacg ctgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgatta ctaggtgtgg ggggactgac cccttcctg
840

ccgcagttaa cacaataagt aatccacctg gggagtacgg ccgcaagggt gaaactcaaa
900

ggaattgacg ggggcccgca caagcagtgg agtatgtggg ttaattcgaa gcaacgcgaa
960

gaaccttacc aggtcttgac atcggatgca tagcctagag ataggtgaag cccttcgggg
1020

catccagaca ggtggtgcat ggttgctgct agctcgtgtc gtgagatgtt gggttaagtc
1080

ccgcaacgag cgcaaccctt attattagtt gctacgcaag agcactctaa tgagactgcc
1140

gttgacaaaa cggaggaagg tggggatgac gtcaaatacat catgcccctt atgacctggg
1200

ctacacacgt actacaatgg cactaaaaca gagggcgggc acaccgagag gtgaagcgaa
1260

tcccgaataa gtgtctcagt tcagattgca ggctgcaacc cgcctgcatg aagtcggaat
1320

tgctagtaat cgcggatcag catgccgcgg tgaatacggtt cccgggcctt gtacacaccg
1380

cccgtcacac catgggagtc ggtaacaccc gaagccagta gcctaaccgc aaggggggagc
1440

ctgtcgaagg tgggattgat gactgggggtg aagtcgtaac aaggtagccg tatcggaagg
1500

t g c g g c t g g a t c a c c t c c t t t
1521

<210> 233

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> >SPC10875|CFFINBFL_03530 16S ribosomal RNA

<400> 233

tcagagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacggggat tatttcattg aagcttcggc agatttggtt taatcctagt ggcggacggg
120

tgagtaacgc gtgggtaacc tgccttatac aggggggataa cagtcagaaa tggctgctaa
180

taccgcataa gcgcacaggg ccgcatggcc cgggtgtgaaa aactgagggtg gtataagatg
240

gacccgcggt ggattagcca gttggcaggg taacggccta ccaaagcgac gatccatagc
300

cggcctgaga ggggtgaacgg ccacattggg actgagacac ggcccagact cctacgggag
360

gcagcagtgg ggaatattgc acaatggggg aaaccctgat gcagcgacgc cgcgatgaagg
420

aagaagtatc tcggtatgta aacttctatc agcagggaag aaaatgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggttaata cgtagggggc aagcgttatc
540

cggatttact ggggtgtaaag ggagcgtaga cggcataaca agtctgatgt gaaaggctgg
600

ggcttaacct cgggactgca ttggaaactg ttaagcttga gtgccggagg ggtaagcgga
660

attcctagtg tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcggc
720

ttactggacg gtaactgacg ttgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgaata ctaggtgtcg gggagcacag ctcttcggtg
840

ccgccgcaaa cgcattaagt attccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg gggacccgca caagcgggtg agcatgtggt ttaattcgaa gcaacgcgaa
960

gaaccttacc aagtcttgac atctgcctga ccggtgagta acgtcacctt tccttcggga
1020

caggcaagac aggtggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaacccc tatccccagt agccagcatg taaagggtggg cactctgagg
1140

agactgccag ggataacctg gaggaagggtg gggatgacgt caaatcatca tgccccttat
1200

gatttgggct acacacgtgc tacaatggcg taaacagagg gaagcgaaag ggtgacctgg
1260

agcaaattccc aaaaataacg tcccagttcg gactgtagtc tgcaaccgga ctacacgaag
1320

ctggaatcgc tagtaatcgc ggatcagaat gccgcggtga atacgttccc gggctcttgta
1380

cacaccgccc gtcacaccat gggagtcagt aacgcccga gtcagtgacc taaccgaaag
1440

ggaggagctg ccgaaggcgg gacggatgac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 234

<211> 1526

<212> DNA

<213> artificial sequence

<220>

<223> >SPC10877|OHAPKBMM_03334 16S ribosomal RNA

<400> 234

atgagagttt gatcctggct caggatgaac gctggcgggc tgcttaacac atgcaagtcg
60

agcgaagcaa ttttaagtga gttttcggat ggatcctaga ttgactgagc ggcggacggg
120

tgagtaacgc gtggataacc tgcctcacac aggggggataa cagttagaaa tgactgctaa
180

taccgcataa gcgcacggta ccgcatggta cagtgtgaaa aactccggtg gtgtgagatg
240

gatccgcgtc tgattaggta gttggtgagg taacggccca ccaagccgac gatcagtagc
300

cgacctgaga gggtgaccgg ccacattggg actgagacac ggcccaaact cctacgggag
360

gcagcagtgg ggaatattgc acaatgggcg aaagcctgat gcagcaacgc cgcgtgagtg
420

aagaagtatc tcggtatgta aagctctatc agcagggaag aaaatgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggttaata cgtagggggc aagcgttatc
540

cggatttact gggtgtaaag ggagcgcaga cggcactgca agtctgaagt gaaagcccgg
600

ggctcaaccc cgggactgct ttggaaactg tagagctaga gtgctggaga ggcaagcgga
660

attcctagt tagcggtgaa atgcgtagat attaggaaga acaccagtgg cgaaggcggc
720

ttgctggaca gtaactgacg ttcaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgaata ctaggtgttg gtgggcaaag cccatcggtg
840

ccgccgcaaa cgcaataagt attccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg gggacccgca caagcgggtg agcatgtggt ttaattcgaa gcaacgcgaa
960

gaaccttacc aagtcttgac atcgtgatga ccggaactta accgttcctt cccttcgggg
1020

catcatagac aggtgggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaaccct tatcctcagt agccagcagt aagatgggca ctctggggag
1140

actgccaggg ataacctgga ggaagggtgg gatgacgtca aatcatcatg ccccttatga
1200

tttgggctac acacgtgcta caatggcgta aacaaaggga agcaagaggg tgacctggag
1260

caaatcccaa aaataacgtc ccagttcgga ctgtagtctg caacccgact acacgaagct
1320

ggaatcgcta gtaatcgag atcagaatgc tgcgggtgaat acgttcccgg gtcttgtaca
1380

caccgcccgt cacaccatgg gagtcagcaa cgcccgaagt cagtgactca accgcaagga
1440

gagagctgcc gaaggcgggg caggtaactg gggatgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t c c t t t
1526

<210> 235

<211> 1526

<212> DNA

<213> artificial sequence

<220>

<223> >SPC10877|OHAPKBMM_03923 16S ribosomal RNA

<400> 235

atgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

agcgaagcaa ttttaagtga gttttcggat ggatcctaga ttgactgagc ggcggacggg
120

tgagtaacgc gtggataacc tgcctcacac aggggggataa cagttagaaa tgactgctaa
180

taccgcataa gcgcacggta ccgcatggta cagtgtgaaa aactccggtg gtgtgagatg
240

gatccgcgtc tgattaggta gttggtgagg taacggccca ccaagccgac gatcagtagc
300

cgacctgaga gggatgaccg ccacattggg actgagacac ggcccaaact cctacgggag
360

gcagcagtgg ggaatattgc acaatgggcg aaagcctgat gcagcaacgc cgcgtgagtg
420

aagaagtatc tcggtatgta aagctctatc agcagggaag aaaatgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggtaata cgtagggggc aagcgttatc
540

cggatttact gggatgtaaag ggagcgcaga cggcactgca agtctgaagt gaaagcccgg
600

ggctcaaccc cgggactgct ttggaaactg tagagctaga gtgctggaga ggcaagcgga
660

attcctagtg tagcgggtgaa atgcgtagat attaggaaga acaccagtgg cgaaggcggc
720

ttgctggaca gtaactgacg ttcaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgaata ctaggtgttg gtgggcaaag cccatcgggtg
840

ccgccgcaaa cgcaataagt attccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg gggacccgca caagcgggtg agcatgtggt ttaattcgaa gcaacgcgaa
960

gaaccttacc aagtcttgac atcgtgatga ccggaactta accgttcctt cccttcgggg
1020

catcatagac aggtggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaaccct tatcctcagt agccagcagt aagatgggca ctctgtggag
1140

actgccaggg ataacctgga ggaaggtggg gatgacgtca aatcatcatg ccccttatga
1200

tttgggctac acacgtgcta caatggcgta aacaaaggga agcaagaggg tgacctggag
1260

caaatcccaa aaataacgtc ccagttcgga ctgtagtctg caacccgact acacgaagct
1320

ggaatcgcta gtaatcgtag atcagaatgc tgcgggtgaat acgttcccgg gtcttgtaca
1380

caccgcccgt cacaccatgg gagtcagcaa cgcccgaagt cagtgactca accgcaagga
1440

gagagctgcc gaaggcgggg caggtaactg ggggtgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g
1526

c t g g a t c a c c

t c c t t t

<210> 236

<211> 1306

<212> DNA

<213> artificial sequence

<220>

<223> >GCA_900066145|PMHAHBNF_02229 16S ribosomal RNA

<400> 236

ctccggtggt ataagatgga cccgcgttgg attagctagt tggcagggca gcggcctacc
60

aaggcgacga tccatagccg gcctgagagg gtgaacggcc acattgggac tgagacacgg
120

cccagactcc tacgggaggc agcagtgggg aatattgcac aatgggggaa accctgatgc
180

agcgacgccg cgtgaaggaa gaagtatctc ggtatgtaaa cttctatcag caggggaagat
240

aatgacggta cctgactaag aagccccggc taactacgtg ccagcagccg cggtaatacg
300

tagggggcga gcgttatccg gatttactgg gtgtaaaggg agcgtagacg gcgtatcaag
360

tctgatgtga aaggcagggg cttaaccctt ggactgcatt ggaaactggg atgcttgagt
420

gccggagggg taagcggaat tcctagtgtg gcggtgaaat gcgtagatat taggaggaac
480

accagtggcg aaggcggcctt actggacggg aactgacgtt gaggctcgaa agcgtgggga
540

gcaaacagga ttagataccc tggtagtcca cgccgtaaac gatgaatact aggtgtctgg
600

gagcacagct cttaggtgcc gccgcaaacg cattaagtat tccacctggg gagtacgttc
660

gcaagaatga aactcaaagg aattgacggg gacccgcaca agcgggtggag catgtgggtt
720

aattcgaagc aacgcgaaga accttaccaa atcttgacat ccctctgaca gagtatgtaa
780

tgtacttttc cttcgggaca ggggagacag gtggtgcatg gttgtcgtca gctcgtgtcg
840

tgagatgttg ggttaagtcc cgcaacgagc gcaacccta tccttagtag ccagcaagta
900

atgttgggca ctctgaggag actgccaggg ataacctgga ggaaggcggg gatgacgtca
960

aatcatcatg ccccttatga tttgggctac acacgtgcta caatggcgta aacaaaggga
1020

agcgaacctg tgagggtggg caaatctcaa aaataacgtc ccagttcgga ctgcagtctg
1080

caactcgact gcacgaagct ggaatcgcta gtaatcgcg atcagaatgc cgcggtgaat
1140

acgttcccgg gtcttgtaca caccgcccgt cacaccatgg gagtcagtaa cgcccgaagt
1200

cagtgacctg accgtaagga aggagctgcc gaaggcggga cggatgactg ggggtgaagtc
1260

gtaacaaggt agccgtatcg gaagggtgcgg ctggatcacc tccttt
1306

<210> 237

<211> 1512

<212> DNA

<213> artificial sequence

<220>

<223> >GCA_900066945|BALMHCNO_04340 16S ribosomal RNA

<220>

<221> misc_feature

<222> (194)..(194)

<223> n is a, c, g, or t

<400> 237

tattgagagt ttgatcctgg ctcaggacga acgctggcgg catgcctaac acatgcaagt
60

cgagcgagtt gatctcttcg gagtgaagct agcggcggac gggtgagtaa cacgtgggca
120

acctgcctca tagaggggaa tagcctcccg aaaggagat taataccgca taagattgta
180

gcttcgcatg aagnagcaat taaaggagca atccgctatg agatgggccc gcggcgcatt
240

agctagttgg tgaggtaacg gctcaccaag gcgacgatgc gtagccgacc tgagagggtg
300

atcggccaca ttgggactga gacacggccc agactcctac gggaggcagc agtggggaat
360

attgcacaat gggggaaacc ctgatgcagc aatgccgcgt gagtgatgac ggccttcggg
420

ttgtaaagct ctgtcttcgg ggacgataat gacggtagcc gaggaggaag ccacggctaa
480

ctacgtgcca gcagccgcgg taatacgtag gtggcaagcg ttgtccggat ttactgggcg
540

taaagggagc gtaggcggat ttttaagtga gatgtgaaat acccgggctt aacttgggtg
600

ctgcatttca aactggaagt ctagagtgca ggagaggaga agggaattcc tagtgtagcg
660

gtgaaatgcg tagagattag gaagaacacc agtggcgaag gcgcttctct ggactgtaac
720

tgacgctgag gctcgaaagc gtgggggagca aacaggatta gataccctgg tagtccacgc
780

cgtaaacgat gaatactagg tgtaggggtt gtcatgacct ctgtgccgcc gctaacgcat
840

taagtattcc gcctggggag tacggtcgca agattaaaac tcaaaggaat tgacgggggc
900

ccgcacaagc agcggagcat gtggtttaat tcgaagcaac gcgaagaacc ttacctagac
960

ttgacatctc ctgcattacc cttaatcggg gaagtcgctt cggcgacagg aagacagggtg
1020

gtgcatgggt gtcgtcagct cgtgtcgtga gatgttgggt taagtcccgc aacgagcgca
1080

acccttattg ttagttgcta ccatttagtt gagcactcta gcgagactgc ccgggttaac
1140

cgggaggaag gtggggatga cgtcaaata tcatgcccct tatgtctagg gctacacacg
1200

tgctacaatg gcaagtacaa agagaagcaa gaccgcgagg tggagcaaaa ctcaaaaact
1260

tgtctcagtt cggattgtag gctgaaactc gcctacatga agctggagtt gctagtaatc
1320

gcgaatcagc atgtcgcggg gaatacgttc ccgggccttg tacacaccgc ccgtcacacc
1380

atgagagttg gcaataacca aagtgcgtga tctaactcgt aagagaggaa gcgccctaag
1440

gtagggtcag cgattgggggt gaagtcgtaa caaggtagcc gtaggagAAC ctgcggctgg
1500

a t c a c c t c c t t t
1512

<210> 238

<211> 1530

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000157975|IJDEOKBJ_00014 16S ribosomal RNA

<400> 238

cagagagttt gatcctggct caggatgaac gctggcgggc tgcttaacac atgcaagtcg
60

aacgaagcga tagagaacgg agatttcggt tgaagttttc tattgactga gtggcggacg
120

ggtgagtaac gcgtgggtaa cctgccctat acagggggat aacagttaga aatgactgct
180

aataccgcat aagcgcacag cttcgcatag agcgggtgtga aaaactgagg tggatatagga
240

tggacccgcg ttggattagc tagttggtga ggtaacggcc caccaaggcg acgatccata
300

gccggcctga gaggggtgaac ggccacattg ggactgagac acggcccaaa ctccctacggg
360

aggcagcagt ggggaatatatt gcacaatggg ggaaaccctg atgcagcgcac gccgcgtgaa
420

ggaagaagta tctcgggtatg taaacttcta tcagcaggga agaaagtgac ggtacctgac
480

taagaagccc cggctaatta cgtgccagca gccgcggtaa tacgtaaggg gcaagcgtta
540

tccggattta ctgggtgtaa agggagcgtg gacggtttgg caagtctgat gtgaaaggca
600

tgggctcaac ctgtggactg cattggaaac tgtcagactt gagtgccgga gaggcaagcg
660

gaattcctag tgtagcgggtg aaatgcgtag atattaggag gaacaccagt ggcgaaggcg
720

gcctgctgga cggtaactga cgttgaggct cgaaagcgtg gggagcaaac aggattagat
780

accctggtag tccacgctgt aaacgatgaa tactaggtgt cgggtggcaa agccattcgg
840

tgccgcagca aacgcaataa gtattccacc tggggagtag gttcgcaaga atgaaactca
900

aaggaattga cggggacccg cacaagcggg ggagcatgtg gtttaattcg aagcaacgcg
960

aagaacctta ccaaattcttg acatccctct gaccgggaag taatgttccc ttttcttcgg
1020

aacagaggag acaggtggtg catggttgtc gtcagctcgt gtcgtgagat gttgggttaa
1080

gtcccgcaac gagcgcaacc cttattctta gtagccagca ggtagagctg ggcactctag
1140

ggagactgcc agggataacc tggaggaagg tggggatgac gtcaaatacat catgcccctt
1200

atgatttggg ctacacacgt gctacaatgg cgtaaacaaa gggaagcgaa ggggtgacct
1260

ggagcaaatac tcaaaaataa cgtctcagtt cggattgtag tctgcaactc gactacatga
1320

agctggaatac gctagtaatac gcgaatacaga atgtcgcggg gaatacgttc ccgggtcttg
1380

tacacaccgc ccgtcacacc atggggagtca gtaacgcccg aagtcagtga cccaaccgaa
1440

aggagggagc tgccgaaggt gggactgata actgggggtga agtcgtaaca aggtagccgt
1500

a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1530

<210> 239

<211> 1521

<212> DNA

<213> artificial sequence

<220>

<223> >SPC11532|contig000121_183_1703

<400> 239

agagtttgat cctggctcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgagc
60

gaagcactta aacggatctc ttcggattga agctttttgtg actgagcggc ggacgggtga
120

gtaacgcgtg ggtaacctgc ctcatacagg gggataacag ttagaaatgg ctgctaatac
180

cgcataagcg cacaggaccg catggtcttg tgtgaaaaac tccggtggta tgagatggac
240

ccgcgtctga ttagctagtt ggaggggtaa cggcccacca aggcgacgat cagtagccgg
300

cctgagaggg tgaacggcca cattgggact gagacacggc ccagactcct acgggaggca
360

gcagtgggga atattgcaca atgggggaaa ccctgatgca gcgacgccgc gtgaaggaag
420

aagtatctcg gtatgtaaac ttctatcagc agggaagaaa atgacggtag ctgactaaga
480

agccccggct aactacgtgc cagcagccgc ggtaatacgt agggggcaag cgttatccgg
540

atttactggg tgtaaaggga gcgtagacgg aagagcaagt ctgatgtgaa aggctggggc
600

ttaaccccag gactgcattg gaaactgttt ttctagagtg ccggagaggt aagcggaatt
660

cctagtgtag cggtgaaatg cgtagatatt aggaggaaca ccagtggcga aggcggctta
720

ctggacggta actgacgttg aggctcgaaa gcgtggggag caaacaggat tagataccct
780

ggtagtccac gccgtaaacg atgaatacta ggtgtcgggt ggcaaagcca ttcggtgccg
840

cagcaaacgc aataagtatt ccacctgggg agtacgttcg caagaatgaa actcaaagga
900

attgacgggg acccgcacaa gcggtggagc atgtgggtta attcgaagca acgcgaagaa
960

ccttaccaag tcttgacatc cctctgaccg gcccgtaacg gggccttccc ttcggggcag
1020

aggagacagg tgggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc
1080

gcaacgagcg caaccctat ccttagtagc cagcaggtga agctgggcac tctagggaga
1140

ctgccgggga taaccgggag gaaggcgggg acgacgtcaa atcatcatgc cccttatgat
1200

ttgggctaca cacgtgctac aatggcgtaa acaaagggaa gcgagacagc gatgttgagc
1260

aaatcccaaa aataacgtcc cagttcggac tgcagtctgc aactcgactg cacgaagctg
1320

gaatcgctag taatcgcgaa tcagaatgtc gcggtgaata cgttcccggg tcttgtacac
1380

accgcccgtc acaccatggg agtcagtaac gcccgaaagtc agtgacccaa ccttatagga
1440

gggagctgcc gaaggcggga ccgataactg ggggtgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t
1521

<210> 240

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000159975|GCAHHPIP_00057 16S ribosomal RNA

<400> 240

tcagagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgggaat tactttattg aaacttcggt cgatttaatt taattctagt ggcggaacggg
120

tgagtaacgc	gtgggtaacc	tgccttatac	agggggataa	cagtcagaaa	tggctgctaa
180					
taccgcataa	gcgcacagag	ctgcatggct	cagtgtgaaa	aactccggtg	gtataagatg
240					
gacccgcgtt	ggattagcta	gttggtgggg	taacggccca	ccaaggcgac	gatccatagc
300					
cggcctgaga	gggtgaacgg	ccacattggg	actgagacac	ggcccagact	cctacgggag
360					
gcagcagtgg	ggaatattgc	acaatggggg	aaaccctgat	gcagcgacgc	cgcgtgaagg
420					
aagaagtatc	tcggtatgta	aacttctatc	agcagggaag	atagtgacgg	tacctgacta
480					
agaagccccg	gctaactacg	tgccagcagc	cgcggtaata	cgtagggggc	aagcgttatac
540					
cggatttact	gggtgtaaag	ggagcgtaga	cgggtgtggca	agtctgatgt	gaaaggcatg
600					
ggctcaacct	gtggactgca	ttggaaactg	tcatacttga	gtgccggagg	ggtaagcgga
660					
attcctagtg	tagcggtgaa	atgcgtagat	attaggagga	acaccagtgg	cgaaggcggc
720					
ttactggacg	gtaactgacg	ttgaggctcg	aaagcgtggg	gagcaaacag	gattagatac
780					
cctggtagtc	cacgccgtaa	acgatgaata	ctaggtgtcg	ggtggcagag	ccattcggtg
840					
ccgtcgcaaa	cgcagtaagt	attccacctg	gggagtacgt	tcgcaagaat	gaaactcaaa
900					
ggaattgacg	gggacccgca	caagcgggtg	agcatgtggg	ttaattcgaa	gcaacgcgaa
960					
gaaccttacc	aagtcttgac	atccgcctga	ctgataccta	accggatctt	tccttcggga
1020					

caggcgagac aggtggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaacccc tatcctcagt agccagcatt taagggtgggc actctgggga
1140

gactgccagg gataacctgg aggaaggcgg ggatgacgtc aaatcatcat gccccttatg
1200

atttgggcta cacacgtgct acaatggcgt aaacaaaggg aagcgagatt gtgagatgga
1260

gcaaattcca aaaataacgt cccagttcgg actgtagtct gcaacccgac tacacgaagc
1320

tggaatcgct agtaatcgcg gatcagaatg ccgcggtgaa tacgttcccg ggtcttgtac
1380

acaccgcccg tcacaccatg gggagtcagt aacgcccga gtcagtgacc taaccgaaag
1440

ggaggagctg ccgaaggcgg gaccgatgac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 241

<211> 1526

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000159975|GCAHHPIP_00330 16S ribosomal RNA

<400> 241

cagagagttt gatcctggct caggatgaac gctggcgggc tgcttaacac atgcaagtcg
60

aacgggaatt actttattga aacttcggtc gatttaattt aattctagtg gcggacgggt
120

gagtaacgcg tgggtaacct gccttataca gggggataac agtcagaaat ggctgcta
180

accgcataag cgcacagagc tgcattggctc agtgtgaaaa actccggtgg tataagatgg
240

acccgcgttg gattagctag ttggtgggggt aacggcccac caaggcgacg atccatagcc
300

ggcctgagag ggtgaacggc cacattggga ctgagacacg gcccagactc ctacgggagg
360

cagcagtggg gaatatggca caatggggga aaccctgatg cagcgacgcc gcgtgaagga
420

agaagtatct cggtatgtaa acttctatca gcagggaaga tagtgacggg acctgactaa
480

gaagccccgg ctaactacgt gccagcagcc gcggtaatac gtagggggca agcgttatcc
540

ggatttactg ggtgtaaagg gagcgtagac ggtgtggcaa gtctgatgtg aaaggcatgg
600

gctcaacctg tggactgcat tggaaactgt catacttgag tgccggaggg gtaagcggaa
660

ttcctagtgt agcggtgaaa tgcgtagata ttaggaggaa caccagtggc gaaggcggct
720

tactggacgg taactgacgt tgaggctcga aagcgtgggg agcaaacagg attagatacc
780

ctggtagtcc acgccgtaaa cgatgaatac taggtgtcgg ggagcatggc tcttcggtgc
840

cgtcgcaaac gcagtaagta ttccacctgg ggagtacggt cgcaagaatg aaactcaaag
900

gaattgacgg ggacccgcac aagcggtgga gcatgtgggt taattcgaag caacgcgaag
960

aaccttacca agtcttgaca tccgcctgac cgatccttaa ccggatcttt ccttcgggac
1020

aggcgagaca ggtggtgcat ggttgctcgtc agctcgtgtc gtgagatggt gggttaagtc
1080

ccgcaacgag cgcaaccct atcctcagta gccagcattt aaggtgggca ctctggggag
1140

actgccaggg ataacctgga ggaaggcggg gatgacgtca aatcatcatg ccccttatga
1200

tttgggctac acacgtgcta caatggcgta aacaaaggga agcgagattg tgagatggag
1260

caaatcccaa aaataacgtc ccagttcgga ctgtagtctg caacccgact acacgaagct
1320

ggaatcgcta gtaatcgcg atcagaatgc cgcggtgaat acgttcccgg gtcttgtaca
1380

caccgcccgt cacaccatgg gagtcagtaa cgcccgaagt cagtgcaccta actgcaaaga
1440

aggagctgcc gaaggcggga ccgatgactg ggggtgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t c c t t t
1526

<210> 242

<211> 1526

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000159975|GCAHHPIP_00407 16S ribosomal RNA

<400> 242

cagagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

aacgggaatt actttattga aacttcggtc gatttaattt aattctagtg gcggacgggt
120

gagtaacgcg tgggtaacct gccttataca gggggataac agtcagaaat ggctgcta
180

accgcataag cgcacagagc tgcattggctc agtgtgaaaa actccgggtg tataagatgg
240

acccgcgttg gattagctgg ttggtggggt aacggcccac caaggcgacg atccatagcc
300

ggcctgagag ggtgaacggc cacattggga ctgagacacg gcccagactc ctacgggagg
360

cagcagtggg gaatattgca caatggggga aaccctgatg cagcgacgcc gcgtgaagga
420

agaagtatct cggtatgtaa acttctatca gcagggaaga tagtgacggg acctgactaa
480

gaagccccgg ctaactacgt gccagcagcc gcggtaatac gtagggggca agcgttatcc
540

ggatttactg ggtgtaaagg gagcgtagac ggtgtggcaa gtctgatgtg aaaggcatgg
600

gctcaacctg tggactgcat tggaaactgt catacttgag tgccggaggg gtaagcggaa
660

ttcctagtgt agcggtgaaa tgcgtagata ttaggaggaa caccagtggc gaaggcggct
720

tactggacgg taactgacgt tgaggctcga aagcgtgggg agcaaacagg attagatacc
780

ctggtagtcc acgccgtaaa cgatgaatac taggtgtcgg gtagcatagc tcttcggtgc
840

cgtcgcaaac gcagtaagta ttccacctgg ggagtacgtt cgcaagaatg aaactcaaag
900

gaattgacgg ggacccgcac aagcggtgga gcatgtgggt taattcgaag caacgcgaag
960

aaccttacca agtcttgaca tccctctgac cgaaacttaa tcggatcttt ccttcgggac
1020

agacgagaca ggtggtgcat ggttgctcgtc agctcgtgtc gtgagatgtt gggttaagtc
1080

ccgcaacgag cgcaaccctt atcctcagta gccagcattt aagggtgggca ctctggggag
1140

actgccaggg ataacctgga ggaaggcggg gatgacgtca aatcatcatg ccccttatga
1200

tttgggctac acacgtgcta caatggcgta aacaaaggga agcgagattg tgagatggag
1260

caaatcccaa aaataacgtc ccagttcgga ctgtagtctg caacccgact acacgaagct
1320

ggaatcgcta gtaatcgcgg atcagaatgc cgcggtgaat acgttcccgg gtcttgtaca
1380

caccgcccgt cacaccatgg gagtcagtaa cgcccgaagt cagtgcacta actgcaaaga
1440

aggagctgcc gaaggcggga ccgatgactg ggggtgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t c c t t t
1526

<210> 243

<211> 1325

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000159975|GCAHHPIP_02849 16S ribosomal RNA

<400> 243

tcagagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgggaaa tatttcattg agacttcggt ggatttgatc tatttctagt ggcggacggg
120

tgagtaacgc gtgggtaacc tgccttatac agggggataa cagtcagaaa tggctgctaa
180

taccgcataa gcgcacagag ctgcatggct cagtgtgaaa aactccggtg gtataagatg
240

gacccgcggt ggattagctg gttggtgggg taacggccca ccaaggcgac gatccatagc
300

cggcctgaga ggggtgaacgg ccacattggg actgagacac ggcccagact cctacgggag
360

gcagcagtgg ggaatattgc acaatggggg aaaccctgat gcagcgacgc cgcgatgaagg
420

aagaagtatc tcggtatgta aacttctatc agcagggaag atagtgcagg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggttaata cgtagggggc aagcggtatc
540

cggatttact ggggtgtaaag ggagcgtaga cgggtgtggca agtctgatgt gaaaggcatg
600

ggctcaacct gtggactgca ttggaaactg tcatacttga gtgccggagg ggtaagcgga
660

attcctagt tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcggc
720

ttactggacg gtaactgacg ttgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgaata ctaggtgtcg gggagcatgg ctcttcgggtg
840

ccgtcgcaaa cgcagtaagt attccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg gggacccgca caagcgggtgg agcatgtggg ttaattcgaa gcaacgcgaa
960

gaaccttacc aagtcttgac atccgcctga ccgataccta accggatctt tccttcggga
1020

caggcgagac aggtggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaacccc taccctcagt agccagcatt taagggtgggc actctgggga
1140

gactgccagg gataacctgg aggaaggcgg ggatgacgtc aaatcatcat gcccttatg
1200

atttgggcta cacacgtgct acaatggcgt aaacaaaggg aagcgagatt gtgagatgga
1260

gcaaatccca aaaataacgt cccagttcgg actgtagtct gcaacccgac tacacgaagc
1320

t g g a a
1325

<210> 244

<211> 1526

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000159975|GCAHHPIP_03032 16S ribosomal RNA

<400> 244

cagagagttt gatcctggct caggatgaac gctggcgggc tgcttaacac atgcaagtcg
60

aacgggaatt actttattga aacttcggtc gatttaattt aattctagtg gcggacgggt
120

gagtaacgcg tgggtaacct gccttataca gggggataac agtcagaaat ggctgctaata
180

accgcataag cgcacagagc tgcattggctc agtgtgaaaa actccgggtgg tataagatgg
240

acccgcgttg gattagctag ttggtggggg aacggcccac caaggcgacg atccatagcc
300

ggcctgagag ggtgaacggc cacattggga ctgagacacg gccagactc ctacgggagg
360

cagcagtggg gaatattgca caatggggga aaccctgatg cagcgacgcc gcgtgaagga
420

agaagtatct cggatatgtaa acttctatca gcagggaaga tagtgacggg acctgactaa
480

gaagccccgg ctaactacgt gccagcagcc gcggtaatac gtagggggca agcgttatcc
540

ggatttactg ggtgttaaagg gagcgtagac ggtgtggcaa gtctgatgtg aaaggcatgg
600

gctcaacctg tggactgcat tggaaactgt catacttgag tgccggaggg gtaagcggaa
660

ttcctagtgt agcggtgaaa tgcgtagata ttaggaggaa caccagtggc gaaggcggct
720

tactggacgg taactgacgt tgaggctcga aagcgtgggg agcaaacagg attagatacc
780

ctggtagtcc acgccgtaaa cgatgaatac taggtgtcgg ggagcatggc tcttcggtgc
840

cgtcgcaaac gcagtaagta ttccacctgg ggagtacgtt cgcaagaatg aaactcaaag
900

gaattgacgg ggacccgcac aagcggtgga gcatgtgggt taattcgaag caacgcgaag
960

aaccttacca agtcttgaca tccgcctgac cgatccttaa ccggatcttt ccttcgggac
1020

aggcgagaca ggtggtgcat ggttgtcgtc agctcgtgtc gtgagatgtt gggttaagtc
1080

ccgcaacgag cgcaaccctt atcctcagta gccagcattt aagggtgggca ctctggggag
1140

actgccaggg ataacctgga ggaaggcggg gatgacgtca aatcatcatg ccccttatga
1200

tttgggctac acacgtgcta caatggcgta aacaaaggga agcgagattg tgagatggag
1260

caaatcccaa aaataacgtc ccagttcgga ctgtagtctg caacccgact acacgaagct
1320

ggaatcgcta gtaatcgcgg atcagaatgc cgcggtgaat acgttcccgg gtcttgtaca
1380

caccgcccgt cacaccatgg gagtcagtaa cgcccgaagt cagtgaccta actgcaaaga
1440

aggagctgcc gaaggcggga ccgatgactg gggatgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t c c t t t
1526

<210> 245

<211> 1527

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000159975|GCAHHP1P_03150 16S ribosomal RNA

<400> 245

tcagagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgggaat tactttattg aaacttcggt cgatttaatt taattctagt ggcggacggg
120

tgagtaacgc gtgggtaacc tgccttatac aggggggataa cagtcagaaa tggctgctaa
180

taccgcataa gcgcacagag ctgcatggct cagtgtgaaa aactccggtg gtataagatg
240

gacccgcggt ggattagctt gttggtgagg taacggccca ccaaggcgac gatccatagc
300

cggcctgaga gggatgaacgg ccacattggg actgagacac ggcccagact cctacgggag
360

gcagcagtgg ggaatattgc acaatggggg aaaccctgat gcagcgacgc cgcgtgaagg
420

aagaagtatc tcggtatgta aacttctatc agcagggaag atagtgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggtaata cgtagggggc aagcgttatc
540

cggatttact gggatgtaaag ggagcgtaga cggatgtggca agtctgatgt gaaaggcatg
600

ggctcaacct gtggactgca ttggaaactg tcatacttga gtgccggagg ggtaagcgga
660

attcctagtg tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcggc
720

ttactggacg gtaactgacg ttgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgaata ctaggtgtcg gggagcatgg ctcttcggtg
840

ccgtcgcaaa cgcagtaagt attccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg gggacccgca caagcgggtg agcatgtggt ttaattcgaa gcaacgcgaa
960

gaaccttacc aagtcttgac atccctctga ccggaactta atcgttcctt tccttcggga
1020

cagaggagac aggtggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaacccc tatcctcagt agccagcatt taagggtgggc actctgggga
1140

gactgccagg gataacctgg aggaaggcgg ggatgacgtc aaatcatcat gcccttatg
1200

atttgggcta cacacgtgct acaatggcgt aaacaaaggg aagcgagatt gtgagatgga
1260

gcaaatecca aaaataacgt cccagttcgg actgtagtct gcaacccgac tacacgaagc
1320

tggaatcgct agtaatcgcg gatcagaatg ccgcggtgaa tacgttcccg ggtcttgtac
1380

acaccgcccg tcacaccatg ggagtcagta acgcccgaag tcagtgacct aactgcaaag
1440

aaggagctgc cgaaggcggg accgatgact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g
1527

g c t g g a t c a c

c t c c t t t

<210> 246

<211> 1527

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000159975|GCAHHP1P_03212 16S ribosomal RNA

<400> 246

tcagagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgggaaa tatttcattg agacttcggt ggatttgatc tatttctagt ggcggacggg
120

tgagtaacgc gtgggtaacc tgccttatac agggggataa cagtcagaaa tggctgctaa
180

taccgcataa gcgcacagag ctgcatggct cagtgtgaaa aactccggtg gtataagatg
240

gacccgcggt ggattagctg gttggtgggg taacggccca ccaaggcgac gatccatagc
300

cggcctgaga ggggtgaacgg ccacattggg actgagacac ggcccagact cctacgggag
360

gcagcagtgg ggaatattgc acaatggggg aaaccctgat gcagcgacgc cgcgtgaagg
420

aagaagtatc tcggtatgta aacttctatc agcagggaag atagtgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggttaata cgtagggggc aagcggtatc
540

cggatttact ggggtgtaaag ggagcgtaga cgggtgtggca agtctgatgt gaaaggcatg
600

ggctcaacct gtggactgca ttggaaactg tcatacttga gtgccggagg ggtaagcgga
660

attcctagtg tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcggc
720

ttactggacg gtaactgacg ttgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgaata ctaggtgtcg ggtggcagag ccattcggtg
840

ccgtcgcaaa cgcagtaagt attccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg gggacccgca caagcgggtg agcatgtggt ttaattcgaa gcaacgcgaa
960

gaaccttacc aagtcttgac atccctctga ccggaactta atcgttcctt tccttcggga
1020

cagaggagac aggtggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaacccc taccctcagt agccagcatt taaggtgggc actctgggga
1140

gactgccagg gataacctgg aggaaggcgg ggatgacgtc aaatcatcat gcccttatg
1200

atttgggcta cacacgtgct acaatggcgt aaacaaaggg aagcgagatt gtgagatgga
1260

gcaaatccca aaaataacgt cccagttcgg actgtagtct gcaacccgac tacacgaagc
1320

tggaatcgct agtaatcgcg gatcagaatg ccgcggtgaa tacgttcccg ggtcttgtac
1380

acaccgcccg tcacaccatg ggagtcagta acgcccgaag tcagtgacct aactgcaaag
1440

aaggagctgc cgaaggcggg accgatgact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g g c t g g a t c a c c t c c t t t
1527

<210> 247
<211> 1372
<212> DNA
<213> artificial sequence

<220>
<223> >GCF_000159975|BJEPP0BG_03390 16S ribosomal RNA

<400> 247
tcagagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgggaaa tatttcattg agacttcggt ggatttgatc tatttctagt ggcggacggg
120

tgagtaacgc gtgggtaacc tgccttatac agggggataa cagtcagaaa tggctgctaa
180

taccgcataa gcgcacagag ctgcatggct cagtgtgaaa aactccggtg gtataagatg
240

gacccgcggt ggattagcta gttggtgggg taacggccca ccaaggcgac gatccatagc
300

cggcctgaga ggggtgaacgg ccacattggg actgagacac ggcccagact cctacgggag
360

gcagcagtgg ggaatattgc acaatggggg aaaccctgat gcagcgacgc cgcgtaagg
420

aagaagtatc tcggtatgta aacttctatc agcagggaag atagtgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggttaata cgtagggggc aagcgttatc
540

cggatttact ggggtgtaaag ggagcgtaga cgggtgtggca agtctgatgt gaaaggcatg
600

ggctcaacct gtggactgca ttggaaactg tcatacttga gtgccggagg ggtaagcgga
660

attcctagtg tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcggc
720

ttactggacg gtaactgacg ttgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgaata ctaggtgtcg ggtggcagag ccattcgggtg
840

ccgtcgcaaa cgcagtaagt attccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg gggacccgca caagcgggtg agcatgtggt ttaattcgaa gcaacgcgaa
960

gaaccttacc aagtcttgac atccgcctga ccgataccta accggatctt tccttcggga
1020

caggcgagac aggtggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaacccc tatcctcagt agccagcatt taagggtgggc actctgggga
1140

gactgccagg gataacctgg aggaaggcgg ggatgacgtc aaatcatcat gccccttatg
1200

atttgggcta cacacgtgct acaatggcgt aaacaaaggg aagcgagatt gtgagatgga
1260

gcaaatccca aaaataacgt ccagttcgg actgtagtct gcaacccgac tacacgaagc
1320

tggaatcgct agtaatcgcg gatcagaatg ccgcggtgaa tacgttcccg gg
1372

<210> 248

<211> 1531

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000313565|GNHMFION_03462 16S ribosomal RNA

<400> 248

atggagagtt tgatcctggc tcaggatgaa cgctggcggc atgcctaata catgcaagtc
60

gaacgaagtg aagatagctt gctattggaa cttagtggcg aacgggtgag taacacgtag
120

ataacctgcc tgtatgaccg ggataacagt tggaacgac tgctaatacc ggataggcag
180

agaggaggca tctcttctct gttaaagttg ggacacaacg caaacagatg gatctgcggt
240

gcattagcta gttggtgagg taacggccca ccaaggcgat gatgcatagc cggcctgaga
300

gggcgaacgg ccacattggg actgagacac ggcccaaact cctacgggag gcagcagtag
360

ggaattttcg gcaatggggg aaaccctgac cgagcaatgc cgcgtgagtg aagacggcct
420

tcgggttgta aagctctgtt gtaagggaag aacggcatag agagggaatg ctctatgagt
480

gacggtacct taccagaaag ccacggctaa ctacgtgcca gcagccgcgg taatacgtag
540

gtggcaagcg ttatccggaa ttattgggcg taaagggtgc gtaggcggcg agataagtct
600

gaggtaaaag cccgtggctc aaccacggta agccttggaa actgtctggc tggagtgcag
660

gagaggacaa tggaattcca tgtgtagcgg taaaatgcgt agatatatgg aggaacacca
720

gtggcgaagg cggttgtctg gcctgtaact gacgctgaag cacgaaagcg tggggagcaa
780

ataggattag ataccctagt agtccacgcc gtaaacgatg agaactaagt gttggggaaa
840

ctcagtgctg cagttaacgc aataagttct ccgcctgggg agtatgcacg caagtgtgaa
900

actcaaagga attgacgggg gcccgacaaa gcggtggagt atgtggttta attcgacgca
960

acgcgaagaa ccttaccagg ccttgacatg gtatcaaagg ccctagagat agggagatag
1020

ttatggtaca cacagggtggg gcatgggttgt cgtcagctcg tgtcgtgaga tggtgggtta
1080

agtcccgcaa cgagcgcaac ccttgtttct agttaccaac agtaagatgg ggactctaga
1140

gagactgccg gtgacaaacc ggaggaaggt ggggatgacg tcaaatacatc atgcccctta
1200

tggcctgggc tacacacgta ctacaatggc gtctacaaag agcagcgagc aggtgactgt
1260

gagcgaatct cataaaggac gtctcagttc ggattgaagt ctgcaactcg acttcatgaa
1320

gtcggaatcg ctagtaatcg cggatcagca tgccgcggtg aatacgttct cgggccttgt
1380

acacaccgcc cgtcaaacca tgggagttga taatacccga agccggtggc ctaaccattt
1440

atggagggag ccgtcgaagg taggatcgat gactgggggtt aagtcgtaac aaggatatcc
1500

t a c g g g a a c g t g g g g a t g g a t c a c c t c c t t t
1531

<210> 249

<211> 1527

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000155435|GLJCGDOH_00018 16S ribosomal RNA

<400> 249

tttgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcctaaca catgcaagtc
60

gaacgaagca tcttatagga agttttcgga tggaatatgg gatgactgag tggcggacgg
120

gtgagtaacg cgtggataac ctgcctcaca ctgggggata acagttagaa atggctgcta
180

ataccgcata agcgcacagt accgcatggg acggtgtgaa aaaccacagg ggtgtgagat
240

ggatccgcgt ctgattagcc agttggcggg gtaacggccc accaaagcga cgatcagtag
300

ccgacctgag aggggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggc gaaagcctga tgcagcgacg ccgcgtgagt
420

gaagaagtat ctcggtatgt aaagctctat cagcagggaa gaaaatgacg gtacctgact
480

aagaagcccc ggctaactac gtgccagcag ccgcggtaat acgtaggggg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgtag acggcgatgc aagtctgaag tgaaagcccg
600

gggctcaacc ccgggactgc tttggaaact gtgtggctgg agtgcaggag aggtaagtgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac tgtaactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat gctaggtgtc ggggggcaaa gccctcggg
840

gccgccgcta acgcaataag cattccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac caagtcttga catccccctg accggacagt aacgtgtccc ttccttcggg
1020

acaggggaga caggtggtgc atggttgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ttatccttag tagccagcat ttcgggtggg cactctaggg
1140

agactgccag ggataacctg gaggaaggtg gggatgacgt caaatcatca tgccccttat
1200

gatttgggct acacacgtgc tacaatggcg taaacaaagg gaagcacctt gcgaaggtga
1260

gcaaattcca aaaataacgt cccagttcgg actgtagtct gcaacccgac tacacgaagc
1320

tggaatcgct agtaatcgcg gatcagaatg ccgcggtgaa tacgttcccg ggtcttgtac
1380

acaccgcccg tcacaccatg ggagtcagca acgcccgaag tcagtgaccc aaccgaaagg
1440

agggagctgc cgaaggcggg gcaggtaact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g g c t g g a t c a c c t c c t t t
1527

<210> 250

<211> 1522

<212> DNA

<213> artificial sequence

<220>

<223> >GCA_900066915|NFPLMCGC_00592 16S ribosomal RNA

<400> 250

atggagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcctaata catgcaagtc
60

gaacgcttca cttcggtgaa gagtggcgaa cgggtgagta atacataagt aacctggcat
120

ctacaggggg ataactgatg gaaacgtcag ctaagaccgc ataggtgtag agatcgcatg
180

aactctatat gaaaagtgct acgggactgg tagatgatgg acttatggcg cattagctgg
240

ttggtagggg aacggcctac caaggcgacg atgcgtagcc gacctgagag ggtgaccggc
300

cacactggga ctgagacacg gcccagactc ctacgggagg cagcagtagg gaattttcgg
360

caatggggga aaccctgacc gagcaacgcc gcgtgaagga agaagtaatt cgttatgtaa
420

acttctgtca tagaggaaga acggtggata tagggaatga tatccaagtg acggtactct
480

ataagaaagc cacggctaac tacgtgccag cagccgcggt aatacgtagg tggcgagcgt
540

tatccggaat tattgggcgt aaagagggag caggcggcac taagggctctg tggtgaaaga
600

tcgaagctta acttcggtaa gccatggaaa ccgtagagct agagtgtgtg agaggatcgt
660

ggaattccat gtgtagcggg gaaatgcgta gatatatgga ggaacaccag tggcgaaggc
720

gacgatctgg cgcataactg acgctcagtc ccgaaagcgt ggggagcaaa taggattaga
780

taccctagta gtccacgccg taaacgatga gtactaagtg ttgggtgtca aagctcagtg
840

ctgcagttaa cgcaataagt actccgcctg agtagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg ggggcccgcg caagcgggtg agcatgtggg ttaattcgaa gcaacgcgaa
960

gaaccttacc aggtcttgac atcgatctaa aggctccaga gatggagaga tagctataga
1020

gaagacaggt ggtgcatggg tgtcgtcagc tcgtgtcgtg agatgttggg ttaagtcccg
1080

caacgagcgc aaccctgtt gccagttgcc agcattaagt tggggactct ggcgagactg
1140

ccggtgacaa gccggaggaa ggcggggatg acgtcaaadc atcatgcccc ttatgacctg
1200

ggctacacac gtgctacaat ggacagagca gaggggaagcg aagccgagag gtggagcgaa
1260

accataaaa ctgttctcag ttcggactgc agtctgcaac tcgactgcac gaagatggaa
1320

tcgctagtaa tcgcgaatca gcatgtcgcg gtgaatacgt tctcgggcct tgtacacacc
1380

gcccgtcaca ccatgagagt cggtaacacc cgaagccggt ggcctaaccg caaggaagga
1440

gctgtctaag gtgggactga tgattgggggt gaagtcgtaa caaggtatcc ctacgggaac
1500

g t g g g g a t g g a t c a c c t c c t t t
1522

<210> 251

<211> 1526

<212> DNA

<213> artificial sequence

<220>

<223> >GCA_900066805|HEBHMNF_02162 16S ribosomal RNA

<400> 251

tttagagagt ttgatactgg ctcaggatga acgctggcgg cgtgcctaac acatgcaagt
60

cgaacgggggt tatttttgaa atctcttcgg agatggaatt cttaacctag tggcggacgg
120

gtgagtaacg cgtgagcaat ctgccttttag gagggggata acagtcggaa acggctgcta
180

ataccgcata atacgtttgg gaggcattctc ttgaacgtca aagattttat cgcctttaga
240

tgagctcgcg tctgattagc tggttggcgg ggtaacggcc caccaaggcg acgatcagta
300

gccggactga gaggttgaac ggccacattg ggactgagac acggcccaga ctcttacggg
360

aggcagcagt ggggaatatt gcgcaatggg ggaaaccctg acgcagcaac gccgcgtgat
420

tgaagaaggc cttcggggtg taaagatctt taatcaggga cgaaaaatga cggtacctga
480

agaataagct ccggctaact acgtgccagc agccgcggta atacgtaggg agcaagcggt
540

atccggattt actgggtgta aagggcgcgc aggcggggccg gcaagttggg agtgaaatcc
600

cggggcttaa ccccggaact gctttcaaaa ctgctggtct tgagtgatgg agaggcaggc
660

ggaattccgt gtgtagcggg gaaatgcgta gatatacggg ggaacaccag tggcgaaggc
720

ggcctgctgg acattaactg acgctgaggc gcgaaagcgt ggggagcaaa caggattaga
780

taccctggta gtccacgccg taaacgatgg atactaggtg tgggaggtat tgacccttc
840

cgtgccgcag ttaacacaat aagtatccca cctggggagt acggccgcaa ggttgaaact
900

caaaggaatt gacggggggc cgcacaagca gtggagtatg tggtttaatt cgaagcaacg
960

cgaagaacct taccaggtct tgacatcccg atgaccggcg tagagatacg ccctctcttc
1020

ggagcatcgg tgacaggtgg tgcattgggtg tcgtcagctc gtgtcgtgag atgttggggt
1080

aagtcccgca acgagcgcaa cccttacggt tagttgatac gcaagatcac tctagccgga
1140

ctgccgttga caaaacggag gaaggtggg acgacgtcaa atcatcatgc cccttatgac
1200

ctgggctaca cacgtactac aatggcagtc atacagaggg aagcaatacc gcgaggtgga
1260

gcaaatccct aaaagctgtc ccagttcaga ttgcaggctg caacccgcct gcatgaagtc
1320

ggaattgcta gtaatcgcg atcagcatgc cgcggtgaat acgttcccgg gccttgtaca
1380

caccgcccgt cacaccatga gagccgtcaa taccgaagt ccgtagccta accgcaaggg
1440

gggcgcggcc gaaggtaggg gtggtaatta ggggtgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t c c t t t
1526

<210> 252

<211> 1527

<212> DNA

<213> artificial sequence

<220>

<223> >GCA_900066575|JHFIFLEE_00174 16S ribosomal RNA

<400> 252

atgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

aacgaagcgc ttaagattga ttcttcggat gaagtctttt gtgactgagt ggcggacggg
120

tgagtaacgc gtgggtaacc tgcctcatac aggggggataa cagttagaaa tgactgctaa
180

taccgcataa gcgcacgggtg tcgcatgaca tagtgtgaaa aactccgggtg gtatgagatg
240

gacccgcgtc tgattagctg gttggtgagg taacggccca ccaaggcgac gatcagtagc
300

cgacctgaga gggatgatcgg ccacattggg actgagacac ggcccaaact cctacgggag
360

gcagcagtgg ggaatattgc acaatggggg aaaccctgat gcagcgacgc cgcgatgaagg
420

aagaagtatt tcggtatgta aacttctatc agcagggaag aaaatgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggttaata cgtagggggc aagcggtatc
540

cggatttact gggatgtaaag ggagcgtagg cggatctgaca agtcagaagt gaaagccccg
600

ggctcaactc cgggactgct ttgaaactg ccggactaga ttgcaggaga ggtaagtgga
660

attcctagt tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcggc
720

ttactggact gtaaattgacg ctgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgaata ctaggtgttg gggagcacag ctcttcgggtg
840

ccgcagcaaa cgcaataagt attccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg gggacccgca caagcgggtg agcatgttgt ttaattcgaa gcaacgcgaa
960

gaaccttacc aagtcttgac atcccgatga ccgtcccgta acggggggctt ctcttcggag
1020

catcggtgac aggtgggtgca tgggtgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaaccct tatcttttagt agccagcggg acggccggggc actctagaga
1140

gactgccagg gataacctgg aggaagggtg ggatgacgtc aaatcatcat gcccttatg
1200

atttgggcta cacacgtgct acaatggcgt aaacaaaggg aagcgaaact gtgaagtcta
1260

gcaaattctca aaaataacgt ctcagttcgg attgtagtct gcaactcgac tacatgaagc
1320

tggaatcgct agtaatcgcg aatcagcatg tcgcggtgaa tacgttcccg ggtcttgtac
1380

acaccgcccc tcacaccatg ggagttggaa acgcccgaag tcagtgaccc aaccgtaagg
1440

agggagctgc cgaaggcggg tctgataact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g g c t g g a t c a c c t c c t t t
1527

<210> 253

<211> 1303

<212> DNA

<213> artificial sequence

<220>

<223> >GCA_900066545|JJMGBGIF_00555 16S ribosomal RNA

<400> 253

ccggtggtat gagatggacc cgcgtctgat tagctggttg gtggggtaac ggcctaccaa
60

ggcgacgata agtagccggc ctgagagggc gaccggccac attgggactg agacacggcc
120

caaactccta cgggaggcag cagtggggaa tattgcacaa tgggggaaac cctgatgcag
180

cgacgccgcg tgaaggaaga agtatttcgg tatgtaaact tctatcagca gggaagaaaa
240

tgacggtacc tgactaagaa gccccggcta actacgtgcc agcagccgcg gtaatacgta
300

gggggcaagc gttatccgga ttactgggt gtaaaggag cgtagacgga gaggcaagtc
360

tgatgtgaaa acccggggct caaccccggg actgcattgg aaactgtttt tctagagtgt
420

cggagaggta agcggaattc ctagtgtagc ggtgaaatgc gtagatatta ggaggaacac
480

cagtggcgaa ggcggcttac tggacgatga ctgacgttga ggctcgaaag cgtggggagc
540

aaacaggatt agataccctg gtagtccacg ccgtaaacga tgactactag gtgtcgggtg
600

gcaaagccat tcggtgccgc agcaaacgca ataagtagtc cacctgggga gtacgttcgc
660

aagaatgaaa ctcaaaggaa ttgacgggga cccgcacaag cgggtggagca tgtgggttaa
720

ttcgaagcaa cgcgaagaac cttacctgct cttgacatcc cggtgaccgc tccgtaatgg
780

gagcttttct tcggaacacc ggagacaggt ggtgcatggg tgtcgtcagc tcgtgtcgtg
840

agatgttggg ttaagtcccg caacgagcgc aaccctatc ttcagtagcc agcggtttgg
900

ccgggcactc tggagagact gccagggata acctggagga aggtggggat gacgtcaaat
960

catcatgccc cttatgagca gggctacaca cgtgctacaa tggcgtaaac aaaggagggc
1020

gaactcgcga gggtaagcaa atccccaaaa taacgtctca gttcggattg tagtctgcaa
1080

ctcgactaca tgaagctgga atcgctagta atcgcgaatc agaatgtcgc ggtgaatacg
1140

ttcccgggtc ttgtacacac cgcccgtcac accatgggag tcagtaacgc ccgaagtcag
1200

tgaccaaacg gtaaggaggg agctgccgaa ggtgggaccg ataactgggg tgaagtcgta
1260

acaaggtagc cgtatcggaa ggtgCGgctg gatcacctcc ttt
1303

<210> 254

<211> 1305

<212> DNA

<213> artificial sequence

<220>

<223> >GCA_900066055|CNDBEJEM_03146 16S ribosomal RNA

<400> 254

tccggtggta tgagatggac ccgcgtctga ttagctagtt ggtgaggtaa cgccccacca
60

aggcgacgat cagtagccga cctgagaggg tgaccggcca cattgggact gagacacggc
120

ccagactcct acgggaggca gcagtggggg atattgcaca atggaggaaa ctctgatgca
180

gcgacgccgc gtgagtgaag aagtatttcg gtatgtaaag ctctatcagc agggaagaaa
240

atgacggtac ctgactaaga agccccggct aactacgtgc cagcagccgc ggtaatacgt
300

agggggcaag cgttatccgg atttactggg tgtaaaggga gcgtagacgg cgacgcaagt
360

ctgaagtgaa ataccCGggc tcaacctggg aactgctttg gaaactgtgt tgctagagtg
420

ctggagaggt aagcgggaatt cctagtgtag cggtgaaatg cgtagatatt aggaagaaca
480

ccagtggcga aggcggctta ctggacagta actgacgttg aggctcgaaa gcgtggggag
540

caaacaggat tagataccct ggtagtccac gccgtaaacg atgaatacta ggtgttggtg
600

agcaaagctc atcggtgccg ccgcaaacgc aataagtatt ccacctgggg agtacgttcg
660

caagaatgaa actcaaagga attgacgggg acccgacaaa gcggtggagc atgtggttta
720

attcgaagca acgcgaagaa ccttaccaaa tcttgacatc cctctgaaaa gcctttaatc
780

gggctcctcc ttcgggacag aggtgacagg tggatgcatt ttgtcgtagc ctcgtgtcgt
840

gagatgttgg gtttaagtccc gcaacgagcg caaccctat tgtcagtagc cagcaggtaa
900

agctgggcac tctgatgaga ctgccaggga taacctggag gaagggtggg atgacgtcaa
960

atcatcatgc cccttatgat ttgggctaca cacgtgctac aatggcgtaa acaaagagaa
1020

gcgagcctgc gagggggagc aaatctcaaa aataacgtct cagttcggat tgtagtctgc
1080

aactcgacta catgaagctg gaatcgctag taatcgcaga tcagaatgct gcggtgaata
1140

cgttcccggg tcttgtagac accgcccgtc acaccatggg agtcggaaat gcccgagcc
1200

agtgacccaa gcgaaagcag ggagctgtcg aaggcaggtc tgataactgg ggtgaagtcg
1260

taacaaggta gccgtatcgg aagggtgcggc tggatcacct ccttt
1305

<210> 255

<211> 1558

<212> DNA

<213> artificial sequence

<220>

<223> >GCA_900066535|PHPOKJPF_02817 16S ribosomal RNA

<220>

<221> misc_feature
<222> (992)..(1038)
<223> n is a, c, g, or t

<400> 255

atgagagttt gatcctggct caggatgaac gctggcggcg tgcctaacac atgcaagtcg
60

aacgaggtat tttgattgaa gttttcggat ggatttcaag ataccgagtg gcggacgggt
120

gagtaacgcg tgggtaacct gcctcataca gggggataac ggtagaaat gactgctaata
180

accgcataag cgcacagtac cgcattggat ggtgtgaaaa actccgggtg tatgagatgg
240

acccgcgtct gattagctag ttggtggggt aacggcccac caaggcgacg atcagtagcc
300

gacctgagag ggtgaccggc cacattggga ctgagacacg gccagactc ctacgggagg
360

cagcagtggg ggatattgca caatggagga aactctgatg cagcgacgcc gcgtgagtga
420

agaagtattt cggatatgtaa agctctatca gcagggaaga aaatgacggt acctgactaa
480

gaagccccgg ctaactacgt gccagcagcc gcggtaatac gtagggggca agcgttatcc
540

ggatttactg ggtgtaaagg gagcgtagac ggcgacgcaa gtctgaagtg aaatacccgg
600

gctcaacctg ggaactgctt tggaaactgt gttgctagag tgctggagag gtaagcggaa
660

ttcctagtgt agcggtgaaa tgcgtagata ttaggaagaa caccagtggc gaaggcggct
720

tactggacag taactgacgt tgaggctcga aagcgtgggg agcaaacagg attagatacc
780

ctggtagtcc acgccgtaaa cgatgaatac taggtgttgg tgagcaaagc tcatcgggtgc
840

cgccgcaaac gcaataagta ttccacctgg ggagtacgtt cgcaagaatg aaactcaaag
900

gaattgacgg ggacccgcac aagcgggtgga gcatgtgggt taattcgaag caacgcgaag
960

aaccttacca aatcttgaca tccctctgaa annnnnnnnn nnnnnnnnnn nnnnnnnnnn
1020

nnnnnnnnnn nnnnnnnncc tccttcggga cagaggtgac aggtgggtgca tggttgtcgt
1080

cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaacccc tattgtcagt
1140

agccagcagg taaagctggg cactctgatg agactgccag ggataacctg gaggaagggtg
1200

gggatgacgt caaatcatca tgccccttat gatttgggct acacacgtgc tacaatggcg
1260

taaacaaaga gaagcgagcc tgcgaggggg agcaaattctc aaaaataacg tctcagttcg
1320

gattgtagtc tgcaactcga ctacatgaag ctggaatcgc tagtaatcgc agatcagaat
1380

gctgcggtga atacgttccc gggctcttgta cacaccgccc gtcacaccat gggagtcgga
1440

aatgcccga gccagtgacc caagcgaaag cagggagctg tcgaaggcag gtctgataac
1500

tgggggtgaag tcgtaacaag gtagccgtat cggaagggtgc ggctggatca cctccttt
1558

<210> 256

<211> 1515

<212> DNA

<213> artificial sequence

<220>

<223> >GCA_900066365|OIBDOBNI_03045 16S ribosomal RNA

<400> 256

atgagagttt gatcctggct caggatgaac gctggcggcg tgcctaacac atgcaagtcg
60

aacggaattt acatgaagcc tagcgattgt aaatttagtg gcggacgggt gagtaacgcg
120

tgggtaacct gccttggtact gggggacaac agttggaaac gactgctaata accgcataag
180

cgcacagctt cgcatagaagc agtgtgaaaa actccgggtgg tacaagatgg acccgcgctct
240

gattagctgg ttggtgaggt aacggcccac caaggcgacg atcagtagcc ggcctgagag
300

ggtgaacggc cacattggga ctgagacacg gcccaaactc ctacgggagg cagcagtggg
360

gaatattgca caatggggga aaccctgatg cagcaacgcc gcgtgagtga agaagtattt
420

cggatatgtaa agctctatca gcaggaaaga aaatgacgggt acctgactaa gaagccccgg
480

ctaactacgt gccagcagcc gcggtaatac gtagggggca agcgttatcc ggatttactg
540

ggtgtaaagg gagcgtagac ggttttgcaa gtctgaagtg aaagccccggg gcttaacccc
600

gggactgctt tggaactgt aggactagag tgcaggagag gtaagtggaa ttcctagtgt
660

agcggtgaaa tgcgtagata ttaggaggaa caccagtggc gaaggcggct tactggactg
720

taactgacgt tgaggctcga aagcgtgggg agcaaacagg attagatacc ctggtagtcc
780

acgccgtaaa cgatgattac taggtgttgg tgggtacgac ccatcgggtgc cgcagcaaac
840

gcaataagta atccacctgg ggagtacgtt cgcaagaatg aaactcaaag gaattgacgg
900

ggacccgcac aagcgggtgga gcatgtggtt taattcgaag caacgcgaag aaccttacct
960

ggtcttgaca tccctatgaa taacgggcaa tgccgttagt acttcggtac ataggagaca
1020

ggtggtgcat ggttgtcgtc agctcgtgtc gtgagatgtt gggttaagtc ccgcaacgag
1080

cgcaaccctt atcttttagta gccagcagta agatgggcac tctagagaga ctgccgggga
1140

taacccggag gaaggtgggg atgacgtcaa atcatcatgc cccttatgac cagggctaca
1200

cacgtgctac aatggcgtaa acaaagagaa gcgaagtcgt gaggcagagc gaatctcaaa
1260

aataacgtct cagttcggat tgtagtctgc aactcgacta catgaagctg gaatcgctag
1320

taatcgcaga tcagaatgct gcggtgaata cgttcccggg tcttgtacac accgcccgtc
1380

acaccatggg agtcggaaat gcccgaagtc ggtgacctaa ccgaaaggaa ggagccgccg
1440

aaggcaggtc tgataactgg ggtgaagtcg taacaaggta gccgtatcgg aagggtcggc
1500

t g g a t c a c c t c c t t t
1515

<210> 257

<211> 1530

<212> DNA

<213> artificial sequence

<220>

<223> >GCA_900066135|AINPJHCN_00778 16S ribosomal RNA

<400> 257

tttagagagt ttgatcctgg ctcaggatga acgctggcgg cgtgcttaac acatgcaagt
60

cgagcgaagc acttatggag attcttcgga tgatccattt gtgactgagc ggcggacggg
120

tgagtaacgc gtgagtaacc tgcctcatac aggggaataa cagttagaaa tgactgctaa
180

tgccgcataa gcgcacaggg ccacatggcc tgggtgtgaaa aactccggtg gtatgagatg
240

gactcgcgtc tgattagcta gttgggtgagg taacggccca ccaaggcgac gatcagtagc
300

cggcctgaga ggggtgaacgg ccacattggg actgagacac ggcccaaact cctacgggag
360

gcagcagtgg ggaatattgc acaatggggg aaaccctgat gcagcgacgc cgcgtgagtg
420

aagaagtatt tcggtatgta aagctctatc agcaggggaag aaaatgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggtaata cgtagggggc aagcgttacc
540

cggatttact ggggtgtaaag ggagcgtaga cggctttgca agtctgacgt gaaaatccgg
600

ggctcaaccc cggaactgcg ttggaaactg tgaggcttga gtgccggaga ggtaagcgga
660

attcctagtg tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcggc
720

ttactggacg gcaactgacg ttgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgcggtaa acgatgaata ctaggtgttg ggggacaaag tccttcggtg
840

ccgccgcaaa cgcattaagt attccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg gggacccgca caagcgggtg agcatgtggt ttaattcgaa gcaacgcgaa
960

gaaccttacc aagtcttgac atcgattcgc cgggactgta atgagtcctt tcccttcggg
1020

gacgaagaag acaggtggtg catggttgtc gtcagctcgt gtcgtgagat gttgggttaa
1080

gtcccgcaac gagcgcaacc cttatcttca gtagccagca agtgaagttg ggcactctgg
1140

agagactgcc agggacaacc tggaggaagg tggggatgac gtcaaatcat catgcccctt
1200

atgacttggg ctacacacgt gctacaatgg cgtaaacaaa gggaagcagc cctgtgaagg
1260

tgagcaaadc ccaaaaataa cgtctcagtt cggattgtag tctgcaactc gactacatga
1320

agctggaatc gctagtaatc gcgaatcaga atgtcgcggt gaatacgttc ccgggtcttg
1380

tacacaccgc ccgtcacacc atgggagtcg gtaacgcccg aagtcagtga cccaaccgaa
1440

aggagggagc tgccgaaggc gggactggta actgggggtga agtcgtaaca aggtagccgt
1500

a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1530

<210> 258

<211> 1531

<212> DNA

<213> artificial sequence

<220>

<223> >SPC11287|PIJPCPCC_02757 16S ribosomal RNA

<400> 258

acgagagttt gtccttggtc caggacgaac gctggcggcg tgcctaacac atgcaagtcg
60

aacgagaatc tttgaacaga tcttttcgga gtgacgttca aagaggaaag tggcggacgg
120

gcgagtaacg cgtgagtaac ctgcccataa gagggggata atccatggaa acgtggacta
180

ataccgcata ttgtagttaa gttgcatgac ttgattatga aagattttatc gcttatggat
240

ggactcgcgt cagattagat agttggtgag gtaacggctc accaagtcaa cgatctgtag
300

ccgaactgag aggttgatcg gccgcattgg gactgagaca cggcccagac tcctacggga
360

ggcagcagtg gggaatattg cgcaatgggg gcaaccctga cgcagcaacg ccgcgtgcag
420

gaagaaggtc ttcggattgt aaactgttgt cgcaagggaa gaagacagtg acggtacctt
480

gtgagaaagt cacggctaac tacgtgccag cagccgcggt aatacgtagg tgacaagcgt
540

tgtccggatt tactgggtgt aaagggcgcg taggcggact gtcaagtcag tcgtgaaata
600

ccggggccta accccggggc tgcgattgaa actgacagcc ttgagtatcg gagaggaaag
660

cggaattcct agtgtagcgg tgaaatgcgt agatattagg aggaacacca gtggcgaagg
720

cggctttctg gacgacaact gacgctgagg cgcgaaagtg tggggagcaa acaggattag
780

ataccctggg agtccacacc gtaaacgatg gatactaggt gtaggaggta tcgaccctt
840

ctgtgccgca gttaacacaa taagtatccc acctggggag tacgaccgca aggttgaaac
900

tcaaaggaat tgacgggggc ccgcacaagc agtggagtat gtggttttaat tcgaagcaac
960

gcgaagaacc ttacctgggc ttgacatccc tggaatcgag tagagatact tgagtgcctt
1020

cggaatcag gtgacaggtg gtgcatggtt gtcgtcagct cgtgtcgtga gatgttgggt
1080

taagtcccg aacgagcgca acccctattg tcagttgcc a tcattaagtt gggcactctg
1140

gcgagactgc cggtgacaaa tcggaggaag gtgggggacga cgtcaaata tcatgcccct
1200

tatgcccagg gctacacacg tactacaatg gccgataaca aagtgcagcg aaaccgtgag
1260

gtggagcgaa tcacaaaact cgggtctcagt tcagattgca ggctgcaact cgctgcatg
1320

aagttggaat tgctagtaat cgcggatcag aatgccgcgg tgaatacgtt cccgggcctt
1380

gtacacaccg cccgtcacac catgagagtc gataacaccc gaagcctgtg agctaacctt
1440

taggaggcag cagtcgaagg tggggttgat gattgggggtg aagtcgtaac aaggtagccg
1500

t a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1531

<210> 259

<211> 1081

<212> DNA

<213> artificial sequence

<220>

<223> >GCA_900066795|CIOLMD00_00006 16S ribosomal RNA (partial)

<220>

<221> misc_feature

<222> (660)..(660)

<223> n is a, c, g, or t

<400> 259

acggcccaga ctccctacggg aggcagcagt ggggaatat ggcgaatggg ggaaaccctg
60

acgcagcaac 120	gccgcgtgat	tgaagaaggc	cttcgggttg	taaagatctt	taattagga
cgaaataaat 180	gacggtacct	gaagaataag	ctccggctaa	ctacgtgcca	gcagccgcgg
taatacgtag 240	ggagcaagcg	ttatccggat	ttactgggtg	taaagggcgc	gcaggcgggc
cggtaaagttg 300	gaagtgaaat	ctatgggctt	aaccataaa	ctgctttcaa	aactgctggt
cttgagtgat 360	ggagaggcag	gcggaattcc	gtgtgtagcg	gtgaaatgcg	tagatatacg
gaggaacacc 420	agtggcgaag	gcggcctgct	ggacattaac	tgacgctgag	gcgcgaaagc
gtggggagca 480	aacaggatta	gataccctgg	tagtccacgc	cgtaaacgat	ggataactagg
tgtgggaggt 540	attgaccctt	tccgtgccgc	agttaacaca	ataagtatcc	cacctgggga
gtacggccgc 600	aaggttgaaa	ctcaaaggaa	ttgacggggg	cccgcacaa	cagtggagta
tgtggtttta 660	ttcgaagcaa	cgcgagaac	cttaccaggt	cttgacatcc	cgatgaccgn
cttttcttcg 720	gaacatcggt	gacagggtgt	gcatgggtgt	cgtcagctcg	tgtcgtgaga
tgttggttta 780	agtcccgcga	cgagcgcaac	ccttacggtt	agttgatacg	caagatcact
ctagccggac 840	tgccgttgac	aaaacggagg	aaggtgggga	cgacgtcaaa	tcatcatgcc
ccttatgacc 900	tgggctacac	acgtactaca	atggcagtca	tacagaggga	agcaaaaccg
cgaggtggag 960	caaatcccta	aaagctgtcc	cagttcagat	tgcaggctgc	aaccgcctg

catgaagtcg gaattgctag taatcgcgga tcagcatgcc gcggtgaata cgttcccggg
1020

ccttgtagac accgcccgtc acacatgag agccgtcaat acccgaagtc cgtagcctaa
1080

c
1081

<210> 260

<211> 1527

<212> DNA

<213> artificial sequence

<220>

<223> >GCA_900066785|BLILDEKL_00759 16S ribosomal RNA

<400> 260

atgagagttt gatcctggct caggatgaac gctggcgggc tgcctaacac atgcaagtcg
60

aacgaggtaa atgagatgaa gttttcggat ggattcttat ttaccgagtg gcggacgggt
120

gagtaacgcg tgggtaacct gcctcataca gggggataac gattggaaac gattgctaata
180

accgcataag cgcacagtac cacatgggtac agtgtgaaaa actccgggtgg tatgagatgg
240

accgcgtctt gattagctag ttgggtgaggt aacggcccac caaggcaacg atcagtagcc
300

gacctgagag ggtgaccggc cacattggga ctgagacacg gccagactc ctacgggagg
360

cagcagtggg ggatattgca caatggagga aactctgatg cagcgacgcc gcgtgagtga
420

agaagtattt cggtatgtaa agctctatca gcagggaaga aaatgacggg acctgactaa
480

gaagccccgg ctaactacgt gccagcagcc gcggtaatac gtagggggca agcgttatcc
540

ggatttactg ggtgtaaagg gagcgtagac ggcgatgcaa gtctgaagtg aaataccgg
600

gctcaacctg ggaactgctt tggaaactgt atggctagag tgctggagag gtaagcggaa
660

ttcctagtgt agcggtgaaa tgcgtagata ttaggaagaa caccagtggc gaaggcggct
720

tactggacag taactgacgt tcaggctcga aagcgtgggg agcaaacagg attagatacc
780

ctggtagtcc acgccgtaaa cgatgaatac taggtgtcgg gggacaaagt ctttcggtgc
840

cgccgcaaac gcaataagta ttccacctgg ggagtacgtt cgcaagaatg aaactcaaag
900

gaattgacgg ggacccgcac aagcggtgga gcatgtgggt taattcgaag caacgcgaag
960

aaccttacca aatcttgaca tccctctgaa aagcctttaa tcgggctcct ccttcgggac
1020

agaggtgaca ggtggtgcat ggttgtcgtc agctcgtgtc gtgagatgtt gggttaagtc
1080

ccgcaacgag cgcaaccctt attgtcagta gccagcaggt aaagctgggc actctgatga
1140

gactgccagg gataacctgg aggaagggtg ggatgacgtc aaatcatcat gcccttatg
1200

atttgggcta cacacgtgct acaatggcgt aaacaaagag aggcgaagct gtgaggcaga
1260

gcaaattctca aaaataacgt ctcagttcgg attgtagtct gcaactcgac tacatgaagc
1320

tggaatcgct agtaatcgcg gatcagaatg ccgcggtgaa tacgttcccg ggtcttgtac
1380

acaccgcccg tcacaccatg ggagtcggaa atgcccgaag ccagtgaccc aagcgaaagc
1440

agggagctgt cgaaggcagg tctgataact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g g c t g g a t c a c c t c c t t t
1527

<210> 261

<211> 986

<212> DNA

<213> artificial sequence

<220>

<223> >GCA_900066785|BLILDEKL_02871 16S ribosomal RNA (partial)

<220>

<221> misc_feature

<222> (1)..(1)

<223> n is a, c, g, or t

<400> 261

nccggattta ctgggtgtaa aggggtgcgta ggcggaactg caagtcagtg gtgaaatctg
60

agggctcaac cctcaaactg ccattgaaac tgtggttctt gagtgaagta gaggtaggcg
120

gaattcccgg tgtagcggtg gaatgcgtag agatcgggag gaacaccagt ggcgaaggcg
180

gcctactggg ctttaactga cgctgaggca cgaaagcatg ggtagcaaac aggattagat
240

accctggtag tccatgccgt aaacgatgat tactaggtgt ggggggtctg accccctccg
300

tgccggagtt aacacaataa gtaatccacc tgggggagtac ggccgcaagg ttgaaactca
360

aaggaattga cggggggcccg cacaagcagt ggagtatgtg gtttaattcg acgcaacgcg
420

aagaacctta ccaggctcttg acatccaact aacgaggtag agatacgtca ggtgcccttc
480

ggggaaagtt gagacagggtg gtgcatggtt gtcgtcagct cgtgtcgtga gatgttgggt
540

taagtcccgc aacgagcgca acccttgtga ttagttgcta cgcaagagca ctctaatacag
600

actgccgttg acaaaacgga ggaagggtggg gatgacgtca aatcatcatg ccctttatga
660

cctgggctac acacgtacta caatggccgt aaacagagag aggcgacacc gcgagggtgaa
720

gcgaaaccct aaaaacggtc tcagttcgga ttgtaggctg caaccgcct acatgaagtt
780

ggaattgcta gtaatcgcg atcagcatgc cgcggtgaat acgttcccgg gccttgtaca
840

caccgcccgt cacaccatgg gagccggtaa taccggaagt cagtagtcta accgcaaggg
900

gggcgctgcc gaaggtagga ttggcgactg ggggtgaagtc gtaacaaggt agccgtatcg
960

g a a g g t g c g g c t g g a t c a c c t c c t t t
986

<210> 262

<211> 1522

<212> DNA

<213> artificial sequence

<220>

<223> >GCA_900066155|ELNAKNNH_00433 16S ribosomal RNA

<400> 262

taaagagttt gatcctggct caggacgaac gctgtcggcg cgcctaacac atgcaagtcg
60

aacgaagttg ctttgaatga attcttcgga aggaatttga ttcaacttag tggcggacgg
120

gtgagtaacg cgtgagtaac ctgcctttca gaggggggata acgtctggaa acggacgcta
180

ataccgcata acatattggt ttcgcatgga gctgatatca aaggagcaat ccgctgaaag
240

atggactcgc gtccaattag ctagttggtg aggtaacggc ccaccaaggc gacgattggt
300

agccggactg agaggttgaa cggccacatt gggactgaga cacggcccag actcctacgg
360

gaggcagcag tggggaatat tgcacaatgg gggaaaccct gatgcagcga cgccgagtga
420

gggaagaagg ttttcggatt gtaaaccctt gtccttggtg aagataatga cggtaaccaa
480

ggaggaagct acggctaact acgtgccagc agccgcggta atacgtaggt agcgagcggt
540

gtccggaatt actgggtgta aagggagcgt aggcgggatt gcaagttgaa tgttaaattct
600

atgggctcaa cccatagccg cgttcaaaac tgcagttctt gagtgaagta gaggcaggcg
660

gaattcctag tgtagcgggtg aaatgcgtaa atattaggag gaacaccagt ggcgaaggcg
720

gcctgctggg ctttaactga cgctgaggct cgaaagcgtg ggtagcaaac aggattagat
780

accctggtag tccacgctgt aaacgatgat tactagggtg ggggggactg accccttcgg
840

tgccggagtt aacacaataa gtaatccacc tggggagtag gaccgcaagg ttgaaactca
900

aaggaattga cgggggcccg cacaagcagt ggagtatgtg gtttaattcg aagcaacgcg
960

aagaacctta ccaggctcttg acatccgggtg catagcctag agatagggtga agcccttcgg
1020

ggcaccgaga cagggtggtgc atggttggtc tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ttacgttttag ttgctacgca agagcactct agacggactg
1140

ccgttgacaa aacggaggaa ggtgggggatg acgtcaaadc atcatgcccc ttatgacctg
1200

ggctacacac gtactacaat ggctattaac agagggaagc aagatgggtga catggagcaa
1260

accctaataa atagtctcag ttcggattgc aggctgcaac ccgcctgcat gaagccggaa
1320

ttgctagtaa tcgcggatca gcatgccgcg gtgaatacgt tcccgggcct tgtacacacc
1380

gcccgtcaca ccatgagagt tggcaacacc cgaagccgat agtctaaccg caagggggac
1440

gtcgtcgaag gtgggggttga tgattgggggt gaagtcgtaa caaggtagcc gtatcggaag
1500

g t g c g g c t g g a t c a c c t c c t t t
1522

<210> 263

<211> 1531

<212> DNA

<213> artificial sequence

<220>

<223> >SPC11276|OLKKOKAM_04952 16S ribosomal RNA

<400> 263

tttgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcctaaca catgcaagtc
60

gaacgaagcg attaggatga agtttttcgga tggattcctg gttgactgag tggcggacgg
120

gtgagtaacg cgtggataac ctgcctcaca ctggggggata acagttagaa atggctgcta
180

ataccgcata agcgcacagt accgcatggg acgggtgtgaa aaaccacagg ggtgtgagat
240

ggatccgcgt ctgattagcc agttggcggg gtaacggccc accaaagcga cgatcagtag
300

ccgacctgag aggggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggc ggaagcctga tgcagcgacg ccgcgtgagt
420

gaagaagtat ctcggtatgt aaagctctat cagcaggga gaaaatgacg gtacctgact
480

aagaagcccc ggctaactac gtgccagcag ccgcggtaat acgtaggggg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgtag acggcgacgc aagtctggag tgaaagcccc
600

gggccaacc ccgggactgc tttggaaact gtgctgctgg agtgcaggag aggtaagtgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac tgtaactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat gctagggtgtc ggggggcaaa gcccttcggt
840

gccgccgcta acgcaataag cattccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac caagtcttga catccccctg accggcgcgt aacggtgccc ttccttcggg
1020

acagggggaga cagggtggtgc atggttgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ttatccttag tagccagcac gtcgtggtgg gcactctagg
1140

gagactgcc **aggataacct** **ggaggaaggt** **gggatgacg** **tcaaatcatc** **atgcccctta**
1200

tgatttgggc **tacacacgtg** **ctacaatggc** **gtaaacaag** **ggaggcgacc** **ctgcgaaggt**
1260

aagcaaatcc **caaaaataac** **gtcccagttc** **ggactgtagt** **ctgcaaccgc** **actacacgaa**
1320

gctggaatcg **ctagtaatcg** **cggatcagaa** **tgccgcggtg** **aatacgttcc** **cgggtcttgt**
1380

acacaccgcc **cgtcacacca** **tgggagtcag** **caacgcccga** **agtcagtgac** **ccaaccttaa**
1440

caggagggag **ctgccgaagg** **cggggcaggt** **aactgggggtg** **aagtcgtaac** **aaggtagccg**
1500

t a t c g g a a g g **t g c g g c t g g a** **t c a c c t c c t t** **t**
1531

<210> 264

<211> 1527

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000158075|CPLHKKGG_00605 16S ribosomal RNA

<400> 264

tttgagagtt **tgatcctggc** **tcaggatgaa** **cgctggcggc** **gtgcctaaca** **catgcaagtc**
60

gaacgaagca **ttttagatga** **agttttcgga** **tggattctga** **gatgactgag** **tggcggacgg**
120

gtgagtaaca **cgtggataac** **ctgcctcaca** **ctggggggaca** **acagttagaa** **atgactgcta**
180

ataccgcata **agcgcacagt** **accgcatggt** **acggtgtgaa** **aaactccggt** **ggtgtgagat**
240

ggatccgcgt **ctgattagcc** **agttggcggg** **gtaacggccc** **accaaagcga** **cgatcagtag**
300

ccgacctgag aggggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggc gaaagcctga tgcagcgacg ccgcgtgagt
420

gaagaagtat ttcgggtatgt aaagctctat cagcagggaa gataatgacg gtacctgact
480

aagaagcccc ggctaactac gtgccagcag ccgcggtaat acgtaggggg caagcgttat
540

ccggattttac tgggtgtaaa gggagcgtag acggcatggc aagtctgaag tgaaaaccca
600

gggctcaacc ctgggactgc tttggaaact gtcaagctag agtgcaggag aggtaagtgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac tgtaactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgagt gctagggtgtt ggggggcaaa gcccttcggt
840

gccgtcgcaa acgcaataag cactccacct ggggagtacg ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg tttaattcga agcaacgcga
960

agaaccttac caagtcttga catccccctg accggcgtgt aacggcgcct ttccttcggg
1020

acaggggaga caggtggtgc atggttgctg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ttatccttag tagccagcat taagatgggc actctagggg
1140

gactgccagg gacaacctgg aggaagggtgg ggatgacgtc aaatcatcat gcccttatg
1200

atttgggcta cacacgtgct acaatggcgt aaacaaaggg aagcgaccct gcgaagggtga
1260

gcaaattctca aaaataacgt cccagttcgg actgtagtct gcaacccgac tacacgaagc
1320

tggaatcgct agtaatcgcg aatcagaatg tcgcggtgaa tacgttcccg ggtcttgtac
1380

acaccgcccg tcacaccatg ggagtcagca acgcccgaag tcagtgaccc aaccgaaagg
1440

agggagctgc cgaaggcggg gcaggtaact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g g c t g g a t c a c c t c c t t t
1527

<210> 265

<211> 1501

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000154445|GIKJCKH_00383 16S ribosomal RNA

<400> 265

atttgagagt ttgatcctgg ctcaggatga acgctggcgg cgtgcctaac acatgcaagt
60

cgagcgattc tcttcggaga agagcggcgg acgggtgagt aacgcgtggg taacctgccc
120

tgtacacacg gataacatac cgaaaggatg gctaatacgg gataacataa gaaattcgca
180

tgttttttctt atcaaagctc cggcgggtaca ggatggaccc gcgtctgatt agctagttgg
240

tgaggtaacg gctcaccaag gcgacgatca gtagccgacc tgagaggggtg atcggccaca
300

ttggaactga gacacgggtcc aaactcctac gggaggcagc agtgggggaat attgcacaat
360

gggcgaaagc ctgatgcagc aacgccgcgt gagcgatgaa ggccttcggg tcgtaaagct
420

ctgtcctcaa ggaagataat gacgggtactt gaggaggaag ccccggtctaa ctacgtgcca
480

gcagccgcgg taatacgtag ggggctagcg ttatccggat ttactgggcg taaaggggtgc
540

gtaggcggtc ttttaagtca ggagtgaag gctacggctc aaccgtagta agctcttgaa
600

actggaggac ttgagtgcag gagaggagag tggaattcct agtgtagcgg tgaaatgcgt
660

agatattagg aggaacacca gtagcgaagg cggctctctg gactgtaact gacgctgagg
720

cacgaaagcg tggggagcaa acaggattag ataccctggg agtccacgcc gttaaagcatg
780

agtactaggt gtcggggggtt acccccctcg gtgccgcagc taacgcatta agtactccgc
840

ctggggagta cgctcgcaag agtgaaactc aaaggaattg acgggggaccc gcacaagtag
900

cggagcatgt ggtttaattc gaagcaacgc gaagaacctt acctaaagctt gacatccttt
960

tgaccgatgc ctaatcgcat ctttcccttc ggggacagaa gtgacagggtg gtgcatgggt
1020

gtcgtcagct cgtgtcgtga gatgttgggt taagtcccgc aacgagcgca acccttgccct
1080

ttagttgcca tcattaagtt gggcactcta gagggactgc cagggaatac ctggaggaag
1140

gtggggatga cgtcaaataca tcatgcccct tatgcttagg gctacacacg tgctacaatg
1200

ggtggtacag agggcagcga agtcgtgagg ccaagctaata cccttaaagc cattctcagt
1260

tcggattgta ggctgaaact cgcctacatg aagctggagt tactagtaat cgcagatcag
1320

aatgctgcgg tgaatgcgtt cccgggtctt gtacacaccg cccgtcacac catgggagtt
1380

gggggcgccc gaagccggct agctaacctt ttggaagcgg tcgtcgaagg tgaaaccaat
1440

aactgggggtg aagtcgtaac aaggtagccg tatcggaagg tgcggctgga tcacctcctt
1500

t
1501

<210> 266

<211> 1501

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000154445|GIKJCKH_02786 16S ribosomal RNA

<400> 266

atttgagagt ttgatcctgg ctcaggatga acgctggcgg cgtgcctaac acatgcaagt
60

cgagcgattc tctttggaga agagcggcgg acgggtgagt aacgcgtggg taacctgccc
120

tgtacacacg gataacatac cgaaaggatg gctaatacgg gataacataa gaaattcgca
180

tgtttttctt atcaaagctc cggcgggtaca ggatggaccc gcgtctgatt agctagttgg
240

tgaggtaacg gctcaccaag gcgacgatca gtagccgacc tgagaggggtg atcggccaca
300

ttggaactga gacacgggtcc aaactcctac gggaggcagc agtggggaat attgcacaat
360

gggcgaaagc ctgatgcagc aacgccgcgt gagcgatgaa ggccttcggg tcgtaaagct
420

ctgtcctcaa ggaagataat gacggtactt gaggaggaag ccccggttaa ctacgtgcca
480

gcagccgcgg taatacgtag ggggctagcg ttatccggat ttactgggcg taaaggggtgc
540

gtaggcggtc ttttaagtca ggagtgaag gctacggctc aaccgtagta agctcttgaa
600

actggggggac ttgagtgcag gagaggagag tggaattcct agtgtagcgg tgaaatgcgt
660

agatattagg aggaacacca gtagcgaagg cggctctctg gactgtaact gacgctgagg
720

cacgaaagcg tggggagcaa acaggattag ataccctggt agtccacgcc gtaaacgatg
780

agtactagct gtcggagggt acccccttcg gtggcgcagc taacgcatta agtactccgc
840

ctggggagta cgctcgcaag agtgaaactc aaaggaattg acggggaccc gcacaagtag
900

cggagcatgt ggtttaattc gaagcaacgc gaagaacctt acctaagctt gacatccttt
960

tgaccgatgc ctaatcgcat ctttcccttc ggggacagaa gtgacagggtg gtgcatgggt
1020

gtcgtcagct cgtgtcgtga gatgttgggt taagtcccgc aacgagcgca acccttgcct
1080

ttagttgcca tcattaagtt gggcactcta gagggactgc cagggataac ctggaggaag
1140

gtggggatga cgtcaaatca tcatgcccct tatgcttagg gctacacacg tgctacaatg
1200

ggtggtacag agggcagcga agtcgtgagg ccaagctaata cccttaaagc cattctcagt
1260

tcggattgta ggctgaaact cgcctacatg aagctggagt tactagtaata cgcagatcag
1320

aatgctgcgg tgaatgcgtt cccgggtctt gtacacaccg cccgtcacac catgggagtt
1380

gggggcgccc gaagccggct agctaacctt ttggaagcgg tcgtcgaagg tgaaaccaat
1440

aactgggggtg aagtcgtaac aaggtagccg tatcggaagg tgcggctgga tcacctcctt
1500

t
1501

<210> 267

<211> 1169

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000154445|GIKJCKH_02787 16S ribosomal RNA (partial)

<400> 267

gaggcagcag tggggaatat tgcacaatgg gcgaaagcct gatgcagcaa cgccgcgtga
60

gcgatgaagg ccttcgggtc gtaaagctct gtcctcaagg aagataatga cggtacttga
120

ggaggaagcc ccggctaact acgtgccagc agccgcggta atacgtaggg ggctagcggt
180

atccggattt actgggcgta aagggtgcgt aggcggtctt ttaagtcagg agtgaaaggc
240

tacggctcaa ccgtagtaag ctcttgaaac tggaggactt gagtgcagga gaggagagt
300

gaattcctag tgtagcgggtg aaatgcgtag atattaggag gaacaccagt agcgaaggcg
360

gctctctgga ctgtaactga cgctgaggca cgaaagcgtg gggagcaaac aggattagat
420

accctggtag tccacgccgt aaacgatgag tactagctgt cggagggttac ccccttcggt
480

ggcgcagcta acgcattaag tactccgcct ggggagtagc ctcgcaagag tgaaactcaa
540

aggaattgac ggggacccgc acaagtagcg gagcatgtgg ttttaattcga agcaacgcga
600

agaaccttac ctaagcttga catccttttg accgatgcct aatcgcatct ttcccttcgg
660

ggacagaagt gacaggtggg gcatggttgt cgtcagctcg tgtcgtgaga tgttgggtta
720

agtcccgcga cgagcgcaac ccttgccctt agttgccatc attaagttgg gcactctaga
780

gggactgccca gggataacct ggaggaaggt ggggatgacg tcaaatacgc atgcccctta
840

tgcttagggc tacacacgtg ctacaatggg tggtacagag ggcagcgaag tcgtgaggcc
900

aagctaatcc cttaaagcca ttctcagttc ggattgtagg ctgaaactcg cctacatgaa
960

gctggagtta ctagtaatcg cagatcagaa tgctgcggtg aatgcgttcc cgggtcttgt
1020

acacaccgcc cgtcacacca tgggagttgg gggcgcccga agccggctag ctaacctttt
1080

ggaagcggtc gtcgaagggt aaaccaataa ctgggggtgaa gtcgtaacaa ggtagccgta
1140

t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1169

<210> 268

<211> 1501

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000154445|GIKJCKH_02788 16S ribosomal RNA

<400> 268

atttgagagt ttgatacctgg ctcaggatga acgctggcgg cgtgcctaac acatgcaagt
60

cgagcgatct tcttcggaag agagcggcgg acgggtgagt aacgcgtggg taacctgccc
120

tgtacacacg gataacatac cgaaaggat gctaatacgg gataacataa gaaattcgca
180

tgtttttctt atcaaagctc cggcgggtaca ggatggaccc gcgtctgatt agctagttgg
240

tgaggtaacg gctcaccaag gcgacgatca gtagccgacc tgagaggggtg atcggccaca
300

ttggaactga gacacgggtcc aaactcctac gggaggcagc agtggggaat attgcacaat
360

gggcgaaagc ctgatgcagc aacgccgcgt gagcgatgaa ggccttcggg tcgtaaagct
420

ctgtcctcaa ggaagataat gacgggtactt gaggaggaag ccccggtctaa ctacgtgcca
480

gcagccgcgg taatacgtag ggggctagcg ttatccggat ttactgggcg taaaggggtgc
540

gtaggcggtc ttttaagtca ggagtgaag gctacggctc aaccgtagta agctcttgaa
600

actggaggac ttgagtgcag gagaggagag tggaattcct agtgtagcgg tgaaatgcgt
660

agatattagg aggaacacca gtagcgaagg cggctctctg gactgtaact gacgctgagg
720

cacgaaagcg tggggagcaa acaggattag ataccctggg agtccacgcc gttaaagcatg
780

agtactagct gtcggagggtt acccccttcg gtggcgcagc taacgcatta agtactccgc
840

ctgggggagta cgctcgcaag agtgaaactc aaaggaattg acgggggaccc gcacaagtag
900

cgagcatgt ggtttaattc gaagcaacgc gaagaacctt acctagctt gacatccttt
960

tgaccgatgc ctaatcgcac ctttcccttc ggggacagaa gtgacagggtg gtgcatgggt
1020

gtcgtcagct cgtgtcgtga gatgttgggt taagtcccg cagagcgca acccttgcct
1080

ttagttgcca tcattaagtt gggcactcta gagggactgc cagggataac ctggaggaag
1140

gtggggatga cgtcaaatca tcatgccctt tatgcttagg gctacacacg tgctacaatg
1200

ggtggtacag agggcagcga agtcgtgagg ccaagctaata cccttaaagc cattctcagt
1260

tcggattgta ggctgaaact cgcctacatg aagctggagt tactagtaata cgcagatcag
1320

aatgctgcgg tgaatgcgtt cccgggtctt gtacacaccg cccgtcacac catgggagtt
1380

gggggcccc gaagccggct agctaacctt ttggaagcgg tcgtcgaagg tgaaaccaat
1440

aactgggggtg aagtcgtaac aaggtagccg tatcggaagg tgcggctgga tcacctcctt
1500

t
1501

<210> 269

<211> 1501

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000154445|GIKJCKH_02812 16S ribosomal RNA

<400> 269

atttgagagt ttgatcctgg ctcaggatga acgctggcgg cgtgcctaac acatgcaagt
60

cgagcgattc tcttcggaga agagcggcgg acgggtgagt aacgcgtggg taacctgccc
120

tgtacacacg gataacatac cgaaaggtat gctaatacgg gataacataa gaaattcgca
180

tgttttttctt atcaaagctc cggcgggtaca ggatggaccc gcgtctgatt agctagttgg
240

tgaggtaacg gctcaccaag gcgacgatca gtagccgacc tgagaggggtg atcggccaca
300

ttggaactga gacacgggtcc aaactcctac gggaggcagc agtggggaat attgcacaat
360

gggcgaaagc ctgatgcagc aacgccgcgt gagcgatgaa ggccttcggg tcgtaaagct
420

ctgtcctcaa ggaagataat gacgggtactt gaggaggaag ccccggtctaa ctacgtgcca
480

gcagccgcgg taatacgtag ggggctagcg ttatccggat ttactgggcg taaaggggtgc
540

gtaggcggtc ttttaagtca ggagtgaaag gctacggctc aaccgtagta agctcttgaa
600

actggaggac ttgagtgcag gagaggagag tggaattcct agtgtagcgg tgaaatgcgt
660

agatattagg aggaacacca gtagcgaagg cggctctctg gactgtaact gacgctgagg
720

cacgaaagcg tggggagcaa acaggattag ataccctggg agtccacgcc gttaaagcatg
780

agtactagct gtcggagggtt acccccttcg gtggcgcagc taacgcatta agtactccgc
840

ctgggggagta cgctcgcaag agtgaaactc aaaggaattg acgggggaccc gcacaagtag
900

cggagcatgt ggtttaattc gaagcaacgc gaagaacctt acctaagctt gacatccttt
960

tgaccgatgc ctaatcgcat ctttcccttc ggggacagaa gtgacagggtg gtgcatgggt
1020

gtcgtcagct cgtgtcgtga gatgttgggt taagtcccg c aacgagcgca acccttgct
1080

ttagttgcca tcattaagtt gggcactcta gagggactgc cagggataac ctggaggaag
1140

gtggggatga cgtcaaata tcatgcccct tatgcttagg gctacacacg tgctacaatg
1200

ggtggtacag agggcagcga agtcgtgagg ccaagctaata cccttaaagc cattctcagt
1260

tcggattgta ggctgaaact cgcctacatg aagctggagt tactagtaata cgcagatcag
1320

aatgctgcgg tgaatgcgtt cccgggtctt gtacacaccg cccgtcacac catgggagtt
1380

gggggagccc gaagccggct agctaacctt ttggaagcgg tcgtcgaagg tgaaaccaat
1440

aactgggggtg aagtcgtaac aaggtagccg tatcggaagg tgcggctgga tcacctcctt
1500

t
1501

<210> 270

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000154365|IEEMCAGI_02026 16S ribosomal RNA

<400> 270

atgagagttt gacctggct caggatgaac gctggcggcg tgcctaacac atgcaagtcg
60

aacgaagcaa ttgaaggaag ttttcggatg gaattcgatt gactgagtgg cggacgggtg
120

agtaacgcgt 180	ggataacctg	cctcacactg	ggggataaca	gtagaaatg	actgctaata
ccgcataagc 240	gcacagtacc	gcatggtaca	gtgtgaaaaa	ctccggtggt	gtgagatgga
tccgcgtctg 300	attagccagt	tggcggggta	acggcccacc	aaagcgacga	tcagtagccg
acctgagagg 360	gtgaccggcc	acattgggac	tgagacacgg	cccaaactcc	tacgggaggc
agcagtgggg 420	aatattgcac	aatgggcgaa	agcctgatgc	agcgacgccg	cgtgagtgaa
gaagtatttc 480	ggtatgtaaa	gctctatcag	cagggaagaa	aatgacggta	cctgactaag
aagccccggc 540	taactacgtg	ccagcagccg	cggtaatacg	tagggggcaa	gcgttatccg
gatttactgg 600	gtgtaaaggg	agcgtagacg	gcgaagcaag	tctgaagtga	aaaccaggg
ctcaaccctg 660	ggactgcttt	ggaaactggt	ttgctagagt	gtcggagagg	taagtggaat
tcctagtgtg 720	gcggtgaaat	gcgtagatat	taggaggaa	accagtggcg	aaggcggctt
actggacgat 780	aactgacggt	gaggctcgaa	agcgtgggga	gcaaacagga	ttagataccc
tggtagtcca 840	cgccgtaa	gatgaatgct	aggtgttggg	gggcaaagcc	cttcggtgcc
gtcgcaaacg 900	cagtaagcat	tccacctggg	gagtacgttc	gcaagaatga	aactcaaagg
aattgacggg 960	gacccgcaca	agcgggtggag	catgtgggtt	aattcgaagc	aacgcgaaga
accttaccaa 1020	gtcttgacat	cctcttgacc	ggcgtgtaac	ggcgccttcc	cttcggggca

agagagacag gtggtgcatg gttgtcgtca gctcgtgtcg tgagatgttg ggtaaagtcc
1080

cgcaacgagc gcaaccctta tccttagtag ccagcaggta aagctgggca ctctagggag
1140

actgccaggg ataacctgga ggaaggtggg gatgacgtca aatcatcatg ccccttatga
1200

tttgggctac acacgtgcta caatggcgta aacaaaggga agcaagacag tgatgtggag
1260

caaatcccaa aaataacgtc ccagttcgga ctgtagtctg caacccgact acacgaagct
1320

ggaatcgcta gtaatcgcgga atcagaatgt cgcggtgaat acgttcccgg gtcttgtaca
1380

caccgcccgt cacaccatgg gagtcagcaa cgcccgaagt cagtgacca actcgcaaga
1440

gagggagctg ccgaaggcgg ggcaggtaac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 271

<211> 1426

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000233455|AHPKGLEH_06074 16S ribosomal RNA

<220>

<221> misc_feature

<222> (1422)..(1426)

<223> n is a, c, g, or t

<400> 271

tttgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcctaaca catgcaagtc
60

gaacgaagca atcagaatga aatttttcgga tggattttctg gttgactgag tggcggacgg
120

gtgagtaacg cgtggataac ctgcctcaca ctggggggata acagttagaa atggctgcta
180

ataccgcata agcgcacagt accgcatggt acggtgtgaa aaactccggt ggtgtgagat
240

ggatccgcgt ctgattagtt agttggcggg gtaacggccc accaagacag cgatcagtag
300

ccgacctgag aggggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggc gaaagcctga tgcagcgacg ccgcgtgagt
420

gaagaagtat ttcggtatgt aaagctctat cagcagggaa gaaaatgacg gtacctgact
480

aagaagcccc ggctaactac gtgccagcag ccgcggtaat acgtaggggg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgtag acggcgaagc aagtctgaag tgaaaaccca
600

gggctcaacc ctgggactgc tttggaaact gttttgctag agtgtcggag aggtaagtgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac gataactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat gctagggtgtt ggggggcaaa gcccttcggt
840

gccgtcgcaa acgcaataag cattccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac caagtcttga catccccctg accggtcagt aaagtgacct ttccttcggg
1020

acaggggaga caggtggtgc atggttgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ttatccttag tagccagcag gtaaagctgg gcactctagg
1140

gagactgcca gggataacct ggaggaaggt ggggatgacg tcaaatacatc atgcccctta
1200

tgatttgggc tacacacgtg ctacaatggc gtaaacaag ggaagcgacc ctgcgaaggc
1260

aagcaaatcc caaaaataac gtcccagttc ggactgtagt ctgcaaccgc actacacgaa
1320

gctggaatcg ctagtaatcg cgaatcagaa tgtcgcggtg aatacgttcc cgggtcttgt
1380

acacaccgcc cgtcacacca tgggagtcag caacgcccga annnnn
1426

<210> 272

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000371525|EJCIJBLF_04781 16S ribosomal RNA

<400> 272

atgagagttt gatcctggct caggatgaac gctggcgggc tgcctaacac atgcaagtcg
60

aacgaagcaa ttaaaggaag ttttcggacg gaatttgatt gactgagtgg cggacgggtg
120

agtaacgcgt ggataacctg cctcacactg ggggataaca gttagaaatg actgctaata
180

ccgcataagc gcacagtacc gcatggtacg gtgtgaaaaa ctccggtggg gtgagatgga
240

tccgcgtctg attagccagt tggcggggta acggcccacc aaagcgacga tcagtagccg
300

acctgagagg gtgaccggcc acattgggac tgagacacgg cccaaactcc tacgggaggg
360

agcagtgggg aatattgcac aatgggcgaa agcctgatgc agcgacgccg cgtgagtgaa
420

gaagtatttc ggtatgtaaa gctctatcag cagggaagaa aatgacggta cctgactaag
480

aagccccggc taactacgtg ccagcagccg cggtaatcgc tagggggcaa gcgttatccg
540

gatttactgg gtgtaaaggg agcgtagacg gcgaagcaag tctgaagtga aaaccagg
600

ctcaaccctg ggactgcttt ggaaactggt ttgctagagt gtcggagagg taagtggaat
660

tcctagtgtg gcggtgaaat gcgtagatat taggaggaac accagtggcg aaggcggctt
720

actggacgat aactgacggt gaggctcgaa agcgtgggga gcaaacagga ttagataccc
780

tggtagtcca cgccgtaaac gatgaatgct aggtgttggg gggcaaagcc cttcggtgcc
840

gtcgcaaacg cagtaagcat tccacctggg gagtacgttc gcaagaatga aactcaaagg
900

aattgacggg gacccgcaca agcgggtggag catgtgggtt aattcgaagc aacgcgaaga
960

accttaccaa gtcttgacat ccttttgacc ggcgtgtaac ggcgccttcc cttcggggca
1020

agagagacag gtggtgcatg gttgtcgtca gctcgtgtcg tgagatgttg ggttaagtcc
1080

cgcaacgagc gcaaccctta tccttagtag ccagcaggta gagctgggca ctctaggagg
1140

actgccaggg ataacctgga ggaaggcggg gatgacgtca aatcatcatg ccccttatga
1200

tttgggctac acacgtgcta caatggcgta aacaaaggga agcaagacag tgatgtggag
1260

caaatcccaa aaataacgtc ccagttcgga ctgtagtctg caacccgact acacgaagct
1320

ggaatcgcta gtaatcgcgga atcagaatgt cgcgggtgaat acgttcccgg gtcttgtaca
1380

caccgcccgt cacaccatgg gagtcagcaa cgcccgaagt cagtgacca actcgcaaga
1440

gagggagctg ccgaaggcgg ggcaggtaac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 273

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000371525|EJCIJBLF_05555 16S ribosomal RNA

<400> 273

atgagagttt gatcctggct caggatgaac gctggcggcg tgcctaacac atgcaagtcg
60

aacgaagcaa ttaaaggaag ttttcggatg gaatttgatt gactgagtgg cggacggggtg
120

agtaacgcgt ggataacctg cctcacactg ggggataaca gttagaaatg actgctaata
180

ccgcataagc gcacagtgcc gcatggtacg gtgtgaaaaa ctccgggtgggt gtgagatgga
240

tccgcgtctg attagccagt tggcggggta acggcccacc aaagcgacga tcagtagccg
300

acctgagagg gtgaccggcc acattgggac tgagacacgg cccaaactcc tacgggaggc
360

agcagtgggg aatattgcac aatgggcgaa agcctgatgc agcgacgccg cgtgagtga
420

gaagtatttc ggtatgtaaa gctctatcag caggggaagaa aatgacggta cctgactaag
480

aagccccggc taactacgtg ccagcagccg cggtaatatc tagggggcaa gcgttatccg
540

gatttactgg gtgtaaaggg agcgtagacg gcgaagcaag tctgaagtga aaaccaggg
600

ctcaaccctg ggactgcttt ggaaactggt ttgctagagt gtcggagagg taagtggaat
660

tcctagtgtg gcggtgaaat gcgtagatat taggaggaac accagtggcg aaggcggctt
720

actggacgat aactgacgtt gaggctcgaa agcgtgggga gcaaacagga ttagataccc
780

tggtagtcca cgccgtaaac gatgaatgct aggtgttggg gggcaaagcc cttcgggtgcc
840

gtcgcaaacg cagtaagcat tccacctggg gagtacgttc gcaagaatga aactcaaagg
900

aattgacggg gacccgcaca agcgggtggag catgtgggtt aattcgaagc aacgcgaaga
960

accttaccaa gtcttgacat cctcttgacc ggcgtgtaac ggcgccttcc cttcggggca
1020

agagagacag gtggtgcatg gttgtcgtca gctcgtgtcg tgagatgttg ggttaagtcc
1080

cgcaacgagc gcaaccctta tccttagtag ccagcaggta gagctgggca ctctagggag
1140

actgccaggg ataacctgga ggaagggtgg gatgacgtca aatcatcatg ccccttatga
1200

tttgggctac acacgtgcta caatggcgta aacaaaggga agcaagacag tgatgtggag
1260

caaatcccaa aaataacgtc ccagttcgga ctgtagtctg caacccgact acacgaagct
1320

ggaatcgcta gtaatcgcgga atcagaatgt cgcggtgaat acgttcccgg gtcttgtaca
1380

caccgcccgt cacaccatgg gagtcagcaa cgcccgaagt cagtgacca actcgcaaga
1440

gagggagctg ccgaaggcgg ggcaggtaac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 274

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000371525|EJCIBLIF_05682 16S ribosomal RNA

<400> 274

atgagagttt gatcctggct caggatgaac gctggcggcg tgcctaacac atgcaagtcg
60

aacgaagcaa ttaaaggaag ttttcggatg gaatttgatt gactgagtgg cggacgggtg
120

agtaacgcgt ggataacctg cctcacactg ggggataaca gttagaaatg actgctaata
180

ccgcataagc gcacagtacc gcatgggtacg gtgtgaaaaa ctccggtggt gtgagatgga
240

tccgcgtctg attagccagt tggcggggta acggcccacc aaagcgacga tcagtagccg
300

acctgagagg gtgaccggcc acattgggac tgagacacgg cccaaactcc tacgggaggg
360

agcagtgggg aatattgcac aatgggcgaa agcctgatgc agcgacgccg cgtgagtgaa
420

gaagtatttc ggtatgtaaa gctctatcag cagggaagaa aatgacggta cctgactaag
480

aagccccggc taactacgtg ccagcagccg cggtaatacg tagggggcaa gcgttatccg
540

gatttactgg gtgtaaaggg agcgtagacg gcgaagcaag tctgaagtga aaaccacagg
600

ctcaaccctg ggactgcttt ggaaactggt ttgctagagt gtcggagagg taagtggaat
660

tcctagtgtg gcggtgaaat gcgtagatat taggaggaac accagtggcg aaggcggctt
720

actggacgat aactgacggt gaggctcgaa agcgtgggga gcaaacagga ttagataccc
780

tggtagtcca cgccgtaaac gatgaatgct aggtgttggg gggcaaagcc cttcgggtgcc
840

gtcgcaaacg cagtaagcat tccacctggg gagtacgttc gcaagaatga aactcaaagg
900

aattgacggg gacccgcaca agcgggtggag catgtggttt aattcgaagc aacgcgaaga
960

accttaccaa gtcttgacat cctcttggcc ggcgtgtaac ggcgccttcc cttcggggca
1020

agagagacag gtggtgcatg gttgtcgtca gctcgtgtcg tgagatgttg ggttaagtcc
1080

cgcaacgagc gcaaccctta tccttagtag ccagcaggta gagctgggca ctctagggag
1140

actgccaggg ataacctgga ggaagggtggg gatgacgtca aatcatcatg ccccttatga
1200

tttgggctac acacgtgcta caatggcgta aacaaaggga agcaagacag tgatgtggag
1260

caaatcccaa aaataacgtc ccagttcgga ctgtagtctg caacccgact acacgaagct
1320

ggaatcgcta gtaatcgcgga atcagaatgt cgcggtgaat acgttcccgg gtcttgtaca
1380

caccgcccgt cacaccatgg gagtcagcaa cgcccgaagt cagtgaccca actcgcaaga
1440

gagggagctg ccgaaggcgg ggcaggtaac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 275

<211> 1513

<212> DNA

<213> artificial sequence

<220>

<223> >GCA_900066955|MEIAGFLD_00763 16S ribosomal RNA

<400> 275

agtgagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcctaaca catgcaagtc
60

gagcgagtga atctccttcg ggagtgaagc tagcggcgga cgggtgagta acacgtgggc
120

aacctgcctc atagagggga atagccttcc gaaaggaaga ttaataaccgc ataagattgt
180

agcttcgcat gaagtagcaa tttaaaggagc aatccgctat gagatggggc cgcggcgcat
240

tagctagttg gtgaggtaac ggctcaccaa ggcgacgatg cgtagccgac ctgagagggg
300

gatcggccac attgggactg agacacggcc cagactccta cgggaggcag cagtggggaa
360

tattgcacaa tgggggaaac cctgatgcag caacgccgcg tgagtgatga cggccttcgg
420

gttgtaaagc tctgtcttca gggacgataa tgacggtacc tgaggaggaa gccacggcta
480

actacgtgcc agcagccgcg gtaatacgtg ggtggcgagc gttgtccgga tttactgggc
540

gtaaagggag cgtaggcgga cttttaagtg agatgtgaaa taccgggct caacttgggt
600

gctgcatttc aaactggaag tctagagtgc aggagaggag aatggaattc ctagtgtagc
660

ggtgaaatgc gtagagatta ggaagaacac cagtggcgaa ggcgattctc tggactgtaa
720

ctgacgctga ggctcgaaag cgtggggagc aaacaggatt agataccctg gtagtccacg
780

ccgtaaacga tgaatactag gtgtaggggt tgtcatgacc tctgtgccgc cgctaacgca
840

ttaagtattc cgctgggga gtacggtcgc aagattaaaa ctcaaaggaa ttgacggggg
900

cccgcacaag cagcggagca tgtggtttaa ttcgaagcaa cgcaagaac cttacctaga
960

cttgacatct cctgcattac ccttaatcgg ggaagttcct tcgggaacag gaagacaggt
1020

ggtgcatggg tgtcgtcagc tcgtgtcgtg agatgttggg ttaagtcccg caacgagcgc
1080

aacccttatt gttagttgct accatttagt tgagcactct agcgagactg cccgggttaa
1140

ccgggaggaa ggtggggatg acgtcaaadc atcatgcccc ttatgtctag ggctacacac
1200

gtgctacaat ggcaagtaca aagagaagca agaccgcgag gtggagcaaa actcaaaaac
1260

ttgtctcagt tcggattgta ggctgaaact cgcctacatg aagctggagt tgctagtaat
1320

cgcgaatcag catgtcgcg tgaatacgtt cccgggcctt gtacacaccg cccgtcacac
1380

catgagagtt ggcaataccc aaagtgcgtg atctgactcg caagagagga agcgccctaa
1440

ggtaggggtca gcgattgggg tgaagtcgta acaaggtagc cgtaggagaa cctgcggctg
1500

g a t c a c c t c c t t t
1513

<210> 276

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000371445|MHGGNMMN_02421 16S ribosomal RNA

<400> 276

atgagagttc gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

agcgaagcgg tttcaatgaa gttttcggat ggaattgaaa ttgacttagc ggcggacggg
120

tgagtaacgc gtgggtaacc tgccttacac tgggggataa cagttagaaa tgactgctaa
180

taccgcataa gcgcacaggg ccgcatggtc tgggtgtgaaa aactccggtg gtgtaagatg
240

gacccgcgtc tgattaggta gttgggtggg taacggccca ccaagccgac gatcagtagc
300

cgacctgaga gggtgaccgg ccacattggg actgagacac ggcccaaact cctacgggag
360

gcagcagtgg ggaatattgg acaatgggcg aaagcctgat ccagcgacgc cgcgtgagtg
420

aagaagtatt tcggtatgta aagctctatc agcagggaag aaaatgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggtaata cgtagggggc aagcgttatc
540

cggatttact ggggtgtaaag ggagcgtaga cggttaagca agtctgaagt gaaagcccgg
600

ggctcaaccc cgggtactgct ttggaaactg tttgacttga gtgcaggaga ggtaagtgga
660

attcctagtg tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcggc
720

ttactggact gtaactgacg ttgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgaata ctaggtgtcg ggggacaacg tccttcggtg
840

ccgccgctaa cgcaataagt attccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg gggacccgca caagcgggtg agcatgtggt ttaattcgaa gcaacgcgaa
960

gaaccttacc aagtcttgac atcccattga aaacacttta accggtgtcc ctcttcggag
1020

caatggagac aggtggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaaccct tatccttagt agccagcaca tgatgggtggg cactctgggg
1140

agactgccag ggataacctg gaggaagggtg gggatgacgt caaatcatca tgccccttat
1200

gatttgggct acacacgtgc tacaatggcg taaacaaagg gaagcaaagg agcgatctgg
1260

agcaaacccc aaaaataacg tctcagttcg gattgcaggc tgcaactcgc ctgcatgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcgggtga atacgttccc gggctcttgta
1380

cacaccgccc gtcacaccat gggagttggt aacgcccga gtcagtgacc caaccgcaag
1440

gagggagctg ccgaaggcgg gactgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 277

<211> 927

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000371445|MHGGNMMN_05914 16S ribosomal RNA (partial)

<400> 277

atgagagttc gatcctggct caggatgaac gctggcgggc tgcttaacac atgcaagtcg
60

agcgaagcgg tttcaatgaa gttttcggat ggatttgaaa ttgacttagc ggcggacggg
120

tgagtaacgc gtgggtaacc tgccttacac tgggggataa cagttagaaa tgactgctaa
180

taccgcataa gcgcacaggg ccgcatggtc tgggtgtgaaa aactccggtg gtgtaagatg
240

gacccgcgtc tgattaggta gttggtgggg taacggccca ccaagccgac gatcagtagc
300

cgacctgaga gggtgaccgg ccacattggg actgagacac ggcccaaact cctacgggag
360

gcagcagtgg ggaatattgg acaatgggcg aaagcctgat ccagcgacgc cgcgtgagtg
420

aagaagtatt tcggtatgta aagctctatc agcagggaag aaaatgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggttaata cgtagggggc aagcgttatc
540

cggtttact ggggtgtaaag ggagcgtaga cggttaagca agtctgaagt gaaagcccgg
600

ggctcaaccc cggtagtgct ttggaaactg tttgacttga gtgcaggaga ggtaagtgga
660

attcctagt tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcggc
720

ttactggact gtaactgacg ttgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgaata ctaggtgtcg ggggacaaag tccttcggtg
840

ccgccgctaa cgcaataagt attccacctg gggagtagct tcgcaagaat gaaactcaaa
900

g g a a t t g a c g g g g a c c c g c a c a a g c g g
927

<210> 278

<211> 1537

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000371425|K0JCOHFI_01470 16S ribosomal RNA

<400> 278

atggagagtt tgatcctggc tcaggatgaa cgctggcggc atgcctaata catgcaagtc
60

gaacgaagac tctaggaagc ttgcttccaa agagacttag tggcgaacgg gtgagtaaca
120

cgtaggtaac ctgcccattgt gtccgggata actgctggaa acggtagcta aaaccggata
180

ggtatacaga gcgcatgctc agtatattaa agcgcccatc aaggcgtgaa catggatgga
240

cctgcggcgc attagctagt tggtaggta acggcccacc aaggcgatga tgcgtagccg
300

gcctgagagg gtaaacggcc acattgggac tgagacacgg cccaaactcc tacgggaggc
360

agcagtaggg aattttcgtc aatgggggaa accctgaacg agcaatgccg cgtgagtga
420

gaaggtcttc ggatcgtaaa gctctgttgt aagtgaagaa cggctcatag aggaaatgct
480

atgggagtga cggtagctta ccagaaagcc acggctaact acgtgccagc agccgcggta
540

atacgtaggt ggcaagcggt atccggaatc attgggcgta aagggtgcgt aggtggcgta
600

ctaagtctgt agtaaaaggc aatggctcaa ccattgtaag ctatggaaac tggtatgctg
660

gagtgcagaa gagggcgatg gaattccatg tgtagcggta aaatgcgtag atatatggag
720

gaacaccagt ggcgaaggcg gtcgcctggt ctgtaactga cactgaggca cgaaagcgtg
780

gggagcaa at aggattagat accctagtag tccacgccgt aaacgatgag aactaagtgt
840

tggaggaatt cagtgctgca gttaacgcaa taagttctcc gcctggggag tatgcacgca
900

agtgtgaaac tcaaaggaat tgacgggggc ccgcacaagc ggtggagtat gtggtttaat
960

tcgaagcaac gcgaagaacc ttaccaggcc ttgacatgga aacaaatacc ctagagatag
1020

ggggataatt atggatcaca caggtggtgc atggttgctg tcagctcgtg tcgtgagatg
1080

ttgggttaag tcccgcaacg agcgcaaccc ttgtcgcgat ttaccagcat caagttgggg
1140

actcatgcga gactgccggt gacaaaccgg aggaagggtg ggatgacgtc aaatcatcat
1200

gccccttatg gcctgggcta cacacgtact acaatggcga ccacaaagag cagcgacttg
1260

gtgacaagaa gcgaatctca taaagggtcgt ctcagttcgg attgaagtct gcaactcgac
1320

ttcatgaagt cggaatcgct agtaatcgca gatcagcatg ctgcggtgaa tacgtttctcg
1380

ggccttgtac acaccgcccc tcaaaccatg ggagtcagta ataccggaag ccggtggcat
1440

aaccgtaagg agtgagccgt cgaaggtagg accgatgact ggggttaagt cgtaacaagg
1500

t a t c c c t a c g g g a a c g t g g g g a t g g a t c a c c t c c t t t
1537

<210> 279

<211> 1537

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000371425|K0JCOHFI_01712 16S ribosomal RNA

<400> 279

atggagagtt tgatcctggc tcaggatgaa cgctggcggc atgcctaata catgcaagtc
60

gaacgaagtc ttcaggaagc ttgcttccaa aaagacttag tggcgaacgg gtgagtaaca
120

cgtaggtaac ctgcccattgt gtccgggata actgctggaa acggtagcta aaaccggata
180

ggtatacggg gcgcatgctc tgtatatata agcgcccatc aaggcgtgaa catggatgga
240

cctgcggcgc attagctagt tgggtgaggta acggcccacc aaggcgatga tgcgtagccg
300

gcctgagagg gtaaaccggcc acattgggac tgagacacgg cccaaactcc tacgggaggg
360

agcagtaggg aatttttcgtc aatgggggaa accctgaacg agcaatgccg cgtgagtgaa
420

gaaggtcttc ggatcgtaaa gctctgttgt aagtgaagaa cggctcatag aggaaatgct
480

atgggagtga cggtagctta ccagaaagcc acggctaact acgtgccagc agccgcggta
540

atacgtaggt ggcaagcggt atccggaatc attgggcgta aaggggtgcgt aggtggcgta
600

ctaagtctgt agtaaaaggc aatggctcaa ccattgtaag ctatggaaac tggatatgctg
660

gagtgcagaa gagggcgatg gaattccatg tgtagcggta aaatgcgtag atatatggag
720

gaacaccagt ggcgaaggcg gtcgcctggg ctgtaactga cactgaggca cgaaagcgtg
780

gggagcaa at aggattagat accctagtag tccacgccgt aaacgatgag aactaagtgt
840

tggaggaatt cagtgctgca gttaacgcaa taagtctctc gcctggggag tatgcacgca
900

agtgtgaaac tcaaaggaat tgacgggggc cgcacaagc ggtggagtat gtggtttaat
960

tcgaagcaac gcgaagaacc ttaccaggcc ttgacatgga aacaaatacc ctagagatag
1020

ggggataatt atggatcaca caggtggtgc atggttgtcg tcagctcgtg tcgtgagatg
1080

ttgggttaag tcccgcacg agcgcaaccc ttgtcgcgtg ttaccagcat caagttgggg
1140

actcatgcga gactgccggt gacaaaccgg aggaagggtg ggatgacgtc aaatcatcat
1200

gccccttatg gcctgggcta cacacgtact acaatggcga ccacaaagag cagcgacttg
1260

gtgacaagaa gcgaatctca taaagggtcgt ctcagttcgg attgaagtct gcaactcgac
1320

ttcatgaagt cggaatcgct agtaatcgca gatcagcatg ctgcggtgaa tacgtttctcg
1380

ggccttgtac acaccgcccg tcaaaccatg ggagtcagta ataccgaag ccggtggcat
1440

aaccgtaagg agtgagccgt cgaaggtagg accgatgact ggggttaagt cgtaacaagg
1500

t a t c c c t a c g g g a a c g t g g g g a t g g a t c a c c t c c t t t
1537

<210> 280

<211> 1537

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000371425|KOJCOHFI_01712 16S ribosomal RNA

<400> 280

atggagagtt tgatcctggc tcaggatgaa cgctggcggc atgcctaata catgcaagtc
60

gaacgaagtc ttcaggaagc ttgcttccaa aaagacttag tggcgaacgg gtgagtaaca
120

cgtaggtaac ctgcccattgt gtccgggata actgctggaa acggtagcta aaaccggata
180

ggtatacgga gcgcatgctc tgtatatataa agcgcccttc aaggcgtgaa catggatgga
240

cctgcgacgc attagctagt tgggtgaggta acggcccacc aaggcgatga tgcgtagccg
300

gcctgagagg gtaaacggcc acattgggac tgagacacgg cccaaactcc tacgggaggc
360

agcagtaggg aatttttcgtc aatgggggaa accctgaacg agcaatgccg cgtgagtgaa
420

gaaggtcttc ggatcgtaaa gctctgttgt aagtgaagaa cggctcatag aggaaatgct
480

atgggagtga cggtagctta ccagaaagcc acggctaact acgtgccagc agccgcggta
540

atacgtaggt ggcaagcggt atccggaatc attgggcgta aaggggtgcgt aggtggcgta
600

ctaagtctgt agtaaaaggc aatggctcaa ccattgtaag ctatggaaac tggatatgctg
660

gagtgcagaa gagggcgatg gaattccatg tgtagcggta aaatgcgtag atatatggag
720

gaacaccagt ggcgaaggcg gtcgcctggt ctgtaactga cactgaggca cgaaagcgtg
780

gggagcaaatt aggattagat accctagtag tccacgccgt aaacgatgag aactaagtgt
840

tggagaaatt cagtgtgca gttaacgcaa taagttctcc gcctggggag tatgcacgca
900

agtgtgaaac tcaaaggaat tgacgggggc cgcacaagc ggtggagtat gtggtttaat
960

tcgaagcaac gcgaagaacc ttaccaggcc ttgacatgga aacaaatacc ctagagatag
1020

ggggataatt atggatcaca caggtggtgc atggttgtcg tcagctcgtg tcgtgagatg
1080

ttgggttaag tcccgcaacg agcgcaaccc ttgtcgcgatg ttaccagcat caagttgggg
1140

actcatgcga gactgccggt gacaaaccgg aggaagggtgg ggatgacgtc aaatcatcat
1200

gcccttatg gcctgggcta cacacgtact acaatggcga ccacaaagag cagcgacttg
1260

gtgacaagaa gcgaatctca taaaggctcgt ctcagttcgg attgaagtct gcaactcgac
1320

ttcatgaagt cggaatcgct agtaatcgca gatcagcatg ctgcggtgaa tacgtttctcg
1380

ggccttgtag acaccgcccc tcaaaccatg ggagtcagta ataccgaag ccggtggcat
1440

aaccgtaagg agtgagccgt cgaaggtagg accgatgact ggggttaagt cgtaacaagg
1500

t a t c c c t a c g g g a a c g t g g g g a t g g a t c a c c t c c t t t
1537

<210> 281

<211> 1537

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000371425|KOJCOHFI_03996 16S ribosomal RNA

<400> 281

atggagagtt tgatcctggc tcaggatgaa cgctggcggc atgcctaata catgcaagtc
60

gaacgaagtc ttcaggaagc ttgcttccaa aaagacttag tggcgaacgg gtgagtaaca
120

cgtaggtaac ctgcccatgt gtccgggata actgctggaa acggtagcta aaaccggata
180

ggtatacgga gcgcatgctc agtatattaa agcgcccatc aaggcgtgaa catggatgga
240

cctgcggcgc attagctagt tggtgaggta acggcccacc aaggcgatga tgcgtagccg
300

gcctgagagg gtaaacggcc acattgggac tgagacacgg cccaaactcc tacgggaggg
360

agcagtaggg aattttcgtc aatgggggaa accctgaacg agcaatgccg cgtgagtgaa
420

gaaggctctt ggatcgtaaa gctctgttgt aagtgaagaa cggctcatag aggaaatgct
480

atgggagtgga	cggtagctta	ccagaaagcc	acggctaact	acgtgccagc	agccgcggta
540					
atacgtaggt	ggcaagcggt	atccggaatc	attgggcgta	aaggggtgcgt	aggtggcgta
600					
ctaagtctgt	agtaaaaggc	aatggctcaa	ccattgtaag	ctatggaaac	tggtatgctg
660					
gagtgcagaa	gagggcgatg	gaattccatg	tgtagcggta	aaatgcgtag	atatatggag
720					
gaacaccagt	ggcgaaggcg	gtcgcctggg	ctgtaactga	cactgaggca	cgaaagcggt
780					
gggagcaaatt	aggattagat	accctagtag	tccacgccgt	aaacgatgag	aactaagtgt
840					
tggaggaatt	cagtgctgca	gttaacgcaa	taagttctcc	gcctggggag	tatgcacgca
900					
agtgtgaaac	tcaaaggaat	tgacgggggc	ccgcacaagc	ggtggagtat	gtggtttaat
960					
tcgaagcaac	gcgaagaacc	ttaccaggcc	ttgacatgga	aacaaatacc	ctagagatag
1020					
ggggataatt	atggatcaca	caggtgggtgc	atggttgtcg	tcagctcgtg	tcgtgagatg
1080					
ttgggttaag	tcccgcacg	agcgcaaccc	ttgtcgcgatg	ttaccagcat	caagttgggg
1140					
actcatgcga	gactgccggt	gacaaaccgg	aggaagggtgg	ggatgacgtc	aatcatcat
1200					
gccccttatg	gcctgggcta	cacacgtact	acaatggcga	ccacaaagag	cagcgacttg
1260					
gtgacaagaa	gcgaatctca	taaagggtcgt	ctcagttcgg	attgaagtct	gcaactcgac
1320					
ttcatgaagt	cggaatcgct	agtaatcgca	gatcagcatg	ctgcggtgaa	tacgtttctcg
1380					

ggccttgtac acaccgcccg tcaaaccatg ggagtcagta ataccgaag ccggtggcat
1440

aaccgtaagg agtgagccgt cgaaggtagg accgatgact ggggttaagt cgtaacaagg
1500

tatccctacg ggaacgtggg gatggatcac ctcccttt
1537

<210> 282

<211> 1537

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000371425|K0JCOHFI_04550 16S ribosomal RNA

<400> 282

atggagagtt tgatcctggc tcaggatgaa cgctggcggc atgcctaata catgcaagtc
60

gaacgaagtc tttaggaagc ttgcttccaa aaagacttag tggcgaacgg gtgagtaaca
120

cgtaggtaac ctgcccattgt gtccgggata actgctggaa acggtagcta aaaccggata
180

ggtatacggg gcgcatgctc tgtatatataa agcgcccatc aaggcgtgaa catggatgga
240

cctgcggcgc attagctagt tgggtgaggta acggcccacc aaggcgtgaa tgcgtagccg
300

gcctgagagg gtaaacggcc acattgggac tgagacacgg cccaaactcc tacgggaggg
360

agcagtaggg aattttcgtc aatgggggaa accctgaacg agcaatgccg cgtgagtga
420

gaaggtcttc ggatcgtaaa gctctgttgt aagtgaagaa cggctcatag aggaaatgct
480

atgggagtga cggtagctta ccagaaagcc acggctaact acgtgccagc agccgcggta
540

atacgtaggt ggcaagcggt atccggaatc attgggcgta aagggtgcgt aggtggcgta
600

ctaagtctgt agtaaaaggc aatggctcaa ccattgtaag ctatggaaac tggatatgctg
660

gagtgcagaa gagggcgatg gaattccatg tgtagcggta aaatgcgtag atatatggag
720

gaacaccagt ggcgaaggcg gtcgcctggg ctgtaactga cactgaggca cgaaagcgtg
780

gggagcaaata aggattagat accctagtag tccacgccgt aaacgatgag aactaagtgt
840

tggaggaatt cagtgctgca gttaacgcaa taagttctcc gcctggggag tatgcacgca
900

agtgtgaaac tcaaaggaat tgacgggggc ccgcacaagc ggtggagtat gtggtttaat
960

tcgaagcaac gcgaagaacc ttaccaggcc ttgacatgga aacaaatacc ctagagatag
1020

ggggataatt atggatcaca cagggtgggtgc atggttgtcg tcagctcgtg tcgtgagatg
1080

ttgggttaag tcccgcaacg agcgcaaccc ttgtcgcattg ttaccagcat caagttgggg
1140

actcatgcga gactgccggt gacaaaccgg aggaagggtgg ggatgacgtc aaatcatcat
1200

gccccttatg gcctgggcta cacacgtact acaatggcga ccacaaagag cagcgacttg
1260

gtgacaagaa gcgaatctca taaagggtcgt ctcagttcgg attgaagtct gcaactcgac
1320

ttcatgaagt cggaatcgct agtaatcgca gatcagcatg ctgcggtgaa tacgttctcg
1380

ggccttgtag acaccgcccg tcaaaccatg ggagtcagta ataccgaag ccggtggcat
1440

aaccgtaagg agtgagccgt cgaaggtagg accgatgact ggggttaagt cgtaacaagg
1500

t a t c c c t a c g g g a a c g t g g g g a t g g a t c a c c t c c t t t
1537

<210> 283

<211> 1529

<212> DNA

<213> artificial sequence

<220>

<223> >SPC11488|PLFPGPHM_01842 16S ribosomal RNA

<400> 283

tttgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcctaaca catgcaagtc
60

gaacgaagca tttcagatga agttttcggg tggattctga gatgactgag tggcggacgg
120

gtgagtaaca cgtggataac ctgcctcaca ctggggggaca acagttagaa atgactgcta
180

ataccgcata agcgcacagt accgcatggt acagtgtgaa aaactccggt ggtgtgagat
240

ggatccgcgt ctgattagcc agttggcggg gtaacggccc accaaagcga cgatcagtag
300

ccgacctgag aggggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggc gaaagcctga tgcagcgacg ccgcgtgagt
420

gaagaagtat ttcggtatgt aaagctctat cagcagggaa gataatgacg gtacctgact
480

aagaagcccc ggctaactac gtgccagcag ccgcggtaat acgtaggggg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgtag acggcatggc aagtctgaag tgaaaacca
600

gggctcaacc ctgggactgc tttggaaact gtcaagctag agtgcaggag aggtaagtgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac tgtaactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgagt gctagggtgtt ggggggcaaa gcccttcggt
840

gccgtcgcaa acgcaataag cactccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac caagtcttga catcctcttg accggcgtgt aacggcgcct ttccttcggg
1020

acaagggaga caggtgggtgc atggttgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ttatccttag tagccagcat taagatgggc actctagga
1140

gactgccagg gacaacctgg aggaagggtgg ggatgacgtc aaatcatcat gcccttatg
1200

atttgggcta cacacgtgct acaatggcgt aaacaaaggg aagcgaccct gcgaagggtga
1260

gcaaattctca aaaataacgt cccagttcgg actgtagtct gcaacccgac tacacgaagc
1320

tggaatcgct agtaatcgcg aatcagaatg tcgcggtgaa tacgttcccg ggtcttgtac
1380

acaccgcccg tcacaccatg ggagtcagca acgcccgaag tcagtgaccc aactcgcaag
1440

agagggagct gccgaaggcg gggcaggtaa ctgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g
1529

c g g c t g g a t c

a c c t c c t t t

<210> 284

<211> 1548

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000154345|EBFLKIBH_01280 16S ribosomal RNA

<400> 284

tttagagagt ttgattcctgg ctcaggacga acgctggcgg cgtgcctaac acatgcaagt
60

cgaacggagt taaattcgac acccgagtat ccggccggga ggcggggtgc tggggggttg
120

atttaactta gtggcggacg ggtgagtaac gcgtgagtaa cctgcctttc agagggggat
180

aacgttctga aaagaacgct aataccgcat aacatcaatt tatcgcatga taggttgatc
240

aaaggagcaa tccgctggaa gatggactcg cgtccgatta gccagttggc ggggtaacgg
300

cccaccaaag cgacgatcgg tagccggact gagaggttga acggccacat tgggactgag
360

acacggccca gactcctacg ggaggcagca gtgggggata ttgcacaatg ggggaaaccc
420

tgatgcagca acgccgcgtg agggaagaag gttttcggat tgtaaacctc tgttcttagt
480

gacgataatg acggtagcta aggagaaagc tccggctaac tacgtgccag cagccgcggt
540

aatacgtagg gagcgagcgt tgtccggatt tactgggtgt aaaggggtgcg taggcggcga
600

ggcaagtcag gcgtgaaatc tatgggctta acccataaac tgcgcttgaa actgtcttgc
660

ttgagtgaag tagaggtagg cggaattccc ggtgtagcgg tgaaatgcgt agagatcggg
720

aggaacacca gtggcgaagg cggcctactg ggctttaact gacgctgaag cacgaaagca
780

tgggtagcaa acaggattag ataccctggt agtccatgcc gtaaacgatg attactaggt
840

gtgggggggtc tgaccccctc cgtgccgcag ttaacacaat aagtaatcca cctggggagt
900

acggccgcaa ggttgaaact caaaggaatt gacggggggcc cgcacaagca gtggagtatg
960

tggtttaatt cgaagcaacg cgaagaacct taccaggtct tgacatccgt ctaacgaagc
1020

agagatgcat taggtgccct tcgggggaaag gcgagacagg tggatgcatgg ttgtcgtcag
1080

ctcgtgtcgt gagatgttgg gttaagtccc gcaacgagcg caacccttgt ttctagttgc
1140

tacgcaagag cactctagag agactgccgt tgacaaaacg gaggaagggtg gggacgacgt
1200

caaatcatca tgccccttat gacctggggc acacacgtac tacaatggct gtaaacagag
1260

ggaagcaaag ccgcgagggtg gagcaaaacc ctaaaagcag tcccagttcg gatcgcaggc
1320

tgcaaccgcg ctgcgtgaag tcggaattgc tagtaatcgc ggatcagcat gccgcggtga
1380

atacgttccc gggccttgta cacaccgcc gtcacaccat gggagccggt aatacccgaa
1440

gccagtagtt caaccgcaag gagagcgctg tcgaaggtag gattggcgac tgggggtgaag
1500

tcgtaacaag gtagccgtat cggaagggtgc ggctggatca cctccttt
1548

<210> 285
<211> 1548
<212> DNA
<213> artificial sequence

<220>
<223> >GCF_000154345|EBFLKIBH_02083 16S ribosomal RNA

<400> 285
tttagagagt ttgatacctgg ctcaggacga acgctggcgg cgtgcctaac acatgcaagt
60

cgaacggagt taaattcgac acccgagtat ccggccggga ggcggggtgc tgggggttgg
120

atttaactta gtggcggacg ggtgagtaac gcgtgagtaa cctgcctttc agagggggat
180

aacgttctga aaagaacgct aataccgcat aacatcaatt tatcgcatga taggttgatc
240

aaaggagcaa tccgctggaa gatggactcg cgtccgatta gccagttggc ggggtaacgg
300

cccaccaaag cgacgatcgg tagccggact gagagggtga acggccacat tgggactgag
360

acacggccca gactcctacg ggaggcagca gtgggggata ttgcacaatg ggggaaaccc
420

tgatgcagca acgccgcgtg agggagaaga gttttcggat tgtaaaccctc tgttcttagt
480

gacgataatg acggtagcta aggagaaagc tccggctaac tacgtgccag cagccgcggt
540

aatacgtagg gagcgagcgt tgtccggatt tactgggtgt aaaggggtgcg taggcggcga
600

ggcaagtcag gcgtgaaatc tatgggctta acccataaac tgcgcttgaa actgtcttgc
660

ttgagtgaag tagaggtagg cggaattccc ggtgtagcgg tgaaatgcgt agagatcggg
720

aggaacacca gtggcgaagg cggcctactg ggctttaact gacgctgaag cacgaaagca
780

tgggtagcaa acaggattag ataccctggg agtccatgcc gtaaacgatg attactaggt
840

gtgggggggtc tgaccccctc cgtgccgcag ttaacacaat aagtaatcca cctgggggagt
900

acggccgcaa gggtgaaact caaaggaatt gacggggggcc cgcacaagca gtggagtatg
960

tggtttaatt cgaagcaacg cgaagaacct taccaggtct tgacatccgt ctaacgaagc
1020

agagatgcat taggtgccct tcgggggaaag gcgagacagg tgggtgcatgg ttgtcgtcag
1080

ctcgtgtcgt gagatgttgg gttaagtccc gcaacgagcg caacccttgt ttctagttgc
1140

tacgcaagag cactctagag agactgccgt tgacaaaacg gaggaagggtg gggacgacgt
1200

caaatcatca tgccccttat gacctggggc acacacgtac tacaatggct gtaaacagag
1260

ggaagcaaag ccgcgagggtg gagcaaaacc ctaaaagcag tcccagttcg gatcgcaggc
1320

tgcaaccgcg ctgctggaag tcggaattgc tagtaatcgc ggatcagcat gccgcggtga
1380

atacgttccc gggccttgta cacaccgccc gtcacaccat gggagccggt aatacccgaa
1440

gccagtagtt caaccgcaag gagagcgctg tcgaaggtag gattggcgac tgggggtgaag
1500

tcgtaacaag gtagccgtat cggaagggtgc ggctgggatca cctccttt
1548

<210> 286

<211> 1513

<212> DNA

<213> artificial sequence

<220>

<223> >GCA_001404795|NBBKEIAN_00682 16S ribosomal RNA

<400> 286

tattgagagt ttgatcctgg ctcaggacga acgctggcgg cgtgcctaac acatgcaagt
60

cgagcgatga agttccttcg ggaacggatt agcggcggac gggtgagtaa cacgtgggca
120

acctgcctta tagaggggaa tagccttcg aaaggaagat taataccgca taagattgta
180

gcttcgcatg aagtagcaat taaaggagca atccgctata agatgggccc gcggcgcatt
240

agctagttgg tgaggtaacg gctcaccaag gcgacgatgc gtagccgacc tgagaggggtg
300

atcggccaca ttgggactga gacacggccc agactcctac gggaggcagc agtggggaat
360

attgcacaat gggggaaacc ctgatgcagc aacgccgcgt gagtgatgac ggccttcggg
420

ttgtaaagct ctgtcttttg ggacgataat gacggtagcc aaggaggaag ccacggctaa
480

ctacgtgcca gcagccgcgg taatacgtag gtggcaagcg ttgtccggat ttactgggcg
540

taaagggagc gtaggcggat ttttaagtgg gatgtgaaat acccgggctc aacctgggtg
600

ctgcattcca aactggaaat ctagagtgca ggaggggaaa gtggaattcc tagtgtagcg
660

gtgaaatgcg tagagattag gaagaacacc agtggcgaag gcgactttct ggactgtaac
720

tgacgctgag gctcgaaagc gtggggagca aacaggatta gataccctgg tagtccacgc
780

cgtaaacgat gaataactagg tgtagggggtt gtcatgacct ctgtgccgcc gctaacgcat
840

taagtattcc gcctgggggag tacgggtcgca agattaaaac tcaaaggaat tgacggggggc
900

ccgcacaagt agcgggagcat gtgggtttaat tcgaagcaac gcgaagaacc ttacctagac
960

ttgacatctc ctgaattacc atgtaatgtg ggaagtcctt tcgggggacag gaagacaggt
1020

ggatgcatggt tgctcgtcagc tcgtgtcgtg agatgttggg ttaagtcccg caacgagcgc
1080

aacccttatt gttagttgct accatttagt tgagcactct agcgagactg cccgggttaa
1140

ccgggaggaa ggtgggggatg acgtcaaadc atcatgcccc ttatgtctag ggctacacac
1200

gtgctacaat ggccggtaca acgagatgca ataccgtgag gtggagcaaa actataaaac
1260

cggtctcagt tcggattgta ggctgaaact cgcctacatg aagctggagt tactagtaat
1320

cgcgaatcag aatgtcgcgg tgaatacgtt cccggggcctt gtacacaccg cccgtcacac
1380

catgagagtt ggcaataccc aaagttggtg atctaaccg taaggaggga agccacctaa
1440

ggtaggggtca gcgattgggg tgaagtcgta acaaggtagc cgtaggagaa cctgcggctg
1500

g a t c a c c t c c t t t
1513

<210> 287

<211> 1510

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000255475|KGFGDIJJ_03202 16S ribosomal RNA

<400> 287

attgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gagcgatgaa gtttccttcg ggaaacggat tagcggcgga cgggtgagta acacgtgggt
120

aacctgcctc atagagtgga atagccttcc gaaaggaaga ttaataccgc ataatgttga
180

aagatggcat catcattcaa ccaaaggagc aatccgctat gagatggacc cgcggcgcat
240

tagctagttg gtggggtaac ggcctaccaa ggcgacgatg cgtagccgac ctgagagggg
300

gatcggccac attgggactg agacacggcc cagactccta cgggaggcag cagtggggaa
360

tattgcacaa tgggggaaac cctgatgcag caacgccgcg tgagtgatga aggttttcgg
420

atcgtaaagc tctgtctttg ggaagataa tgacggtacc caaggaggaa gccacggcta
480

actacgtgcc agcagccgcg gtaatacgta ggtggcgagc gttatccgga tttactgggc
540

gtaaagggag cgtaggcgga tgattaagtg ggatgtgaaa taccgggct caacttgggt
600

gctgcattcc aaactgggta tctagagtgc aggagaggag agtggaattc ctagtgtagc
660

ggtgaaatgc gtagagatta ggaagaacac cagtggcgaa ggcgactctc tggactgtaa
720

ctgacgctga ggctcgaaag cgtgggggagc aaacaggatt agataccctg gtagtccacg
780

ccgtaaacga tgaatactag gtgtgggggt ttcaacacct ccgtgccgcc gctaacgcat
840

taagtattcc gcctggggag tacggtcgca agattaaaac tcaaaggaat tgacggggac
900

ccgcacaagt agcggagcat gtggtttaat tcgaagcaac gcgaagaacc ttacctacac
960

ttgacatccc ttgcattact cttaatcgag gaaatccctt cggggacaag gtgacagggtg
1020

gtgcatgggt gtcgtcagct cgtgtcgtga gatgttgggt taagtcccgc aacgagcgca
1080

acccttggtc ttagttacta ccattaagtt gaggactcta gcgagactgc ctgggttaac
1140

caggaggaag gtggggatga cgtcaaata tcatgcccct tatgtgtagg gctacacacg
1200

tgctacaatg gctggtacag agagatgcaa taccgcgagg tggagccaaa cttaaaaacc
1260

agtctcagtt cggattgtag gctgaaactc gcctacatga agctggagtt actagtaatc
1320

gcgaatcaga atgtcgcgggt gaatacgttc ccgggtcttg tacacaccgc ccgtcacacc
1380

atgagagttg gcaatacccg aagtccgtga gctaaccgca aggaggcagc ggccgaaggt
1440

agggtcagcg attgggggtga agtcgtaaca aggtagccgt aggagaacct gcggctggat
1500

c a c c t c c t t t
1510

<210> 288

<211> 1524

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000154485|DBDELJNL_00399 16S ribosomal RNA

<400> 288

atggagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcctaata catgcaagtc
60

gaacgcgagc acttggtgctc gagtggcgaa cgggtgagta atacataagt aacctgccct
120

agacaggggg ataactattg gaaacgatag ctaagaccgc atagggtacgg aactgcatg
180

gtgaccgtat taaaagtgcc tcaaagcact ggtagaggat ggacttatgg cgcattagct
240

ggttggcggg gtaacggccc accaaggcga cgatgcgtag ccgacctgag agggtgaccg
300

gccacactgg gactgagaca cggcccagac tcctacggga ggcagcagta gggaattttc
360

ggcaatgggg gaaaccctga ccgagcaacg ccgcgtgaag gaagaagggtt ttcggattgt
420

aaacttctgt tataaaggaa gaacggcggc tacaggaaat ggtagccgag tgacgggtact
480

ttattagaaa gccacggcta actacgtgcc agcagccgcg gtaatacgtg ggtggcaagc
540

gttatccgga attattgggc gtaaagaggg agcaggcggc agcaagggtc tgtggtgaaa
600

gcctgaagct taacttcagt aagccataga aaccaggcag ctagagtgca ggagaggatc
660

gtggaattcc atgtgtagcg gtgaaatgcg tagatatatg gaggaacacc agtggcgaag
720

gcgacgatct ggcctgcaac tgacgctcag tcccgaaagc gtggggagca aataggatta
780

gataccctag tagtccacgc cgtaaacgat gagtactaag tgttggatgt caaagttcag
840

tgctgcagtt aacgcaataa gtactccgcc tgagtagtac gttcgcaaga atgaaactca
900

aaggaattga cgggggcccc cacaagcggg ggagcatgtg gtttaattcg aagcaacgcg
960

aagaacctta ccaggtcttg acatactcat aaaggctcca gagatggaga gatagctata
1020

tgagatacag gtggtgcatg gttgtcgtca gctcgtgtcg tgagatgttg ggtaagtcc
1080

cgcaacgagc gcaaccctta tcgttagtta ccatcattaa gttggggact ctagcgagac
1140

tgccagtgac aagctggagg aaggcgggga tgacgtcaaa tcatcatgcc cttatgacc
1200

tgggctacac acgtgctaca atggatgggtg cagagggaag cgaagccgcg aggtgaagca
1260

aaacccataa aaccattctc agttcggatt gtagtctgca actcgactac atgaagttgg
1320

aatcgctagt aatcgcgaat cagcatgtcg cggatgaatac gttctcgggc cttgtacaca
1380

ccgcccgtca caccacgaga gttgataaca cccgaagccg gtggcctaac cgcaaggaag
1440

gagctgtcta aggtgggatt gatgattggg gtgaagtcgt aacaaggtat ccctacggga
1500

a c g t g g g g a t g g a t c a c c t c c t t t
1524

<210> 289

<211> 1420

<212> DNA

<213> artificial sequence

<220>

<223> >SPC10801|PLHJGIDB_03707 16S ribosomal RNA

<400> 289

tagtggcgga cgggtgagta acgcgtgggt aacctgcctt gtactggggg acaacagttg
60

gaaacgactg ctaataccgc ataagcgcac agcttcgcat gaagcagtgt gaaaaactcc
120

ggtggtacaa gatggacccg cgtctgatta gctggttggt gaggtaacgg cccaccaagg
180

cgacgatcag tagccggcct gagaggggtga acggccacat tgggactgag acacggccca
240

aactcctacg ggaggcagca gtggggaata ttgcacaatg ggggaaaccc tgatgcagca
300

acgccgcgtg agtgaagaag tatttcggta tgtaaagctc tatcagcagg aaagaaaatg
360

acggtacctg actaagaagc cccggctaac tacgtgccag cagccgcggt aatacgtagg
420

gggcaagcgt tatccggatt tactgggtgt aaagggagcg tagacggttt tgcaagtctg
480

aagtgaaagc ccggggctta accccgggac tgctttggaa actgtagaac tagagtgcag
540

gagaggtaag tggaattcct agtgtagcgg tgaaatgcgt agatattagg aggaacacca
600

gtggcgaagg cggcttactg gactgtaact gacgttgagg ctcgaaagcg tggggagcaa
660

acaggattag ataccctggg agtccacgcc gtaaacgatg attactaggt gttggtgggt
720

acgacccatc ggtgccgcag caaacgcaat aagtaatcca cctggggagt acgttcgcaa
780

gaatgaaact caaaggaatt gacggggacc cgcacaagcg gtggagcatg tggtttaatt
840

cgaagcaacg cgaagaacct tacctgggtc tgacatccct atgaataacg ggcaatgccg
900

ttagtacttc ggtacatagg agacaggtgg tgcattggtg tcgtcagctc gtgtcgtgag
960

atgttgggtt aagtcccgca acgagcgcaa cccttatctt tagtagccag cagtaagatg
1020

ggcactctag agagactgcc ggggataacc cggaggaagg tggggatgac gtcaaatacat
1080

catgcccctt atgaccaggg ctacacacgt gctacaatgg cgtaaacaaa gagaagcgaa
1140

gtcgtgaggc agagcgaatc tcaaaaataa cgtctcagtt cggattgtag tctgcaactc
1200

gactacatga agctggaatc gctagtaatc gcagatcaga atgctgcggt gaatacgttc
1260

ccgggtcttg tacacaccgc ccgtcacacc atgggagtcg gaaatgcccg aagtcggtga
1320

cctaaccgca aggaaggagc cgccgaaggc aggtctgata actgggggtga agtcgtaaca
1380

aggtagccgt atcggaagg tgcggctggat cacctccttt
1420

<210> 290

<211> 1497

<212> DNA

<213> artificial sequence

<220>

<223> >SPC11486|contig000066_69_1565

<400> 290

agagtttgat cctggctcag gacgaacgct ggcggcgtgc ctaacacatg caagtcgagc
60

gatgaagccc ttcgggggtgg attagcggcg gacgggtgag taacacgtgg gtaacctgcc
120

ttgtagaggg ggatagcctt ccgaaaggaa gattaatacc gcataacatc tttttatcgc
180

atggtagaaa gatcaaagga gcaatccgct acaagatgga cccgcggcgc attagctagt
240

tggtgaggta acggctcacc aaggcgacga tgcgtagccg acctgagagg gtgatcggcc
300

acattggaac tgagacacgg tccagactcc tacgggaggg agcagtgggg aatattgcgc
360

aatgggggaa accctgacgc agcaacgccg cgtgaatgaa gaaggcctta gggttgtaaa
420

gttctgttta cggggacgat aatgacggta cccgtggagg aagccacggc taactacgtg
480

ccagcagccg cggtaatacg taggtggcaa gcgttggtccg gatttactgg gcgtaaagga
540

tgcgtaggcg gatgtttaag tgagatgtga aatacccggg ctcaacttgg gtgctgcatt
600

tcaaactgga catctagagt gcgggagagg aaagcggaat tcctagtgtg gcggtgaaat
660

gcgtagagat taggaagaac accagtggcg aaggcggctt tctggaccgt aactgacgct
720

gaggcataaa agcgtgggga gcaaacagga ttagataccc tggtagtcca cgccgtaaac
780

gatgaatact aggtgtagga ggtatcgact ccttctgtgc cgcagttaac acaataagta
840

ttccgcctgg gaagtacgat cgcaagatta aaactcaaag gaattgacgg gggcccgcac
900

aagcagcgga gcatgtgggt taattcgaag caacgcgaag aaccttacct agacttgaca
960

tctcctgaat tactcttaat cgaggaagcc cttcggggca ggaagacagg tgggtgcatgg
1020

ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc gcaacgagcg caacccttat
1080

cattagttgc taccattaag ttgagcactc tagtgagact gccacggtta acgtggagga
1140

aggtggggat gacgtcaaat catcatgccc cttatgtcta gggctacaca cgtgctacaa
1200

tgggtgaatac aaatagatgc aataccgcga ggtggagcca aactataaaa ttcatcccag
1260

ttcggattgc agtctgaaac tcgactgcat gaagccggag ttgctagtaa tcgcgaatca
1320

gcatgtcgcg gtgaatacgt tcccgggcct tgtacacacc gcccgtcaca ccatgagagc
1380

tggtaacacc cgaagtccgt gaggtaacgc caaggagcca gcggccgaag gtgggattag
1440

tgattgggggt gaagtcgtaa caaggtagcc gtaggagAAC ctgcggctgg atcacct
1497

<210> 291

<211> 1527

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000466485|MLALJMBA_01519 16S ribosomal RNA

<400> 291

atgagagttt gatcctggct caggatgaac gctggcggcg tgcctaacac atgcaagtcg
60

aacgaagcga tttaacggaa gttttcggat ggaagttgaa ttgactgagt ggcggacggg
120

tgagtaacgc gtgggtaacc tgccttgtac tgggggacaa cagttagaaa tgactgctaa
180

taccgcataa gcgcacagta ttgcatgata cagtgtgaaa aactccggtg gtacaagatg
240

gacccgcgtc tgattagcta gttggtaagg taacggctta ccaaggcgac gatcagtagc
300

cgacctgaga gggtgaccgg ccacattggg actgagacac ggcccaaact cctacgggag
360

gcagcagtgg ggaatattgc acaatgggcg aaagcctgat gcagcgacgc cgcgtagagt
420

aagaagtatt tcggtatgta aagctctatc agcaggggaag aaaatgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggttaata cgtagggggc aagcgttatc
540

cggatttact ggggtgtaaag ggagcgtaga cggtaaagca agtctgaagt gaaagcccg
600

ggctcaactg cgggactgct ttggaaactg ttttaactgga gtgtcggaga ggtaagtgga
660

attcctagtg tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcgac
720

ttactggacg ataactgacg ttgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgaata ctaggtgttg gggagcaaag ctcttcggtg
840

ccgtcgcaaa cgcagtaagt attccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg gggacccgca caagcgggtg agcatgtggt ttaattcgaa gcaacgcgaa
960

gaaccttacc aggtcttgac atcgatccga cgggggagta acgtcccctt cccttcgggg
1020

cggagaagac aggtggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaaccct tattctaagt agccagcggg tcggccggga actcttggga
1140

gactgccagg gataacctgg aggaagggtg ggatgacgtc aaatcatcat gcccttatg
1200

atctgggcta cacacgtgct acaatggcgt aaacaaagag aagcaagacc gcgaggtgga
1260

gcaaattctca aaaataacgt ctcagttcgg actgcaggct gcaactcgcc tgcacgaagc
1320

tggaatcgct agtaatcgcg aatcagaatg tcgcggtgaa tacgttcccc ggtcttgtac
1380

acaccgcccc tcacaccatg ggagtcagta acgcccgaag tcagtgaccc aaccgcaagg
1440

agggagctgc cgaaggcggg accgataact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g g c t g g a t c a c c t c c t t t
1527

<210> 292

<211> 976

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000210555|DBPIKDPN_00450 16S ribosomal RNA (partial)

<220>

<221> misc_feature

<222> (974)..(976)

<223> n is a, c, g, or t

<400> 292

atgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

aacggacgat gaagagcttg cttttcaaag ttagtggcgg acgggtgagt aacgcgtggg
120

taacctgcct catacagggg gatagcagct ggaaacggct gataaaaccg cataagcgca
180

cagcatcgca tgatgcagtg tgaaaaactc cgggtggtatg agatggaccc gcgtctgatt
240

agctggttgg tgaggtaacg gcccaccaag gcgacgatca gtagccggcc tgagagggtg
300

accggccaca ttgggactga gacacggccc aaactcctac gggaggcagc agtggggaat
360

attgcacaat gggggaaacc ctgatgcagc gacgccgcgt gaaggaagaa gtatctcggt
420

atgtaaactt ctatcagcag ggaagataat gacggtacct gactaagaag ccccggtctaa
480

ctacgtgcc a gcagccgcgg taatacgtag ggggcaagcg ttatccggat ttactgggtg
540

taaagggagc gtaggcggcg gagcaagtca gaagtgaaag cccggggctc aacccccggga
600

cggcttttga aactgccctg cttgatttca ggagaggtaa gcggaattcc tagtgtagcg
660

gtgaaatgcg tagatattag gaggaacacc agtggcgaag gcggcttact ggactgacaa
720

tgacgctgag gctcgaaagc gtgggggagca aacaggatta gataccctgg tagtccacgc
780

cgtaaacgat gaatactagg tgtcgggggc tcataagagc tttcggtgcc gcagcaaacg
840

caataagtat tccacctggg gagtacgttc gcaagaatga aactcaaagg aattgacggg
900

gacccgcaca agcgggtggag catgtgggtt aattcgaagc aacgcgaaga accttaccag
960

g c c t t g a c a t c c c n n n
976

<210> 293

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000210555|DBPIKDPN_00450 16S ribosomal RNA (partial)

<400> 293

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgaagca ctttaacctg attcttcgga tgaaggTTTT tgtgactgag tggcggacgg
120

gtgagtaacg cgtgggtaac ctgcctcata cagggggata acagttagaa atgactgcta
180

ataccgcata agaccacaga gccgcatggc tcggtgggaa aaactccggt ggtatgagat
240

ggacccgcgt ctgattaggt agttggtggg gtaacggcct accaagccaa cgatcagtag
300

ccgacctgag agggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtaggc
420

gaagaagtat ttcggtatgt aaagctctat cagcagggaa gaaaatgacg gtacctgact
480

aagaagcacc ggctaaatac gtgccagcag ccgcggtaat acgtatggtg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgtag acggctgtgt aagtctgaag tgaaagcccg
600

gggctcaacc ccgggactgc tttggaaact atgcagctag agtgtcggag aggtaagtgg
660

aattcccagt gtagcgggtga aatgcgtaga tattgggagg aacaccagtg gcgaaggcgg
720

cttactggac gatgactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgact actaggtgtc ggggagcaaa gctcttcggt
840

gccgcagcaa acgcaataag tagtccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac ctgctcttga catcccgggtg accggcgtgt aatgacgcct tttcttcgga
1020

acaccgggtga caggtgggtgc atggttgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ttatcttcag tagccagcaa ttcggatggg cactctggag
1140

agactgccag ggataacctg gaggaagggtg gggatgacgt caaatcatca tgccccttat
1200

gagcagggct acacacgtgc tacaatggcg taaacaaagg gaagcgagcc tgcgagggta
1260

agcaaattctc aaaaataacg tctcagttcg gattgtagtc tgcaactcga ctacatgaag
1320

ctggaatcgc tagtaatcgc gaatcagcat gtcgcgggtga atacgttccc gggctcttgta
1380

cacaccgccc gtcacaccat gggagttgggt aacgcccga gtcagtgacc caaccgtaag
1440

gagggagctg ccgaagggtgg gaccgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 294

<211> 1527

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000169235|JBAGCDPO_00185 16S ribosomal RNA

<400> 294

acgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

agcgaagcac ataagttcga ttcttcggat gaagactttt gtgactgagc ggcggacggg
120

tgagtaacgc gtgggtaacc tgcctcatac aggggggataa cagctagaaa tggctgctaa
180

taccgcataa gaccacagta ctgcatggta cagtggtaaa aactccggtg gtatgagatg
240

gacccgcgtc tgattaggta gttgggtgagg taacggccca ccaagccgac gatcagtagc
300

cgacctgaga gggtgaccgg ccacattggg actgagacac ggcccagact cctacgggag
360

gcagcagtgg ggaatattgc acaatgggcg aaagcctgat gcagcgacgc cgcgtgaagg
420

atgaagtatt tcggtatgta aacttctatc agcaggggaag aaaatgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggtaata cgtagggggc aagcgttacc
540

cggatttact gggtgtaaag ggagcgtaga cggctgtgca agtctgaagt gaaaggcatg
600

ggctcaacct gtggactgct ttggaaactg tgcagctaga gtgtcggaga ggtaagtgga
660

attcctagtg tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcggc
720

ttactggacg atgactgacg ttgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgactg ctaggtgtcg ggtagcaaag ctattcggtg
840

ccgcagctaa cgcaataagc agtccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg gggacccgca caagcgggtg agcatgtggt ttaattcgaa gcaacgcgaa
960

gaaccttacc tgatcttgac atcccgatga ccgcttcgta atggaagttt ttcttcggaa
1020

catcggtgac aggtggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaaccct tatcttcagt agccagcatt aaggatgggc actctggaga
1140

gactgccagg gataacctgg aggaagggtg ggatgacgtc aaatcatcat gccccttatg
1200

accagggcta cacacgtgct acaatggcgt aaacaaaggg aggcagagcc gcgaggccga
1260

gcaaattctca aaaataacgt ctcagttcgg attgtagtct gcaactcgac tacatgaagc
1320

tggaatcgct agtaatcgca gatcagaatg ctgcggtgaa tacgttcccg ggtcttgtac
1380

acaccgcccg tcacaccatg ggagtcagta acgcccgaag tcagtgaccc aaccgaaagg
1440

agggagctgc cgaagggtggg accgataact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g g c t g g a t c a c c t c c t t t
1527

<210> 295

<211> 1527

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000169235|JBAGCDPO_00583 16S ribosomal RNA

<400> 295

acgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

agcgaagcac ttaagtttga ttcttcggat gaagactttt gtgactgagc ggcggaacggg
120

tgagtaacgc gtgggtaacc tgcctcatac agggggataa cagttagaaa tggctgctaa
180

taccgcataa gaccacagta ctgcatggta cagtggtaaa aactccggtg gtatgagatg
240

gacccgcgtc tgattaggta gttggtgagg taacggccca ccaagccgac gatcagtagc
300

cgacctgaga gggtgaccgg ccacattggg actgagacac ggcccagact cctacgggag
360

gcagcagtgg ggaatattgc acaatgggcg aaagcctgat gcagcgacgc cgcgatgaagg
420

atgaagtatt tcggtatgta aacttctatc agcagggaag aaaatgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggtataa cgtagggggc aagcggtatc
540

cggatttact ggggtgtaaag ggagcgtaga cggctgtgca agtctgaagt gaaaggcatg
600

ggctcaacct gtggactgct ttggaaactg tgcagctaga gtgtcggaga ggtaagtgga
660

attcctagtg tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcggc
720

ttactggacg atgactgacg ttgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgactg ctaggtgtcg ggtagcaaag ctattcgggtg
840

ccgcagctaa cgcaataagc agtccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg gggacccgca caagcgggtg agcatgtggt ttaattcgaa gcaacgcgaa
960

gaaccttacc tgatcttgac atcccgatga ccgcttcgta atggaagctt ttcttcggaa
1020

catcgggtgac aggtggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaaccct tatcttcagt agccagcatt aaggatgggc actctggaga
1140

gactgccagg gataacctgg aggaagggtg ggatgacgtc aaatcatcat gccccttatg
1200

accagggcta cacacgtgct acaatggcgt aaacaaaggg aagcagagcc gcgaggccga
1260

gcaaattctca aaaataacgt ctcagttcgg attgtagtct gcaactcgac tacatgaagc
1320

tggaatcgct agtaatcgca gatcagaatg ctgcggtgaa tacgttcccg ggtcttgtac
1380

acaccgcccg tcacaccatg ggagtcagta acgcccgaag tcagtgaccc aaccgaaagg
1440

agggagctgc cgaagggtggg accgataact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g g c t g g a t c a c c t c c t t t
1527

<210> 296

<211> 1527

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000169235|JBAGCDPO_00880 16S ribosomal RNA

<400> 296

acgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

agcgaagcac ttaagtttga ttcttcggat gaagactttt gtgactgagc ggcggacggg
120

tgagtaacgc gtgggtaacc tgcctcatac aggggggataa cagttagaaa tggctgctaa
180

taccgcataa 240	gaccacagta	ctgcatggta	cagtggtaaa	aactccggtg	gtatgagatg
gacccgcgtc 300	tgattaggta	gttggtgagg	taacggccca	ccaagccgac	gatcagtagc
cgacctgaga 360	gggtgaccgg	ccacattggg	actgagacac	ggcccagact	cctacgggag
gcagcagtgg 420	ggaatattgc	acaatgggcg	aaagcctgat	gcagcgacgc	cgcgatgaagg
atgaagtatt 480	tcggtatgta	aacttctatc	agcaggggaag	aaaatgacgg	tacctgacta
agaagccccg 540	gctaactacg	tgccagcagc	cgcggttaata	cgtagggggc	aagcggtatc
cggatttact 600	gggtgtaaag	ggagcgtaga	cggctgtgca	agtctgaagt	gaaaggcatg
ggctcaacct 660	gtggactgct	ttggaaactg	tgcagctaga	gtgtcggaga	ggtaagtgga
attcctagtg 720	tagcggtgaa	atgcgtagat	attaggagga	acaccagtgg	cgaaggcggc
ttactggacg 780	atgactgacg	ttgaggctcg	aaagcgtggg	gagcaaacag	gattagatac
cctggtagtc 840	cacgccgtaa	acgatgactg	ctagggtgtcg	ggtagcaaag	ctattcggtg
ccgcagctaa 900	cgcaataagc	agtccacctg	gggagtacgt	tcgcaagaat	gaaactcaaa
ggaattgacg 960	gggacccgca	caagcggtag	agcatgtggg	ttaattcgaa	gcaacgcgaa
gaaccttacc 1020	tgatcttgac	atccccgatga	ccgcttcgta	atggaagttt	ttcttcggaa
catcggtgac 1080	aggtgggtgca	tggttggtcg	cagctcgtgt	cgtgagatgt	tgggttaagt

cccgcaacga gcgcaaccct tatattcagt agccagcatt taggatgggc actctggaga
1140

gactgccagg gataacctgg aggaagggtg ggatgacgtc aaatcatcat gccccttatg
1200

accagggcta cacacgtgct acaatggcgt aaacaaaggg aggcagagcc gcgaggccga
1260

gcaaattctca aaaataacgt ctcagttcgg attgtagtct gcaactcgac tacatgaagc
1320

tggaatcgct agtaatcgca gatcagaatg ctgcggtgaa tacgttcccg ggtcttgtac
1380

acaccgcccc tcacaccatg ggagtcagta acgcccgaag tcagtgaccc aaccgaaagg
1440

agggagctgc cgaagggtggg accgataact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g g c t g g a t c a c c t c c t t t
1527

<210> 297

<211> 1527

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000169235|JBAGCDPO_01429 16S ribosomal RNA

<400> 297

acgagagttt gatcctggct caggatgaac gctggcgggc tgcttaacac atgcaagtcg
60

agcgaagcac ttaagtttga ttcttcggat gaagactttt gtgactgagc ggcggacggg
120

tgagtaacgc gtgggtaacc tgcctcatac aggggggataa cagttagaaa tggctgctaa
180

taccgcataa gaccacagta ctgcatggta cagtggtaaa aactccggtg gtatgagatg
240

gacccgcgtc tgattaggta gttggtgagg taacggccca ccaagccgac gatcagtagc
300

cgacctgaga gggtgaccgg ccacattggg actgagacac ggcccagact cctacgggag
360

gcagcagtgg ggaatattgc acaatgggcg aaagcctgat gcagcgacgc cgcgtgaagg
420

atgaagtatt tcggtatgta aacttctatc agcagggaag aaaatgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggtaata cgtagggggc aagcgttatt
540

cggatttact gggtgtaaag ggagcgtaga cggctgtgca agtctgaagt gaaaggcatg
600

ggctcaacct gtggactgct ttggaaactg tgcagctaga gtgtcggaga ggtaagtgga
660

attcctagtg tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcggc
720

ttactggacg atgactgacg ttgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgactg ctaggtgtcg ggtagcaaag ctattcgggtg
840

ccgcagctaa cgcaataagc agtccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg gggacccgca caagcgggtg agcatgtggt ttaattcgaa gcaacgcgaa
960

gaaccttacc tgatcttgac atcccgatga ccgcttcgta atggaagctt ttcttcggaa
1020

catcggtgac aggtgggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaaccct tatcttcagt agccagcatt taggatgggc actctggaga
1140

gactgccagg gataacctgg aggaagggtg ggatgacgtc aaatcatcat gccccttatg
1200

accagggcta cacacgtgct acaatggcgt aaacaaaggg aggcagagcc gcgaggccga
1260

gcaaattctca aaaataacgt ctcagttcgg attgtagtct gcaactcgac tacatgaagc
1320

tggaatcgct agtaatcgca gatcagaatg ctgcggtgaa tacgttcccg ggtcttgtac
1380

acaccgcccc tcacaccatg ggagtcagta acgcccgaag tcagtgacct aaccgaaagg
1440

agggagctgc cgaagggtgg accgataact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g g c t g g a t c a c c t c c t t t
1527

<210> 298

<211> 1296

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000169235|JBAGCDPO_02683 16S ribosomal RNA

<400> 298

tatgagatgg acccgcgctct gattaggtag ttggtgaggt aacggcccac caagccgacg
60

atcagtagcc gacctgagag ggtgaccggc cacattggga ctgagacacg gccagactc
120

ctacgggagg cagcagtggg gaatattgca caatgggcga aagcctgatg cagcgacgcc
180

gcgtgaagga tgaagtatct cggtatgtaa acttctatca gcagggaaga aaatgacggt
240

acctgactaa gaagccccgg ctaactacgt gccagcagcc gcggtaatat gtagggggca
300

agcgttatcc ggatttactg ggtgtaaagg gagcgtagac ggctgtgcaa gtctgaagtg
360

aaaggcatgg gctcaacctg tggactgctt tggaaactgt gcagctagag tgtcggagag
420

gtaagtggaa ttcctagtgt agcgggtgaaa tgcgtagata ttaggaggaa caccagtggc
480

gaaggcggct tactggacga tgactgacgt tgaggctcga aagcgtgggg agcaaacagg
540

attagatacc ctggtagtcc acgccgtaaa cgatgactgc taggtgtcgg gtagcaaagc
600

tattcgggtgc cgcagctaac gcaataagca gtccacctgg ggagtacgtt cgcaagaatg
660

aaactcaaag gaattgacgg ggacccgcac aagcgggtgga gcatgtgggt taattcgaag
720

caacgcgaag aaccttacct gatcttgaca tcccgatgac cgcttcgtaa tggaagtttt
780

tcttcggaac atcgggtgaca ggtggtgcat ggttgtcgtc agctcgtgtc gtgagatgtt
840

gggttaagtc ccgcaacgag cgcaaccctt atcttcagta gccagcattt aggatgggca
900

ctctggagag actgccaggg ataacctgga ggaagggtgg gatgacgtca aatcatcatg
960

ccccttatga ccagggttac acacgtgcta caatggcgta aacaaaggga ggcagagccg
1020

cgaggccgag caaatctcaa aaataacgtc tcagttcgga ttgtagtctg caactcgact
1080

acatgaagct ggaatcgcta gtaatcgag atcagaatgc tgcgggtgaat acgttcccgg
1140

gtcttgtaca caccgcccgt cacaccatgg gagtcagtaa cgcccgaagt cagtgacca
1200

accgaaagga gggagctgcc gaaggtggga ccgataactg ggggtgaagtc gtaacaaggt
1260

agccgtatcg gaagggtgcgg ctggatcacc tccttt
1296

<210> 299

<211> 1527

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000169235|JBAGCDPO_02881 16S ribosomal RNA

<400> 299

acgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

agcgaagcac ataagttcga ttcttcggat gaagactttt gtgactgagc ggcggacggg
120

tgagtaacgc gtgggtaacc tgcctcatac aggggggataa cagctagaaa tggctgctaa
180

taccgcataa gaccacagta ctgcatggta cagtggtaaa aactccggtg gtatgagatg
240

gacccgcgtc tgattaggta gttggtgagg taacggccca ccaagccgac gatcagtagc
300

cgacctgaga gggtgaccgg ccacattggg actgagacac ggcccagact cctacgggag
360

gcagcagtgg ggaatattgc acaatgggcg aaagcctgat gcagcgacgc cgcgtgaagg
420

atgaagtatt tcggtatgta aacttctatc agcagggaag aaaatgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggtaata cgtagggggc aagcgttatc
540

cggatttact gggtgtaaag ggagcgtaga cggctgtgca agtctgaagt gaaaggcatg
600

ggctcaacct gtggactgct ttggaaactg tgcagctaga gtgtcggaga ggtaagtgga
660

attcctagtg tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcggc
720

ttactggacg atgactgacg ttgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgactg ctaggtgtcg ggtagcaaag ctattcgggtg
840

ccgcagctaa cgcaataagc agtccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg gggacccgca caagcgggtg agcatgtggt ttaattcgaa gcaacgcgaa
960

gaaccttacc tgatcttgac atcccgatga ccgcttcgta atggaagctt ttcttcggaa
1020

catcggtgac aggtggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaaccct tatcttcagt agccagcatt taggatgggc actctggaga
1140

gactgccagg gataacctgg aggaagggtg ggatgacgtc aaatcatcat gccccttatg
1200

accagggcta cacacgtgct acaatggcgt aaacaaaggg aagcagagcc gcgaggccga
1260

gcaaattctca aaaataacgt ctcagttcgg attgtagtct gcaactcgac tacatgaagc
1320

tggaatcgct agtaatcgca gatcagaatg ctgcggtgaa tacgttcccg ggtcttgtac
1380

acaccgcccg tcacaccatg ggagtcagta acgcccgaag tcagtgaccc aaccgaaagg
1440

agggagctgc cgaagggtggg accgataact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g
1527

g c t g g a t c a c

c t c c t t t

<210> 300

<211> 1529

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000154065|EBKNHIAM_01676 16S ribosomal RNA

<400> 300

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gagcgaagcg cttaagtttg attcttcgga tgaagacttt tgtgactgag cggcggacgg
120

gtgagtaacg cgtgggtaac ctgcctcata cagggggata acagttagaa atgactgcta
180

ataccgcata agaccacggc accgcatggc acagtggtaa aaactccggc ggtatgagat
240

ggacccgcgt ctgattaggt agttggtggg gtaacggcct accaagccga cgatcagtag
300

ccgacctgag agggtgaccg gccacattgg gactgagaca cggcccagac tcctacggga
360

ggcagcagtg gggaatattg cacaatggag gaaactctga tgcagcgacg ccgcgtgaag
420

gatgaagtat ttcggtatgt aaacttctat cagcagggaa gaaaatgacg gtacctgact
480

aagaagcccc ggctaactac gtgccagcag ccgcggtaat acgtaggggg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgtag acggcacggc aagccagatg tgaaagcccg
600

gggctcaacc ccgggactgc atttggaact gctgagctag agtgtcggag aggcaagtgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttgctggac gatgactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgact gctaggtgtc ggggtggcaaa gccattcggg
840

gccgcagcta acgcaataag cagtccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac ctgatcttga catcccgatg accgcttcgt aatggaagtt tttcttcgga
1020

acatcgggtga caggtgggtgc atggttgtcg tcagctcgtg tcgtgagatg ttggggttaag
1080

tcccgcaacg agcgcaaccc ctatcttcag tagccagcag gttaagctgg gcactctgga
1140

gagactgcca gggataacct ggaggaaggt ggggatgacg tcaaatacatc atgcccctta
1200

tgaccagggc tacacacgtg ctacaatggc gtaaacaag agaagcgaac tcgcgagggg
1260

aagcaaattct caaaaataac gtctcagttc ggattgtagt ctgcaactcg actacatgaa
1320

gctggaatcg ctagtaatcg cagatcagaa tgctgcgggtg aatacgttcc cgggtcttgt
1380

acacaccgcc cgtcacacca tgggagtcag taacgcccga agtcagtgac ccaaccgtaa
1440

ggagggagct gccgaagggt ggaccgataa ctgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1529

<210> 301
<211> 825
<212> DNA
<213> artificial sequence

<220>
<223> >GCF_000154065|EBKNHIAM_01761 16S ribosomal RNA (partial)

<400> 301
aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gagcgaagcg ctttggaaag attcttcgga tgatttcctt tgtgactgag cggcggacgg
120

gtgagtaacg cgtgggtaac ctgcctcata cagggggata acagttagaa atgactgcta
180

ataccgcata agaccacggc accgcatggc acagtggtaa aaactccggc ggtatgagat
240

ggacccgcgt ctgattaggt agttgggtggg gtaacggcct accaagccga cgatcagtag
300

ccgacctgag aggggtgaccg gccacattgg gactgagaca cggcccagac tcctacggga
360

ggcagcagtg gggaatatgt cacaatggag gaaactctga tgcagcgacg ccgcgtgaag
420

gatgaagtat ttcgggtatgt aaacttctat cagcagggaa gaaaatgacg gtacctgact
480

aagaagcccc ggctaactac gtgccagcag ccgcggtaat acgtaggggg caagcgttat
540

ccggattttac tgggtgtaaa gggagcgtag acggcacggc aagccagatg tgaaagcccg
600

gggctcaacc ccgggactgc atttggaact gctgagctag agtgtcggag aggcaagtgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaagcggc
720

ttgctggacg atgactgacg ttgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgactg ctaggtgtcg ggtgg
825

<210> 302

<211> 1514

<212> DNA

<213> artificial sequence

<220>

<223> >GCA_900066695|JAAICDLI_00064 16S ribosomal RNA

<400> 302

attaagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcctaaca catgcaagtc
60

gagcgagaag ccattgaccg atacttcggt aaagggatat ggcggaaagc ggcggacggg
120

tgagtaacgc gtaggcaacc tgccccttac agagggatag ccattggaaa cgatgattaa
180

gacctcataa cgcctccctc ccacatgagg gggaggccaa agattcatcg gtaagggatg
240

ggcctgcgtc tgattagctt gttggcgggg taacggccca ccaaggcgac gatcagtagc
300

cgacctgaga ggggtgatcg ccacattgga actgagacac ggtccaaact cctacgggag
360

gcagcagtgg ggaatattgc acaatgggcg gaagcctgat gcagcaacgc cgcgtgaggg
420

atgaaggcct tcgggtcgta aacctctgtc cttggggaag aaacaaatga cggtagccat
480

ggaggaagcc ccggctaact acgtgccagc agccgcggta atacgtaggg ggcgagcggt
540

atccggaatt attgggcgta aagagtgcgt aggtgggttac ctaagcgcag ggtctaaggc
600

aatggctcaa ccattgttcg ccctgcgaac tgggctactt gagtgcagga gaggaaagcg
660

gaattcctag tgtagcgggtg aaatgcgtag atattaggag gaacaccagt ggcgaaggcg
720

gctttctgga ctgttactga cactgaggca cgaaagcgtg gggagcaaac aggattagat
780

accctggtag tccacgccgt aaacgatgag cactaggtgt cggggccgca aggcttcggt
840

gccgcagtta acgcattaag tgctccgcct ggggagtacg cacgcaagtg tgaaactcaa
900

aggaattgac ggggacccgc acaagcagcg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac caggacttga catccccctg acagatcctt aaccggatcc ttcttcggac
1020

aggggagaca ggtggtgcat ggttgtcgtc agctcgtgtc gtgagatgtt gggttaagtc
1080

ccgcaacgag cgcaaccctt gccattagtt gccatcattc agttgggcac tctaattggga
1140

ctgccgggga caactcggag gaagggtgggg atgacgtcaa atcatcatgc cccttatgtt
1200

ctgggctaca cacgtgctac aatggccggt acagcaggaa gcgatcccg caggggggagc
1260

aaatcccaaa aaccggtccc agttcggact gcaggctgca acccgctgc acgaagccgg
1320

agttgctagt aatcgtggat cagaatgcca cgggtgaatgc gttcccgggt cttgtacaca
1380

ccgcccgtca caccatggaa gttgggggtg cccgaagccg gcaggagat atgctgtcta
1440

aggcaaaacc aatgactggg gtgaagtcgt aacaaggtag ccgtatcgga aggtgcggct
1500

g g a t c a c c t c
1514

c t t t

<210> 303

<211> 1537

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000242195|MJIGDLMC_01655 16S ribosomal RNA

<400> 303

atggagagtt tgatcctggc tcaggatgaa cgctggcggc atgcctaata catgcaagtc
60

gaacgaagtt tcgaggaagc ttgcttccaa agagacttag tggcgaacgg gtgagtaaca
120

cgtaggtaac ctgcccattgt gtccgggata actgctggaa acggtagcta aaaccggata
180

ggtatacaga gcgcatgctc agtatattaa agcgcccatc aaggcgtgaa catggatgga
240

cctgcggcgc attagctagt tgggtgaggta acggcccacc aaggcgatga tgcgtagccg
300

gcctgagagg gtaaacggcc acattgggac tgagacacgg cccaaactcc tacgggaggc
360

agcagtaggg aattttcgtc aatgggggaa accctgaacg agcaatgccg cgtgagtgaa
420

gaaggtcttc ggatcgtaaa gctctgttgt aagtgaagaa cggctcatag aggaaatgct
480

atgggagtgat cggtagctta ccagaaagcc acggctaact acgtgccagc agccgcggta
540

atacgtaggt ggcaagcggt atccggaatc attgggcgta aagggtgcgt aggtggcgta
600

ctaagtctgt agtaaaaggc aatggctcaa ccattgtaag ctatggaaac tggatatgctg
660

gagtgcagaa gagggcgatg gaattccatg tgtagcggta aaatgcgtag atatatggag
720

gaacaccagt ggcgaaggcg gtcgcctggt ctgtaactga cactgaggca cgaaagcgtg
780

gggagcaaatt aggattagat accctagtag tccacgccgt aaacgatgag aactaagtgt
840

tggaggaatt cagtgctgca gttaacgcaa taagttctcc gcctgggggag tatgcacgca
900

agtgtgaaac tcaaaggaat tgacgggggc ccgcacaagc ggtggagtat gtggtttaat
960

tcgaagcaac gcgaagaacc ttaccaggcc ttgacatgga tgcaaattgtt ctagagatag
1020

ggggataatt atggatcaca caggtggtgc atggttgtcg tcagctcgtg tcgtgagatg
1080

ttgggttaag tcccgcaacg agcgcaaccc ttgtcgcattg ttaccagcat caagttgggg
1140

actcatgcga gactgccggt gacaaaccgg aggaagggtgg ggatgacgtc aaatcatcat
1200

gccccttatg gcctgggcta cacacgtact acaatggcgg ccacaaagag cagcgacaca
1260

gtgatgtgaa gcgaatctca taaaggctcg ctcagttcgg attgaagtct gcaactcgac
1320

ttcatgaagt cggaatcgct agtaatcgca gatcagcatg ctgcggtgaa tacgtttctcg
1380

ggccttgtag acaccgcccg tcaaaccatg ggagtcagta ataccgaag ccggtggcat
1440

aaccgtaagg agtgagccgt cgaaggtagg accgatgact ggggttaagt cgtaacaagg
1500

t a t c c c t a c g g g a a c g t g g g g a t g g a t c a c c t c c t t t
1537

<210> 304

<211> 997

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000242195|MJIGDLMC_02716 16S ribosomal RNA (partial)

<400> 304

atggagagtt tgatcctggc tcaggatgaa cgctggcggc atgcctaata catgcaagtc
60

gaacgaagtt tcgaggaagc ttgcttccaa agagacttag tggcgaacgg gtgagtaaca
120

cgtaggtaac ctgcccattgt gtccgggata actgctggaa acggtagcta aaaccggata
180

ggtatacaga gcgcatgctc agtatattaa agcgcccatc aaggcgtgaa catggatgga
240

cctgcggcgc attagctagt tggtagagta acggcccacc aaggcgtatga tgcgtagccg
300

gcctgagagg gtaaaccggcc acattgggac tgagacacgg cccaaactcc tacgggaggc
360

agcagtaggg aattttcgtc aatgggggaa accctgaacg agcaatgccg cgtgagtgaa
420

gaaggtcttc ggatcgtaaa gctctgttgt aagtgaagaa cggctcatag aggaaatgct
480

atgggagtgat cggtagctta ccagaaagcc acggctaact acgtgccagc agccgcggta
540

atacgtaggt ggcaagcggt atccggaatc attgggcgta aagggtgcgt aggtggcgta
600

ctaagtctgt agtaaaaggc aatggctcaa ccattgtaag ctatggaaac tggatatgctg
660

gagtgcagaa gagggcgatg gaattccatg tgtagcggta aaatgcgtag atatatggag
720

gaacaccagt ggcgaaggcg gtcgcctggt ctgtaactga cactgaggca cgaaagcgtg
780

gggagcaaatt aggattagat accctagtag tccacgccgt aaacgatgag aactaagtgt
840

tggaggaatt cagtgctgca gttaacgcaa taagttctcc gcctggggag tatgcacgca
900

agtgtgaaac tcaaaggaat tgacgggggc ccgcacaagc ggtggagtat gtggtttaat
960

t c g a a g c a a c g c g a a g a a c c t t a c c a g g c c t t g a c a t
997

<210> 305

<211> 1537

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000242195|MJIGDLMC_03476 16S ribosomal RNA

<400> 305

atggagagtt tgatcctggc tcaggatgaa cgctggcggc atgcctaata catgcaagtc
60

gaacgaagtt tcgaggaagc ttgcttccaa agagacttag tggcgaacgg gtgagtaaca
120

cgtaggtaac ctgcccattgt gtccgggata actgctggaa acggtagcta aaaccggata
180

ggtatacaga gcgcatgctc agtatattaa agcgcccatc aaggcgtgaa catggatgga
240

cctgcggcgc attagctagt tggtgaggta acggcccacc aaggcgatga tgcgtagccg
300

gcctgagagg gtaaacggcc acattgggac tgagacacgg cccaaactcc tacgggaggc
360

agcagtaggg aattttcgtc aatgggggaa accctgaacg agcaatgccg cgtgagtgaa
420

gaaggtcttc ggatcgtaaa gctctgttgt aagtgaagaa cggctcatag aggaaatgct
480

atgggagtga cggtagctta ccagaaagcc acggctaact acgtgccagc agccgcggta
540

atacgtaggt ggcaagcggt atccggaatc attgggcgta aaggggtgcgt aggtggcgta
600

ctaagtctgt agtaaaaggc aatgggtcaa ccattgtaag ctatggaaac tggatatgctg
660

gagtgcagaa gagggcgatg gaattccatg tgtagcggta aaatgcgtag atatatggag
720

gaacaccagt ggcgaaggcg gtcgcctggt ctgtaactga cactgaggca cgaaagcgtg
780

gggagcaaat aggattagat accctagtag tccacgccgt aaacgatgag aactaagtgt
840

tggaggaatt cagtgtgca gttaacgcaa taagttctcc gcctggggag tatgcacgca
900

agtgtgaaac tcaaaggaat tgacgggggc ccgcacaagc ggtggagtat gtggtttaat
960

tcgaagcaac gcgaagaacc ttaccaggcc ttgacatgga tgcaaattgtt ctagagatag
1020

ggggataatt atggatcaca caggtggtgc atggttgctg tcagctcgtg tcgtgagatg
1080

ttgggttaag tcccgcacg agcgcaaccc ttgtcgcatt ttaccagcat caagttgggg
1140

actcatgcga gactgccggt gacaaaccgg aggaagggtg ggatgacgtc aaatcatcat
1200

gcccttatg gcctgggcta cacacgtact acaatggcgg ccacaaagag cagcgacaca
1260

gtgatgtgaa gcgaatctca taaaggctcg ctcagttcgg attgaagtct gcaactcgac
1320

ttcatgaagt cggaatcgct agtaatcgca gatcagcatg ctgcggtgaa tacgtttctcg
1380

ggccttgtac acaccgcccg tcaaaccatg ggagtcagta ataccgaag ccggtggcat
1440

aaccgtaagg agtgagccgt cgaaggtagg accgatgact ggggttaagt cgtaacaagg
1500

t a t c c c t a c g g g a a c g t g g g g a t g g a t c a c c t c c t t t
1537

<210> 306

<211> 1537

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000242195|MJIGDLMC_04017 16S ribosomal RNA

<400> 306

atggagagtt tgatcctggc tcaggatgaa cgctggcggc atgcctaata catgcaagtc
60

gaacgaagtt tcgaggaagc ttgcttccaa agagacttag tggcgaacgg gtgagtaaca
120

cgtaggtaac ctgcccattgt gtccgggata actgctggaa acggttagcta aaaccggata
180

ggtatacaga gcgcatgctc agtatattaa agcgcccatc aaggcgtgaa catggatgga
240

cctgcggcgc attagctagt tggtgaggta acggcccacc aaggcgatga tgcgtagccg
300

gcctgagagg gtaaacggcc acattgggac tgagacacgg cccaaactcc tacgggaggg
360

agcagtaggg aattttcgtc aatgggggaa accctgaacg agcaatgccg cgtgagtgaa
420

gaaggtcttc ggatcgtaaa gctctgttgt aagtgaagaa cggctcatag aggaaatgct
480

atgggagtgga cggtagctta ccagaaagcc acggctaact acgtgccagc agccgcggta
540

atacgtaggt ggcaagcggt atccggaatc attgggcgta aagggtgcgt aggtggcgta
600

ctaagtctgt agtaaaaggc aatggctcaa ccattgtaag ctatggaaac tggatatgctg
660

gagtgcagaa gagggcgatg gaattccatg tgtagcggta aaatgcgtag atatatggag
720

gaacaccagt ggcgaaggcg gtcgcctggg ctgtaactga cactgaggca cgaaagcgtg
780

gggagcaaata aggattagat accctagtag tccacgccgt aaacgatgag aactaagtgt
840

tggaggaatt cagtgctgca gttaacgcaa taagttctcc gcctggggag tatgcacgca
900

agtgtgaaac tcaaaggaat tgacgggggc cgcacaagc ggtggagtat gtggtttaat
960

tcgaagcaac gcgaagaacc ttaccaggcc ttgacatgga tgcaaatgtt ctagagatag
1020

ggggataatt atggatcaca caggtgggtgc atggttgtcg tcagctcgtg tcgtgagatg
1080

ttgggttaag tcccgcaacg agcgcaaccc ttgtcgcatt ttaccagcat caagttgggg
1140

actcatgcga gactgccggt gacaaaccgg aggaagggtg ggatgacgtc aaatcatcat
1200

gccccttatg gcctgggcta cacacgtact acaatggcgg ccacaaagag cagcgacaca
1260

gtgatgtgaa gcgaatctca taaagggtcgt ctcagttcgg attgaagtct gcaactcgac
1320

ttcatgaagt cggaatcgct agtaatcgca gatcagcatg ctgcggtgaa tacgtttctg
1380

ggccttgtac acaccgcccg tcaaaccatg ggagtcagta ataccgaag ccggtggcat
1440

aaccgtaagg agtgagccgt cgaaggtagg accgatgact ggggttaagt cgtaacaagg
1500

tatccctacg ggaacgtggg gatggatcac ctcccttt
1537

<210> 307

<211> 1537

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000242195|MJIGDLMC_04346 16S ribosomal RNA

<400> 307

atggagagtt tgatcctggc tcaggatgaa cgctggcggc atgcctaata catgcaagtc
60

gaacgaagtt tcgaggaagc ttgcttccaa agagacttag tggcgaacgg gtgagtaaca
120

cgtaggtaac ctgcccattgt gtccgggata actgctggaa acggtagcta aaaccggata
180

ggtatacaga gcgcatgctc agtatattaa agcgcccatc aaggcgtgaa catggatgga
240

cctgcggcgc attagctagt tgggtgaggta acggcccacc aaggcgtatga tgcgtagccg
300

gcctgagagg gtaaacggcc acattgggac tgagacacgg cccaaactcc tacgggaggg
360

agcagtaggg aattttcgtc aatgggggaa accctgaacg agcaatgccg cgtgagtga
420

gaaggtcttc ggatcgtaaa gctctgttgt aagtgaagaa cggctcatag aggaaatgct
480

atgggagtga cggtagctta ccagaaagcc acggctaact acgtgccagc agccgcggta
540

atacgtaggt 600	ggcaagcggt	atccggaatc	attgggcgta	aagggtgcgt	aggtggcgta
ctaagtctgt 660	agtaaaaggc	aatggctcaa	ccattgtaag	ctatggaaac	tggtatgctg
gagtgcagaa 720	gagggcgatg	gaattccatg	tgtagcggta	aaatgcgtag	atatatggag
gaacaccagt 780	ggcgaaggcg	gtcgcctggg	ctgtaactga	cactgaggca	cgaaagcgtg
gggagcaaatt 840	aggattagat	accctagtag	tccacgccgt	aaacgatgag	aactaagtgt
tggaggaatt 900	cagtgctgca	gttaacgcaa	taagttctcc	gcctggggag	tatgcacgca
agtgtgaaac 960	tcaaaggaat	tgacgggggc	ccgcacaagc	ggtggagtat	gtggtttaatt
tcgaagcaac 1020	gcgaagaacc	ttaccaggcc	ttgacatgga	tgcaaatgtt	ctagagatag
ggggataatt 1080	atggatcaca	caggtgggtgc	atggttgtcg	tcagctcgtg	tcgtgagatg
ttgggttaag 1140	tcccgcaacg	agcgcaaccc	ttgtcgcgatg	ttaccagcat	caagttgggg
actcatgcga 1200	gactgccggt	gacaaaccgg	aggaagggtgg	ggatgacgtc	aatcatcat
gccccttatg 1260	gcctgggcta	cacacgtact	acaatggcgg	ccacaaagag	cagcgacaca
gtgatgtgaa 1320	gcgaatctca	taaagggtcgt	ctcagttcgg	attgaagtct	gcaactcgac
ttcatgaagt 1380	cggaatcgct	agtaatcgca	gatcagcatg	ctgcggtgaa	tacgttctcg
ggccttgtac 1440	acaccgcccg	tcaaaccatg	ggagtcagta	atacccgaag	ccggtggcat

aaccgtaagg agtgagccgt cgaaggtagg accgatgact ggggttaagt cgtaacaagg
1500

t a t c c c t a c g g g a a c g t g g g g a t g g a t c a c c t c c t t t
1537

<210> 308

<211> 1536

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000225685|BADFAMJP_04945 16S ribosomal RNA

<400> 308

atggagagtt tgatcctggc tcaggatgaa cgctggcggc atgcctaata catgcaagtc
60

gaacgaagct tcaggaagct tgcttcctaaa gagacttagt ggcgaaacggg tgagtaacac
120

gtaggtaacc tgcccatgtg tccgggataa ctgctggaaa cggtagctaa aaccggatag
180

gtatacagag cgcatgctca gtatatataa gcgccccatca aggcgtgaac atggatggac
240

ctgcggcgca ttagctagtt ggtgaggtaa cggcccacca aggcgatgat gcgtagccgg
300

cctgagaggg taaacggcca cattgggact gagacacggc ccaaactcct acgggaggca
360

gcagtaggga attttcgtca atgggggaaa ccctgaacga gcaatgccgc gtgagtgaag
420

aagggtcttcg gatcgtaaag ctctgttgta agtgaagaac ggctcataga ggaaatgcta
480

tgggagtgac ggtagcttac cagaaagcca cggctaacta cgtgccagca gccgcggtaa
540

tacgtaggtg gcaagcggtta tccggaatca ttgggcgtaa aggggtgcgta ggtggcgta
600

taagtctgta gtaaaaggca atgggtcaac cattgtaagc tatggaaact ggtatgctgg
660

agtgcagaag agggcgatgg aattccatgt gtagcggtaa aatgcgtaga tatatggagg
720

aacaccagtg gcgaaggcgg tcgcctggtc tgtaactgac actgaggcac gaaagcgtgg
780

ggagcaaata ggattagata ccctagtagt ccacgccgta aacgatgaga actaagtgtt
840

ggaggaattc agtgctgcag ttaacgcaat aagttctccg cctggggagt atgcacgcaa
900

gtgtgaaact caaaggaatt gacggggggcc cgcacaagcg gtggagtatg tggtttaatt
960

cgaagcaacg cgaagaacct taccaggcct tgacatggaa acaaataccc tagagatagg
1020

gggataatta tggatcacac aggtggtgca tggttgtcgt cagctcgtgt cgtgagatgt
1080

tgggttaagt cccgcaacga gcgcaaccct tgtcgcatgt taccagcatc aagttgggga
1140

ctcatgcgag actgccggtg acaaaccgga ggaagggtggg gatgacgtca aatcatcatg
1200

ccccttatgg cctgggctac acacgtacta caatggcgac cacaaagagc agcgacttgg
1260

tgacaagaag cgaatctcat aaaggtcgtc tcagttcgga ttgaagtctg caactcgact
1320

tcatgaagtc ggaatcgcta gtaatcgcag atcagcatgc tgcggtgaat acgttctcgg
1380

gccttgtaca caccgcccgt caaaccatgg gagtcagtaa taccgaagc cgggtggcata
1440

accgtaagga gtgagccgtc gaaggtagga ccgatgactg gggttaagtc gtaacaaggt
1500

atccctacgg gaacgtgggg atggatcacc tccttt
1536

<210> 309

<211> 1536

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000165065|BEIFJCLA_04572 16S ribosomal RNA

<400> 309

atggagagtt tgatcctggc tcaggatgaa cgctggcggc atgcctaata catgcaagtc
60

gaacgaagtc tctaggagct tgcttccaaa gagacttagt ggcgaaacggg tgagtaacac
120

gtaggtaacc tgcccatgtg tctgggataa ctgctggaaa cggtagctaa aaccggatag
180

gtatacggag cgcatgctct gtatatataa gcaccctca aggtgtgaac atggatggac
240

ctgcggcgca ttagctagtt ggtgaggtaa cggcccacca aggcgatgat gcgtagccgg
300

cctgagaggg taaacggcca cattgggact gagacacggc ccaaactcct acgggaggca
360

gcagtaggga attttcgtca atggggggaa ccctgaacga gcaatgccgc gtgagtgaag
420

aagggtcttcg gatcgtaaag ctctgttgta agtgaagaac ggctcataga ggaaatgcta
480

tgggagtgac ggtagcttac cagaaagcca cggctaacta cgtgccagca gccgcggtaa
540

tacgtaggtg gcaagcgta tccggaatca ttgggcgtaa aggggtgcgta ggtggcgta
600

taagtctgta gtaaaaggca atggctcaac cattgtaagc tatggaaact ggtaggctag
660

agtgcagaag agggcgatgg aattccatgt gtagcggtaa aatgcgtaga tatatggagg
720

aacaccagtg gcgaaggcgg tcgcctggtc tgtaactgac actgaggcac gaaagcgtgg
780

ggagcaaata ggattagata ccctagtagt ccacgccgta aacgatgaga actaagtgtt
840

ggaggaattc agtgctgcag ttaacgcaat aagttctccg cctggggagt atgcacgcaa
900

gtgtgaaact caaaggaatt gacgggggcc cgcacaagcg gtggagtatg tggtttaatt
960

cgaagcaacg cgaagaacct taccaggcct tgacatggat gcaaaggctc tagagataga
1020

gagataatta tggatcacac aggtggtgca tggttgtcgt cagctcgtgt cgtgagatgt
1080

tgggttaagt cccgcaacga gcgcaaccct tgtcgcatgt taccagcatc aagttgggga
1140

ctcatgcgag actgccggtg acaaaccgga ggaagggtggg gatgacgtca aatcatcatg
1200

ccccttatgg cctgggctac acacgtacta caatggcgac cacaaagagc agcgacttgg
1260

tgacaaggag cgaatctcat aaaggccgtc tcagttcgga ttgaagtctg caactcgact
1320

tcatgaagtc ggaatcgcta gtaatcgag atcagcatgc tgcggtgaat acgttctcgg
1380

gccttgtaca caccgcccgt caaaccatgg gagtcagtaa taccgaagc cgggtggcata
1440

accgtaagga gtgagccgtc gaaggtagga ccgatgactg gggttaagtc gtaacaaggt
1500

a t c c c t a c g g g a a c g t g g g g a t g g a t c a c c t c c t t t
1536

<210> 310
<211> 1537
<212> DNA
<213> artificial sequence

<220>

<223> >GCF_000242175|NJF00MND_02191 16S ribosomal RNA

<400> 310

atggagagtt tgatcctggc tcaggatgaa cgctggcggc atgcctaata catgcaagtc
60

gaacgaagtt tcgaggaagc ttgcttccaa agagacttag tggcgaacgg gtgagtaaca
120

cgtaggtaac ctgcccattgt gtccgggata actgctggaa acggtagcta aaaccggata
180

ggtatacaga gcgcatgctc agtatattaa agcgtccatc aaggcgtgaa catggatgga
240

cctgcggcgc attagctagt tggtagagta acggctcacc aaggcgtatga tgcgtagccg
300

gcctgagagg gtaaaccggcc acattgggac tgagacacgg cccaaactcc tacgggaggc
360

agcagtaggg aattttcgtc aatgggggaa accctgaacg agcaatgccg cgtgagtgaa
420

gaaggtcttc ggatcgtaaa gctctgttgt aagtgaagaa cggctcatag aggaaatgct
480

atgggagtga cggtagctta ccagaaagcc acggctaact acgtgccagc agccgcggta
540

atacgtaggt ggcaagcggt atccggaatc attgggcgta aagggtgcgt aggtggcgta
600

ctaagtctgt agtaaaaggc aatggctcaa ccattgtaag ctatggaaac tggatatgctg
660

gagtgcagaa gagggcgatg gaattccatg tgtagcggta aaatgcgtag atatatggag
720

gaacaccagt ggcgaaggcg gtcgcctggc ctgtaactga cactgaggca cgaaagcgtg
780

gggagcaaatt aggattagat accctagtag tccacgccgt aaacgatgag aactaagtgt
840

tggaggaatt cagtgctgca gttaacgcaa taagttctcc gcttggggag tatgcacgca
900

agtgtgaaac tcaaaggaat tgacgggggc ccgcacaagc ggtggagtat gtggtttaatt
960

tcgaagcaac gcgaagaacc ttaccaggcc ttgacatgga aacaaatacc ctagagatag
1020

ggggataatt atggatcaca caggtggtgc atggttgtcg tcagctcgtg tcgtgagatg
1080

ttgggttaag tcccgcacg agcgcaaccc ttgtcgcgtg ttaccagcat caagttgggg
1140

actcatgcga gactgccggt gacaaaccgg aggaagggtg ggatgacgtc aaatcatcat
1200

gccccttatg gcctgggcta cacacgtact acaatggcgg ccacaaagag cagcgacaca
1260

gtgatgtgaa gcgaatctca taaaggctcg ctcagttcgg attgaagtct gcaactcgac
1320

ttcatgaagt cggaatcgct agtaatcgca gatcagcatg ctgcgggtgaa tacgtttctcg
1380

ggccttgtac acaccgcccg tcaaaccatg ggagtcagta ataccgaag ccggtggcat
1440

aaccgtaagg agtgagccgt cgaaggtagg accgatgact ggggttaagt cgtaacaagg
1500

t a t c c c t a c g g g a a c g t g g g g a t g g a t c a c c t c c t t t
1537

<210> 311

<211> 1537

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000242175|NJFOOMND_03280 16S ribosomal RNA

<400> 311

atggagagtt tgatcctggc tcaggatgaa cgctggcggc atgcctaata catgcaagtc
60

gaacgaagtt tcgaggaagc ttgcttccaa agagacttag tggcgaacgg gtgagtaaca
120

cgtaggtaac ctgcccattgt gtccgggata actgctggaa acggtagcta aaaccggata
180

ggtatacaga gcgcatgctc agtatattaa agcgcccatc aaggcgtgaa catggatgga
240

cctgcggcgc attagctagt tggtgaggta acggcccacc aaggcgtgaa tgcgtagccg
300

gcctgagagg gtaaacggcc acattgggac tgagacacgg cccaaactcc tacgggagggc
360

agcagtaggg aattttcgtc aatgggggaa accctgaacg agcaatgccg cgtgagtgaa
420

gaaggtcttc ggatcgtaaa gctctgttgt aagtgaagaa cggatcatag aggaaatgct
480

atgggagtga cggtagctta ccagaaagcc acggctaact acgtgccagc agccgcggta
540

atacgtaggt ggcaagcggt atccggaatc attgggcgta aagggtgcgt aggtggcgta
600

ctaagtctgt agtaaaaggc aatggctcaa ccattgtaag ctatggaaac tggatatgctg
660

gagtgacagaa gagggcgatg gaattccatg tgtagcggta aaatgcgtag atatatggag
720

gaacaccagt ggcgaaggcg gtcgcctggg ctgtaactga cactgaggca cgaaagcgtg
780

gggagcaaat aggattagat accctagtag tccacgccgt aaacgatgag aactaagtgt
840

tggaggaatt cagtgctgca gttaacgcaa taagttctcc gcctggggag tatgcacgca
900

agtgtgaaac tcaaaggaat tgacgggggc cgcacaagc ggtggagtat gtggtttaat
960

tcgaagcaac gcgaagaacc ttaccaggcc ttgacatgga aacaaatacc ctagagatag
1020

ggggataatt atggatcaca caggtggtgc atggttgtcg tcagctcgtg tcgtgagatg
1080

ttgggttaag tcccgcaacg agcgcaaccc ttgtcgcattg ttaccagcat caagttgggg
1140

actcatgcga gactgccggt gacaaaccgg aggaagggtg ggatgacgtc aaatcatcat
1200

gccccttatg gcctgggcta cacacgtact acaatggcgg ccacaaagag cagcgacaca
1260

gtgatgtgaa gcgaatctca taaagggtcgt ctcagttcgg attgaagtct gcaactcgac
1320

ttcatgaagt cggaatcgct agtaatcgca gatcagcatg ctgcggtgaa tacgtttctcg
1380

ggccttgtac acaccgcccg tcaaaccatg ggagtcagta ataccggaag ccggtggcat
1440

aaccgtaagg agtgagccgt cgaaggtagg accgatgact ggggttaagt cgtaacaagg
1500

t a t c c c t a c g g g a a c g t g g g g a t g g a t c a c c t c c t t t
1537

<210> 312

<211> 1537

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000242175|NJF00MND_03586 16S ribosomal RNA

<400> 312

atggagagtt tgatcctggc tcaggatgaa cgctggcggc atgcctaata catgcaagtc
60

gaacgaagtt tcgaggaagc ttgcttccaa agagacttag tggcgaacgg gtgagtaaca
120

cgtaggtaac ctgcccattgt gtccgggata actgctggaa acggtagcta aaaccggata
180

ggtatacaga gcgcatgctc agtatattaa agcgcccatc aaggcgtgaa catggatgga
240

cctgcggcgc attagctagt tggtagaggta acggcccacc aaggcgatga tgcgtagccg
300

gcctgagagg gttaaaccggcc acattgggac tgagacacgg cccaaactcc tacgggagggc
360

agcagtaggg aattttcgtc aatgggggaa accctgaacg agcaatgccg cgtgagtgaa
420

gaaggtcttc ggatcgtaaa gctctgttgt aagtgaagaa cggatcatag aggaaatgct
480

atgggagtga cggtagctta ccagaaagcc acggctaact acgtgccagc agccgcggta
540

atacgtaggt ggcaagcgtt atccggaatc attgggcgta aagggtgcgt aggtggcgta
600

ctaagtctgt agtaaaaggc aatggctcaa ccattgtaag ctatggaaac tggatatgctg
660

gagtgcagaa gagggcgatg gaattccatg tgtagcggta aaatgcgtag atatatggag
720

gaacaccagt ggcgaaggcg gtcgcctggc ctgtaactga cactgaggca cgaaagcgtg
780

gggagcaaat aggattagat accctagtag tccacgccgt aaacgatgag aactaagtgt
840

tggaggaatt cagtgctgca gttaacgcaa taagttctcc gcctggggag tatgcacgca
900

agtgtgaaac tcaaaggaat tgacgggggc ccgcacaagc ggtggagtat gtggtttaat
960

tcgaagcaac gcgaagaacc ttaccaggcc ttgacatgga aacaaatacc ctagagatag
1020

ggggataatt atggatcaca caggtggtgc atggttgtcg tcagctcgtg tcgtgagatg
1080

ttgggttaag tcccgcacg agcgcaaccc ttgtcgcacg ttaccagcat caagttgggg
1140

actcatgcga gactgccggt gacaaaccgg aggaagggtg ggatgacgtc aaatcatcat
1200

gccccttatg gcctgggcta cacacgtact acaatggcgg ccacaaagag cagcgacaca
1260

gtgatgtgaa gcgaatctca taaagggtcgt ctcagttcgg attgaagtct gcaactcgac
1320

ttcatgaagt cggaatcgct agtaatcgca gatcagcatg ctgcggtgaa tacgttctcg
1380

ggccttgtag acaccgcccg tcaaaccatg ggagtcagta ataccgaag ccggtggcat
1440

aaccgtaagg agtgagccgt cgaaggtagg accgatgact ggggttaagt cgtaacaagg
1500

t a t c c c t a c g g g a a c g t g g g g a t g g a t c a c c t c c t t t
1537

<210> 313

<211> 1210

<212> DNA

<213> artificial sequence

<220>

<223> >SPC10651|LCDCKKHI_03416 16S ribosomal RNA (partial)

<400> 313

gaacggccac attgggactg agacacggcc cagactccta cgggaggcag cagtggggaa
60

tattgcgcaa tgggggaaac cctgacgcag caacgccgcg tgattgaaga aggccttcgg
120

gttgtaaaga tctttaattg gggacgaaaa atgacggtag ccaaagaata agctccggct
180

aactacgtgc cagcagccgc ggtaatacgt agggagcaag cggtatccgg atttactggg
240

tgtaaagggc gagtaggcgg gctggcaagt tgggagtga atcccggggc ttaaccccgg
300

aactgctttc aaaactgctg gtcttgagt atggagaggc aggcggaatt ccgtgtgtag
360

cggtgaaatg cgtagatata cggaggaaca ccagtggcga aggcggcctg ctggacatta
420

actgacgctg aggagcgaaa gcgtggggag caaacaggat tagataccct ggtagtccac
480

gccgtaaacg atggatacta ggtgtgggag gtattgaccc cttccgtgcc ggagttaaca
540

caataagtat cccacctggg gagtacggcc gcaagggtga aactcaaagg aattgacggg
600

ggcccgcaca agcagtggag tatgtggttt aattcgaagc aacgcgaaga accttaccag
660

gtcttgacat ccctctgacc gccctagaga tagggtttcc cttcggggca gaggtgacag
720

gtggtgcatg gttgtcgtca gctcgtgtcg tgagatgttg ggttaagtcc cgcaacgagc
780

gcaaccctta cggttagttg atacgcaaga tcactctagc cggactgccg ttgacaaaac
840

ggaggaaggt ggggacgacg tcaaatcatc atgcccctta tgacctgggc tacacacgta
900

ctacaatggc agtcatacag agggaagcaa aacagtgatg tggagcaaat ccctaaaagc
960

tgtcccagtt cagattgcag gctgcaactc gcctgcatga agtcggaatt gctagtaatc
1020

gcggatcagc atgccgcggt gaatacgttc ccgggccttg tacacaccgc ccgtcacacc
1080

atgagagccg gtaatacccg aagtccgtag cctaaccgca aggagggcgc ggccgaaggt
1140

aggactggta attaggggtga agtcgtaaca aggtagccgt atcggaaggt gcggctggat
1200

c a c c t c c t t t
1210

<210> 314

<211> 1530

<212> DNA

<213> artificial sequence

<220>

<223> >SPC10987|PGIJJNHC_00268 16S ribosomal RNA

<400> 314

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gagcgaagcg ctttacttag atttcttcgg attgaagagt tttgcgactg agcggcggac
120

gggtgagtaa cgcgtgggta acctgcctca tacaggggga taacagttag aaatgactgc
180

taataaccgca taagaccaca gtaccgcatg gtaccgtggg aaaaactccg gtggtatgag
240

atggaccgcg gtctgattag ctagttggta aggtaacggc ttaccaaggc gacgatcagt
300

agccgacctg agagggtgac cggccacatt gggactgaga cacggcccaa actcctacgg
360

gaggcagcag tggggaatat tgcacaatgg gggaaaccct gatgcagcga cgccgcgtga
420

aggatgaagt atttcggtat gtaaacttct atcagcaggg aagaaaatga cggtacctga
480

ctaagaagcc ccggctaact acgtgccagc agccgcggta atacgtaggg ggcaagcggt
540

atccggattt actgggtgta aaggagcgt agacggttat gtaagtctga tgtgaaaacc
600

cggggctcaa ccccgggact gcattggaaa ctatgtaact agagtgtcgg agaggtaagt
660

ggaattccta gtgtagcggg gaaatgcgta gatattagga ggaacaccag tggcgaaggc
720

ggcttactgg acgatgactg acgttgaggc tcgaaagcgt ggggagcaaa caggattaga
780

taccctggta gtccacgccg taaacgatgc atactaggtg tcgggtggca aagccattcg
840

gtgccgcagc aaacgcaata agtatgccac ctggggagta cgttcgcaag aatgaaactc
900

aaaggaattg acgggggaccc gcacaagcgg tggagcatgt ggtttaattc gaagcaacgc
960

gaagaacctt acctgctctt gacatcccc tgaccggcgc gtaatggtgc ctttccttcg
1020

ggacagggga gacaggtggg gcatggttgt cgtcagctcg tgtcgtgaga tgttgggtta
1080

agtcccgcaa cgagcgcaac ccttatcttt agtagccagc ggttcggccg ggcactctag
1140

agagactgcc agggataacc tggaggaagg tggggatgac gtcaaatcat catgcccctt
1200

atgagcaggg ctacacacgt gctacaatgg cgtaaacaaa gggaggcgaa gccgcgaggt
1260

ggagcaaadc ccaaaaataa cgtctcagtt cggattgtag tctgcaactc gactacatga
1320

agctggaatc gctagtaatc gcgaatcaga atgtcgcggt gaatacgttc ccgggtcttg
1380

tacacaccgc ccgtcacacc atgggagttg gtaacgcccg aagtcagtga cccaaccgta
1440

aggagggagc tgccgaaggt gggaccgata actgggggtga agtcgtaaca aggtagccgt
1500

a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1530

<210> 315

<211> 1530

<212> DNA

<213> artificial sequence

<220>

<223> >SPC10987|PGIJJNHC_03558 16S ribosomal RNA

<400> 315

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gagcgaagcg ctttacttag atttcttcgg attgaagagt tttgcgactg agcggcggac
120

gggtgagtaa cgcgtgggta acctgcctca tacaggggga caacagttag aaatgactgc
180

taataaccgca taagaccacg gtaccgcatg gtacagtggg aaaaactccg gtggtatgag
240

atggaccgcg gtctgattag ctagttggta aggtaacggc ttaccaaggc gacgatcagt
300

agccgacctg agaggggtgac cggccacatt gggactgaga cacggcccaa actcctacgg
360

gaggcagcag tgggggaatat tgcacaatgg gggaaaccct gatgcagcga cgccgcgtga
420

aggatgaagt 480	atttcggtat	gtaaacttct	atcagcaggg	aagaaaatga	cggtacctga
ctaagaagcc 540	ccggctaact	acgtgccagc	agccgcggta	atacgtaggg	ggcaagcggt
atccggattt 600	actgggtgta	aagggagcgt	agacggttat	gtaagtctga	tgtgaaaacc
cggggctcaa 660	ccccgggact	gcattggaaa	ctatgtaact	agagtgtcgg	agaggtaagt
ggaattccta 720	gtgtagcggg	gaaatgcgta	gatattagga	ggaacaccag	tggcgaaggc
ggcttactgg 780	acgatgactg	acgttgaggc	tcgaaagcgt	ggggagcaaa	caggattaga
taccctggta 840	gtccacgccg	taaacgatgc	atactaggtg	tcgggtggca	aagccattcg
gtgccgcagc 900	aaacgcaata	agtatgccac	ctggggagta	cgttcgcaag	aatgaaactc
aaaggaattg 960	acggggaccc	gcacaagcgg	tggagcatgt	ggtttaattc	gaagcaacgc
gaagaacctt 1020	acctgctctt	gacatcccc	tgaccggcgc	gtaatggtgc	ctttccttcg
ggacagggga 1080	gacaggtggg	gcatggttgt	cgtcagctcg	tgtcgtgaga	tgttgggtta
agtcccgcaa 1140	cgagcgcaac	ccttatcttt	agtagccagc	ggttcggccg	ggcactctag
agagactgcc 1200	agggataacc	tggaggaagg	tggggatgac	gtcaaatacat	catgcccctt
atgagcaggg 1260	ctacacacgt	gctacaatgg	cgtaaacaaa	gggaggcgaa	gccgcgaggt
ggagcaaata 1320	ccaaaaataa	cgtctcagtt	cggattgtag	tctgcaactc	gactacatga

agctggaatc gctagtaatc gcgaatcaga atgtcgcggt gaatacgttc ccgggtcttg
1380

tacacaccgc ccgtcacacc atgggagttg gtaacgcccg aagtcagtga cccaaccgta
1440

aggagggagc tgccgaaggt gggaccgata actgggggtga agtcgtaaca aggtagccgt
1500

a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1530

<210> 316

<211> 1530

<212> DNA

<213> artificial sequence

<220>

<223> >SPC10987|PGIJJNHC_03567 16S ribosomal RNA

<400> 316

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gagcgaagcg ctttacttag atttcttcgg attgaagagt tttgcgactg agcggcggac
120

gggtgagtaa cgcgtgggta acctgcctca tacaggggga taacagttag aaatgactgc
180

taataaccgca taagaccacg gtaccgcatg gtacagtggg aaaaactccg gtggtatgag
240

atggaccgcg gtctgattag ctagttggta aggtaacggc ttaccaaggc gacgatcagt
300

agccgacctg agagggtgac cggccacatt gggactgaga cacggcccaa actcctacgg
360

gaggcagcag tgggggaatat tgcacaatgg gggaaaccct gatgcagcga cgccgcgtga
420

aggatgaagt atttcggtat gtaaacttct atcagcaggg aagaaaatga cggtacctga
480

ctaagaagcc ccggctaact acgtgccagc agccgcggta atacgtaggg ggcaagcggt
540

atccggattt actgggtgta aaggagcggt agacgggttat gtaagtctga tgtgaaaacc
600

cggggctcaa ccccgggact gcattggaaa ctatgtaact agagtgtcgg agaggtaagt
660

ggaattccta gtgtagcggg gaaatgcgta gatattagga ggaacaccag tggcgaaggc
720

ggcttactgg acgatgactg acgttgaggc tcgaaagcgt ggggagcaaa caggattaga
780

taccctggta gtccacgccg taaacgatgc atactaggtg tcgggtggca aagccattcg
840

gtgccgcagc aaacgcaata agtatgccac ctggggagta cgttcgcaag aatgaaactc
900

aaaggaattg acgggggaccc gcacaagcgg tggagcatgt ggtttaattc gaagcaacgc
960

gaagaacctt acctgctctt gacatcccc tgaccggcgc gtaatggtgc ctttccttcg
1020

ggacagggga gacaggtggg gcatggttgt cgtcagctcg tgtcgtgaga tgttgggtta
1080

agtcccgcaa cgagcgcaac ccttatcttt agtagccagc ggttcggccg ggcactctag
1140

agagactgcc agggataacc tggaggaagg tggggatgac gtcaaatcat catgcccctt
1200

atgagcaggg ctacacacgt gctacaatgg cgtaaacaaa gggaggcgaa gccgcgaggt
1260

ggagcaaadc ccaaaaataa cgtctcagtt cggattgtag tctgcaactc gactacatga
1320

agctggaatc gctagtaatc gcgaatcaga atgtcgcggg gaatacgttc ccgggtcttg
1380

tacacaccgc ccgtcacacc atgggagttg gtaacgcccg aagtcagtga cccaaccgta
1440

aggagggagc tgccgaaggt gggaccgata actgggggtga agtcgtaaca aggtagccgt
1500

a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1530

<210> 317

<211> 1530

<212> DNA

<213> artificial sequence

<220>

<223> >SPC10987|PGIJJNHC_04151 16S ribosomal RNA

<400> 317

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gagcgaagca ctttacttag atttcttcgg aatgaagagt gttgtgactg agcggcggac
120

gggtgagtaa cgcgtgggta acctgcctca tacaggggga taacagttag aaatgactgc
180

taataccgca taagaccacg gtaccgcatg gtacagtggg aaaaactccg gtggtatgag
240

atggacccgc gtctgattag ctagttggta aggtaacggc ttaccaaggc gacgatcagt
300

agccgacctg agaggggtgac cggccacatt gggactgaga cacggcccaa actcctacgg
360

gaggcagcag tggggaatat tgcacaatgg gggaaaccct gatgcagcga cgccgcgtga
420

aggatgaagt atttcggtat gttaaacttct atcagcaggg aagaaaatga cggtacctga
480

ctaagaagcc ccggctaact acgtgccagc agccgcggta atacgtaggg ggcaagcggt
540

atccggattt actgggtgta aaggagcgt agacggttat gtaagtctga tgtgaaaacc
600

cggggctcaa ccccgggact gcattggaaa ctatgtaact agagtgtcgg agaggtaagt
660

ggaattccta gtgtagcgggt gaaatgcgta gatattagga ggaacaccag tggcgaaggc
720

ggcttactgg acgatgactg acgttgaggc tcgaaagcgt ggggagcaaa caggattaga
780

taccctggta gtccacgccg taaacgatgc atactaggtg tcgggtggca aagccattcg
840

gtgccgcagc aaacgcaata agtatgccac ctggggagta cgttcgcaag aatgaaactc
900

aaaggaattg acggggaccc gcacaagcgg tggagcatgt ggtttaattc gaagcaacgc
960

gaagaacctt acctgctctt gacatcccc tgaccggcgc gtaatggtgc ctttccttcg
1020

ggacagggga gacaggtgggt gcatggttgt cgtcagctcg tgtcgtgaga tgttgggtta
1080

agtcccgcaa cgagcgcaac ccttatcttt agtagccagc ggttcggccg ggcactctag
1140

agagactgcc agggataacc tggaggaagg tggggatgac gtcaaatacat catgcccctt
1200

atgagcaggg ctacacacgt gctacaatgg cgtaaacaaa gggaggcgaa gccgcgaggt
1260

ggagcaaata ccaaaaataa cgtctcagtt cggattgtag tctgcaactc gactacatga
1320

agctggaata gctagtaata gcgaatcaga atgtcgcgggt gaatacgttc ccgggtcttg
1380

tacacaccgc ccgtcacacc atgggagttg gtaacgcccg aagtcagtga cccaaccgta
1440

aggagggagc tgccgaaggt gggaccgata actgggggtga agtcgtaaca aggtagccgt
1500

a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1530

<210> 318

<211> 1529

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000146185|PINFBIPJ_00014 16S ribosomal RNA

<400> 318

ttatgagagt ttgatacctgg ctcaggatga acgctggcgg cgtgcttaac acatgcaagt
60

cgaacgaagc atttagaaca gattacttcg gtttgaagtt ctttatgact gagtggcgga
120

cgggtgagta acgcgtgggt aacctgcctt gtactggggg atagcagctg gaaacggctg
180

gtaataccgc ataagcgcac aatgttgcac gacatgggtgt gaaaaactcc ggtggtataa
240

gatggacccg cgtctgatta gctagttggt gagataacag cccaccaagg cgacgatcag
300

tagccgacct gagaggggtga ccggccacat tgggactgag acacggccca gactcctacg
360

ggaggcagca gtggggaata ttgcacaatg gaggaaactc tgatgcagcg acgccgcgtg
420

agtgaagaag taattcggtta tgtaaagctc tatcagcagg gaagatagtg acggtacctg
480

actaagaagc tccggctaaa tacgtgccag cagccgcggt aatacgtatg gagcaagcgt
540

tatccggatt tactgggtgt aaagggagtg taggtggcca tgcaagtcag aagtgaaaat
600

ccgggggctca accccggaac tgcttttgaa actgtaaggc tggagtgcag gaggggtgag
660

tggaattcct agtgtagcgg tgaaatgcgt agatattagg aggaacacca gtggcgaagg
720

cggctcactg gactgtaact gacactgagg ctcgaaagcg tggggagcaa acaggattag
780

ataccctggg agtccacgcc gtaaacgatg aatactaggt gtcggggccc ataagggctt
840

cggtgccgca gcaaacgcaa taagtattcc acctggggag tacgttcgca agaatgaaac
900

tcaaaggaat tgacggggac ccgcacaagc ggtggagcat gtggtttaat tcgaagcaac
960

gcgaagaacc ttaccaagtc ttgacatcct cttgaccggt cagtaatgtg gcctttcctt
1020

cgggacaaga gagacagggt gtgcatgggt gtcgtcagct cgtgtcgtga gatgttgggt
1080

taagtcccgc aacgagcgca acccctatcc ttagtagcca gcagtaagat gggcactcta
1140

gggagactgc cagggataac ctggaggaag gtggggatga cgtcaaataca tcatgccctt
1200

tatgacttgg gctacacacg tgctacaatg gcgtaaacia agtgaagcga agtcgtgagg
1260

ccaagcaaata cacaaaaata acgtctcagt tcggattgta gtctgcaact cgactacatg
1320

aagctggaat cgctagtaat cgcagatcag aatgctgcgg tgaatacgtt cccgggtctt
1380

gtacacaccg cccgtcacac catgggagtc gaaaatgccc gaagtcggtg acctaacgta
1440

agaaggagcc gccgaaggca ggtttgataa ctgggggtgaa gtcgtaacia ggtagccgta
1500

t c g g a a g g t g
1529

c g g c t g g a t c

a c c t c c t t t

<210> 319

<211> 1530

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000146185|PINFBIPJ_00374 16S ribosomal RNA

<400> 319

ttatgagagt ttgatcctgg ctcaggatga acgctggcgg cgtgcttaac acatgcaagt
60

cgaacgaagc atttagaaca gattatttcg gtatgaagtt ctttatgact gagtggcgga
120

cggggtgagta acgcgtgggt aacctgcctt gtactggggg atagcagctg gaaacggctg
180

gtaataccgc ataagcgcac aatgttgcac gacatgggtgt gaaaaactcc ggtggtataa
240

gatggacccg cgtctgatta gctagttggt gagataacag cccaccaagg cgacgatcag
300

tagccgacct gagaggggtga ccggccacat tgggactgag acacggccca gactcctacg
360

ggaggcagca gtggggaata ttgcacaatg gaggaaactc tgatgcagcg acgccgcgtg
420

agtgaagaag taattcggtta tgtaaagctc tatcagcagg gaagatagtg acggtacctg
480

actaagaagc tccggctaaa tacgtgccag cagccgcggt aatacgtatg gagcaagcgt
540

tatccggatt tactgggtgt aaagggagtg taggtggcca tgcaagtcag aagtgaaaat
600

ccggggctca accccggaac tgcttttgaa actgtaaggc tggagtgacg gaggggtgag
660

tggaattcct agtgtagcgg tgaaatgcgt agatattagg aggaacacca gtggcgaagg
720

cggctcactg gactgtaact gacactgagg ctcgaaagcg tggggagcaa acaggattag
780

ataccctggg agtccacgcc gtaaacgatg aatactaggt gtcggggccc aaaagggctt
840

cggtgccgca gcaaacgcaa taagtattcc acctggggag tacgttcgca agaatgaaac
900

tcaaaggaat tgacggggac ccgcacaagc ggtggagcat gtggtttaat tcgaagcaac
960

gcgaagaaac cttaccaagt cttgacatcc cactgaccgg acagtaatgt gtcctttcct
1020

tcgggacagt ggtgacaggt ggtgcatggg tgtcgtcagc tcgtgtcgtg agatgttggg
1080

ttaagtcccg caacgagcgc aaccctatc cttagtagcc agcagtaaga tgggcactct
1140

agggagactg ccagggataa cctggaggaa ggtggggatg acgtcaaadc atcatgcccc
1200

ttatgacttg ggctacacac gtgctacaat ggcgtaaaca aagtgaagcg aagtcgtgag
1260

gccaagcaaa tcacaaaaat aacgtctcag ttcggattgt agtctgcaac tcgactacat
1320

gaagctggaa tcgctagtaa tcgcagatca gaatgctgcg gtgaatacgt tcccgggtct
1380

tgtacacacc gcccgtcaca ccatgggagt cgaaaatgcc cgaagtcggg gacctaacgt
1440

aagaaggagc cgccgaaggc aggtttgata actgggggtga agtcgtaaca aggtagccgt
1500

a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1530

<210> 320
<211> 1529
<212> DNA
<213> artificial sequence

<220>

<223> >GCF_000146185|PINFBIPJ_00675 16S ribosomal RNA

<400> 320

ttatgagagt ttgatacctgg ctcaggatga acgctggcgg cgtgcttaac acatgcaagt
60

cgaacgaagc atttagaaca gattatttcg gtatgaagtt ctttatgact gagtggcgga
120

cgggtgagta acgctgagggt aacctgcctt gtactggggg atagcagctg gaaacggctg
180

gtaataccgc ataagcgcac aatgttgcac gacatagtg gaaaaactcc ggtggtataa
240

gatggacccg cgtctgatta gctagttggt gagataacag cccaccaagg cgacgatcag
300

tagccgacct gagaggggtga ccggccacat tgggactgag acacggccca gactcctacg
360

ggaggcagca gtggggaata ttgcacaatg gaggaaactc tgatgcagcg acgccgcgtg
420

agtgaagaag taattcggtta tgtaaagctc tatcagcagg gaagatagtg acggtacctg
480

actaagaagc tccggctaaa tacgtgccag cagccgcggt aatacgtatg gagcaagcgt
540

tatccggatt tactgggtgt aaaggagtg taggtggcca tgcaagtcag aagtgaaaat
600

ccggggctta accccggaac tgcttttgaa actgtaaggc tggagtcag gaggggtgag
660

tggaattcct agtgtagcgg tgaaatgcgt agatattagg aggaacacca gtggcgaagg
720

cggtcactg gactgtaact gacactgagg ctcgaaagcg tggggagcaa acaggattag
780

ataccctggg agtccacgcc gtaaacgatg aatactaggt gtcggggccc ataagggctt
840

cggtgccgca gcaaacgcaa taagtattcc acctggggag tacgttcgca agaatgaaac
900

tcaaaggaat tgacggggac ccgcacaagc ggtggagcat gtggtttaat tcgaagcaac
960

gcgaagaacc ttaccaagtc ttgacatccc actgaccgga cagtaatgtg tcctttcctt
1020

cgggacagtg gtgacagggt gtgcatgggt gtcgtcagct cgtgtcgtga gatgttgggt
1080

taagtcccg c aacgagcgca acccctatcc ttagtagcca gcagtaagat gggcactcta
1140

gggagactgc cagggataac ctggaggaag gtggggatga cgtcaaataca tcatgccctt
1200

tatgacttgg gctacacacg tgctacaatg gcgtaaacia agtgaagcga agtcgtgagg
1260

ccaagcaaat cacaaaaata acgtctcagt tcggattgta gtctgcaact cgactacatg
1320

aagctggaat cgctagtaat cgcagatcag aatgctgcgg tgaatacgtt cccgggtctt
1380

gtacacaccg cccgtcacac catgggagtc gaaaatgccc gaagtcgggtg acctaacgaa
1440

agaaggagcc gccgaaggca ggtttgataa ctgggggtgaa gtcgtaacia ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1529

<210> 321

<211> 1529

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000146185|PINFBIPJ_00831 16S ribosomal RNA

<400> 321

ttatgagagt ttgatcctgg ctcaggatga acgctggcgg cgtgcttaac acatgcaagt
60

cgaacgaagc atttagaaca gattatttcg gtatgaagtt ctttatgact gagtggcgga
120

cggggtgagta acgcgtgggt aacctgcctt gtactggggg atagcagctg gaaacggctg
180

gtaataccgc ataagcgcac aatgttgcac gacatgggtgt gaaaaactcc ggtggtataa
240

gatggacccg cgtctgatta gctagttggg gagataacag cccaccaagg cgacgatcag
300

tagccgacct gagaggggtga ccggccacat tgggactgag acacggccca gactcctacg
360

ggaggcagca gtggggaata ttgcacaatg gaggaaactc tgatgcagcg acgccgcgtg
420

agtgaagaag taattcggtta tgtaaagctc tatcagcagg gaagatagtg acggtacctg
480

actaagaagc tccggctaaa tacgtgccag cagccgcggt aatacgtatg gagcaagcgt
540

tatccggatt tactgggtgt aaaggaggat taggtggcca tgcaagtcag aagtgaaaat
600

ccgggggtca accccggaac tgcttttgaa actgtgaggc tggagtgacg gaggggtgag
660

tggaattcct agtgtagcgg tgaaatgcgt agatattagg aggaacacca gtggcgaagg
720

cggtcactg gactgtaact gacactgagg ctcgaaagcg tggggagcaa acaggattag
780

ataccctggg agtccacgcc gtaaacgatg aatactaggt gtcggggccc ataaggcctt
840

cggtgccgca gcaaacgcaa taagtattcc acctggggag tacgttcgca agaatgaaac
900

tcaaaggaat tgacggggac ccgcacaagc ggtggagcat gtggtttaat tcgaagcaac
960

gcgaagaacc ttaccaagtc ttgacatccc actgaccgga cagtaatgtg tcctttcctt
1020

cgggacagtg gagacagggtg gtgcatgggt gtcgtcagct cgtgtcgtga gatgttgggt
1080

taagtcccgc aacgagcgca acccctatcc ttagtagcca gcagtaagat gggcactcta
1140

gggagactgc cagggataac ctggaggaag gtggggatga cgtcaaatac tcatgcccct
1200

tatgacttgg gctacacacg tgctacaatg gcgtaaacia agtgaagcaa agtcgtgagg
1260

ccaagcaaata cacaaaaata acgtctcagt tcggattgta gtctgcaact cgactacatg
1320

aagctggaat cgctagtaat cgcagatcag aatgctgcgg tgaatacgtt cccgggtcct
1380

gtacacaccg cccgtcacac catgggagtc gaaaatgccc gaagtcggtg acctaacgca
1440

agaaggagcc gccgaaggca ggtttgataa ctgggggtgaa gtcgtaacia ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1529

<210> 322

<211> 1529

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000146185|PINFBIPJ_01903 16S ribosomal RNA

<400> 322

ttatgagagt ttgatcctgg ctcaggatga acgctggcgg cgtgcttaac acatgcaagt
60

cgaacgaagc atttgcgaca gatttttttcg gaatgaagtt gcttatgact gagtggcgga
120

cgggtgagta acgcgtgggt aacctgcctt gtactggggg atagcagctg gaaacggctg
180

gtaataccgc ataagcgcac aatgttgcac gacatgggtgt gaaaaactcc ggtggtataa
240

gatggacccg cgtctgatta gctagttagt gagataacag cccaccaagg cgacgatcag
300

tagccgacct gagaggggtga ccggccacat tgggactgag acacggccca gactcctacg
360

ggaggcagca gtggggaata ttgcacaatg gaggaaactc tgatgcagcg acgccgcgtg
420

agtgaagaag taattcggtta tgtaaagctc tatcagcagg gaagatagtg acggtacctg
480

actaagaagc tccggctaaa tacgtgccag cagccgcggt aatacgtatg gagcaagcgt
540

tatccggatt tactgggtgt aaaggagtg taggtggcca tgcaagtcag aagtgaaaat
600

ccggggctca accccggaac tgcttttgaa actgtaaggc tggagtgcag gaggggtgag
660

tggaattcct agtgtagcgg tgaaatgcgt agatattagg aggaacacca gtggcgaagg
720

cggctcactg gactgtaact gacactgagg ctcgaaagcg tggggagcaa acaggattag
780

ataccctggg agtccacgcc gtaaacgatg aatactaggt gtcggggccc ataagggctt
840

cggtgccgca gcaaacgcaa taagtattcc acctggggag tacgttcgca agaatgaaac
900

tcaaaggaat tgacggggac ccgcacaagc ggtggagcat gtggtttaat tcgaagcaac
960

gcgaagaacc ttaccaagtc ttgacatccc actgaccgga cagtaatgtg tcctttcctt
1020

cgggacagtg gagacagggtg gtgcatggtt gtcgtcagct cgtgtcgtga gatgttgggt
1080

taagtcccg c aacgagcgc acccctatcc ttagtagcca gcagtaagat gggcactcta
1140

gggagactgc cagggataac ctggaggaag gtggggatga cgtcaaata tcatgccct
1200

tatgacttgg gctacacacg tgctacaatg gcgtaaaca agtgaagcga agtcgtgagg
1260

ccaagcaaata cacaataa acgtctcagt tcggattgta gtctgcaact cgactacatg
1320

aagctggaat cgctagtaat cgcagatcag aatgctgcgg tgaatacgtt cccgggtctt
1380

gtacacaccg cccgtcacac catgggagtc gaaaatgcc gaagtcggtg acctaacgta
1440

agaaggagcc gccgaaggca ggtttgataa ctggggtgaa gtcgtaaca ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1529

<210> 323

<211> 1424

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000173975|DKAPCDKB_00547 16S ribosomal RNA

<400> 323

ctgagtggcg gacgggtgag taacgcgtgg gtaacctgcc ctgtacaggg ggataacagc
60

tggaaacggc tgctaatacc gcataagcgc acgaggagac atctccttgt gtgaaaaact
120

ccggtggtac aggatgggccc cgcgtctgat tagctggttg gcagggtaac ggcctaccaa
180

ggcaacgata agtagccggt ctgagaggat gaacggccac attggaactg agacacggtc
240

caaactccta cgggagggcag cagtggggaa tattgcacaa tgggggaaac cctgatgcag
300

caacgccgcg tgagtgaaga agtatttcgg tatgtaaagc tctatcagca gggaagataa
360

tgacgggtacc tgactaagaa gctccggcta aatacgtgcc agcagccgcg gtaatacgta
420

tggagcaagc gttatccgga ttactgggt gtaaagggtg cgtaggtggc agtgcaagtc
480

agatgtgaaa ggccggggct caaccccgga gctgcatttg aaactgctcg gctagagtac
540

aggagaggca ggcggaattc ctagtgtagc ggtgaaatgc gtagatatta ggaggaacac
600

cagtggcgaa ggcggcctgc tggactgtta ctgacactga ggcacgaaag cgtggggagc
660

aaacaggatt agataccctg gtagtccacg ccgtaaacga tgaatactag gtgtcggggc
720

cgtataggct tcggtgccgc cgctaacgca gtaagtattc cacctgggga gtacgttcgc
780

aagaatgaaa ctcaaaggaa ttgacgggga cccgcacaag cgggtggagca tgtgggttaa
840

ttcgaagcaa cgcgaagaac cttaccaggt cttgacatcc ttctgaccgc accttaatcg
900

gtgctttcct tcgggacaga agagacaggt ggtgcatggt tgtcgtcagc tcgtgtcgtg
960

agatgttggg ttaagtcccg caacgagcgc aaccctatc ttcagtagcc agcaggtaag
1020

gctgggcact ctggagagac tgccagggat aacctggagg aagggtgggga cgacgtcaaa
1080

tcatcatgcc ctttatgac tgggcgacac acgtgctaca atggcggtca cagagtgagg
1140

cgaacccgcg aggggggagca aaccacaaaa aggccgtccc agttcggact gtagtctgca
1200

acccgactac acgaagctgg aatcgctagt aatcgcgaaat cagaatgtcg cgggtgaatac
1260

gttcccgggt cttgtacaca ccgcccgtca caccatggga gtcggaaatg cccgaagcca
1320

gtgaccaaac cttttggagg gagctgtcga aggtggagcc ggtaactggg gtgaagtcgt
1380

aacaaggtag ccgtatcgga aggtgcggt ggatcacctc cttt
1424

<210> 324

<211> 1432

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000469345|EB0BJPBI_00933 16S ribosomal RNA

<400> 324

gttctgtgac tgagtggcgg acgggtgagt aacgcgtgga taacctgcct cacacagggg
60

gataacagtt ggaaacgact gctaataccg cataagcgca cagcaccgca tgggtgcagtg
120

tgaaaaactc cgggtggtgtg agatggatcc gcgtctgatt agcttggttg cggggtaacg
180

gcccaccaag 240	gcgacgatca	gtagccggcc	tgagagggcg	accggccaca	ttgggactga
gacacggccc 300	agactcctac	gggaggcagc	agtggggaat	attgcacaat	gggggaaacc
ctgatgcagc 360	gacgccgcgt	gagcgatgaa	gtatttcggt	atgtaaagct	ctatcagcag
ggaagataat 420	gacggtacct	gactaagaag	ctccggctaa	atacgtgcca	gcagccgcgg
taatacgtat 480	ggagcaagcg	ttatccggat	ttactgggtg	taaagggagc	gtaggcggtc
ctgcaagtct 540	gatgtgaaag	gccggggctc	aaccccggga	ctgcattgga	aactgtagga
ctagagtgtc 600	ggaggggtaa	gtggaattcc	tagtgtagcg	gtgaaatgcg	tagatattag
gaggaacacc 660	agtggcgaag	gcggcttact	ggacgactac	tgacgctgag	gctcgaaagc
gtggggagca 720	aacaggatta	gataccctgg	tagtccacgc	cgtaaacgat	gaataactagg
tgttggcagg 780	taagacctgt	cggtgccgca	gcaaacgcaa	taagtattcc	acctggggag
tacgttcgca 840	agaatgaaac	tcaaaggaat	tgacggggac	ccgcacaagc	ggtggagcat
gtggtttaat 900	tcgaagcaac	gcgaagaacc	ttaccaagtc	ttgacatccc	ggtgacagaa
catgtaatgt 960	gttttcctt	cggggcaccg	gtgacagggtg	gtgcatggtt	gtcgtcagct
cgtgtcgtga 1020	gatgttgggt	taagtcccgc	aacgagcgca	acccttatcc	ccagtagcca
gcatttcgga 1080	tgggcactct	gtggagactg	ccagggacaa	cctggaggaa	ggtggggatg

acgtcaaatc atcatgcccc ttatgacttg ggctacacac gtgctacaat ggcgtaaaca
1140

aagggaagcg agaccgcgag gtggagcaaa tcccaaaaat aacgtcccag ttcggattgt
1200

agtctgcaac tcgactacat gaagctggaa tcgctagtaa tcgcagatca gaatgctgcg
1260

gtgaatacgt tcccgggtct tgtacacacc gcccgtcaca ccatgggagt cggaaatgcc
1320

cgaagccggt ggcctaaccg caaggaagga gccgtcgaag gcaggtctga taactggggt
1380

gaagtcgtaa caaggtagcc gtatcggaag gtgcggctgg atcacctcct tt
1432

<210> 325

<211> 1529

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000020605|FPCJLJAB_00010 16S ribosomal RNA

<400> 325

atgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

aacgaagcac tttatttgat ttccttcggg actgattatt ttgtgactga gtggcggacg
120

ggtgagtaac gcgtgggtaa cctgccttgt acagggggat aacagttgga aacggctgct
180

aataccgcat aagcgcacgg catcgcatga tgcagtgtga aaaactccgg tggataaga
240

tggacccgcg ttggattagc tagttgggtga ggtaacggcc caccaaggcg acgatccata
300

gccgacctga gagggtgacc ggccacattg ggactgagac acggcccaaa ctctacggg
360

aggcagcagt ggggaatatt gcacaatggg cgaaagcctg atgcagcgac gccgcgtgag
420

cgaagaagta tttcgggtatg taaagctcta tcagcaggga agataatgac ggtacctgac
480

taagaagcac cggctaaata cgtgccagca gccgcggtaa tacgtatggg gcaagcgtaa
540

tccggattta ctgggtgtaa agggagcgca ggcgggtgcgg caagtctgat gtgaaagccc
600

ggggctcaac cccgggtactg cattggaaac tgtcgtacta gagtgtcgga ggggtaagcg
660

gaattcctag tgtagcgggtg aaatgcgtag atattaggag gaacaccagt ggcgaaggcg
720

gcttactgga cgataactga cgctgaggct cgaaagcgtg gggagcaaac aggattagat
780

accctggtag tccacgccgt aaacgatgaa tactaggtgt tgggaagcat tgcttctcgg
840

tgccgtcgca aacgcagtaa gtattccacc tggggagtag gttcgcaaga atgaaactca
900

aaggaattga cggggacccg cacaagcggg ggagcatgtg gtttaattcg aagcaacgcg
960

aagaacctta ccaagtcttg acatccttct gaccgggtact taaccgtacc ttctcttcgg
1020

agcaggagtg acagggtggg catggttgtc gtcagctcgt gtcgtgagat gttgggttaa
1080

gtcccgcac gagcgcaacc cttatcttta gtagccagcg gttcggccgg gcactctaga
1140

gagactgcca gggataacct ggaggaaggc ggggatgacg tcaaatcatc atgcccctta
1200

tgacttgggc tacacacgtg ctacaatggc gtaaacaag ggaagcaaag ctgtgaagcc
1260

gagcaaattct caaaaataac gtctcagttc ggactgtagt ctgcaaccgc actacacgaa
1320

gctggaatcg ctagtaatcg cagatcagaa tgctgcggtg aatacgttcc cgggtcttgt
1380

acacaccgcc cgtcacacca tgggagttgg gaatgcccga agccagtgac ctaaccgaaa
1440

ggaaggagct gtcgaaggca ggctcgataa ctgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1529

<210> 326

<211> 1529

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000020605|FPCJLJAB_00303 16S ribosomal RNA

<400> 326

atgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

aacgaagcac tttatttgat ttccttcggg actgattatt ttgtgactga gtggcggacg
120

ggtgagtaac gcgtgggtaa cctgccttgt acagggggat aacagttgga aacggctgct
180

aataccgcat aagcgcacag catcgcatga tgcagtgtga aaaactccgg tggataaga
240

tggacccgcg ttggattagc tagttggtga ggtaacggcc caccaaggcg acgatccata
300

gccgacctga gagggtgacc ggccacattg ggactgagac acggcccaaa ctccctacggg
360

aggcagcagt ggggaatatt gcacaatggg cgaaagcctg atgcagcgac gccgcgtgag
420

cgaagaagta tttcgggtatg taaagctcta tcagcaggga agataatgac ggtacctgac
480

taagaagcac cggctaaata cgtgccagca gccgcggtaa tacgtatggt gcaagcgtaa
540

tccggattta ctgggtgtaa agggagcgcga ggcgggtgcgg caagtctgat gtgaaagccc
600

ggggctcaac cccgggtactg cattggaaac tgtcgtacta gagtgtcggga ggggtaagcg
660

gaattcctag tgtagcgggtg aaatgcgtag atattaggag gaacaccagt ggcgaaggcg
720

gcttactgga cgataactga cgctgaggct cgaaagcgtg gggagcaaac aggattagat
780

accctggtag tccacgccgt aaacgatgaa tactaggtgt tgggaagcat tgcttctcgg
840

tgccgtcgcga aacgcagtaa gtattccacc tggggagtag gttcgcaaga atgaaactca
900

aaggaattga cggggacccg cacaagcgggt ggagcatgtg gtttaattcg aagcaacgcg
960

aagaacctta ccaagtcttg acatccttct gaccgggtact taaccgtacc ttctcttcgg
1020

agcaggagtg acaggtgggtg catggttgtc gtcagctcgt gtcgtgagat gttgggttaa
1080

gtcccgcgaac gagcgcaacc cttatcttta gtagccagcg gtccggccgg gcactctaga
1140

gagactgcca gggataacct ggaggaaggc ggggatgacg tcaaatacgc atgcccccta
1200

tgacttgggc tacacacgtg ctacaatggc gtaaacaag ggaagcaaag ctgtgaagcc
1260

gagcaaattc caaaaataac gtctcagttc ggactgtagt ctgcaaccgc actacacgaa
1320

gctggaatcg ctagtaatcg cagatcagaa tgctgcggtg aatacgttcc cgggtcttgt
1380

acacaccgcc cgtcacacca tgggagttgg gaatgcccgga agccagtgac ctaaccgaaa
1440

ggaaggagct gtcgaaggca ggctcgataa ctgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1529

<210> 327

<211> 1529

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000020605|FPCJLJAB_00754 16S ribosomal RNA

<400> 327

atgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

aacgaagcac tttatttgat ttccttcggg actgattatt ttgtgactga gtggcggacg
120

ggtgagtaac gcgtgggtaa cctgccttgt acagggggat aacagttgga aacggctgct
180

aataccgcat aagcgcacgg catcgcatga tgcagtgtga aaaactccgg tggataaaga
240

tggaaccgcg ttggattagc tagttgggtga ggtaacggcc caccaaggcg acgatccata
300

gccgacctga gagggtgacc ggccacattg ggactgagac acggcccaaa ctcctacggg
360

aggcagcagt ggggaatatt gcacaatggg cgaaagcctg atgcagcgac gccgcgtgag
420

cgaagaagta tttcggtatg taaagctcta tcagcaggga agataatgac ggtacctgac
480

taagaagcac 540	cggctaaata	cgtgccagca	gccgcggtaa	tacgtatggt	gcaagcgtta
tccggattta 600	ctgggtgtaa	agggagcgca	ggcggtgcg	caagtctgat	gtgaaagccc
ggggctcaac 660	cccgggtactg	cattggaaac	tgtcgtacta	gagtgtcgga	ggggtaagcg
gaattcctag 720	tgtagcgggtg	aaatgcgtag	atattaggag	gaacaccagt	ggcgaaggcg
gcttactgga 780	cgataactga	cgctgaggct	cgaaagcgtg	gggagcaaac	aggattagat
accctggtag 840	tccgcgccgt	aaacgatgaa	tactaggtgt	tgggaagcat	tgcttctcgg
tgccgtcgca 900	aacgcagtaa	gtattccacc	tggggagtac	gttcgcaaga	atgaaactca
aaggaattga 960	cggggacccg	cacaagcgg	ggagcatgtg	gtttaattcg	aagcaacgcg
aagaacctta 1020	ccaagtcttg	acatccttct	gaccgggtact	taaccgtacc	ttctcttcgg
agcaggagtg 1080	acagggtgg	catggttg	gtcagctcgt	gtcgtgagat	gttgggttaa
gtcccgaac 1140	gagcgcaacc	cttatcttta	gtagccagcg	gtttggccgg	gcactctaga
gagactgcca 1200	gggataacct	ggaggaaggc	ggggatgacg	tcaaatac	atgcccctta
tgacttgggc 1260	tacacacgtg	ctacaatggc	gtaaacaaag	ggaagcaaag	ctgtgaagcc
gagcaaattct 1320	caaaaataac	gtctcagttc	ggactgtagt	ctgcaaccgg	actacacgaa
gctggaatcg 1380	ctagtaatcg	cagatcagaa	tgctgcgggtg	aatacgttcc	cgggtcttgt

acacaccgcc cgtcacacca tgggagttgg gaatgcccga agccagtgac ctaaccgaaa
1440

ggaaggagct gtcgaaggca ggctcgataa ctgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1529

<210> 328

<211> 1529

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000020605|FPCJLJAB_01402 16S ribosomal RNA

<400> 328

atgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

aacgaagcac tttatttgat ttccttcggg actgattatt ttgtgactga gtggcggacg
120

ggtgagtaac gcgtgggtaa cctgccttgt acagggggat aacagttgga aacggctgct
180

aataccgcat aagcgcacgg catcgcacga tgcagtgtga aaaactccgg tggataaga
240

tggacccgcg ttggattagc tagttggtga ggtaacggcc caccaaggcg acgatccata
300

gccgacctga gagggtgacc ggccacattg ggactgagac acggcccaaa ctctacggg
360

aggcagcagt ggggaatatt gcacaatggg cgaaagcctg atgcagcgac gccgcgtgag
420

cgaagaagta tttcggtatg taaagctcta tcagcaggga agataatgac ggtacctgac
480

taagaagcac cggctaaata cgtgccagca gccgcggtaa tacgtatggg gcaagcgtaa
540

tccggattta ctgggtgtaa agggagcgca ggcggtgcgg caagtctgat gtgaaagccc
600

ggggctcaac cccggtactg cattggaaac tgtcgtacta gagtgtcgga ggggtaagcg
660

gaattcctag tgtagcgggtg aaatgcgtag atattaggag gaacaccagt ggcgaaggcg
720

gcttactgga cgataactga cgctgaggct cgaaagcgtg gggagcaaac aggattagat
780

accctggtag tccacgccgt aaacgatgaa tactagggtgt tgggaagcat tgcttctcgg
840

tgccgtcgca aacgcagtaa gtattccacc tggggagtag gttcgcaaga atgaaactca
900

aaggaattga cggggacccg cacaagcggg ggagcatgtg gtttaattcg aagcaacgcg
960

aagaacctta ccaagtcttg acatccttct gaccgggtact taaccgtacc ttctcttcgg
1020

agcaggagtg acaggtgggtg catggttgtc gtcagctcgt gtcgtgagat gttgggttaa
1080

gtcccgcacg gagcgcaacc cttatcttta gtagccagcg gttcggccgg gcactctaga
1140

gagactgcca gggataacct ggaggaaggc ggggatgacg tcaaatacat atgcccctta
1200

tgacttgggc tacacacgtg ctacaatggc gtaaacaag ggaagcaaag ctgtgaagcc
1260

gagcaaattc caaaaataac gtctcagttc ggactgtagt ctgcaaccgg actacacgaa
1320

gctggaatcg ctagtaatcg cagatcagaa tgctgcgggtg aatacgttcc cgggtcttgt
1380

acacaccgcc cgtcacacca tgggagttgg gaatgccga agccagtgac ctaaccgaaa
1440

ggaaggagct gtcgaaggca ggctcgataa ctgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1529

<210> 329

<211> 1529

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000020605|FPCJLJAB_02105 16S ribosomal RNA

<400> 329

atgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

aacgaagcac tttatttgat ttccttcggg actgattatt ttgtgactga gtggcggacg
120

ggtgagtaac gcgtgggtaa cctgccttgt acagggggat aacagttgga aacggctgct
180

aataccgcat aagcgcacag catcgcatga tgcagtgtga aaaactccgg tggataaga
240

tggacccgcg ttggattagc tagttgggtga ggtaacggcc caccaaggcg acgatccata
300

gccgacctga gagggtgacc ggccacattg ggactgagac acggcccaaa ctcctacggg
360

aggcagcagt ggggaatatt gcacaatggg cgaaagcctg atgcagcgac gccgcgtgag
420

cgaagaagta tttcggtatg taaagctcta tcagcaggga agataatgac ggtacctgac
480

taagaagcac cggctaaata cgtgccagca gccgcggtaa tacgtatggg gcaagcgтта
540

tccggattta ctgggtgtaa agggagcgca ggcggtgcgg caagtctgat gtgaaagccc
600

ggggctcaac cccggtactg cattggaaac tgtcgtacta gagtgtcgga ggggtaagcg
660

gaattcctag tgtagcgggtg aaatgcgtag atattaggag gaacaccagt ggcgaaggcg
720

gcttactgga cgataactga cgctgaggct cgaaagcgtg gggagcaaac aggattagat
780

accctggtag tccacgctgt aaacgatgaa tactagggtgt tgggaagcat tgcttctcgg
840

tgccgtcgca aacgcagtaa gtattccacc tggggagtag gttcgcaaga atgaaactca
900

aaggaattga cggggacccg cacaagcggg ggagcatgtg gtttaattcg aagcaacgcg
960

aagaacctta ccaagtcttg acatccttct gaccggtact taaccgtacc ttctcttcgg
1020

agcaggagtg acagggtggg catggttgtc gtcagctcgt gtcgtgagat gttgggttaa
1080

gtcccgcaac gagcgcaacc cttatcttta gtagccagcg gtctggccgg gcactctaga
1140

gagactgcca gggataacct ggaggaaggc ggggatgacg tcaaatacgc atgcccctta
1200

tgacttgggc tacacacgtg ctacaatggc gtaaacaag ggaagcgaag ctgtgaagcc
1260

gagcaaattc caaaaataac gtctcagttc ggactgtagt ctgcaaccgc actacacgaa
1320

gctggaatcg ctagtaatcg cagatcagaa tgctgcgggtg aatacgttcc cgggtcttgt
1380

acacaccgcc cgtcacacca tgggagttgg gaatgcccga agccagtgac ctaaccgaaa
1440

ggaaggagct gtcgaaggca ggctcgataa ctgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g
1529

c g g c t g g a t c

a c c t c c t t t

<210> 330

<211> 1505

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000154325|NCECJGME_00373 16S ribosomal RNA

<400> 330

caaagagttt gatcctggct caggacgaac gctggcggcg cgcctaacac atgcaagtcg
60

aacggtgaag aggagcttgc tcctcggatc agtggcggac gggtgagtaa cacgtgagca
120

acctggctct aagaggggga caacagttgg aaacgactgc taataccgca taacgtatcg
180

ggatggcatc ttcctgatac caaagatttt atcgcttaga gatgggctcg cgtctgatta
240

gatagttggc ggggtaacgg cccaccaagt cgacgatcag tagccggact gagaggttga
300

acggccacat tgggactgag acacggccca gactcctacg ggaggcagca gtgggggata
360

ttggacaatg ggggcaaccc tgatccagcg acgccgcgtg agggaagaag gttttcggat
420

tgtaaacctc tgttgacgga gaaaaaaatg atggtatccg tttagaaagc cacggctaac
480

tacgtgccag cagccgcggt aatacgtagg tggcaagcgt tgtccggaat tactgggtgt
540

aaagggagtg taggcgggat atcaagtcag aagtgaaaat tacgggctca actcgtaacc
600

tgcttttgaa actgacattc ttgagtgaag tagaggcaag cggaattcct agtgtagcgg
660

tgaaatgcgt agatattagg aggaacacca gtggcgaagg cggcttgctg ggcttttact
720

gacgctgagg ctcgaaagcg tggggagcaa acaggattag ataccctggg agtccacgcc
780

gtaaacgatg attactaggt gtgggggggat tgaccacctc cgtgccggag taaacacaat
840

aagtaatcca cctggggagt acgaccgcaa ggttgaaact caaaggaatt gacggggggcc
900

cgcacaagca gtggagtatg tggtttaatt cgacgcaacg cgaagaacct taccaggtct
960

tgacatcgag tgaccgccta agagattagg ctttcccttc ggggacacaa agacaggtgg
1020

tgcattggtt tcgtcagctc gtgtcgtgag atgttggggt aagtcccgca acgagcgcaa
1080

cccttatcat tagttgctac gcaagagcac tctaattgaga ctgccgttga caaaacggag
1140

gaaggtgggg atgacgtcaa atcatcatgc cctttatgac ctgggctaca cacgtactac
1200

aatggcggtt aacaaagaga agcaaagccg cgaggcagag caaatctcca aaaaacgtct
1260

cagttcggat tgtaggctgc aactcgccta catgaagtcg gaattgctag taatcgtagg
1320

tcagcatact acggtgaata cgttcccggg ccttgtagac accgcccgtc aaaccatgag
1380

agttggcaac acccgaagtc ggtagtctaa ccgcaaggag gacgccgccg aaggtggggg
1440

tgatgattag ggttaagtcg taacaaggta gccgtatcgg aaggtgcggc tggatcacct
1500

c c t t t
1505

<210> 331
<211> 1505
<212> DNA
<213> artificial sequence

<220>
<223> >GCF_000154325|NCECJGME_01093 16S ribosomal RNA

<400> 331
caaagagttt gatcctggct caggacgaac gctggcggcg cgcctaacac atgcaagtcg
60

aacggtgaag aggagcttgc tcctcggaac agtggcggac gggtgagtaa cacgtgagca
120

acctggctct aagaggggga caacagttgg aaacgactgc taataccgca taacgtatcg
180

ggatggcatc ttcctgatac caaagatttt atcgcttaga gatgggctcg cgtctgatta
240

gatagttggc ggggtaacgg cccaccaagt cgacgatcag tagccggact gagaggttga
300

acggccacat tgggactgag acacggccca gactcctacg ggaggcagca gtgggggata
360

ttggacaatg ggggcaaccc tgatccagcg acgccgcgtg agggaagaag gttttcggat
420

tgtaaacctc tgttgacgga gaaaaaaaaatg atggtatccg tttagaaagc cacggctaac
480

tacgtgccag cagccgcggt aatacgtagg tggcaagcgt tgtccggaat tactgggtgt
540

aaagggagtg taggcgggat atcaagtcag aagtgaaaat tacgggctca actcgtaacc
600

tgcttttgaa actgacattc ttgagtgaag tagaggcaag cggaattcct agtgtagcgg
660

tgaaatgcgt agatattagg aggaacacca gtggcgaagg cggcttgctg ggcttttact
720

gacgctgagg ctcgaaagcg tggggagcaa acaggattag ataccctggt agtccacgcc
780

gtaaacgatg attactaggt gtgggggggat tgaccaccttc cgtgccggag taaacacaat
840

aagtaatcca cctgggggagt acgaccgcaa ggttgaaact caaaggaatt gacggggggcc
900

cgcacaagca gtggagtatg tggttttaatt cgacgcaacg cgaagaacct taccaggtct
960

tgacatcgag tgaccgccta agagattagg ctttcccttc ggggacacaa agacaggtgg
1020

tgcatggttg tcgtcagctc gtgtcgtgag atgttgggtt aagtcccgca acgagcgcaa
1080

cccttatcat tagttgctac gcaagagcac tctaattgaga ctgccgttga caaaacggag
1140

gaaggtgggg atgacgtcaa atcatcatgc cctttatgac ctgggctaca cacgtactac
1200

aatggcgttt aacaaagaga agcaaagccg cgaggcagag caaatctcca aaaaacgtct
1260

cagttcggat tgtaggctgc aactcgccta catgaagtcg gaattgctag taatcgtagg
1320

tcagcatact acgggtgaata cgttcccggg ccttgtacac accgcccgtc aaaccatgag
1380

agttggcaac acccgaagtc ggtagtctaa ccgcaaggag gacgccgccg aaggtggggg
1440

tgatgattag ggttaagtcg taacaaggta gccgtatcgg aaggtgcggc tggatcacct
1500

c c t t t
1505

<210> 332

<211> 1505

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000154325|NCECJGME_01403 16S ribosomal RNA

<400> 332

caaagagttt gatcctggct caggacgaac gctggcggcg cgcctaacac atgcaagtcg
60

aacggtgaag aggagcttgc tcctcggatc agtggcggac gggtgagtaa cacgtgagca
120

acctggctct aagaggggga caacagttgg aaacgactgc taataccgca tgatgtatcg
180

ggatggcatc ttcctgatac caaagatttt atcgcttaga gatgggctcg cgtctgatta
240

gatagttggc ggggtaacgg cccaccaagt cgacgatcag tagccggact gagaggttga
300

acggccacat tgggactgag acacggccca gactcctacg ggaggcagca gtgggggata
360

ttggacaatg ggggcaaccc tgatccagcg acgccgcgtg agggaagaag gttttcggat
420

tgtaaacctc tgttgacgga gaaaaaatg atggtatccg tttagaaagc cacggctaac
480

tacgtgccag cagccgcggt aatacgtagg tggcaagcgt tgtccggaat tactgggtgt
540

aaagggagtg taggcgggat atcaagtcag aagtgaaaat tacgggctca actcgtaacc
600

tgcttttgaa actgacattc ttgagtgaag tagaggcaag cggaattcct agtgtagcgg
660

tgaaatgcgt agatattagg aggaacacca gtggcgaagg cggcttgctg ggcttttact
720

gacgctgagg ctcgaaagcg tggggagcaa acaggattag ataccctggg agtccacgcc
780

gtaaacgatg attactaggt gtgggggggat tgaccaccttc cgtgccggag taaacacaat
840

aagtaatcca cctgggggagt acgaccgcaa ggttgaaact caaaggaatt gacggggggcc
900

cgcacaagca gtggagtatg tggttttaatt cgacgcaacg cgaagaacct taccaggtct
960

tgacatcgag tgaccgccta agagattagg ctttcccttc ggggacacaa agacaggtgg
1020

tgcattggtt tcgtcagctc gtgtcgtgag atgttgggtt aagtcccgca acgagcgcaa
1080

cccttatcat tagttgctac gcaagagcac tctaattgaga ctgccgttga caaacggag
1140

gaaggtgggg atgacgtcaa atcatcatgc cctttatgac ctgggctaca cacgtactac
1200

aatggcggtt aacaaagaga agcaaagccg cgaggcagag caaatctcca aaaaacgtct
1260

cagttcggat tgtaggctgc aactcgccta catgaagtcg gaattgctag taatcgtagg
1320

tcagcatact acggtgaata cgttcccggg ccttgtacac accgcccgtc aaaccatgag
1380

agttggcaac acccgaagtc ggtagtctaa ccgcaaggag gacgccgccg aaggtggggg
1440

tgatgattag ggttaagtcg taacaaggta gccgtatcgg aaggtgcggc tggatcacct
1500

c c t t t
1505

<210> 333

<211> 1505

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000154325|NCECJGME_01821 16S ribosomal RNA

<400> 333

caaagagttt gatcctggct caggacgaac gctggcggcg cgcctaacac atgcaagtcg
60

aacggtgaag aggagcttgc tcctcggatc agtggcggac gggtgagtaa cacgtgagca
120

acctggctct aagaggggga caacagttgg aaacgactgc taataccgca taacgtatcg
180

ggatggcatc ttcctgatac caaagatttt atcgcttaga gatgggctcg cgtctgatta
240

gatagttggc ggggtaacgg cccaccaagt cgacgatcag tagccggact gagaggttga
300

acggccacat tgggactgag acacggccca gactcctacg ggaggcagca gtgggggata
360

ttggacaatg ggggcaaccc tgatccagcg acgccgcgtg agggaagaag gttttcggat
420

tgtaaacctc tgttgacgga gaaaaaaatg atggtatccg tttagaaagc cacggctaac
480

tacgtgccag cagccgcggt aatacgtagg tggcaagcgt tgtccggaat tactgggtgt
540

aaagggagtg taggcgggat atcaagtcag aagtgaaaat tacgggctca actcgtaacc
600

tgcttttgaa actgacattc ttgagtgaag tagaggcaag cggaattcct agtgtagcgg
660

tgaaatgcgt agatattagg aggaacacca gtggcgaagg cggcttgctg ggcttttact
720

gacgctgagg ctcgaaagcg tggggagcaa acaggattag ataccctggg agtccacgcc
780

gtaaacgatg attactaggt gtgggggggat tgacccttc cgtgccggag taaacacaat
840

aagtaatcca cctggggagt acgaccgcaa ggttgaaact caaaggaatt gacgggggcc
900

cgcacaagca gtggagtatg tggtttaatt cgacgcaacg cgaagaacct taccaggtct
960

tgacatcgag tgaccgccta agagattagg ccttccttc ggggacacaa agacaggtgg
1020

tgcattggtt tcgtcagctc gtgtcgtgag atgttgggtt aagtcccgca acgagcgcaa
1080

cccttatcat tagttgctac gcaagagcac tctaattgaga ctgccgttga caaaacggag
1140

gaaggtgggg atgacgtcaa atcatcatgc cctttatgac ctgggctaca cacgtactac
1200

aatggcggtt aacaaagaga agcaaagccg cgaggcagag caaatctcca aaaaacgtct
1260

cagttcggat tgtaggctgc aactcgccta catgaagtcg gaattgctag taatcgtagg
1320

tcagcatact acggtgaata cgttcccggg ccttgtacac accgcccgtc aaaccatgag
1380

agttggcaac acccgaagtc ggtagtctaa ccgcaaggag gacgccgccg aaggtggggt
1440

tgatgattag ggttaagtcg taacaaggta gccgtatcgg aaggtgcggc tggatcacct
1500

c c t t t
1505

<210> 334

<211> 1535

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000273585|IPMLJOLE_00330 16S ribosomal RNA

<400> 334

atggagagtt tgatcctggc tcaggatgaa cgctggcggc atgcctaata catgcaagtc
60

gaacgaagtc tttaggaagc ttgcttccaa agagacttag tggcgaacgg gtgagtaaca
120

cgtaggtaac ctgccccatgt gcccgggata actgctggaa acggtagcta aaaccggata
180

ggtatgaggg aggcattctt ctcataattaa agcaccttcg ggtgtgaaca tggatggacc
240

tgcggcgcac tagctggttg gtgaggtaac ggcccaccaa ggcgatgatg cgtagccgac
300

ctgagaggggt gaacggccac attgggactg agacacggcc caaactccta cgggaggcag
360

cagtagggaa ttttcgtcaa tgggggggaac cctgaacgag caatgccgcg tgtgtgaaga
420

aggtcttcgg atcgtaaagc actgttgtaa gtgaagaatg ccacatagag gaaatgctat
480

gtgggtgacg gtagcttacc agaaagccac ggctaactac gtgccagcag ccgcggtaat
540

acgtaggtgg caagcgttat ccggaatcat tgggcgtaaa ggggtgcgtag gtggcacgat
600

aagtctgaag taaaaggcaa cagctcaact gttgtatgct ttggaaactg tcgagctaga
660

gtgcagaaga gggcgatgga attccatgtg tagcggtaaa atgcgtagat atatggagga
720

acaccagtgg cgaaggcggc cgcctgggtc gtaactgaca ctgatgcacg aaagcgtggg
780

gagcaaatag gattagatac cctagtagtc cacgccgtaa acgatgagaa ctaagtgttg
840

gagagattca gtgctgcagt taacgcaata agttctccgc ctggggagta tgcacgcaag
900

tgtgaaactc aaaggaattg acggggggccc gcacaagcgg tggagtatgt ggtttaattc
960

gaagcaacgc gaagaacctt accaggcctt gacatggata taaatgttct agagatagaa
1020

agatagctat atatcacaca ggtggtgcat ggttgtcgtc agctcgtgtc gtgagatggt
1080

gggttaagtc ccgcaacgag cgcaaccctt gtcttctggt accagcatta ggttggggac
1140

tcaggagaga ctgccggtga caaaccggag gaaggtgggg atgacgtcaa atcatcatgc
1200

cccttatggc ctgggctaca cacgtactac aatggcgcct acaaagagca gcgacaccgc
1260

gaggtggagc gaatctcata aagggcgtct cagttcggat tgaagtctgc aactcgactt
1320

catgaagtcg gaatcgctag taatcgcaga tcagcatgct gcggtgaata cgttctcggg
1380

ccttgtagac accgcccgtc aaaccatggg agttggtaat acccgaagcc ggtggcataa
1440

ccgcaaggag tgagccgtcg aaggtaggac cgatgactgg gggttaagtcg taacaaggta
1500

t c c c t a c g g g a a c g t g g g g a t g g a t c a c c t c c t t t
1535

<210> 335

<211> 1535

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000273585|IPMLJOLE_00418 16S ribosomal RNA

<400> 335

atggagagtt tgatcctggc tcaggatgaa cgctggcggc atgcctaata catgcaagtc
60

gaacgaagtc tttaggaagc ttgcttccaa agagacttag tggcgaacgg gtgagtaaca
120

cgtaggtaac ctgccccatgt gcccgggata actgctggaa acggtagcta aaaccggata
180

ggtatgaggg aggcattcttc ctcataattaa agcaccttcg ggtgtgaaca tggatggacc
240

tgcggcgcat tagctggttg gtgaggtaac ggcccaccaa ggcgatgatg cgtagccgac
300

ctgagaggggt gaacggccac attgggactg agacacggcc caaactccta cgggaggcag
360

cagtagggaa ttttcgtcaa tggggggaac cctgaacgag caatgccgcg tgtgtgaaga
420

aggtcttcgg atcgtaaagc actgttgtaa gtgaagaatg ccacatagag gaaatgctat
480

gtgggtgacg gtagcttacc agaaagccac ggctaactac gtgccagcag ccgcggtaat
540

acgtaggtgg caagcgttat ccggaatcat tgggcgtaaa ggggtgcgtag gtggcacgat
600

aagtctgaag taaaaggcaa cagctcaact gttgtatgct ttggaaactg tcgagctaga
660

gtgcagaaga gggcgatgga attccatgtg tagcggtaaa atgcgtagat atatggagga
720

acaccagtgg cgaaggcggg cgcctgggtc gtaactgaca ctgatgcacg aaagcgtggg
780

gagcaaatag gattagatac cctagtagtc cacgccgtaa acgatgagaa ctaagtgttg
840

gagagattca gtgctgcagt taacgcaata agttctccgc ctggggagta tgcacgcaag
900

tgtgaaactc aaaggaattg acggggggccc gcacaagcgg tggagtatgt ggtttaattc
960

gaagcaacgc gaagaacctt accaggcctt gacatggata taaatgttct agagatagaa
1020

agatagctat atatcacaca ggtggtgcat ggttgtcgtc agctcgtgtc gtgagatgtt
1080

gggttaagtc ccgcaacgag cgcaaccctt gtcttctgtt accagcatta ggttggggac
1140

tcaggagaga ctgccggtga caaaccggag gaagggtggg atgacgtcaa atcatcatgc
1200

cccttatggc ctgggctaca cacgtactac aatggcgcct acaaagagca gcgacaccgc
1260

gagggtggagc gaatctcata aagggcgtct cagttcggat tgaagtctgc aactcgactt
1320

catgaagtcg gaatcgctag taatcgcaga tcagcatgct gcggtgaata cgttctcggg
1380

ccttgtacac accgcccgtc aaaccatggg agttggtaat acccgaagcc ggtggcataa
1440

ccgcaaggag tgagccgtcg aaggtaggac cgatgactgg ggttaagtcg taacaaggta
1500

t c c c t a c g g g a a c g t g g g g a t g g a t c a c c t c c t t t
1535

<210> 336

<211> 1535

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000273585|IPMLJOLE_00538 16S ribosomal RNA

<400> 336

atggagagtt tgatcctggc tcaggatgaa cgctggcggc atgcctaata catgcaagtc
60

gaacgaagtc tttaggaagc ttgcttccaa agagacttag tggcgaacgg gtgagtaaca
120

cgtaggtaac ctgccccatgt gcccgggata actgctggaa acggtagcta aaaccggata
180

ggtatgaggg aggcattcttc ctcatattaa agcaccttcg ggtgtgaaca tggatggacc
240

tgcggcgcat tagctggttg gtgaggtaac ggcccaccaa ggcgatgatg cgtagccgac
300

ctgagaggggt gaacggccac attgggactg agacacggcc caaactccta cgggaggcag
360

cagtagggaa ttttcgtcaa tggggggaac cctgaacgag caatgccgcg tgtgtgaaga
420

aggtcttcgg atcgtaaagc actgttgtaa gtgaagaatg ccatatagag gaaatgctat
480

gtgggtgacg gtagcttacc agaaagccac ggctaactac gtgccagcag ccgcggtaat
540

acgtaggtgg caagcgttat ccggaatcat tgggcgtaaa ggggtgcgtag gtggcacgat
600

aagtctgaag taaaaggcaa cagctcaact gttgtatgct ttggaaactg tcgagctaga
660

gtgcagaaga gggcgatgga attccatgtg tagcggtaaa atgcgtagat atatggagga
720

acaccagtgg cgaaggcggt cgcctgggtct gtaactgaca ctgatgcacg aaagcgtggg
780

gagcaaatag gattagatac cctagtagtc cacgccgtaa acgatgagaa ctaagtgttg
840

gagagattca gtgctgcagt taacgcaata agttctccgc ctggggagta tgcacgcaag
900

tgtgaaactc aaaggaattg acggggggccc gcacaagcgg tggagtatgt ggtttaattc
960

gaagcaacgc gaagaacctt accaggcctt gacatggata taaatgttct agagatagaa
1020

agatagctat atatcacaca ggtggtgcat ggttgctgctc agctcgtgctc gtgagatggt
1080

gggttaagtc ccgcaacgag cgcaaccctt gtcttctgtt accagcatta ggttggggac
1140

tcaggagaga ctgccggtga caaaccggag gaagggtgggg atgacgtcaa atcatcatgc
1200

cccttatggc ctgggctaca cacgtactac aatggcgcct acaaagagca gcgacaccgc
1260

gagggtgaagc gaatctcata aagggcgtct cagttcggat tgaagtctgc aactcgactt
1320

catgaagtcg gaatcgctag taatcgcaga tcagcatgct gcggtgaata cgttctcggg
1380

ccttgtacac accgcccgtc aaaccatggg agttggtaat acccgaagcc ggtggcataa
1440

ccgcaaggag tgagccgtcg aaggtaggac cgatgactgg ggttaagtcg taacaaggta
1500

t c c c t a c g g g a a c g t g g g g a t g g a t c a c c t c c t t t
1535

<210> 337

<211> 1535

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000273585|IPMLJOLE_01281 16S ribosomal RNA

<400> 337

atggagagtt tgatcctggc tcaggatgaa cgctggcggc atgcctaata catgcaagtc
60

gaacgaagtc tttaggaagc ttgcttccaa agagacttag tggcgaacgg gtgagtaaca
120

cgtaggtaac ctgcccattgt gcccgggata actgctggaa acggtagcta aaaccggata
180

ggtatgaggg aggcattcttc ctcataattaa agcaccttcg ggtgtgaaca tggatggacc
240

tgcggcgcat tagctgggtg gtgaggtaac ggcccaccaa ggcgatgatg cgtagccgac
300

ctgagaggggt gaacggccac attgggactg agacacggcc caaactccta cgggaggcag
360

cagtagggaa ttttcgtcaa tggggggaac cctgaacgag caatgccgcg tgtgtgaaga
420

aggtcttcgg atcgtaaagc actgttgtaa gtgaagaatg ccacatagag gaaatgctat
480

gtgggtgacg gtagcttacc agaaagccac ggctaactac gtgccagcag ccgcggtaat
540

acgtaggtgg caagcgttat ccggaatcat tgggcgtaaa ggggtgcgtag gtggcacgat
600

aagtctgaag taaaaggcaa cagctcaact gttgtatgct ttggaaactg tcgagctaga
660

gtgcagaaga gggcgatgga attccatgtg tagcggtaaa atgcgtagat atatggagga
720

acaccagtgg cgaaggcggt cgcctgggtct gtaactgaca ctgatgcacg aaagcgtggg
780

gagcaaatag gattagatac cctagtagtc cacgccgtaa acgatgagaa ctaagtgttg
840

gagagattca gtgctgcagt taacgcaata agttctccgc ctggggagta tgcacgcaag
900

tgtgaaactc aaaggaattg acggggggccc gcacaagcgg tggagtatgt ggtttaattc
960

gaagcaacgc gaagaacctt accaggcctt gacatggata taaatgttct agagatagaa
1020

agatagctat atatcacaca ggtgggtgcat ggttgtcgtc agctcgtgtc gtgagatgtt
1080

gggttaagtc ccgcaacgag cgcaaccctt gtcttctgtt accagcatta agttggggac
1140

tcaggagaga ctgccggtga caaaccggag gaaggtgggg atgacgtcaa atcatcatgc
1200

cccttatggc ctgggctaca cacgtactac aatggcgcct acaaagagca gcgacaccgc
1260

gaggtggagc gaatctcata aagggcgtct cagttcggat tgaagtctgc aactcgactt
1320

catgaagtcg gaatcgctag taatcgcaga tcagcatgct gcggtgaata cgttctcggg
1380

ccttgtagac accgcccgtc aaaccatggg agttggtaat acccgaagcc ggtggcataa
1440

ccgcaaggag tgagccgtcg aaggtaggac cgatgactgg gggttaagtcg taacaaggta
1500

t c c c t a c g g g a a c g t g g g g a t g g a t c a c c t c c t t t
1535

<210> 338

<211> 1535

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000273585|IPMLJOLE_02005 16S ribosomal RNA

<400> 338

atggagagtt tgatcctggc tcaggatgaa cgctggcggc atgcctaata catgcaagtc
60

gaacgaagtc tttaggaagc ttgcttccaa agagacttag tggcgaacgg gtgagtaaca
120

cgtaggtaac ctgcccattgt gcccgggata actgctggaa acggtagcta aaaccggata
180

ggtatgaggg aggcattctt ctcataattaa agcaccttcg ggtgtgaaca tggatggacc
240

tgcggcgcac tagctgggtg gtgaggtaac ggcccaccaa ggcgatgatg cgtagccgac
300

ctgagagggg gaacggccac attgggactg agacacggcc caaactccta cgggaggcag
360

cagtagggaa ttttcgtcaa tgggggggaa cctgaacgag caatgccgcg tgtgtgaaga
420

aggctcttcg atcgtaaagc actgttgtaa gtgaagaatg ccatatagag gaaatgctat
480

gtgggtgacg gtagcttacc agaaagccac ggctaactac gtgccagcag ccgcggtaat
540

acgtaggtgg caagcgttat ccggaatcat tgggcgtaaa ggggtgcgtag gtggcacgat
600

aagtctgaag taaaaggcaa cagctcaact gttgtatgct ttggaaactg tcgagctaga
660

gtgcagaaga gggcgatgga attccatgtg tagcggtaaa atgcgtagat atatggagga
720

acaccagtgg cgaaggcggt cgcctgggtc gtaactgaca ctgatgcacg aaagcgtggg
780

gagcaaatag gattagatac cctagtagtc cacgccgtaa acgatgagaa ctaagtgttg
840

gagagattca gtgctgcagt taacgcaata agttctccgc ctggggagta tgcacgcaag
900

tgtgaaactc aaaggaattg acggggggccc gcacaagcgg tggagtatgt ggtttaattc
960

gaagcaacgc gaagaacctt accaggcctt gacatggata taaatgttct agagatagaa
1020

agatagctat atatcacaca ggtgggtgcat ggttgctcgtc agctcgtgtc gtgagatgtt
1080

gggttaagtc ccgcaacgag cgcaaccctt gtcttctgtt accagcatta ggttggggac
1140

tcaggagaga ctgccggtga caaaccggag gaagggtggg atgacgtcaa atcatcatgc
1200

cccttatggc ctgggctaca cacgtactac aatggcgcct acaaagagca gcgacaccgc
1260

gaggtggagc gaatctcata aagggcgtct cagttcggat tgaagtctgc aactcgactt
1320

catgaagtcg gaatcgctag taatcgcaga tcagcatgct gcggtgaata cgttctcggg
1380

ccttgtagac accgcccgtc aaaccatggg agttggtaat acccgaagcc ggtggcataa
1440

ccgcaaggag tgagccgtcg aaggtaggac cgatgactgg ggttaagtcg taacaaggta
1500

t c c c t a c g g g a a c g t g g g g a t g g a t c a c c t c c t t t
1535

<210> 339

<211> 1531

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000153885|MCKEIMFN_02162 16S ribosomal RNA

<400> 339

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaata catgcaagtc
60

gaacgaagca ccttggacag aatccttcgg gaggaagacc attgtgactg agtggcggac
120

gggtgagtaa cgcgtgggta acctgccttg tacaggggga taacagttgg aaacgactgc
180

taataaccgca taagcgcaca gtaccgcatg gtacggtgtg aaaaactccg gtggtacaag
240

atggacccgc gtctgattag ctggttggtg aggtaacggc ccaccaaggc gacgatcagt
300

agccgacttg agagagtgat cggccacatt gggactgaga cacggcccaa actcctacgg
360

gaggcagcag tagggaatat tgcacaatgg gggaaaccct gatgcagcga cgccgcgtga
420

aggaagaagt atttcggtat gtaaacttct atcagcaagg aagaaaatga cgggtacttga
480

ctaagaagcc ccggctaaat acgtgccagc agccgcggta atacgtatgg ggcaagcggt
540

atccggattt actgggtgta aaggagcgt aggcggcatg gcaagtcaga agtgaaagcc
600

tggggctcaa ccccggaatt gcttttgaaa ctgtcaggct agagtgtcgg aggggtaagc
660

ggaattccta gtgtagcggg gaaatgcgta gatattagga ggaacaccgg tggcgaaggc
720

ggcttactgg acgattactg acgctgaggc tcgaaagcgt ggggagcaaa caggattaga
780

taccctggta gtccacgccg taaacgatga atactaggtg tcgggggaca atagttcctc
840

ggtgccgaag caaacgcatt aagtattcca cctggggagt acgttcgcaa gaatgaaact
900

caaaggaatt gacggggacc cgcacaagcg gtggagcatg tggtttaatt cgaagcaacg
960

cgaagaacct tacctgctct tgacatccca ctgacaggtc agtaatgtga ccctttcttc
1020

ggaacagtgg agacaggtgg tgcattggtg tcgtcagctc gtgtcgtgag atgttgggtt
1080

aagtcccgca acgagcgcaa cccttgtctt tagtagccag cagtacggct gggcactcta
1140

gagagactgc cagggataac ctggaggaag gcggggatga cgtcaaatca tcatgccct
1200

tacgagcagg gctacacacg tgctacaatg gcgtaaacia agggaagcga ccccgtaggg
1260

gtaagcaaata ctcaaaaata acgtctcagt tcggattgta gtctgcaact cgactacatg
1320

aagctggaat cgctagtaat cgcgaatcag aatgtcgcgg tgaatacgtt cccgggtctt
1380

gtacacaccg cccgtcacac catgggagtt ggatatgccc gaagtcagtg acccaaccgt
1440

aaggagggag ctgccgaagg tggagccgat aactgggggtg aagtcgtaac aaggtagccg
1500

t a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1531

<210> 340

<211> 1509

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000154385|NOBPEHKA_00083 16S ribosomal RNA

<400> 340

tataaagagt ttgatacctgg ctcaggacga acgctggcgg cgcgcctaac acatgcaagt
60

cgaacgagcg agagagagct tgcttttcttg agcgagtggc gaacgggtga gtaacgcgtg
120

aggaacctgc ctcaaagagg gggacaacag ttggaaacga ctgctaatac cgcataagcc
180

cacggctcgg catcgagcag agggaaaagg agcaatccgc tttgagatgg cctcgcgtcc
240

gattagctgg ttggtgaggt aacggcccac caaggcgacg atcggtagcc ggactgagag
300

gttgaacggc cacattggga ctgagacacg gccagactc ctacgggagg cagcagtggg
360

gaatattgca caatggggga aaccctgatg cagcgacgcc gcgtggagga agaaggtctt
420

cggattgtaa actcctgttg ttgaggaaga taatgacggt actcaacaag gaagtgacgg
480

ctaactacgt gccagcagcc gcggtaaaac gtaggtcaca agcgttgtcc ggaattactg
540

ggtgtaaagg gagcgcaggc gggaagacaa gttggaagtg aaatccatgg gctcaacca
600

tgaactgctt tcaaaactgt ttttcttgag tagtgcagag gtaggcggaa ttcccggtgt
660

agcgggtgaa tgcgtagata tcgggaggaa caccagtggc gaaggcggcc tactgggcac
720

caactgacgc tgaggctcga aagtgtgggt agcaaacagg attagatacc ctggtagtcc
780

acactgtaaa cgatgattac taggtgttgg aggattgacc ccttcagtgc cgcagttaac
840

acaataagta atccacctgg ggagtacgac cgcaagggtg aaactcaaag gaattgacgg
900

gggcccgcac aagcagtgga gtatgtgggt taattcgacg caacgcgaag aaccttacca
960

agtcttgaca tcccttgacg atgctggaaa cagtatttct cttcggagca aggagacagg
1020

tggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc gcaacgagcg
1080

caacccttat ggtcagttac tacgcaagag gactctggcc agactgccgt tgacaaaacg
1140

gaggaagggtg gggatgacgt caaatcatca tgccctttat gacttgggct acacacgtac
1200

tacaatggcg ttaaacaag agaagcaaga ccgcgagggtg gagcaaaact cagaaacaac
1260

gtcccagttc ggactgcagg ctgcaactcg cctgcacgaa gtcggaattg ctagtaatcg
1320

cagatcagca tgctgcggtg aatacgttcc cgggccttgt acacaccgcc cgtcacacca
1380

tgagagccgg ggggacccga agtcggtagt ctaaccgcaa ggaggacgcc gccgaaggta
1440

aaactgggtga ttgggggtgaa gtcgtaacaa ggtagccgta ggagaacctg cggctggatc
1500

a c c t c c t t t
1509

<210> 341

<211> 1509

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000154385|NOBPEHKA_01556 16S ribosomal RNA

<400> 341

tataaagagt ttgatcctgg ctcaggacga acgctggcgg cgcgccctaac acatgcaagt
60

cgaacgagcg agaggagggt tactttctca agcgagtggc gaacgggtga gtaacgcgtg
120

aggaacctgc ctcaaagagg gggacaacag ttggaaacga ctgctaatac cgcataagcc
180

cacgaccgga catcgggtag agggaaaagg agcaatccgc tttgagatgg cctcgcgtcc
240

gattagctag ttggtgaggt aatggccac caaggcgacg atcggtagcc ggactgagag
300

gttgaacggc cacattggga ctgagacacg gccagactc ctacgggagg cagcagtggg
360

gaatattgca caatggggga aaccctgatg cagcgacgcc gcgtggagga agaaggtcctt
420

cggtattgtaa actcctgttg ttgaggaaga taatgacggt actcaacaag gaagtgacgg
480

ctaactacgt gccagcagcc gcggtaaaac gtaggtcaca agcgttgtcc ggaattactg
540

ggtgtaaagg gagcgcaggc gggaagacaa gttggaagtg aaatccatgg gctcaacca
600

tgaactgctt tcaaaaactgt ttttcttgag tagtgcagag gtaggcggaa ttcccgggtg
660

agcgggtggaa tgcgtagata tcgggaggaa caccagtggc gaaggcggcc tactgggcac
720

caactgacgc tgaggctcga aagtgtgggt agcaaacagg attagatacc ctggtagtcc
780

acactgtaaa cgatgattac taggtgttgg aggattgacc ccttcagtgc cgcagttaac
840

acaataagta atccacctgg ggagtacgac cgcaagggtg aaactcaaag gaattgacgg
900

gggcccgcac aagcagtgga gtatgtgggt taattcgacg caacgcgaag aaccttacca
960

agtcttgaca tcctgcgacg cacatagaaa tatgtgtttc cttcgggacg cagagacagg
1020

tggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc gcaacgagcg
1080

caacccttat ggtcagttac tacgcaagag gactctggcc agactgccgt tgacaaaacg
1140

gaggaagggtg gggatgacgt caaatcatca tgccctttat gacttgggct acacacgtac
1200

tacaatggcg ttaaacaaag agaagcaaga ccgcgagggtg gagcaaaact cagaaacaac
1260

gtcccagttc ggactgcagg ctgcaactcg cctgcacgaa gtcggaattg ctagtaatcg
1320

cagatcagca tgctgcggtg aatacgttcc cgggccttgt acacaccgcc cgtcacacca
1380

tgagagccgg ggggacccga agtcggtagt ctaaccgcaa ggaggacgcc gccgaaggta
1440

aaactggtga ttgggggtgaa gtcgtaacaa ggtagccgta ggagaacctg cggctggatc
1500

a c c t c c t t t
1509

<210> 342

<211> 1509

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000154385|NOBPEHKA_01788 16S ribosomal RNA

<400> 342

tataaagagt ttgatcctgg ctcaggacga acgctggcgg cgcgccctaac acatgcaagt
60

cgaacgagcg agagagagct tgctttctca agcgagtggc gaacgggtga gtaacgcgtg
120

aggaaacctgc ctcaaagagg gggacaacag ttggaaacga ctgctaatac cgcataagcc
180

cacgacccgg catcgggtag agggaaaagg agcaatccgc tttgagatgg cctcgcgtcc
240

gattagctag ttggtgaggt aacggcccac caaggcgacg atcggtagcc ggactgagag
300

gttgaacggc cacattggga ctgagacacg gcccagactc ctacgggagg cagcagtggg
360

gaatattgca caatggggga aaccctgatg cagcgacgcc gcgtggagga agaaggtctt
420

cggattgtaa actcctgttg ttgaggaaga taatgacggt actcaacaag gaagtgacgg
480

ctaactacgt gccagcagcc gcggtaaaac gtaggtcaca agcgttgtcc ggaattactg
540

ggtgtaaagg gagcgcaggc gggaagacaa gttggaagtg aaatccatgg gctcaacca
600

tgaactgctt tcaaaactgt ttttcttgag tagtgcagag gtaggcggaa ttcccggtgt
660

agcgggtggaa tgcgtagata tcgggaggaa caccagtggc gaaggcggcc tactgggcac
720

caactgacgc tgaggctcga aagtgtgggt agcaaacagg attagatacc ctggtagtcc
780

acaccgtaaa cgatgattac taggtgttgg aggattgacc ccttcagtgc cgcagttaac
840

acaataagta atccacctgg ggagtacgac cgcaagggtg aaactcaaag gaattgacgg
900

gggcccgcac aagcagtgga gtatgtggtt taattcgacg caacgcgaag aaccttacca
960

agtcttgaca tcccttgacg atgctggaaa cagtatttct cttcggagca aggagacagg
1020

tggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc gcaacgagcg
1080

caacccttat ggtcagttac tacgcaagag gactctggcc agactgccgt tgacaaaacg
1140

gaggaagggtg gggatgacgt caaatcatca tgccctttat gacttgggct acacacgtac
1200

tacaatggcg ttaaacaag agaagcaaga ccgcgaggtg gagcaaaact cagaaacaac
1260

gtcccagttc ggactgcagg ctgcaactcg cctgcacgaa gtcggaattg ctagtaatcg
1320

cagatcagca tgctgcggtg aatacgttcc cgggccttgt acacaccgcc cgtcacacca
1380

tgagagccgg ggggacccga agtcggtagt ctaaccgcaa ggaggacgcc gccgaaggta
1440

aaactggtga ttgggggtgaa gtcgtaacaa ggtagccgta ggagaacctg cggctggatc
1500

a c c t c c t t t
1509

<210> 343

<211> 1509

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000154385|NOBPEHKA_02359 16S ribosomal RNA

<400> 343

tataaagagt ttgatacctgg ctcaggacga acgctggcgg cgcgccctaac acatgcaagt
60

cgaacgagcg agagagagct tgctttctca agcgagtggc gaacgggtga gtaacgcgtg
120

aggaacctgc ctcaaagagg gggacaacag ttggaaacga ctgctaatac cgcataagcc
180

cacgacccgg catcgggtag agggaaaagg agcaatccgc tttgagatgg cctcgcgtcc
240

gattagctgg ttggtgaggt aacggccac caaggcgacg atcggtagcc ggactgagag
300

gttgaacggc cacattggga ctgagacacg gccagactc ctacgggagg cagcagtggg
360

gaatattgca caatggggga aaccctgatg cagcgacgcc gcgtggagga agaaggtctt
420

cggattgtaa actcctgttg ttgaggaaga taatgacggt actcaacaag gaagtgacgg
480

ctaactacgt gccagcagcc gcggtaaaac gtaggtcaca agcgttgtcc ggaattactg
540

ggtgtaaagg gagcgcaggc gggaagacaa gttggaagtg aaatccatgg gctcaaccca
600

tgaactgctt tcaaaactgt ttttcttgag tagtgcagag gtaggcggaa ttcccgggtgt
660

agcgggtggaa tgcgtagata tcgggaggaa caccagtggc gaaggcggcc tactgggcac
720

caactgacgc tgaggctcga aagtgtgggt agcaaacagg attagatacc ctggtagtcc
780

acaccgtaaa cgatgattac taggtgttgg aggattgacc ccttcagtgc cgcagttaac
840

acaataagta atccacctgg ggagtacgac cgcaagggtt aaactcaaag gaattgacgg
900

gggcccgcac aagcagtgga gtatgtggtt taattcgacg caacgcgaag aaccttacca
960

agtcttgaca tcctgcgacg cacatagaaa tatgtgtttc cttcgggacg cagagacagg
1020

tggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc gcaacgagcg
1080

caacccttat ggtcagttac tacgcaagag gactctggcc agactgccgt tgacaaaacg
1140

gaggaagggtg gggatgacgt caaatcatca tgccctttat gacttgggct acacacgtac
1200

tacaatggcg ttaaacaag agaagcaaga ccgcgagggtg gagcaaaact cagaaacaac
1260

gtcccagttc ggactgcagg ctgcaactcg cctgcacgaa gtcggaattg ctagtaatcg
1320

cagatcagca tgctgcggtg aatacgttcc cgggccttgt acacaccgcc cgtcacacca
1380

tgagagccgg ggggacccga agtcggtagt ctaaccgcaa ggaggacgcc gccgaaggta
1440

aaactggtga ttggggtgaa gtcgtaacaa ggtagccgta ggagaacctg cggctggatc
1500

a c c t c c t t t
1509

<210> 344

<211> 1509

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000154385|NOBPEHKA_02612 16S ribosomal RNA

<400> 344

tataaagagt ttgatacctgg ctcaggacga acgctggcgg cgcgacctaac acatgcaagt
60

cgaacgagcg agagagagct tgcttttctca agcgagtggc gaacgggtga gtaacgcgtg
120

aggaacctgc ctcaaagagg gggacaacag ttggaaacga ctgctaatac cgcataagcc
180

cacgacccgg catcgggtag agggaaaagg agcaatccgc tttgagatgg cctcgcgtcc
240

gattagctag ttggtgaggt aacggcccac caaggcgacg atcggtagcc ggactgagag
300

gttgaacggc cacattggga ctgagacacg gccagactc ctacgggagg cagcagtggg
360

gaatattgca caatggggga aaccctgatg cagcgacgcc gcgtggagga agaaggtctt
420

cggattgtaa actcctgttg ttgaggaaga taatgacggt actcaacaag gaagtgacgg
480

ctaactacgt gccagcagcc gcggtaaaac gtaggtcaca agcgttgtcc ggaattactg
540

ggtgtaaagg gagcgcaggc gggaagacaa gttggaagtg aaatccatgg gctcaaccga
600

tgaactgctt tcaaaactgt ttttcttgag tagtgcagag gtaggcggaa ttcccgggtgt
660

agcgggtggaa tgcgtagata tcgggaggaa caccagtggc gaaggcggcc tactgggcac
720

caactgacgc tgaggctcga aagtgtgggt agcaaacagg attagatacc ctggtagtcc
780

acactgtaaa cgatgattac taggtgttgg aggattgacc ccttcagtgc cgcagttaac
840

acaataagta atccacctgg ggagtacgac cgcaagggtg aaactcaaag gaattgacgg
900

gggcccgcac aagcagtgga gtatgtggtt taattcgacg caacgcgaag aaccttacca
960

agtcttgaca tcctgcgacg cacatagaaa tatgtgtttc cttcgggacg cagagacagg
1020

tggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc gcaacgagcg
1080

caacccttat ggtcagttac tacgcaagag gactctggcc agactgccgt tgacaaaacg
1140

gaggaagggtg gggatgacgt caaatcatca tgccctttat gacttgggct acacacgtac
1200

tacaatggcg ttaaacaag agaagcaaga ccgcgagggtg gagcaaaact cagaaacaac
1260

gtcccagttc ggactgcagg ctgcaactcg cctgcacgaa gtcggaattg ctagtaatcg
1320

cagatcagca tgctgcggtg aatacgttcc cgggccttgt acacaccgcc cgtcacacca
1380

tgagagccgg ggggacccga agtcggtagt ctaaccgcaa ggaggacgcc gccgaaggta
1440

aaactgggtga ttgggggtgaa gtcgtaacaa ggtagccgta ggagaacctg cggctggatc
1500

a c c t c c t t t
1509

<210> 345

<211> 1509

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000154385|NOBPEHKA_02916 16S ribosomal RNA

<400> 345

tataaagagt ttgatacctgg ctcaggacga acgctggcgg cgcgcctaac acatgcaagt
60

cgaacgagcg agagagagct tgcttttctca agcgagtggc gaacgggtga gtaacgcgtg
120

aggaacctgc ctcaaagagg gggacaacag ttggaaacga ctgctaatac cgcataagcc
180

cacgacccgg catcgggtag agggaaaagg agcaatccgc tttgagatgg cctcgcgtcc
240

gattagctag ttggtgaggt aatggcccac caaggcgacg atcggtagcc ggactgagag
300

gttgaacggc cacattggga ctgagacacg gcccagactc ctacgggagg cagcagtggg
360

gaatattgca caatggggga aaccctgatg cagcgacgcc gcgtggagga agaaggtctt
420

cggattgtaa actcctgttg ttgaggaaga taatgacggt actcaacaag gaagtgacgg
480

ctaactacgt gccagcagcc gcggtaaaac gtaggtcaca agcgttgtcc ggaattattg
540

ggtgtaaagg gagcgcaggc ggggaagacaa gttggaagtg aaatccatgg gctcaaccca
600

tgaactgctt tcaaaactgt ttttcttgag tagtgcagag gtaggcggaa ttcccggtgt
660

agcgggtggaa tgcgtagata tcgggaggaa caccagtggc gaaggcggcc tactgggcac
720

caactgacgc tgaggctcga aagtgtgggt agcaaacagg attagatacc ctggtagtcc
780

acactgtaaa cgatgattac taggtgttgg aggattgacc ccttcagtgc cgcagttaac
840

acaataagta atccacctgg ggagtacgac cgcaagggtg aaactcaaag gaattgacgg
900

gggcccgcac aagcagtgga gtatgtggtt taattcgacg caacgcgaag aaccttacca
960

agtcttgaca tcctgcgacg cacatagaaa tatgtgtttc cttcgggacg cagagacagg
1020

tggtgcatgg ttgtcgtcag ctcgtgtcgt gagatgttgg gttaagtccc gcaacgagcg
1080

caacccttat ggtcagttac tacgcaagag gactctggcc agactgccgt tgacaaaacg
1140

gaggaagggtg gggatgacgt caaatcatca tgccctttat gacttgggct acacacgtac
1200

tacaatggcg ttaaacaag agaagcaaga ccgcgagggtg gagcaaaact cagaaacaac
1260

gtcccagttc ggactgcagg ctgcaactcg cctgcacgaa gtcggaattg ctagtaatcg
1320

cagatcagca tgctgcggtg aatacgttcc cgggccttgt acacaccgcc cgtcacacca
1380

tgagagccgg ggggacccga agtcggtagt ctaaccgcaa ggaggacgcc gccgaaggta
1440

aaactgggtga ttgggggtgaa gtcgtaacaa ggtagccgta ggagaacctg cggctggatc
1500

a c c t c c t t t
1509

<210> 346
<211> 1529
<212> DNA
<213> artificial sequence

<220>

<223> >GCA_900066825|JDGJCHGO_03964 16S ribosomal RNA

<400> 346

tattgagagt ttgatacctgg ctcaggatga acgctggcgg cgtgcttaac acatgcaagt
60

cgaacggagt gcccatgaca gaggattcgt ccaatggatt gggttactta gtggcggacg
120

ggtgagtaac gcgtgaggaa cctgcctcgg agtgggggaat aacacaacga aagctgtgct
180

aataccgcat gatacagttg ggtcgcataga ctctgactgt caaagattta tcgctctgag
240

atggcctcgc gtctgattag ctagttggtg gggtaacggc ccaccaaggc gacgatcagt
300

agccggactg agaggttgac cggccacatt gggactgaga cacggcccag actcctacgg
360

gaggcagcag tggggaatat tgggcaatgg gcgcaagcct gaccagcaa cgccgcgtga
420

aggaagaagg ctttcggggt gtaaacttct tttctcaggg acgaagcaag tgacgggtacc
480

tgaggaataa gccacggcta actacgtgcc agcagccgcg gtaatacgtg ggtggcaagc
540

gttatccgga tttactgggt gtaaaggcg tgtaggcggg atcgcaagtc agatgtgaaa
600

actggaggct caacctccag cctgcatttg aaactgtggt tcttgagtac tggagaggca
660

gacggaattc ctagtgtagc ggtgaaatgc gtagatatta ggaggaacac cagtggcgaa
720

ggcgggtctgc tggacagcaa ctgacgctga ggcgcgaaag cgtgggggagc aaacaggatt
780

agataccctg gtagtccacg ctgtaaacga tggatactag gtgtggggggg tctgaccccc
840

tccgtgccgc agttaacaca ataagtatcc cacctgggga gtacgatcgc aaggttgaaa
900

ctcaaaggaa ttgacggggg cccgcacaag cgggtggagta tgtgggtttaa ttcgaagcaa
960

cgcgaagaac cttaccaggg cttgacatcc cgaggcccgg cctagagata ggcctttctc
1020

ttcggagacc tcggtgacag gtggtgcatg gttgtcgtca gctcgtgtcg tgagatgttg
1080

ggttaagtcc cgcaacgagc gcaacccta ttgttagttg ctacgcaaga gcactctagc
1140

gagactgccg ttgacaaaac ggaggaaggt ggggacgacg tcaaatacgc atgcccctta
1200

tgtcctgggc cacacacgta ctacaatggg ggtaaacaga gggaggcaag accgtgaggt
1260

ggagcaaata cctaaaagcc atcccagttc ggattgcagg ctgcaaccgc cctgcatgaa
1320

gttggaatcg ctagtaatcg cggatcagca tgccgcgggtg aatacgttcc cgggccttgt
1380

acacaccgcc cgtcacacca tgagagtcgg gaacacccga agtccgtagc ctaacagcaa
1440

tgggggacgc gccgaagggt gggttcgataa ttgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1529

<210> 347

<211> 1529

<212> DNA

<213> artificial sequence

<220>

<223> >GCA_900066645|DBEMCOBG_02766 16S ribosomal RNA

<400> 347

tattgagagt ttgatcctgg ctcaggatga acgctggcgg cgtgcttaac acatgcaagt
60

cgaacggagt gctcatgaca gaggattcgt ccaatggagt gagttactta gtggcggacg
120

ggtgagtaac gcgtgagtaa cctgccttgg agtggggaat aacagggtgga aacatctgct
180

aataccgcat gatgcagttg ggtcgcattg ctctgactgc caaagattta tcgctctgag
240

atggactcgc gtctgattag ctggttggcg gggtaacggc ccaccaaggc gacgatcagt
300

agccggactg agaggttggc cggccacatt gggactgaga cacggcccag actcctacgg
360

gaggcagcag tggggaatat tgggcaatgg gcgcaagcct gaccagcaa cgccgcgtga
420

aggaagaagg ctttcggggt gtaaacttct tttctcaggg acgaagcaag tgacgggtacc
480

tgaggaataa gccacggcta actacgtgcc agcagccgcg gtaatacgta ggtggcgagc
540

gttatccgga tttactgggt gtaaaggcg tgtaggcggg actgcaagtc agatgtgaaa
600

accatgggct caacctgtgg cctgcatttg aaactgtagt tcttgagtac tggagaggca
660

gacggaattc ctagtgtagc ggtgaaatgc gtagatatta ggaggaacac cagtggcgaa
720

ggcggctctgc tggacagcaa ctgacgctga ggcgcgaaag cgtgggggagc aaacaggatt
780

agataccctg gtagtccacg ctgtaaacga tggatactag gtgtgggggg tctgaccccc
840

tccgtgccgc agttaacaca ataagtatcc cacctgggga gtacgatcgc aagggtgaaa
900

ctcaaaggaa ttgacggggg cccgcacaag cgggtggagta tgtgggtttaa ttcgaagcaa
960

cgcgaagaac cttaccaggg cttgacatcc cggtgaccgg tgtagagata caccttcttc
1020

ttcggaagcg ccggtgacag gtggtgcatg gttgtcgtca gctcgtgtcg tgagatgttg
1080

ggttaagtcc cgcaacgagc gcaaccctta ttgttagttg ctacgcaaga gcactctagc
1140

gagactgccg ttgacaaaac ggaggaaggt ggggacgacg tcaaatacgc atgcccctta
1200

tgtcctgggc cacacacgta ctacaatggt ggtcaacaga gggaagcaag accgcgaggt
1260

ggagcaaacc cctaaaagcc atcccagttc ggattgcagg ctgcaactcg cctgtatgaa
1320

gttggaatcg ctagtaatcg cggatcagca tgccgcggtg aatacgttcc cgggccttgt
1380

acacaccgcc cgtcacacca tgagagtcgg gaacacccga agtccgtagc ctaaccgcaa
1440

ggggggcgcg gccgaagggt ggttcgataa ttgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1529

<210> 348

<211> 1530

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000239295|GPJGAEFO_00132 16S ribosomal RNA

<400> 348

tattgagagt ttgatcctgg ctcaggatga acgctggcgg cgtgcttaac acatgcaagt
60

cgaacgggggt gctcatgacg gaggattcgt ccaatggatt gagttaccta gtggcggacg
120

ggtgagtaac gcgtgaggaa cctgccttgg agaggggaat aacactccga aaggagtgct
180

aataccgcat gaagcagttg ggtcgcattg ctctgactgc caaagattta tcgctctgag
240

atggcctcgc gtctgattag ctagtaggcg gggtaacggc ccacctaggc gacgatcagt
300

agccggactg agaggttgac cggccacatt gggactgaga cacggcccag actcctacgg
360

gaggcagcag tggggaatat tgggcaatgg gcgcaagcct gaccagcaa cgccgcgtga
420

aggaagaagg ctttcggggt gtaaacttct tttgtcgggg acgaaacaaa tgacggtacc
480

cgacgaataa gccacggcta actacgtgcc agcagccgcg gtaatacgta ggtggcaagc
540

gttatccgga ttactgggt gtaaaggcg tgtaggcggg attgcaagtc agatgtgaaa
600

actgggggct caacctccag cctgcatttg aaactgtagt tcttgagtgc tggagaggca
660

atcggaattc cgtgtgtagc ggtgaaatgc gtagatatac ggaggaacac cagtggcgaa
720

ggcggattgc tggacagtaa ctgacgctga ggcgcgaaag cgtggggagc aaacaggatt
780

agataccctg gtagtccacg ccgtaaacga tggatactag gtgtgggggg tctgaccccc
840

tccgtgccgc agttaacaca ataagtatcc cacctgggga gtacgatcgc aaggttgaaa
900

ctcaaaggaa ttgacggggg cccgcacaag cgggtggagta tgtgggtttaa ttcgaagcaa
960

cgcgaagaac cttaccaggg cttgacatcc cactaacgag gcagagatgc gttaggtgcc
1020

cttcgggggaa agtggagaca ggtggtgcat ggttgtcgtc agctcgtgtc gtgagatggt
1080

gggttaagtc ccgcaacgag cgcaaccctt attgttagtt gctacgcaag agcactctag
1140

cgagactgcc gttgacaaaa cggaggaagg tggggacgac gtcaaatacat catgcccctt
1200

atgtcctggg ccacacacgt actacaatgg tggttaacag agggaggcaa taccgcgagg
1260

tggagcaaata ccctaaaagc catcccagtt cggattgcag gctgaaaccc gcctgtatga
1320

agttggaatc gctagtaatc gcggatcagc atgccgcggt gaatacgttc ccgggccttg
1380

tacacaccgc ccgtcacacc atgagagtcg ggaacacccg aagtccgtag cctaaccgca
1440

aggagggcgc ggccgaaggt gggttcgata attgggggtga agtcgtaaca aggtagccgt
1500

a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1530

<210> 349

<211> 1530

<212> DNA

<213> artificial sequence

<220>

<223> >GCA_001405555|OFJOBHHC_00309 16S ribosomal RNA

<400> 349

tcagagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gagcgaagca gttaagttga tttcttcgga ttgattcttg actgactgag cggcggacgg
120

gtgagtaacg cgtgggtgac ctgccccata ccgggggata acagctggaa acggctgcta
180

ataccgcata agcgcacaga gctgcatggc tcggtgtgaa aaactccggt ggtatgggat
240

gggcccgcg tctgattaggc agttggcggg gtaacggccc accaaaccga cgatcagtag
300

ccggcctgag agggcgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtaggc
420

gaagaagtat ttcggtatgt aaagctctat cagcagggaa gataatgacg gtacctgact
480

aagaagcccc ggctaactac gtgccagcag ccgcggtaat acgtaggggg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgtag acggcaaggc aagtctgatg tgaaaaccca
600

gggcttaacc ctgggactgc attggaaact gtctggctcg agtgccggag aggtaagcgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggaag aacaccagtg gcgaaggcgg
720

cttactggac ggtaactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat gctaggtggt ggggagcaaa gctcttcggt
840

gccgccgcaa acgcattaag cattccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg tttaattcga agcaacgcga
960

agaaccttac caggtcttga catcccgatg accggcccgt aacggggcctt tctcttcgga
1020

gcattggaga caggtgggtgc atggttgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ttatcctcag tagccagcag gtaaagctgg gcactctgtg
1140

gagactgcca gggataacct ggaggaaggt ggggatgacg tcaaatcatc atgcccctta
1200

tgatctgggc tacacacgtg ctacaatggc gtaaacaag ggaggcaaag ccgcgaggtg
1260

gagcaaatcc caaaaataac gtctcagttc ggactgcagt ctgcaactcg actgcacgaa
1320

gctggaatcg ctagtaatcg cgaatcagaa tgtcgcgggtg aatacgttcc cgggtcttgt
1380

acacaccgcc cgtcacacca tgggagttgg taacgcccga agtcagtgac ccaacctttt
1440

aggagggagc tgccgaaggc gggactgata actgggggtga agtcgtaaca aggtagccgt
1500

a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1530

<210> 350

<211> 1305

<212> DNA

<213> artificial sequence

<220>

<223> >SPC10383|KCGKKHOP_02957 16S ribosomal RNA

<400> 350

aaaggattta ttcgcttcag gatggactcg cgtccaatta gctagttggt gaggtaacgg
60

cccaccaagg 120	cgacgattgg	tagccggact	gagaggttga	acggccacat	tgggactgag
acacggccca 180	gactcctacg	ggaggcagca	gtgggggata	ttgcacaatg	ggggaaaccc
tgatgcagcg 240	acgccgcgtg	gaggaagaag	gttttcggat	tgtaaactcc	tgtcgttagg
gacgataatg 300	acggtaccta	acaagaaagc	accggctaac	tacgtgccag	cagccgcggt
aaaacgtagg 360	gtgcaagcgt	tgtccggaat	tactgggtgt	aaagggagcg	caggcggacc
ggcaagttag 420	aagtgaaatc	catgggctca	accggtgaat	tgctttcaaa	actgctggcc
ttgagtagtg 480	cagaggtagg	tggaattccc	ggtgtagcgg	tggaatgcgt	agatatcggg
aggaacacca 540	gtggcgaagg	cgacctactg	ggcaccaact	gacgctgagg	ctcgaaagca
tgggtagcaa 600	acaggattag	ataccctggg	agtccatgcc	gtaaacgatg	attactaggt
gttgagggat 660	tgacccttc	agtgccgcag	ttaacacaat	aagtaatcca	cctggggagt
acgaccgcaa 720	ggttgaaact	caaaggaatt	gacgggggcc	cgcacaagca	gtggagtatg
tggtttaatt 780	cgaagcaacg	cgaagaacct	taccaggtct	tgacatccga	tgcatagtgc
agagatgcat 840	gaagtccttc	gggacatcga	gacaggtggg	gcatggttgt	cgtcagctcg
tgtcgtgaga 900	tgttgggtta	agtcccgcaa	cgagcgcaac	ccttattgcc	agttactacg
caagaggact 960	ctggcgagac	tgccgttgac	aaaacggagg	aaggtgggga	tgacgtcaaa

tcatcatgcc ctttatgacc tgggctacac acgtactaca atggcggttta acaaagagaa
1020

gcaagaccgc gaggtggagc aaaactcaga aacaacgtct cagttcagat tgcaggctgc
1080

aactcgcctg catgaagtcg gaattgctag taatcgcgga tcagcatgcc gcggtgaata
1140

cgttcccggg ccttgtagac accgcccgtc acaccatgag agccggggggg acccgaagtc
1200

ggtagtctaa ccgcaaggag gacgccgccg aaggtaaaac tggtgattgg ggtgaagtcg
1260

taacaaggta gccgtatcgg aagggtgcggc tggatcacct ccttt
1305

<210> 351

<211> 1307

<212> DNA

<213> artificial sequence

<220>

<223> >SPC10676|BNNMOMCD_02995 16S ribosomal RNA

<400> 351

aaaaggattt attcgcttta ggatggactc gcgtccaatt agctagttgg tgaggtaacg
60

gccaccaag gcgacgattg gtagccggac tgagaggttg aacggccaca ttgggactga
120

gacacggccc agactcctac gggaggcagc agtgggggat attgcacaat gggggaaacc
180

ctgatgcagc gacgccgcgt ggaggaagaa ggttttcgga ttgtaaactc ctgtcgttag
240

ggacgataat gacggtacct aacaagaaag caccggctaa ctacgtgcca gcagccgcgg
300

taaaacgtag ggtgcaagcg ttgtccggaa ttactgggtg taaagggagc gcaggcggga
360

agacaagttg gaagtgaaaa ccatgggctc aacccatgaa ttgctttcaa aactgttttt
420

cttgagtagt gcagaggtag atggaattcc cgggtgtagcg gtggaatgcg tagatatcgg
480

gaggaacacc agtggcgaag gcggtctact gggcaccaac tgacgctgag gctcgaaagc
540

atgggtagca aacaggatta gataccctgg tagtccatgc cgtaaacgat gattactagg
600

tgttggggga ttgacccctt cagtgccgca gttaacacaa taagtaatcc acctggggag
660

tacgaccgca aggttgaaac tcaaaggaat tgacgggggc ccgcacaagc agtggagtat
720

gtggtttaat tcgaagcaac gcgaagaacc ttaccaggtc ttgacatccg atgcatagca
780

cagagatgtg tgaaatcctt cgggacatcg agacaggtagg tgcattggtt tcgtcagctc
840

gtgtcgtgag atgttgggtt aagtcccgca acgagcgcaa cccttattgc cagttactac
900

gttaagagga ctctggcgag actgccgttg acaaaacgga ggaagggtgg gatgacgtca
960

aatcatcatg ccctttatga cctgggctac acacgtacta caatggcggtt aaacaaagag
1020

aagcaagacc gcgaggtgga gcaaaactca aaaacaacgt ctcagttcag attgcaggct
1080

gcaactcgcc tgcattgaagt cgggaattgct agtaatcgcg gatcagcatg ccgcggtgaa
1140

tacgttcccg ggccttgtag acaccgcccg tcacaccatg agagccgggg ggacccgaag
1200

tcgatagtct aaccgcaagg aggacgtcgc cgaaggtaaa actgggtgatt ggggtgaagt
1260

cgtaacaagg tagccgtatc ggaagggtgcg gctggatcac ctccttt
1307

<210> 352

<211> 1264

<212> DNA

<213> artificial sequence

<220>

<223> >GCF_000157995|GAIEDKPD_00018 16S ribosomal RNA (partial)

<400> 352

acctaggcga tgatacgtag ccgacctgag aggggtgaccg gccacattgg gactgagaca
60

cggcccaaac tcctacggga ggcagcagta gggaattttc ggcaatgggc gaaagcctga
120

ccgagcaacg ccgcgtgagt gaagaaggcc ttcgggttgt aaagctctgt tgtgaaggaa
180

gaacggctca tacagggaat ggtatgggag tgacgggtact ttaccagaaa gccacggcta
240

actacgtgcc agcagccgcg gtaatacgtg ggtggcgagc gttatccgga attattgggc
300

gtaaaggggtg cgcaggcggg ttgttaagtt taagggtgaaa gcgtggggct taaccccata
360

tagccttaga aactgacaga ctagagtaca ggagagggca atggaattcc atgtgtagcg
420

gtaaaatgcg tagatatatg gaggaacacc agtggcgaag gcggttgcct ggccctgtaac
480

tgacgctcat gcacgaaagc gtgggggagca aataggatta gataccctag tagtccacgc
540

cgtaaacgat gagaactaag tggtggggaa actcagtgtc gcagttaacg caataagttc
600

tccgcctggg gagtatgcac gcaagtgtga aactcaaagg aattgacggg ggccccgcaca
660

agcgggtggag tatgtgggttt aattcgacgc aacgcgaaga accttaccag gtcttgacat
720

cccctgcaaa gacatagaga tatgttggag gttatcaggg agacaggtgg tgcattggtt
780

tcgtcagctc gtgtcgtgag atgttgggtt aagtcccgca acgagcgcaa cccttgtctt
840

tagttgctaa cattaagttg aggactctag agagactgcc ggtgacaaac cggaggaagg
900

tggggatgac gtcaaatacat catgcccctt atgacctggg ctacacacgt actacaatgg
960

cggatacaac gagaagcaag acagtgatgt ggagcaaaac tcagaaagtc cgtctcagtt
1020

cggattgaag tctgcaaccc gacttcatga agccggaatc gctagtaatc gcggatcagc
1080

atgccgcggt gaatacgttc tcgggccttg tacacaccgc ccgtcaaacc atgagagttg
1140

gcaatacccg aagccggtgg cctaacctcg caagaggagg gagccgtcga aggtagggct
1200

gatgattggg gttaagtcgt aacaaggat ccctacggga acgtggggat ggatcacctc
1260

c t t t
1264

<210> 353

<211> 1253

<212> DNA

<213> artificial sequence

<220>

<223> >SPC10710|GNNPDKLC_02969 16S ribosomal RNA (partial)

<400> 353

ggctcaccaa ggcgacgac agtagccgga ctgagaggtt ggccggccac attgggactg
60

agacacggcc cagactccta cgggaggcag cagtggggaa tattgggcaa tgggcgaaag
120

cctgaccag caacgccgcg tgaaggaaga aggccctcgg gttgtaaact tcttttgtca
180

gggacgaagc aagtgacggt acctgacgaa taagccacgg ctaactacgt gccagcagcc
240

gcggtaatac gtaggtggca agcgttatcc ggatttactg ggtgtaaagg gcgtgtaggc
300

gggagtgcaa gtcagatgtg aaaactatgg gctcaacca tagcctgcat ttgaaactgt
360

acttcttgag tgatggagag gcaggcggaa ttccctgtgt agcggtgaaa tgcgtagata
420

tagggaggaa caccagtggc gaaggcggcc tgctggacat taactgacgc tgaggcgcga
480

aagcgtgggg agcaaacagg attagatacc ctggtagtcc acgccgtaaa cgatggatac
540

taggtgtggg gggctctgacc ccctccgtgc cgcagttaac acaataagta tcccacctgg
600

ggagtacgat cgcaagggtg aaactcaaag gaattgacgg gggcccgcac aagcggtgga
660

gtatgtggtt taattcgaag caacgcgaag aaccttacca ggacttgaca tcctactaac
720

gaagcagaga tgcataaggt gcccttcggg gaaagtagag acaggtggtg catgggtgtc
780

gtcagctcgt gtcgtgagat gttgggttaa gtcccgcac gagcgcaacc cttattgtta
840

gttgctacgc aagagcactc tagcgagact gccgttgaca aaacggagga aggtggggac
900

gacgtcaa atcatcatgcc cttatgtcct gggccacaca cgtactacaa tggcgggtcaa
960

cagaggggaag caaagccgcg aggtggagca aatccctaaa agccgtccca gttcggattg
1020

caggctgaaa ctgcctgta tgaagtcgga atcgctagta atcgcggatc agcatgccgc
1080

ggtgaatacg ttcccgggccc ttgtacacac cgcccgtcac accatgagag tcgggaacac
1140

ccgaagtccg tagcctaaca gcaatggggg cgcggccgaa ggtgggttcg ataattgggg
1200

tgaagtcgta acaaggtagc cgtatcgga ggtgcggctg gatcacctcc ttt
1253

<210> 354

<211> 1530

<212> DNA

<213> artificial sequence

<220>

<223> >SPC10896|PKADNJIL_02878 16S ribosomal RNA

<400> 354

ttatgagagt ttgatcctgg ctcaggatga acgctggcgg cgtgcttaac acatgcaagt
60

cgaacgaagc atttgcgaca gatttcttcg gattgaagtt gcttatgact gagtggcgga
120

cgggtgagta acgcgtgggt aacctgcctc acacaggggg atagcagttg gaaacggctg
180

ataataccgc ataagcgcac agtaccgcat ggtacagtgt gaaaaactcc ggtggtgtga
240

gatggacccg cgtctgatta gcttgttggc agggtaacgg cctaccaagg caacgatcag
300

tagccgacct gagaggggtga ccggccacat tgggactgag acacggccca gactcctacg
360

ggaggcagca gtggggaata ttgcacaatg gaggaaactc tgatgcagcg acgccgcgtg
420

agtgaagaag taattcgtta tgtaaagctc tatcagcagg gaagatagtg acggtacctg
480

actaagaagc tccggctaaa tacgtgccag cagccgcggt aatacgtatg gagcaagcgt
540

tatccggatt tactgggtgt aaagggagtg taggtggcat cacaagtcag aagtgaagc
600

ccggggctca accccgggac tgcttttgaa actgtggagc tggagtgcag gagaggcaag
660

tggaattcct agtgtagcgg tgaaatgcgt agatattagg aggaacacca gtggcgaagg
720

cggcttgctg gactgtaact gacactgagg ctcgaaagcg tggggagcaa acaggattag
780

ataccctggg agtccacgcc gtaaacgatg aatactaggt gtcggggctc ataagagctt
840

cggtgccgca gcaaacgcaa taagtattcc acctggggag tacgttcgca agaataaac
900

tcaaaggaat tgacggggac ccgcacaagc ggtggagcat gtggtttaat tcgaagcaac
960

gcgaagaacc ttaccaagtc ttgacatcct cttgcccggg cagtaatgtg accttttctt
1020

cgaacaaga gtgacagggt gtgcatggtt gtcgtcagct cgtgtcgtga gatgttgggt
1080

taagtcccgc aacgagcgca acccctattc ttagtagcca gcatttaagg tgggcactct
1140

aggaagactg ccagggataa cctggaggaa ggtggggatg acgtcaaata atcatgcccc
1200

ttatgacttg ggctacacac gtgctacaat ggcgtaaaca aagtgaagcg agagtgtgag
1260

cttaagcaaa tcacaaaaat aacgtctcag ttcggattgt agtctgcaac tcgactacat
1320

gaagctggaa tcgctagtaa tcgcgaatca gaatgtcgcg gtgaatacgt tcccgggtct
1380

tgtacacacc gcccgtcaca ccatgggagt cggaatgcc cgaagtcggt gacctaacga
1440

aagaaggagc cgccgaaggc aggtctgata actgggggtga agtcgtaaca aggtagccgt
1500

a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1530

<210> 355

<211> 1530

<212> DNA

<213> artificial sequence

<220>

<223> GCA_001405835|LAPFHGJD_02535 16S ribosomal RNA

<400> 355

ttatgagagt ttgatcctgg ctcaggatga acgctggcgg cgtgcttaac acatgcaagt
60

cgaacgaagc atttaagaca gattacttcg gtttgaagtc ttttatgact gagtggcgga
120

cggggtgagta acgcgtgggt aacctgcctc atacaggggg atagcagctg gaaacggctg
180

gtaataccgc ataagcgcac agtaccacat ggtacagtgt gaaaaactcc ggtgggtatga
240

gatggacccg cgtctgatta gcttgttggc ggggtaacgg cccaccaagg cgacgatcag
300

tagccgacct gagaggggtga ccggccacat tgggactgag acacggccca gactcctacg
360

ggaggcagca gtggggaata ttgcacaatg gaggaaactc tgatgcagcg acgccgcgtg
420

agtgaagaag tagttcgcta tgtaaagctc tatcagcagg gaagatagtg acggtacctg
480

actaagaagc tccggctaaa tacgtgccag cagccgcggt aatacgtatg gagcaagcgt
540

tatccggatt tactgggtgt aaagggagtg taggtggcca ggcaagtcag aagtgaaagc
600

ccgggggtca accccgggac tgcttttgaa actgcagggc tagagtgcag gaggggcaag
660

tggaattcct agtgtagcgg tgaaatgcgt agatattagg aggaacacca gtggcgaagg
720

cggcttgctg gactgtaact gacactgagg ctcgaaagcg tggggagcaa acaggattag
780

ataccctggg agtccacgcc gtaaacgatg aatactaggt gtcggggcac ataagtgctc
840

cggtgccgca gcaaacgcaa taagtattcc acctggggag tacgttcgca agaataaac
900

tcaaaggaat tgacggggac ccgcacaagc ggtggagcat gtggtttaat tcgaagcaac
960

gcgaagaacc ttaccaagtc ttgacatcct cttgaccggt cagtaatgtg accttttctt
1020

cggaacaaga gtgacagggt gtgcatgggt gtcgtcagct cgtgtcgtga gatgttgggt
1080

taagtcccgc aacgagcgc acccttatcc ttagtagcca gcagttcggc tgggcactct
1140

agggagactg ccagggataa cctggaggaa ggtggggatg acgtcaaata atcatgcccc
1200

ttatgacttg ggctacacac gtgctacaat ggcgtaaaca aagtgaagcg agagcgtgag
1260

cttaagcaaa tcacaaaaat aacgtctcag ttcggattgt agtctgcaac tcgactacat
1320

gaagctggaa tcgctagtaa tcgcagatca gaatgctgcg gtgaatacgt tcccgggtct
1380

tgtacacacc gcccgtcaca ccatgggagt cggaaatgcc cgaagtcggt gacctaacgt
1440

aagaaggagc cgccgaaggc aggtctgata actgggggtga agtcgtaaca aggtagccgt
1500

a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1530

<210> 356

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000218445|OHMFMPNB_02632 16S ribosomal RNA

<400> 356

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcctaaca catgcaagtc
60

gagcgaagca ctttgcttag attcttcgga tgaagaggat tgtgactgag cggcggacgg
120

gtgagtaacg cgtgggtaac ctgcctcata caggggggata acagttagaa atgactgcta
180

ataccgcata agaccacagc accgcatggc gcggggggtaa aaactccggt ggtatgagat
240

ggacccgcgt ctgattagct agttggtaag gtaacggctt accaaggcga cgatcagtag
300

ccgacctgag agggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtgagc
420

gaagaagtat ttcggtatgt aaagctctat cagcagggaa gaaaatgacg gtacctgact
480

aagaagcacc ggctaaatac gtgccagcag ccgcggtaat acgtatgggtg caagcgttat
540

ccggattttac tgggtgtaaa gggagcgtag acggatgggc aagtctgatg tgaaaacccg
600

gggctcaacc ccgggactgc attggaaact gttcatctag agtgctggag aggtaagtgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac agtaactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgact actaggtgtc ggggtggcaaa gccattcggg
840

gccgcagcaa acgcaataag tagtccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac ctgctcttga catcccgtg accggacggg aatgcgtcct tcccttcggg
1020

gcagcggaga caggtgggtgc atggttgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ctatcttttag tagccagcgg ccaggccggg cactctagag
1140

agactgccgg ggataacccg gaggaagggtg gggatgacgt caaatcatca tgccccttat
1200

gagcagggct acacacgtgc tacaatggcg taaacaaagg gaagcgagac cgcgagggtg
1260

agcaaattccc aaaaataacg tctcagttcg gattgtagtc tgcaactcga ctacatgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcgggtga atacgttccc ggggtcttgta
1380

cacaccgccc gtcacaccat gggagtcagt aacgcccga gtcagtgacc caaccgtaag
1440

gagggagctg ccgaaggcgg gaccgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 357

<211> 1529

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000218465|KMEKDMLC_03101 16S ribosomal RNA

<400> 357

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gagcgaagca ccttgacgga tttcttcgga ttgaagcctt ggtgactgag cggcggacgg
120

gtgagtaacg cgtgggtaac ctgcctcata cagggggata acagttggaa acggctgcta
180

ataccgcata agcgcacagt accgcatggt acggtgtgaa aaactccggt ggtatgagat
240

ggacccgcgt ctgattaggt agttggtggg gtaacggcct accaagccga cgatcagtag
300

ccgacctgag agggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtgagc
420

gatgaagtat ttcggtatgt aaagctctat cagcagggaa gaaaatgacg gtacctgact
480

aagaagcccc ggctaactac gtgccagcag ccgcggtaat acgtaggggg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgtag acggcatggc aagccagatg tgaaagcccc
600

gggctcaacc ccgggactgc atttggaact gtcaggctag agtgtcggag aggaaagcgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

ctttctggac gatgactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat actagggtgtc ggggtggcaaa gccattcgggt
840

gccgcagcaa acgcaataag tattccacct ggggagtacg ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac ctggtcttga catccctctg accgctcttt aatcggagct ttccttcggg
1020

acagaggaga caggtggtgc atggttgctg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ctatcttttag tagccagcat tttcggatgg gcactctaga
1140

gagactgcca gggataacct ggaggaaggt ggggatgacg tcaaatacgc atgcccccta
1200

tgaccagggc tacacacgtg ctacaatggc gtaaacaag ggaagcgagc ccgcgagggg
1260

gagcaaattc caaaaataac gtctcagttc ggattgtagt ctgcaactcg actacatgaa
1320

gctggaatcg ctagtaatcg cgaatcagaa tgtcgcgggtg aatacgttcc cgggtcttgt
1380

acacaccgcc cgtcacacca tgggagtcag taacgcccga agtcagtgac ccaaccgcaa
1440

ggagggagct gccgaagggt ggaccgataa ctgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g
1529

c g g c t g g a t c

a c c t c c t t t

<210> 358

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000209405|ACFAKHHP_02907 16S ribosomal RNA

<400> 358

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcctaaca catgcaagtc
60

gagcgaagca ctttgcttag attcttcgga tgaagaggat tgtgactgag cggcggacgg
120

gtgagtaacg cgtgggtaac ctgcctcata caggggggata acagttagaa atgactgcta
180

ataccgcata agaccacagc accgcatggc gcggggggtaa aaactccggt ggtatgagat
240

ggacccgcgt ctgattagct agttggtaag gtaacggctt accaaggcga cgatcagtag
300

ccgacctgag agggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtgagc
420

gaagaagtat ttcggtatgt aaagctctat cagcagggaa gaaaatgacg gtacctgact
480

aagaagcacc ggctaaatac gtgccagcag ccgcggtaat acgtatgggtg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgtag acggatgggc aagtctgatg tgaaaacccg
600

gggctcaacc ccgggactgc attggaaact gttcatctag agtgctggag aggtaagtgg
660

aattcctagt gtagcggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac agtaactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgact actagggtgtc ggggtggcaaa gccattcggg
840

gccgcagcaa acgcaataag tagtccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac ctgctcttga catcccgtg accggacggg aatgcgtcct tcccttcggg
1020

gcagcggaga caggtggtgc atggttgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ctatcttttag tagccagcgg ccaggccggg cactctagag
1140

agactgccgg ggataacccg gaggaagggtg gggatgacgt caaatcatca tgccccttat
1200

gagcagggct acacacgtgc tacaatggcg taaacaaagg gaagcgagac cgcgagggtg
1260

agcaaattccc aaaaataacg tctcagttcg gattgtagtc tgcaactcga ctacatgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcgggtga atacgttccc gggctcttgta
1380

cacaccgccc gtcacaccat gggagtcagt aacgcccga gtcagtgacc caaccgtaag
1440

gagggagctg ccgaaggcgg gaccgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 359
<211> 1527

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000218405|ADIHEGGI_03670 16S ribosomal RNA

<400> 359

agagagtttg atcctggctc aggatgaacg ctggcggcgt gcctaacaca tgcaagtcga
60

acgaagttac acggaggaag ttttcggatg gaatcggtat aacttagtgg cggacgggtg
120

agtaacgcgt gggaaacctg ccctgtaccg ggggataaca cttagaaata ggtgctaata
180

ccgcataagc gcacggaacc gcatggttcc gtgtgaaaaa ctccggtggg acaggatggg
240

cccgcgtctg attagccagt tggcagggtg acggcctacc aaagcgacga tcagtagccg
300

gcctgagagg gtgaacggcc acattgggac tgagacacgg cccaaactcc tacgggaggg
360

agcagtgggg aatattgcac aatgggggaa accctgatgc agcgacgccg cgtgagtga
420

gaagtatttc ggtatgtaaa gctctatcag cagggaagaa aatgacggta cctgactaag
480

aagccccggc taactacgtg ccagcagccg cggtataacg tagggggcaa gcgttatccg
540

gatttactgg gtgtaaaggg agcgtagacg gcatggcaag ccagatgtga aaaccaggg
600

ctcaaccttg ggattgcatt tggaactgcc aggctggagt gcaggagagg taagcggaat
660

tcctagtgtg gcggtgaaat gcgtagatat taggaggaac accagtggcg aaggcggctt
720

actggactgt aactgacgtt gaggctcgaa agcgtgggga gcaaacagga ttagataccc
780

tggtagtcca cgcggtaaac gatgattgct aggtgtaggt gggatatggac ccatcgggtgc
840

cgcagctaac gcaataagca atccacctgg ggagtacgtt cgcaagaatg aaactcaaag
900

gaattgacgg ggacccgcac aagcgggtgga gcatgtgggt taattcgaag caacgcgaag
960

aaccttacca agtcttgaca tccccctgaa tatcttgtaa aaaagagatg ccttcgggac
1020

aggggagaca ggtggtgcat ggttgtcgtc agctcgtgtc gtgagatggt gggttaagtc
1080

ccgcaacgag cgcaaccctt attcttagta gccagcaggt aaggctgggc actctaagga
1140

gactgccggg gataaccgag aggaaggcgg ggatgacgtc aaatcatcat gccccttatg
1200

atttgggcta cacacgtgct acaatggcgt aaacaaaggg aagcgagaca gtgatgtgga
1260

gcaaatccca gaaataacgt ctcagttcgg attgtagtct gcaactcgac tacatgaagc
1320

tggaatcgct agtaatcgcg aatcagcatg tcgcggtgaa tacgttcccg ggtcttgtac
1380

acaccgcccg tcacaccatg ggagttggaa atgcccgaag tctgtgacct aaccgaaagg
1440

gaggagcagc cgaaggcagg tctgataact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g g c t g g a t c a c c t c c t t t
1527

<210> 360

<211> 1527

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000218405|ADIHEGGI_04479 16S ribosomal RNA

<400> 360

agagagtttg atcctggctc aggatgaacg ctggcggcgt gcctaacaca tgcaagtcga
60

acgaagttat atcgaggaag ttttcggatg gaatcagtat aacttagtgg cggacgggtg
120

agtaacgcgt gggaaacctg ccctgtaccg ggggataaca cttagaaata ggtgctaata
180

ccgcataagc gcacagcttc acatgaagca gtgtgaaaaa ctccggtggg acaggatggt
240

cccgcgtctg attagccagt tggcagggtg acggcctacc aaagcgacga tcagtagccg
300

gcctgagagg gtgaacggcc acattgggac tgagacacgg cccaaactcc tacgggaggg
360

agcagtgggg aatattgcac aatgggggaa accctgatgc agcgacgccg cgtgagtgaa
420

gaagtatttc ggtatgtaaa gctctatcag cagggaagaa aatgacggta cctgactaag
480

aagccccggc taactacgtg ccagcagccg cggtaatacg tagggggcaa gcgttatccg
540

gatttactgg gtgtaaaggg agcgtagacg gcatggcaag ccagatgtga aaaccaggg
600

ctcaaccttg ggattgcatt tggaactgtc aggctggagt gcaggagagg taagcggaat
660

tcctagtgtg gcggtgaaat gcgtagatat taggagggaac accagtggcg aaggcggctt
720

actggactgt aactgacgtt gaggctcgaa agcgtgggga gcaaacagga ttagataccc
780

tggtagtcca cgcggtaaac gatgattgct aggtgtaggt gggatatggac ccatcgggtgc
840

cgcagctaac gcaataagca atccacctgg ggagtacgtt cgcaagaatg aaactcaaag
900

gaattgacgg ggacccgcac aagcgggtgga gcatgtgggtt taattcgaag caacgcgaag
960

aaccttacca agtcttgaca tccccctgac tctcctgtaa aagagtgagg ccttcgggac
1020

attggagaca ggtggtgcat ggttgtcgtc agctcgtgtc gtgagatgtt gggttaagtc
1080

ccgcaacgag cgcaaccctt attcttagta gccagcaggt aaagctgggc actctaagga
1140

gactgccggg gataaccgga aggaaggcgg ggatgacgtc aaatcatcat gcccccttatg
1200

atttgggcta cacacgtgct acaatggcgt aaacaaaggg aagcgagaca gtgatgtgga
1260

gcaaattcca gaaataacgt ctcagttcgg attgtagtct gcaactcgac tacatgaagc
1320

tggaatcgct agtaatcgcg aatcagcatg tcgcgggtgaa tacgttcccg ggtcttgtac
1380

acaccgcccc tcacaccatg ggagttggaa atgcccgaag tctgtgacct aaccgaaagg
1440

gaggagcagc cgaaggcagg tctgataact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g g c t g g a t c a c c t c c t t t
1527

<210> 361

<211> 1527

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000218405|ADIHEGGI_06579 16S ribosomal RNA

<400> 361

agagagtttg atcctggctc aggatgaacg ctggcggcgt gcctaacaca tgcaagtcga
60

acgaagttac acagaggaag ttttcggatg gaatcggtat aacttagtgg cggacgggtg
120

agtaacgcgt gggaaacctg ccctgtaccg ggggataaca cttagaaata ggtgctaata
180

ccgcataagc gcacggattc acatgaagca gtgtgaaaaa ctccggtggt acaggatggt
240

cccgcgtctg attagccagt tggcagggtg acggcctacc aaagcgacga tcagtagccg
300

gcctgagagg gtgaacggcc acattgggac tgagacacgg cccaaactcc tacgggaggg
360

agcagtgggg aatattgcac aatgggggaa accctgatgc agcgacgccg cgtgagtga
420

gaagtatttc ggtatgtaaa gctctatcag cagggaagaa aatgacggta cctgactaag
480

aagccccggc taactacgtg ccagcagccg cggtaatacg tagggggcaa gcgttatccg
540

gatttactgg gtgtaaaggg agcgtagacg gcatggcaag ccagatgtga aaaccaggg
600

ctcaaccttg ggattgcatt tggaactgtc aggctggagt gcaggagagg taagcggaat
660

tcctagtgtg gcggtgaaat gcgtagatat taggaggaa accagtggcg aaggcggctt
720

actggactgt aactgacgtt gaggctcgaa agcgtgggga gcaaacagga ttagataccc
780

tggtagtcca cgcggtaaac gatgattgct aggtgtaggt gggatatggac ccatcgggtgc
840

cgcagctaac gcaataagca atccacctgg ggagtacgtt cgcaagaatg aaactcaaag
900

gaattgacgg ggacccgcac aagcgggtgga gcatgtgggtt taattcgaag caacgcgaag
960

aaccttacca agtcttgaca tcccaatgac gcacctgtaa agagggtgttc ccttcggggc
1020

attggagaca ggtggtgcat ggttgtcgtc agctcgtgtc gtgagatgtt gggttaagtc
1080

ccgcaacgag cgcaaccctt attcttagta gccagcaggt aaagctgggc actctaagga
1140

gactgccggg gataaccgga aggaaggcgg ggatgacgtc aaatcatcat gccccttatg
1200

atttgggcta cacacgtgct acaatggcgt aaacaaaggg aagcgagaca gtgatgtgga
1260

gcaaattcca gaaataacgt ctcagttcgg attgtagtct gcaactcgac tacatgaagc
1320

tggaatcgct agtaatcgcg aatcagcatg tcgcggtgaa tacgttcccg ggtcttgtac
1380

acaccgcccc tcacaccatg ggagttggaa atgcccgaag tctgtgacct aaccgaaagg
1440

gaggagcagc cgaaggcagg tctgataact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g g c t g g a t c a c c t c c t t t
1527

<210> 362

<211> 1532

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000218425|CPDMHMPF_01985 16S ribosomal RNA

<400> 362

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcctaaca catgcaagtc
60

gaacgaagcg cctggccccg acttcttcgg aacgaggagc cttgcgactg agtggcggaac
120

gggtgagtaa cgcgtagggca acctgccttg cactggggga taacagccag aaatggctgc
180

taataccgca taagaccgaa gcgccgcatg gcgcggcggc caaagccccg gcggtgcaag
240

atgggccccg gtctgattag gtagttggcg gggtaacggc ccaccaagcc gacgatcagt
300

agccgacctg agaggggtgac cggccacatt gggactgaga cacggcccag actcctacgg
360

gaggcagcag tggggaatat tgcacaatgg gggaaaccct gatgcagcga cgccgcgtga
420

aggatgaagt atttcggtat gtaaacttct atcagcaggg aagaagatga cggtacctga
480

ctaagaagcc ccggctaact acgtgccagc agccgcggta atacgtaggg ggcaagcggt
540

atccggattt actgggtgta aagggagcgt agacggcgat gcaagccaga tgtgaaagcc
600

cggggctcaa ccccgaggact gcatttggaa ctgcgtggct ggagtgtcgg agaggcaggc
660

ggaattccta gtgtagcggc gaaatgcgta gatattagga ggaacaccag tggcgaaggc
720

ggcctgctgg acgatgactg acgttgaggc tcgaaagcgt ggggagcaaa caggattaga
780

taccctggta gtccacgccg taaacgatga ctactaggtg tcgggtggca aggccattcg
840

gtgccgcagc aaacgcaata agtagtcac ctggggagta cgttcgcaag aatgaaactc
900

aaaggaattg acggggaccc gcacaagcgg tggagcatgt ggtttaattc gaagcaacgc
960

gaagaacctt acctgatctt gacatcccga tgccaaagcg cgtaacgcgc tctttcttcg
1020

gaacatcggg gacaggtggg gcatggttgt cgtcagctcg tgtcgtgaga tgttgggtta
1080

agtcccgcaa cgagcgcaac ccctatcttc agtagccagc attatggatg ggcactctgg
1140

agagactgcc agggagaacc tggaggaagg tggggatgac gtcaaatacat catgcccctt
1200

atgaccaggg ctacacacgt gctacaatgg cgtaaacaaa gggaggcgaa cccgcgaggg
1260

tgggcaaatac ccaaaaataa cgtctcagtt cggattgtag tctgcaactc gactacatga
1320

agctggaatac gctagtaatac gcgaatcaga atgtcgcggg gaatacgttc ccgggtcttg
1380

tacacaccgc ccgtcacacc atggggagtca gtaacgcccg aagccgggtga cccaaccggt
1440

aagggaggga gccgtcgaag gtgggaccga taactggggg gaagtcgtaa caaggtagcc
1500

g t a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1532

<210> 363

<211> 1529

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000185525|GBMCNOMD_03113 16S ribosomal RNA

<400> 363

atgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

aacgaaacac 120	cttatttgat	tttcttcgga	actgaagatt	tggtgattga	gtggcggacg
ggtgagtaac 180	gcgtgggtaa	cctgccctgt	acagggggat	aacagtcaga	aatgactgct
aataccgcat 240	aagaccacag	caccgcatgg	tgcaggggta	aaaactccgg	tggtacagga
tggacccgcg 300	tctgattagc	tggttggtga	ggtaacggct	caccaaggcg	acgatcagta
gccggcttga 360	gagagtgaac	ggccacattg	ggactgagac	acggcccaaa	ctcctacggg
aggcagcagt 420	ggggaatatt	gcacaatggg	ggaaaccctg	atgcagcgac	gccgcgtgag
tgaagaagta 480	tctcggtatg	taaagctcta	tcagcaggga	agaaaatgac	ggtacctgac
taagaagccc 540	cggctaacta	cgtgccagca	gccgcggtaa	tacgtagggg	gcaagcgtta
tccggaatta 600	ctgggtgtaa	agggtgcgta	ggtggtatgg	caagtcagaa	gtgaaaaccc
agggcttaac 660	tctgggactg	cttttgaaac	tgtcagactg	gagtgcagga	gaggtaagcg
gaattcctag 720	tgtagcgggtg	aaatgcgtag	atattaggag	gaacatcagt	ggcgaaggcg
gcttactgga 780	ctgaaactga	cactgaggca	cgaaagcgtg	gggagcaaac	aggattagat
accctggtag 840	tccacgccgt	aaacgatgaa	tactaggtgt	cggggccgta	gaggcttcgg
tgccgcagcc 900	aacgcagtaa	gtattccacc	tggggagtac	gttcgcaaga	atgaaactca
aaggaattga 960	cggggacccg	cacaagcggt	ggagcatgtg	gtttaattcg	aagcaacgcg

aagaacctta cctgggtcttg acatccttct gaccggctct taaccggacc tttccttcgg
1020

gacaggagag acaggtggtg catggttgct gtcagctcgt gtcgtgagat gttgggttaa
1080

gtcccgcaac gagcgcaacc cctatcttta gtagccagca tataagggtgg gcactctaga
1140

gagactgcca gggataacct ggaggaaggt ggggacgacg tcaaatacatc atgcccctta
1200

tgaccagggc tacacacgtg ctacaatggc gtaaacagag ggaagcagcc tcgtgagagt
1260

gagcaaatacc caaaaataac gtctcagttc ggattgtagt ctgcaactcg actacatgaa
1320

gctggaatcg ctagtaatcg cgaatcagaa tgtcgcggtg aatacgttcc cgggtcttgt
1380

acacaccgcc cgtcacacca tgggagtcag taacgcccga agtcagtgac ccaaccgtaa
1440

ggagggagct gccgaaggcg ggaccgataa ctgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1529

<210> 364

<211> 1530

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000242155|PDMPOPFD_05796 16S ribosomal RNA

<400> 364

tattgagagt ttgatcctgg ctcaggatga acgctggcgg cgtgcttaac acatgcaagt
60

cgaacgggggt gctcatgacg gaggattcgt ccaacggatt gagttaccta gtggcggacg
120

ggtgagtaac gcgtgaggaa cctgccttgg agaggggaat aacactccga aaggagtgct
180

aataccgcat gatgcagttg ggtcgcattg ctctgactgc caaagattta tcgctctgag
240

atggcctcgc gtctgattag ctagtaggcg gggtaacggc ccacctaggc gacgatcagt
300

agccggactg agaggttgac cggccacatt gggactgaga cacggcccag actcctacgg
360

gaggcagcag tggggaatat tgggcaatgg gcgcaagcct gaccagcaa cgccgcgtga
420

aggaagaagg ctttcggggt gtaaacttct tttgtcgggg acgaaacaaa tgacggtacc
480

cgacgaataa gccacggcta actacgtgcc agcagccgcg gtaatacgta ggtggcaagc
540

gttatccgga tttactgggt gtaaagggcg ttagggcggg attgcaagtc agatgtgaaa
600

actgggggct caacctccag cctgcatttg aaactgtagt tcttgagtgc tggagaggca
660

atcggaattc cgtgtgtagc ggtgaaatgc gtagatatac ggaggaacac cagtggcgaa
720

ggcggattgc tggacagtaa ctgacgctga ggcgcgaaag cgtggggagc aaacaggatt
780

agataccctg gtagtccacg ccgtaaacga tggatactag gtgtgggggg tctgaccccc
840

tccgtgccgc agttaacaca ataagtatcc cacctgggga gtacgatcgc aaggttgaaa
900

ctcaaaggaa ttgacggggg cccgcacaag cgggtggagta tgtgggttaa ttcgaagcaa
960

cgcgaagaac cttaccaggg cttgacatcc cactaacgaa gcagagatgc attaggtgcc
1020

cttcggggaa agtggagaca ggtggtgcat ggttgtcgtc agctcgtgtc gtgagatggt
1080

gggttaagtc ccgcaacgag cgcaaccctt attgttagtt gctacgcaag agcactctag
1140

cgagactgcc gttgacaaaa cggaggaagg tggggacgac gtcaaatcat catgcccctt
1200

atgtcctggg ccacacacgt actacaatgg tggttaacag agggaggcaa taccgcgagg
1260

tggagcaaat ccctaaaagc catcccagtt cggattgcag gctgaaaccc gcctgtatga
1320

agttggaatc gctagtaatc gcggatcagc atgccgcggt gaatacgttc ccgggccttg
1380

tacacaccgc ccgtcacacc atgagagtcg ggaacacccg aagtccgtag cctaaccgca
1440

aggagggcgc ggccgaaggt gggttcgata attgggggtga agtcgtaaca aggtagccgt
1500

a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1530

<210> 365

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000185545|PCENBMEB_02615 16S ribosomal RNA

<400> 365

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcctaaca catgcaagtc
60

gagcgaagca ctttgcttag attcttcgga tgaagaggat tgtgactgag cggcggacgg
120

gtgagtaacg cgtgggtaac ctgcctcata caggggggata acagttagaa atgactgcta
180

ataccgcata 240	agaccacagc	accgcatggt	gcgggggtaa	aaactccggt	ggtatgagat
ggacccgcgt 300	ctgattagct	agttggtaag	gtaacggctt	accaaggcga	cgatcagtag
ccgacctgag 360	agggtgaccg	gccacattgg	gactgagaca	cggcccaaac	tcctacggga
ggcagcagtg 420	gggaatattg	cacaatgggg	gaaaccctga	tgcagcgacg	ccgcgtgagc
gaagaagtat 480	ttcggtatgt	aaagctctat	cagcagggaa	gaaaatgacg	gtacctgact
aagaagcacc 540	ggctaaatac	gtgccagcag	ccgcggtaat	acgtatggtg	caagcgttat
ccggattttac 600	tgggtgtaaa	gggagcgtag	acggatgggc	aagtctgatg	tgaaaacccg
gggctcaacc 660	ccgggactgc	attggaaact	gttcatctag	agtgctggag	aggtaagtgg
aattcctagt 720	gtagcgggtga	aatgcgtaga	tattaggagg	aacaccagtg	gcgaaggcgg
cttactggac 780	agtaactgac	gttgaggctc	gaaagcgtgg	ggagcaaaca	ggattagata
ccctggtagt 840	ccacgccgta	aacgatgact	actaggtgtc	gggtggcaaa	gccattcgggt
gccgcagcaa 900	acgcaataag	tagtccacct	ggggagtacg	ttcgcaagaa	tgaaactcaa
aggaattgac 960	ggggacccgc	acaagcgggtg	gagcatgtgg	tttaattcga	agcaacgcga
agaaccttac 1020	ctgctcttga	catcccgtg	accggacgggt	aatgcgtcct	tcccttcggg
gcagcggaga 1080	caggtgggtgc	atggttgctg	tcagctcgtg	tcgtgagatg	ttgggttaag

tcccgcaacg agcgcaaccc ctatcttttag tagccagcgg ccaggccggg cactctagag
1140

agactgccgg ggataacccg gaggaagggtg gggatgacgt caaatcatca tgccccttat
1200

gagcaggggt acacacgtgc tacaatggcg taaacaaagg gaagcgagac cgcgagggtg
1260

agcaaattccc aaaaataacg tctcagttcg gattgtagtc tgcaactcga ctacatgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcggtga atacgttccc gggctcttgta
1380

cacaccgccc gtcacaccat gggagtcagt aacgcccga gtcagtgacc caaccgtaag
1440

gagggagctg ccgaaggcgg gaccgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 366

<211> 1226

<212> DNA

<213> artificial sequence

<220>

<223> SPC10981|AOEMJKFB_04012 16S ribosomal RNA (partial)

<400> 366

ctgagagggt gaccggccac attgggactg agacacggcc caaactccta cgggaggcag
60

cagtggggaa tattgcacaa tgggggaaac cctgatgcag cgacgccgcg tgaaggaaga
120

agtatttcgg tatgtaaact tctatcagca gggaagaaaa tgacgggtacc tgactaagaa
180

gccccggcta attacgtgcc agcagccgcg gtaatacgta aggggcaagc gttatccgga
240

tttactgggt gtaaagggag cgtagacggc agtgcaagtc tgatgtgaaa gcccggggct
300

caaccccggg actgcattgg aaactgtgca gctagagtgt cggagaggta agtggaattc
360

ctagtgtagc ggtgaaatgc gtagatatta ggaggaacac cagtggcgaa ggcggcttac
420

tggacgataa ctgacgttga ggctcgaaag cgtggggagc aaacaggatt agataccctg
480

gtagtccacg ccgtaaacga tgaatactag gtgtcgggcg ccaaaggcgt tcggtgccgc
540

agcaaacgca ataagtattc cacctgggga gtacgttcgc aagaatgaaa ctcaaaggaa
600

ttgacgggga cccgcacaag cgggtggagca tgtggtttta ttcgaagcaa cgcaagaac
660

cttaccaagt cttgacatct gcctgaccgg tccgtaacag gacccttcct tcgggacagg
720

caagacaggt ggtgcatggg tgtcgtcagc tcgtgtcgtg agatgttggg ttaagtcccg
780

caacgagcgc aacccttatc cttagtagcc agcaggtaga gctgggcact ctagggagac
840

tgccagggac aacctggagg aaggtgggga tgacgtcaaa tcatcatgcc ccttatgatt
900

tgggctacac acgtgctaca atggcgtaaa caaagggagg cgaaggggtg acctggagca
960

aatcccaaaa ataacgtctc agttcggatt gtagtctgca actcgactac atgaagctgg
1020

aatcgctagt aatcgcgaaat cagaatgtcg cgggtgaatac gttcccgggt cttgtacaca
1080

ccgcccgtca caccatggga gtcggatatg cccgaagccg gtgaccgaac ccgaaagggga
1140

aggagccgtc gaaggtggag ccgataactg ggggtgaagtc gtaacaaggt agccgtatcg
1200

g a a g g t g c g g c t g g a t c a c c t c c t t t
1226

<210> 367

<211> 1529

<212> DNA

<213> artificial sequence

<220>

<223> SPC10744|OPBLIJHF_02044 16S ribosomal RNA

<400> 367

tatagagagt ttgatacctgg ctcaggacga acgctggcgg cgtgcttaac acatgcaagt
60

cgaacggagc acccttgact gaggtttcgg ccaaatagata ggaatgctta gtggcggact
120

ggtgagtaac gcgtgaggaa cctaccttcc agagggggac aacagttgga aacgactgct
180

aataccgcat gacgcatgac cggggcatcc cgggcatgtc aaagatttta tcgctggaag
240

atggcctcgc gtctgattag ctagatgggtg gggtaacggc ccaccatggc gacgatcagt
300

agccggactg agaggttgac cggccacatt gggactgaga tacggcccag actcctacgg
360

gaggcagcag tggggaatat tgggcaatgg acgcaagtct gaccagcaa cgccgcgtga
420

aggaagaagg ctttcggggtt gttaaacttct tttgtcaggg aagagtagaa gacggtacct
480

gacgaataag ccacggctaa ctacgtgcca gcagccgcgg taatacgtag gtggcaagcg
540

ttgtccggat ttactgggtg taaagggcgt gcagccgggc cggcaagtca gatgtgaaat
600

ctggaggctt 660	aacctccaaa	ctgcatttga	aactgtaggt	cttgagtacc	ggagaggtta
tcggaattcc 720	ttgtgtagcg	gtgaaatgcg	tagatataag	gaagaacacc	agtggcgaag
gcgataact 780	ggacggcaac	tgacggtgag	gcgcgaaagc	gtggggagca	aacaggatta
gataccctgg 840	tagtccacgc	tgtaaacgat	ggataactagg	tgtgcgggga	ctgaccccct
gcgtgccgca 900	gttaacacaa	taagtatccc	acctggggag	tacgatcgca	aggttgaaac
tcaaaggaat 960	tgacgggggc	ccgcacaagc	ggtggattat	gtggtttaat	tcgaagcaac
gcgaagaacc 1020	ttaccagggc	ttgacatcct	actaacgaag	tagagataca	tcaggtgccc
ttcggggaaa 1080	gtagagacag	gtggtgcatg	gttgtcgtca	gctcgtgtcg	tgagatgttg
ggttaagtcc 1140	cgcaacgagc	gcaacccta	ttgttagttg	ctacgcaaga	gcactctagc
gagactgccg 1200	ttgacaaaac	ggaggaaggt	ggggacgacg	tcaaatacatc	atgcccctta
tgtcctgggc 1260	tacacacgta	atacaatggc	ggtcaacaga	gggaggcaaa	gccgcgaggc
agagcaaacc 1320	cccaaaagcc	gtcccagttc	ggatcgcagg	ctgcaaccgc	cctgcgtgaa
gtcggaatcg 1380	ctagtaatcg	cggatcagca	tgccgcggtg	aatacgttcc	cgggccttgt
acacaccgcc 1440	cgtcacacca	tgagagtcgg	gaacaccgga	agtccgtagc	ctaaccgcaa
ggagggcgcg 1500	gccgaaggtg	ggttcgataa	ttggggtgaa	gtcgtaacaa	ggtagccgta

t c g g a a g g t g
1529

c g g c t g g a t c

a c c t c c t t t

<210> 368

<211> 1530

<212> DNA

<213> artificial sequence

<220>

<223> SPC10529|CHIMCABN_03373 16S ribosomal RNA

<400> 368

atgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

aacgaagcac tctatttgat tttcttcgga aatgaagatt ttgtgactga gtggcggacg
120

ggtgagtaac gcgtgggtaa cctgcctcat acagggggat aacagttgga aacgactgct
180

aataccgcat aagcgcacag gattgcatga tccggtgtga aaaactccgg tggatatggga
240

tggacccgcg tctgattagc cagttggcag ggtaacggcc taccaaagcg acgatcagta
300

gccgacctga gagggtgacc ggccacattg ggactgagac acggcccaaa ctcctacggg
360

aggcagcagt ggggaatatt gcacaatggg ggaaaccctg atgcagcgac gccgcgtgag
420

cgaagaagta tttcgggtatg taaagctcta tcagcaggaa agaaaaatga cggtacctga
480

ctaagaagca ccggctaaat acgtgccagc agccgcggta atacgtatgg tgcaagcggt
540

atccggattt actgggtgta aaggagcgc aggcggtgcg gcaagtctga tgtgaaagcc
600

cggggctcaa ccccgggtact gcattggaaa ctgtcgtact agagtgtcgg aggggtaagt
660

ggaattccta gtgtagcggc gaaatgcgta gatattagga ggaacaccag tggcgaaggc
720

ggcttactgg acgataactg acgctgaggc tcgaaagcgt ggggagcaaa caggattaga
780

taccctggta gtccacgccg taaacgatga atactaggtg tcggggagca ttgctcttcg
840

gtgccgcagc aaacgcaata agtattccac ctgggggagta cgttcgcaag aatgaaactc
900

aaaggaattg acggggaccc gcacaagcgg tggagcatgt ggtttaattc gaagcaacgc
960

gaagaacctt accaagtctt gacatcccga tgacagagta tgtaatgtac tttctcttcg
1020

gagcatcggt gacaggtggt gcatggttgt cgtcagctcg tgtcgtgaga tgttggggtta
1080

agtcccgcaa cgagcgcaac ccctgttctt agtagccagc ggttcggccg ggcactctag
1140

ggagactgcc agggataacc tggaggaagg cggggatgac gtcaaatcat catgcccctt
1200

atgacttggg ctacacacgt gctacaatgg cgtaaacaaa gggaagcgga gccgtgaggc
1260

cgagcaaattc tcaaaaataa cgtctcagtt cggactgtag tctgcaaccc gactacacga
1320

agctggaatc gctagtaatc gcagatcaga atgctgcggt gaatacgttc ccgggtcttg
1380

tacacaccgc ccgtcacacc atgggagttg gaaatgcccg aagtcagtga cccaaccgca
1440

aggaggggagc tgccgaaggc aggttcgata actgggggtga agtcgtaaca aggtagccgt
1500

a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1530

<210> 369
<211> 1528
<212> DNA
<213> artificial sequence

<220>
<223> GCF_000225345|MLGHKGPC_00026 16S ribosomal RNA

<400> 369
atgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

aacgaagcac tttaattgat ttcttcggaa tgaagttttt gtgactgagt ggcggacggg
120

tgagtaacgc gtgggtaacc tgcctcatac aggggggataa cagttggaaa cgactgctaa
180

taccgcataa gcgcacagga ttgcatgatc cagtgtgaaa aactccggtg gtatgagatg
240

gacccgcgtc tgattagcca gttggcgggg taacggccca ccaaagcgac gatcagtagc
300

cgacctgaga gggtgaccgg ccacattggg actgagacac ggcccaaact cctacgggag
360

gcagcagtgg ggaatattgc acaatggggg aaaccctgat gcagcgacgc cgcgtagcgc
420

aagaagtatt tcggtatgta aagctctatc agcagggaag aagaatgacg gtacctgact
480

aagaagcacc ggctaaatac gtgccagcag ccgcggtaat acgtatgggtg caagcgttat
540

ccggattttac tgggtgtaaa gggagcgcag gcggtacggc aagtctgatg tgaaatcccg
600

gggctcaacc ccggtactgc attggaaact gtcggactag agtgtcggag gggtaagtgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac gattactgac gctgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat actaggtgtc ggggagcatt gctcttcggt
840

gccgcagcaa acgcaataag tattccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac caagtcttga catcccactg acaaagtatg taatgtactt tctcttcgga
1020

gcagtgggtga caggtgggtgc atggttgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ctattcttag tagccagcgg ttcggccggg cactctaggg
1140

agactgccag ggataacctg gaggaagggtg gggatgacgt caaatcatca tgccccttat
1200

gacttgggct acacacgtgc tacaatggcg taaacaaagg gaagcaatcc cgcgaggggg
1260

agcaaattctc aaaaataacg tctcagttcg gactgtagtc tgcaactcga ctacacgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcgggtga atacgttccc gggctcttgta
1380

cacaccgccc gtcacaccat gggagttggt aatgcccga gtcagtgacc caaccgcaag
1440

gagggagctg ccgaaggcag gactgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 370

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000225345|MLGHKGPC_00569 16S ribosomal RNA

<400> 370

atgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

aacgaagcac ttttaattgat ttcttcggaa tgaagttttt gtgactgagt ggcggacggg
120

tgagtaacgc gtgggtaacc tgcctcatac agggggataa cagttggaaa cgactgctaa
180

taccgcataa gcgcacagga ttgcatgata cagtgtgaaa aactccggtg gtatgagatg
240

gacccgcgtc tgattagcca gttggcgggg taacggccca ccaaagcgac gatcagtagc
300

cgacctgaga gggtgaccgg ccacattggg actgagacac ggcccaaact cctacgggag
360

gcagcagtgg ggaatattgc acaatggggg aaaccctgat gcagcgacgc cgcgtagcgc
420

aagaagtatt tcggtatgta aagctctatc agcaggggaag aagaatgacg gtacctgact
480

aagaagcacc ggctaaatac gtgccagcag ccgcggtaat acgtatgggtg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgcag gcggtacggc aagtctgatg tgaaatcccg
600

gggctcaacc ccggtactgc attggaaact gtcggactag agtgtcggag gggtaagtgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac gattactgac gctgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat actaggtgtc ggggagcatt gctcttcggt
840

gccgcagcaa acgcaataag tattccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac caagtcttga catcccactg acagagtatg taatgtactt tctcttcgga
1020

gcagtgggtga caggtgggtgc atggttgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ctattcttag tagccagcgg ttcggccggg cactctaggg
1140

agactgccag ggataacctg gaggaagggtg gggatgacgt caaatcatca tgccccttat
1200

gacttgggct acacacgtgc tacaatggcg taaacaaagg gaagcaatcc cgcgaggggg
1260

agcaaattctc aaaaataacg tctcagttcg gactgtagtc tgcaactcga ctacacgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcgggtga atacgttccc ggggtcttgta
1380

cacaccgccc gtcacaccat gggagttgggt aatgcccga gtcagtgacc caaccgcaag
1440

gagggagctg ccgaaggcag gactgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 371

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000225345|MLGHKGPC_00947 16S ribosomal RNA

<400> 371

atgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

aacgaagcac ttttaattgat ttcttcggaa tgaagttttt gtgactgagt ggcggaacggg
120

tgagtaacgc gtgggtaacc tgcctcatac aggggggataa cagttggaaa cgactgctaa
180

taccgcataa gcgcacagga ttgcatgac cagtgtgaaa aactccggtg gtatgagatg
240

gacccgcgtc tgattagcca gttggcgggg taacggccca ccaaagcgac gatcagtagc
300

cgacctgaga gggtgaccgg ccacattggg actgagacac ggcccaaact cctacgggag
360

gcagcagtgg ggaatattgc acaatggggg aaaccctgat gcagcgacgc cgcgtagcgc
420

aagaagtatt tcggtatgta aagctctatc agcagggaag aagaatgacg gtacctgact
480

aagaagcacc ggctaaatac gtgccagcag ccgcggtaat acgtatgggtg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgcag gcggtacggc aagtctgatg tgaaatcccg
600

gggctcaacc ccggtactgc attggaaact gtcggactag agtgtcggag gggtaagtgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac gattactgac gctgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat actaggtgtc ggggagcatt gctcttcggt
840

gccgcagcaa acgcaataag tattccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac caagtcttga catcccactg acagagtatg taatgtactt tctcttcgga
1020

gcagtgggtga caggtgggtgc atggttgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcacacg agcgcaaccc ctattcttag tagccagcgg ttcggccggg cactctaggg
1140

agactgccag ggataacctg gaggaagggtg gggatgacgt caaatcatca tgccccttat
1200

gacttgggct acacacgtgc tacaatggcg taaacaaagg gaagcaatcc cgcgaggggg
1260

agcaaattctc aaaaataacg tctcagttcg gactgtagtc tgcaactcga ctacacgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcgggtga atacgttccc ggggtcttgta
1380

cacaccgccc gtcacaccat gggagttgggt aatgcccga gtcagtgacc caaccgcaag
1440

gagggagctg ccgaaggcag gactgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 372

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000225345|MLGHKGPC_02811 16S ribosomal RNA

<400> 372

atgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

aacgaagcac ttttaattgat ttcttcggaa tgaagttttt gtgactgagt ggcggacggg
120

tgagtaacgc gtgggtaacc tgcctcatac aggggggataa cagttggaaa cgactgctaa
180

taccgcataa gcgcacagga ttgcatgac cgggtgtgaaa aactccggtg gtatgagatg
240

gacccgcgtc tgattagcca gttggcgggg taacggccca ccaaagcgac gatcagtagc
300

cgacctgaga gggtgaccgg ccacattggg actgagacac ggcccaaact cctacgggag
360

gcagcagtgg ggaatattgc acaatggggg aaaccctgat gcagcgacgc cgcgtgagcg
420

aagaagtatt tcggtatgta aagctctatc agcagggaag aagaatgacg gtacctgact
480

aagaagcacc ggctaaatac gtgccagcag ccgcggtaat acgtatggtg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgcag gcggtacggc aagtctgatg tgaaatcccg
600

gggctcaacc ccggtactgc attggaaact gtcggactag agtgtcggag gggtaagtgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac gattactgac gctgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat actaggtgtc ggggagcatt gctcttcggt
840

gccgcagcaa acgcaataag tattccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac caagtcttga catcccactg acagagtatg taatgtactt tctcttcgga
1020

gcagtgggtga caggtgggtgc atggttgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ctattcttag tagccagcgg ttcggccggg cactctaggg
1140

agactgccag ggataacctg gaggaagggtg gggatgacgt caaatcatca tgccccttat
1200

gacttgggct acacacgtgc tacaatggcg taaacaaagg gaagcaatcc cgcgaggggg
1260

agcaaattctc aaaaataacg tctcagttcg gactgtagtc tgcaactcga ctacacgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcgggtga atacgttccc gggctcttgta
1380

cacaccgccc gtcacaccat gggagttgggt aatgcccga gtcagtgacc caaccgcaag
1440

gagggagctg ccgaaggcag gactgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 373

<211> 1076

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000156535|GNJEIKKG_01739 16S ribosomal RNA (partial)

<400> 373

atgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

aacgaagcac tttatttgat ttcttcggaa tgaagatttt gtgactgagt ggcggacggg
120

tgagtaacgc gtgggtaacc tgcctcatac aggggggataa cagttggaaa cgactgctaa
180

taccgcataa gcgcacaggg tcgcatgacc tgggtgtgaaa aactccggtg gtatgagatg
240

gacccgcgtc tgattagcca gttgggtgggg taacggccta ccaaagcgac gatcagtagc
300

cgacctgaga gggtgaccgg ccacattggg actgagacac ggcccaaact cctacgggag
360

gcagcagtgg ggaatattgc acaatggggg aaaccctgat gcagcgacgc cgcgtagcgc
420

aagaagtatt tcggtatgta aagctctatc agcaggggaag aagaaatgac ggtacctgac
480

taagaagcac cggctaaata cgtgccagca gccgcggtaa tacgtatggg gcaagcgтта
540

tccggatttta ctgggtgtaa agggagcgca ggcggtacgg caagtctgat gtgaaagccc
600

ggggctcaac cccggtactg cattggaaac tgtcggacta gagtgtcgga ggggtaagtg
660

gaattcctag tgtagcgggtg aaatgcgtag atattaggag gaacaccagt ggcgaaggcg
720

gcttactgga cgattactga cgctgaggct cgaaagcgtg gggagcaaac aggattagat
780

accctggtag tccacgccgt aaacgatgaa tactaggtgt cggggagtat tgctcttcgg
840

tgccgcagca aacgcaataa gtattccacc tggggagtag gttcgcaaga atgaaactca
900

aaggaattga cggggacccg cacaagcggg ggagcatgtg gtttaattcg aagcaacgcg
960

aagaacctta ccaagtcttg acatcccggg gacagaacat gtaatgtgtt ttctcttcgg
1020

agcatcgggtg acagggtgggtg catggttgtc gtcagctcgt gtcgtgagat gttggg
1076

<210> 374

<211> 1521

<212> DNA

<213> artificial sequence

<220>

<223> SPC10814|contig000120_22_1542

<400> 374

agagtttgat cctgggtcag gatgaacgct ggcggcgtgc ttaacacatg caagtcgaac
60

gaagcacttt gatcgatttc ttcggattga aatttttagtg actgagtggc ggacgggtga
120

gtaacgcgtg ggtaacctgc ctcacacagg gggataacag ttggaaacgg ctgctaatac
180

cgcataagcg cacagtaccg catggtacag tgtgaaaaac tccggtgggtg tgagatggac
240

ccgcgtctga ttagctagtt ggcagggcaa cggcctacca aggcgacgat cagtagccga
300

cctgagaggg tgaccggcca cattgggact gagacacggc ccaaactcct acgggaggga
360

gcagtgggga atattgcaca atgggggaaa ccctgatgca gcgacgccgc gtgagcgaag
420

aagtatttcg gtatgtaaag ctctatcagc agggaagaag aaatgacggg acctgactaa
480

gaagcaccgg ctaaatacgt gccagcagcc gcggtaatac gtatggtgca agcgttatcc
540

ggatttactg ggtgtaaagg gagcgcaggc ggaaggctaa gtctgatgtg aaagcccggg
600

gctcaacccc ggtactgcat tggaaactgg tcatctagag tgtcggaggg gtaagtggaa
660

ttcctagtgt agcgggtgaaa tgcgtagata ttaggaggaa caccagtggc gaaggcggct
720

tactggacga taactgacgc tgaggctcga aagcgtgggg agcaaacagg attagatacc
780

ctggtagtcc acgccgtaaa cgatgaatac taggtgtcgg gaagcacagc ttttcgggtgc
840

cgccgcaaac gcattaagta ttccacctgg ggagtacgtt cgcaagaatg aaactcaaag
900

gaattgacgg ggacccgcac aagcggtgga gcatgtggtt taattcgaag caacgcgaag
960

aaccttacca agtcttgaca tccttctgac cggacagtaa tgtgtccttt ccttcgggac
1020

agaagtgaca ggtggtgcat ggttgtcgtc agctcgtgtc gtgagatgtt gggttaagtc
1080

ccgcaacgag cgcaaccctt atccccagta gccagcggtt cggccggggca ctctgaggag
1140

actgccaggg ataacctgga ggaagggtggg gatgacgtca aatcatcatg ccccttatga
1200

cttgggctac acacgtgcta caatggcgta aacaaaggga agcaagaccg tgagggtggag
1260

caaatcccaa aaataacgtc tcagttcgga ctgtagtctg caacccgact acacgaagct
1320

ggaatcgcta gtaatcgcac atcagaatgc tgcgggtgaat acgttcccgg gtcttgtaca
1380

caccgcccgt cacaccatgg gagttggaaa tgcccgaagt cagtgacca accgcaagga
1440

gggagctgcc gaaggcaggt tcgataactg ggggtgaagtc gtaacaaggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t
1521

<210> 375

<211> 1531

<212> DNA

<213> artificial sequence

<220>

<223> GCA_900066395|DFLPCHGC_01805 16S ribosomal RNA

<400> 375

atgagagttt gatcctggct caggatgaac gctggcggcg tgcttaacac atgcaagtcg
60

aacgaagcac tttattacga tttcttcgga atgacgattt agtgactgag tggcggacgg
120

gtgagtaacg cgtgggtaac ctgccttata caggggggata acagttagaa atgactgcta
180

ataccgcata agcgcacagg attgcatgat ctggtgtgaa aaactccggt ggtataagat
240

ggacccgcgt ctgattagct ggttggtgag gtaacggccc accaaggcga cgatcagtag
300

ccgacctgag agggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg ggggaatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtgagc
420

gaagaagtat ttcggtatgt aaagctctat cagcagggaa gaaaaaaatg acggtacctg
480

actaagaagc cccggctaac tacgtgccag cagccgcggt aatacgtagg gggcaagcgt
540

tatccggatt tactgggtgt aaagggagcg caggcgggtgc ggcaagtctg atgtgaaagc
600

ccggggctca accccgggac tgcattggaa actgtcgtac ttgagtatcg gagaggtaag
660

tggaattcct agtgtagcgg tgaaatgcgt agatattagg aggaacacca gtggcgaagg
720

cggcttactg gacgataact gacgctgagg ctcgaaagcg tggggagcaa acaggattag
780

ataccctggt agtccacgcc gtaaacgatg aatactaggt gtcggggggac atagtccttc
840

ggtgccgcag caaacgcaat aagtattcca cctgggggagt acgttcgcaa gaatgaaact
900

caaaggaatt gacgggggacc cgcacaagcg gtggagcatg tggtttaatt cgaagcaacg
960

cgaagaacct taccaagtct tgacatcccg gtgacaaagt atgtaatgta ctctttcttc
1020

ggaacaccgg tgacaggtgg tgcattggtg tcgtcagctc gtgtcgtgag atgttgggtt
1080

aagtcccgca acgagcgcaa cccctgttct tagtagccag cggttcggcc gggcactcta
1140

gggagactgc cagggataac ctggaggaag gcgggggatga cgtcaaataca tcatgcccct
1200

tatgacttgg gctacacacg tgctacaatg gcgtaaacia agggaagcga aaagggtgact
1260

tctagcaaata cccaaaaata acgtcccagt tcggactgta gtctgcaact cgactacacg
1320

aagctggaat cgctagtaat cgcgaatcag aatgtcgcgg tgaatacgtt cccgggtctt
1380

gtacacaccg cccgtcacac catgggagtc gggaatgcc gaagccggtg actcaaccga
1440

aaggagagag ccgtcgaagg caggtctgat aactgggggtg aagtcgtaac aaggtagccg
1500

t a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1531

<210> 376
<211> 1529
<212> DNA
<213> artificial sequence

<220>
<223> GCF_000177015|JIDMOKDH_02648 16S ribosomal RNA

<400> 376
tattgagagt ttgatacctgg ctcaggatga acgctggcgg cgtgcttaac acatgcaagt
60

cgaacggagt gcctttgaaa gaggattcgt ccaattgata aggttactta gtggcggacg
120

ggtgagtaac gcgtgaggaa cctgccttgg agtggggaat aacacagtga aaattgtgct
180

aataccgcat aatgcagttg ggccgcatgg ctctgactgc caaagattta tcgctctgag
240

atggcctcgc gtctgattag ctagttggtg gggtaacggc ccaccaaggc gacgatcagt
300

agccggactg agaggttggc cggccacatt gggactgaga cacggcccag actcctacgg
360

gaggcagcag tggggaatat tgggcaatgg gcgcaagcct gaccagcaa cgccgcgtga
420

aggaagaagg ctttcggggt gttaaacttct tttcttaggg acgaagcaag tgacgggtacc
480

taaggaataa gccacggcta actacgtgcc agcagccgcg gtaatacgta ggtggcaagc
540

gttatccgga tttactgggt gttaaaggcg tgtaggcggg attgcaagtc agatgtgaaa
600

accacgggct caacctgtgg cctgcatttg aaactgtagt tcttgagtac tggagaggca
660

gacggaattc ctagtgtagc ggtgaaatgc gtagatatta ggaggaacac cagtggcgaa
720

ggcgggtctgc tggacagcaa ctgacgctga ggcgcgaaag cgtgggggagc aaacaggatt
780

agataccctg gtagtccacg ctgtaaacga tggatactag gtgtggggggg tctgaccct
840

tccgtgccgc agttaacaca ataagtatcc cacctgggga gtacgatcgc aaggttgaaa
900

ctcaaaggaa ttgacggggg cccgcacaag cgggtggagta tgtgggtttaa ttcgaagcaa
960

cgcgaagaac cttaccaggg cttgacatcc cgaggcccgg tctagagata gacctttctc
1020

ttcggagacc tcggtgacag gtggtgcatg gttgtcgtca gctcgtgtcg tgagatgttg
1080

ggttaagtcc cgcaacgagc gcaacccta ttgttagttg ctacgcaaga gcactctagc
1140

gagactgccg ttgacaaaac ggaggaaggt ggggacgacg tcaaatacgc atgcccctta
1200

tgtcctgggc cacacacgta ctacaatggt ggtaaacaga gggaggcaat accgcgaggt
1260

ggagcaaacc cctaaaagcc atcccagttc ggattgcagg ctgcaaccgc cctgcatgaa
1320

gttggaatcg ctagtaatcg cggatcagca tgccgcggtg aatacgttcc cgggccttgt
1380

acacaccgcc cgtcacacca tgagagtcgg gaacaccga agtccgtagc ctaaccgcaa
1440

ggggggcgcg gccgaagggt gggttcgataa ttgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1529

<210> 377

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> SPC10470|FPCDEKLF_00420 16S ribosomal RNA

<400> 377

ttagagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcctaaca catgcaagtc
60

gaacggaact tctttaaagg atttcttcgg aatgaatttg attaagttaa gtggcggacg
120

ggtgagtaac gcgtgagtaa cctgcctcta agaggggaat aacattctga aaagaatgct
180

aataccgcat aatatatatt tatcgcatgg tagatatatc aaagatttat cgcttagaga
240

tggactcgcg tccgattagt tagttgggta ggtaacggct caccaagacc gcgatcggta
300

gccggactga gaggttgaac ggccacattg ggactgagac acggcccaga ctcttacggg
360

aggcagcagt gggggatatt gcgcaatggg ggaaaccctg acgcagcaac gccgcgtgaa
420

ggatgaaggt cttcggattg taaacttctt ttattaagga cgaagaaagt gacgggtactt
480

aatgaataag ctccggctaa ctacgtgcc a gcagccgcgg taatacgtag ggagcaagcg
540

ttgtccggat ttactgggtg taaaggggtgc gtaggcggct ttgcaagtca gatgtgaaat
600

ctatgggctc aacccatagc ctgcatttga aactgcagag cttgagttaa gtagaggcag
660

gcggaattcc ccgtgtagcg gtgaaatgcg tagagatggg gaggaacacc agtggcgaag
720

gcggcctgct gggctttaac tgacgctgag gcacgaaagc gtgggtagca aacaggatta
780

gataccctgg tagtccacgc tgtaaacgat gattactagg tgtgggggggt ctgaccctt
840

ccgtgccgga gttaacacaa taagtaatcc acctggggag tacggccgca aggttgaaac
900

tcaaaggaat tgacgggggc ccgcacaagc agtggagtat gtggtttaat tcgaagcaac
960

gcgaagaacc ttaccaggtc ttgacatcct actaacgaga tagagatatg ttaggtgccc
1020

ttcggggaaa gtagagacag gtggtgcatg gttgtcgtca gctcgtgtcg tgagatgttg
1080

ggttaagtcc cgcaacgagc gcaacccttg ctattagttg ctacgcaaga gcactcta
1140

aggactgccg ttgacaaaac ggaggaaggt ggggacgacg tcaaatacgc atgcccctta
1200

tgacctgggc tacacacgta ctacaatgga cattaacaga gggaagcaat acagtgatgt
1260

ggagcaaacc cctaaaaatg ttctcagttc agattgcagg ctgcaaccgc cctgtatgaa
1320

gatggaattg ctagtaatcg cagatcagca tgctgcggtg aatacgttcc cgggccttgt
1380

acacaccgcc cgtcacacca tgggagccgg taatacccga agtcagtagt ctaaccgcaa
1440

ggaggacgct gccgaaggta ggattggcga ctgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t c c t t
1528

<210> 378

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> SPC10470|FPCDEKLF_02210 16S ribosomal RNA

<400> 378

ttagagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcctaaca catgcaagtc
60

gaacggaact tctttaaagg atttcttcgg aatgaatttg attaagttta gtggcggacg
120

ggtgagtaac gcgtgagtaa cctgcctcta agtggggaat aacattctga aaagaatgct
180

aataccgcat aatatatatt tatcgcatgg tagatatatc aaagatttat cgcttagaga
240

tggactcgcg tccgattagt tagttggtga ggtaacggct caccaagacc gcgatcggta
300

gccggactga gaggttgaac ggccacattg ggactgagac acggcccaga ctctacggg
360

aggcagcagt gggggatatt gcgcaatggg gggaaccctg acgcagcaac gccgcgtgaa
420

ggatgaagggt cttcggattg taaacttctt ttattaagga cgaagaaagt gacggtactt
480

aatgaataag ctctggctaa ctacgtgcca gcagccgcgg taatacgtag ggagcaagcg
540

ttgtccggat ttactgggtg taaaggggtgc gtaggcggct ttgcaagtca gatgtgaaat
600

ctatgggctc aacccatagc ctgcatttga aactgcagag cttgagtga gtagaggcag
660

gcggaattcc ccgtgtagcg gtgaaatgcg tagagatggg gaggaacacc agtggcgaag
720

gcggcctgct gggctttaac tgacgctgag gcacgaaagc gtgggtagca aacaggatta
780

gataccctgg tagtccacgc tgtaaacgat gattactagg tgtgggggggt ctgaccctt
840

ccgtgccgga gttaacacaa taagtaatcc acctggggag tacggccgca aggttgaaac
900

tcaaaggaat tgacgggggc ccgcacaagc agtggagtat gtggttttaat tcgaagcaac
960

gcgaagaacc ttaccaggtc ttgacatcct actaacgaga tagagatatg ttaggtgccc
1020

ttcggggaaa gtagagacag gtggtgcatg gttgtcgtca gctcgtgtcg tgagatgttg
1080

ggttaagtcc cgcaacgagc gcaacccttg ctattagttg ctacgcaaga gcactctaata
1140

aggactgccg ttgacaaaac ggaggaaggt ggggacgacg tcaaatacgc atgcccctta
1200

tgacctgggc tacacacgta ctacaatgga tattaacaga gggaagcaat acagtgatgt
1260

ggagcaaacc cctaaaaatg ttctcagttc agattgcagg ctgcaaccgc cctgtatgaa
1320

gatggaattg ctagtaatcg cagatcagca tgctgcggtg aatacgttcc cgggccttgt
1380

acacaccgcc cgtcacacca tgggagccgg taataccgca agtcagtagt ctaaccgcaa
1440

ggaggacgct gccgaaggta ggattggcga ctgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t c c t t
1528

<210> 379

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> SPC10470|FPCDEKLF_02214 16S ribosomal RNA

<400> 379

ttagagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcctaaca catgcaagtc
60

gaacggaact tttttaaaag atttcttcgg aatgaatttg attaagttta gtggcggacg
120

ggtgagtaac gcgtgagtaa cctgcctcta agagggggaat aacattctga aaagaatgct
180

aataccgcat aatatatatt tatcgcatgg tagatatatc aaagatttat cgcttagaga
240

tggactcgcg tccgattagt tagttggtga ggtaacggct caccaagact gcgatcggta
300

gccggactga gaggttgaac ggccacattg ggactgagac acggcccaga ctctacggg
360

aggcagcagt gggggatatt gcgcaatggg ggaaaccctg acgcagcaac gccgcgtgaa
420

ggatgaaggt cttcggattg taaacttctt ttattaagga cgaagaaagt gacggtactt
480

aatgaataag ctccggctaa ctacgtgcca gcagccgcgg taatacgtag ggagcaagcg
540

ttgtccggat ttactgggtg taaaggggtgc gtaggcggct ttgcaagtca gatgtgaaat
600

ctatgggctc aacccatagc ctgcatttga aactgcagag cttgagtga gtagaggcag
660

gcggaattcc ccgtgtagcg gtgaaatgcg tagagatggg gaggaacacc agtggcgaag
720

gcggcctgct gggctttaac tgacgctgag gcacgaaagc gtgggtagca aacaggatta
780

gataccctgg tagtccacgc tgtaaacgat gattactagg tgtgggggggt ctgaccctt
840

ccgtgccgga gttaacacaa taagtaatcc acctggggag tacggccgca aggttgaaac
900

tcaaaggaat tgacgggggc ccgcacaagc agtggagtat gtggtttaat tcgaagcaac
960

gcgaagaacc ttaccaggtc ttgacatcct actaacgaga tagagatatg ttaggtgccc
1020

ttcggggaaa gtagagacag gtggtgcatg gttgtcgtca gctcgtgtcg tgagatgttg
1080

ggttaagtcc cgcaacgagc gcaacccttg ctattagttg ctacgcaaga gcactctaata
1140

aggactgccg ttgacaaaac ggaggaaggt ggggacgacg tcaaatacatc atgcccctta
1200

tgacctgggc tacacacgta ctacaatgga cataaacaga gggaagcaat acagtgatgt
1260

ggagcaaacc cctaaaaatg ttctcagttc agattgcagg ctgcaaccgc cctgtatgaa
1320

gatggaattg ctagtaatcg cagatcagca tgctgcggtg aatacgttcc cgggccttgt
1380

acacaccgcc cgtcacacca tgggagccgg taataaccga agtcagtagt ctaaccgcaa
1440

ggaggacgct gccgaaggta ggattggcga ctgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t c c t t
1528

<210> 380

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> SPC10470|FPCDEKLF_02436 16S ribosomal RNA

<400> 380

ttagagagtt tgatcctggc tcaggacgaa cgctggcggc gtgcctaaca catgcaagtc
60

gaacggaact tctttaaggg atttcttcgg aatgaatttg attaagttta gtggcggacg
120

ggtgagtaac gcgtgagtaa cctgcctctg agagggggaat aacattctga aaagaatgct
180

aataccgcat aacatatatt tatcgcatgg tagatatatc aaagatttat cgcttagaga
240

tggactcgcg tccgattagt tagttggtga ggtaacggct caccaagacc gcgatcggta
300

gccggactga gaggttgaac ggccacattg ggactgagac acggcccaga ctctacggg
360

aggcagcagt ggggggatatt gcgcaatggg ggaaaccctg acgcagcaac gccgcgtgaa
420

ggatgaaggt cttcggattg taaacttctt ttattaagga cgaagaaagt gacgggtactt
480

aatgaataag ctccggctaa ctacgtgccg gcagccgcgg taatacgtag ggagcaagcg
540

ttgtccggat ttactgggtg taaaggggtgc gtaggcggct ttgcaagtca gatgtgaaat
600

ctatgggctc aacccatagc ctgcatttga aactgcagag cttgagtga gtagaggcag
660

gcggaattcc ccgtgtagcg gtgaaatgcg tagagatggg gaggaacacc agtggcgaag
720

gcggcctgct gggctttaac tgacgctgag gcacgaaagc gtgggtagca aacaggatta
780

gataccctgg tagtccacgc tgtaaacgat gattactagg tgtgggggggt ctgaccctt
840

ccgtgccgga gttaacacaa taagtaatcc acctgggggag tacggccgca aggttgaaac
900

tcaaaggaat tgacgggggc ccgcacaagc agtggagtat gtggtttaat tcgaagcaac
960

gcgaagaacc ttaccaggtc ttgacatcct actaacgaga tagagatatg ttaggtgccc
1020

ttcggggaaa gtagagacag gtggtgcatg gttgtcgtca gctcgtgtcg tgagatgttg
1080

ggttaagtcc cgcaacgagc gcaacccttg ctattagttg ctacgcaaga gcactctaata
1140

aggactgccg ttgacaaaac ggaggaaggt ggggacgacg tcaaatacatc atgcccctta
1200

tgacctgggc tacacacgta ctacaatgga tattaacaga gggaagcaat acagtgatgt
1260

ggagcaaacc cctaaaaatg ttctcagttc agattgcagg ctgcaaccgc cctgtatgaa
1320

gatggaattg ctagtaatcg cagatcagca tgctgcggtg aatacgttcc cgggccttgt
1380

acacaccgcc cgtcacacca tgggagccgg taatacccgga agtcagtagt ctaaccgcaa
1440

ggaggacgct gccgaaggta ggattggcga ctgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t c c t t
1528

<210> 381

<211> 1530

<212> DNA

<213> artificial sequence

<220>

<223> GCA_900066615|JJEECKEO_00315 16S ribosomal RNA

<400> 381

tatgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gagcgaagca ctctgctttg attctttcgg gatgaagagc attgtgactg agcggcggac
120

gggtgagtaa cgcgtgggta acctgcctca tacaggggga taacagttag aaatggctgc
180

taataaccgca taagaccaca gcaccgcatg gtgcaggggt aaaaactccg gtggtatgag
240

atggacccgc gtctgattag ctagttggtg gggtaacggc ctaccaaggc gacgatcagt
300

agccgacctg agaggggtgac cggccacatt gggactgaga cacggcccaa actcctacgg
360

gaggcagcag tggggaatat tgcacaatgg gggaaaccct gatgcagcga cgccgcgtga
420

gcgaagaagt atttcggtat gtaaagctct atcagcaggg aagaaaatga cggtacctga
480

ctaagaagcc ccggctaact acgtgccagc agccgcggta atacgtaggg ggcaagcggt
540

atccggattt actgggtgta aagggagcgt agacggcgag gcaagtctga tgtgaaaacc
600

cggggctcaa ccccggtgact gcattggaaa ctgttttgct tgagtgccgg agaggtaagc
660

ggaattccta gtgtagcgggt gaaatgcgta gatattagga ggaacaccag tggcgaaggc
720

ggcttactgg acggcaactg acgttgaggc tcgaaagcgt ggggagcaaa caggattaga
780

taccctggta gtccacgccg taaacgatga atactaggtg tcggggagca aagctcttcg
840

gtgccgccgc aaacgcaata agtattccac ctggggagta cgttcgcaag aatgaaactc
900

aaaggaattg acgggggaccc gcacaagcgg tggagcatgt ggtttaattc gaagcaacgc
960

gaagaacctt accaagcctt gacatcccat tgacagagca tgtaatgtgc tttcccttcg
1020

gggcagtggg gacaggtggg gcatggttgt cgtcagctcg tgtcgtgaga tggtgggtta
1080

agtcccgcaa cgagcgcaac ccctatcttc agtagccagc gggtcggccg ggcactctgg
1140

agagactgcc agggataacc tggaggaagg tggggatgac gtcaaatacat catgcccctt
1200

atggcttggg ctacacacgt gctacaatgg cgtaaacaaa gggaagcgag cctgcgaggg
1260

ggagcaaatac ccaaaaataa cgtctcagtt cggattgtag tctgcaactc gactacatga
1320

agctggaatac gctagtaatac gcgaatacaga atgtcgcggt gaatacgttc ccgggtcttg
1380

tacacaccgc ccgtcacacc atgggagtcg gcaacgcccg aagccagtga cccaaccgaa
1440

aggagggagc tgtcgaaggc ggggccggta actgggggtga agtcgtaaca aggtagccgt
1500

a t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1530

<210> 382

<211> 1511

<212> DNA

<213> artificial sequence

<220>

<223> GCA_900067025|EGKPLLKC_05280 16S ribosomal RNA

<400> 382

attaagagtt tgatcctggc tcaggacgaa cgctggcggc acgcttaaca catgcaagtc
60

gaacgagaga agagaagctt gcttttctga tctagtggcg gacgggtgag taacacgtga
120

gcaatctgcc tttcagaggg ggataccgat tggaacgat cgtaataacc gcataacata
180

attgaaccgc atgatttgat tatcaaagat ttatcgctga aagatgagct cgcgtctgat
240

tagctagttg gtaaggtaac ggcttaccaa ggcgacgac agtagccgga ctgagagggtt
300

gatcggccac attgggactg agacacggcc cagactccta cgggaggcag cagtggggaa
360

tattgcacaa tggaggaaac tctgatgcag cgatgccgcg tgagggaaga aggttttagg
420

attgtaaacc tctgtcttca gggacgaaaa aaaagacggg acctgaggag gaagctccgg
480

ctaactacgt gccagcagcc gcggtaatac gtagggagcg agcgttgtcc ggaattactg
540

ggtgtaaagg gagcgtaggc gggatcgcaa gtcagatgtg aaaactatgg gcttaaccca
600

taaactgcat ttgaaactgt ggttcttgag tgaagtagag gtaagcggaa ttcctagtgt
660

agcggtgaaa tgcgtagata ttaggaggaa catcagtggc gaaggcggct tactgggctt
720

taactgacgc tgaggctcga aagcgtgggg agcaaacagg attagatacc ctggtagtcc
780

acgccgtaaa cgatgattac taggtgtggg gggactgacc ccttccgtgc cgcagcaaac
840

gcaataagta atccacctgg ggagtacgac cgcaagggtg aaactcaaag gaattgacgg
900

gggcccgcac aagcagtgga gtatgtggat taattcgaag caacgcgaag aaccttacca
960

ggtcttgaca tcgtatgcat agctcagaga tgagtgaaat ctcttcggag acatatagac
1020

aggtggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga
1080

gcgcaaccct tactgttagt tgctacgcaa gagcactcta gcaggactgc cgttgacaaa
1140

acggaggaag gtgggggatga cgtcaaataca tcatgcccct tatgacctgg gcctcacacg
1200

tactacaatg gctgtcaaca gagggatgca aagccgcgag gtggagcgaa cccctaaaag
1260

cagtcttagt tcggattgta ggctgcaacc cgcctacatg aagtcggaat tgctagtaat
1320

cgcagatcag catgctgcgg tgaatacggt cccgggcctt gtacacaccg cccgtcacgc
1380

catgggagtc ggtaacaccc gaagcctgta gtctaaccgc aaggaggacg cagtcgaagg
1440

tgggattgat gactgggggtg aagtcgtaac aaggtagccg tatcggaagg tgcggctgga
1500

t c a c c t c c t t t
1511

<210> 383

<211> 1312

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000209875|FPCKKGIF_00294 16S ribosomal RNA

<400> 383

atatcaaaga ttttatcgct tgaagatgga ctcgcggtccg attagttagt tgggtgaggta
60

acggctcacc aagaccgcga tcggtagccg gactgagagg ttgaacggcc acattgggac
120

tgagacacgg cccagactcc tacgggaggc agcagtgggg gatattgcgc aatggggggca
180

accctgacgc agcaacgccg cgtgaaggat gaaggttttc ggattgtaaa cttcttttat
240

taaggacgaa acttgacggt acttaatgaa taagctccgg ctaactacgt gccagcagcc
300

gcggtataac gtagggagca agcgttgtcc ggatttactg ggtgtaaagg gtgcgtaggc
360

ggctttgcaa gtcagatgtg aaatctatgg gctcaacca taaactgcat ttgaaactgt
420

agagcttgag tgaagtagag gcaggcggaa ttccccgtgt agcggtgaaa tgcgtagaga
480

tggggaggaa caccagtggc gaaggcggcc tgctgggctt taactgacgc tgaggcacga
540

aagcgtgggt agcaaacagg attagatacc ctggtagtcc acgctgtaaa cgatgattac
600

taggtgtggg gggctctgacc ccttccgtgc cggagttaac acaataagta atccacctgg
660

ggagtacggc cgcaagggtg aaactcaaag gaattgacgg gggcccgcac aagcagtgga
720

gtatgtgggt taattcgaag caacgcgaag aaccttacca ggtcttgaca tccaactaac
780

gaagtagaga tacattaggt gcccttcggg gaaagttgag acagggtggtg catgggtgtc
840

gtcagctcgt gtcgtgagat gttgggttaa gtcccgcaac gagcgcaacc cttgctatta
900

gttgctacgc aagagcactc taataggact gccgttgaca aaacggagga aggtggggac
960

gacgtcaaata catcatgccc cttatgacct gggctacaca cgtactacaa tggatgttaa
1020

cagaggggaag caagacagcg atgtggagca aaccctaaa aacattctca gttcagattg
1080

caggctgcaa cccgcctgca tgaagatgga attgctagta atcgcggatc agcatgccgc
1140

ggtgaatacgttccccgggcc ttgtacacac cgcccgtcac accatgggag ccggtatac
1200

ccgaagtcag tagtccaacc tcgtgaggac gctgccgaag gtaggattgg cgactgggggt
1260

gaagtcgtaa caaggtagcc gtatcggaag gtgcggctgg atcacctcct tt
1312

<210> 384

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000507805|ONIFJNBG_02190 16S ribosomal RNA

<400> 384

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gagcgaagca cttttgcgga tttcttcgga ttgaagcaat tgtgactgag cggcggacgg
120

gtgagtaacg cgtgggtaac ctgcctcata caggggggata acagttggaa acggctgcta
180

ataccgcata agcgcacagt accgcatggc accgtgtgaa aaactccggt ggtatgagat
240

ggacccgcgt ctgattagct agttgggtggg gtaacggcct accaaggcga cgatcagtag
300

ccgacctgag agggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtgagc
420

gatgaagtat ttcgggtatgt aaagctctat cagcagggaa gaaaatgacg gtacctgact
480

aagaagcccc ggctaactac gtgccagcag ccgcggtaat acgtaggggg caagcgttat
540

ccggattttac tgggtgtaaa gggagcgtag acggcatggc aagccagatg tgaaagcccg
600

gggctcaacc ccgggactgc atttggaact gtcaggctag agtgtcggag aggaaagcgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

ctttctggac gatgactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat actaggtgtc ggggtggcaaa gccattcggg
840

gccgcagcaa acgcaataag tattccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac ctggtcttga catccccctg accgctcttt aatcggagct ttccttcggg
1020

acagggggaga caggtgggtgc atggttgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ctatcttttag tagccagcat ttcggatggg cactctagag
1140

agactgccag ggataacctg gaggaagggtg gggatgacgt caaatcatca tgccccttat
1200

gaccagggct acacacgtgc tacaatggcg taaacaaagg gaagcgagcc cgcgaggggg
1260

agcaaattccc aaaaataacg tctcagttcg gattgtagtc tgcaactcga ctacatgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcgggtga atacgttccc ggggtcttgta
1380

cacaccgccc gtcacaccat gggagtcagt aacgcccga gtcagtgacc caaccgcaag
1440

gagggagctg ccgaaggtgg gaccgataac tggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 385

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000507805|ONIFJNBG_02411 16S ribosomal RNA

<400> 385

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gagcgaagca ccttgacgga tttcttcgga ttgaagcctt ggtgactgag cggcggacgg
120

gtgagtaacg cgtgggtaac ctgcctcata cagggggata acagttggaa acggctgcta
180

ataccgcata agcgcacagt accgcatggt acggtgtgaa aaactccggt ggtatgagat
240

ggacccgcgt ctgattaggt agttggtggg gtaacggcct accaagccga cgatcagtag
300

ccgacctgag agggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtgagc
420

gatgaagtat ttcggtatgt aaagctctat cagcagggaa gaaaatgacg gtacctgact
480

aagaagcccc ggctaactac gtgccagcag ccgcggtaat acgtaggggg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgtag acggcatggc aagccagatg tgaaagcccc
600

gggctcaacc ccgggactgc atttggaact gtcaggctag agtgtcggag aggaaagcgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

ctttctggac gatgactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat actagggtgtc ggggtggcaaa gccattcggg
840

gccgcagcaa acgcaataag tattccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac ctggtcttga catccctctg accgctcttt aatcggagct ttccttcggg
1020

acagaggaga caggtgggtgc atggttggtc tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ctatcttttag tagccagcat tttggatggg cactctagag
1140

agactgccag ggataacctg gaggaagggtg gggatgacgt caaatcatca tgccccttat
1200

gatcagggct acacacgtgc tacaatggcg taaacaaagg gaagcgagcc cgcgaggggg
1260

agcaaattccc aaaaataacg tctcagttcg gattgtagtc tgcaactcga ctacatgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcgggtga atacgttccc gggctcttgta
1380

cacaccgccc gtcacaccat gggagtcagt aacgcccga gtcagtgacc caaccgcaag
1440

gagggagctg ccgaagggtg gaccgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c
1528

g g c t g g a t c a

c c t c c t t t

<210> 386

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000507805|ONIFJNBG_02808 16S ribosomal RNA

<400> 386

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gagcgaagca ccttgacgga tttcttcgga ttgaagcctt ggtgactgag cggcggacgg
120

gtgagtaacg cgtgggtaac ctgcctcata cagggggata acagttggaa acggctgcta
180

ataccgcata agcgcacagt accgcatggc acggtgtgaa aaactccggt ggtatgagat
240

ggacccgcgt ctgattaggt agttggtggg gtaacggcct accaagccga cgatcagtag
300

ccgacctgag agggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtgagc
420

gatgaagtat ttcggtatgt aaagctctat cagcaggga gaaaatgacg gtacctgact
480

aagaagcccc ggctaactac gtgccagcag ccgcggtaat acgtaggggg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgtag acggcatggc aagccagatg tgaaagcccg
600

gggctcaacc ccgggactgc atttggaact gtcaggctag agtgtcggag aggaaagcgg
660

aattcctagt gtagcggtaga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

ctttctggac gatgactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat actagggtgtc ggggtggcaaa gccattcggg
840

gccgcagcaa acgcaataag tattccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac ctgggtcttga catccccctg accgctcttt aatcggagct ttccttcggg
1020

acagaggaga caggtgggtgc atggttgtcg tcagctcgtg tcgtgagatg ttggggttaag
1080

tcccgcaacg agcgcaaccc ctatcttttag tagccagcat tttggatggg cactctagag
1140

agactgccag ggataacctg gaggaagggtg gggatgacgt caaatcatca tgccccttat
1200

gatcagggct acacacgtgc tacaatggcg taaacaaagg gaagcgagcc cgcgaggggg
1260

agcaaattccc aaaaataacg tctcagttcg gattgtagtc tgcaactcga ctacatgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcgggtga atacgttccc ggggtcttgta
1380

cacaccgccc gtcacaccat gggagtcagt aacgcccga gtcagtgacc caaccgcaag
1440

gagggagctg ccgaagggtgg gaccgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 387
<211> 1242
<212> DNA
<213> artificial sequence

<220>
<223> GCF_000507805|ONIFJNBG_02871 16S ribosomal RNA (partial)

<220>
<221> misc_feature
<222> (1)..(1)
<223> n is a, c, g, or t

<400> 387
ncgacgatca gtagccgacc tgagaggggtg accggccaca ttgggactga gacacggccc
60

aaactcctac gggagggcagc agtgggggaat attgcacaat gggggaaacc ctgatgcagc
120

gacgccgcgt gagcgatgaa gtatttcggt atgtaaagct ctatcagcag ggaagaaaat
180

gacggtacct gactaagaag ccccggtctaa ctacgtgccca gcagccgcgg taatacgtag
240

ggggcaagcg ttatccggat ttactgggtg taaagggagc gtagacggca tggcaagcca
300

gatgtgaaag cccgggggctc aaccccggga ctgcatttgg aactgtcagg ctagagtgtc
360

ggagaggaaa gcggaattcc tagtgtagcg gtgaaatgcg tagatattag gaggaacacc
420

agtggcgaag gcggctttct ggacgatgac tgacgttgag gctcgaaagc gtggggagca
480

aacaggatta gataccctgg tagtccacgc cgtaaacgat gaatactagg tgtcgggtgg
540

caaagccatt cggtgccgca gcaaacgcaa taagtattcc acctggggag tacgttcgca
600

agaatgaaac tcaaaggaat tgacggggac ccgcacaagc ggtggagcat gtggtttaat
660

tcgaagcaac gcgaagaacc ttacctggtc ttgacatccc tctgaccgct ctttaatcgg
720

aactttcctt cgggacagag gagacaggtg gtgcatggtt gtcgtcagct cgtgtcgtga
780

gatgttgggt taagtcccgc aacgagcgc acccctatct ttagtagcca gcattttgga
840

tgggcactct agagagactg ccagggataa cctggaggaa ggtggggatg acgtcaaatac
900

atcatgcccc ttatgaccag ggctacacac gtgctacaat ggcgtaaaca aagggaagcg
960

agcccgcgag ggggagcaaa tccccaaaat aacgtctcag ttcggattgt agtctgcaac
1020

tcgactacat gaagctggaa tcgctagtaa tcgcgaatca gaatgtcgcg gtgaatacgt
1080

tcccgggtct tgtacacacc gcccgtcaca ccatgggagt cagtaacgcc cgaagtcagt
1140

gacccaaccg caaggaggga gctgccgaag gtgggaccga taactgggggt gaagtcgtaa
1200

caaggtagcc gtatcggaag gtgcggctgg atcacctcct tt
1242

<210> 388

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000507805|ONIFJNBG_03037 16S ribosomal RNA

<400> 388

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gagcgaagca ccttgacgga tttcttcgga ttgaagcctt ggtgactgag cggcggacgg
120

gtgagtaacg cgtgggtaac ctgcctcata cagggggata acagttggaa acggctgcta
180

ataccgcata agcgcacagt accgcatggt acggtgtgaa aaactccggt ggtatgagat
240

ggacccgcgt ctgattaggt agttggtggg gtaacggcct accaagccga cgatcagtag
300

ccgacctgag agggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtgagc
420

gatgaagtat ttcggtatgt aaagctctat cagcagggaa gaaaatgacg gtacctgact
480

aagaagcccc ggctaactac gtgccagcag ccgcggtaat acgtaggggg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgtag acggcatggc aagccagatg tgaaagcccg
600

gggctcaacc ccgggactgc atttggaact gtcaggctag agtgtcggag aggaaagcgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

ctttctggac gatgactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgaat actagggtgtc ggggtggcaaa gccattcggg
840

gccgcagcaa acgcaataag tattccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac ctggtcttga catccctctg accgctcttt aatcggagct ttccttcggg
1020

acagaggaga caggtggtgc atggttgctg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ctatcttttag tagccagcat ttcggatggg cactctagag
1140

agactgccag ggataacctg gaggaagggtg gggatgacgt caaatcatca tgccccttat
1200

gaccagggct acacacgtgc tacaatggcg taaacaaagg gaagcgagcc cgcgaggggg
1260

agcaaattccc aaaaataacg tctcagttcg gattgtagtc tgcaactcga ctacatgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcggtga atacgttccc gggctcttgta
1380

cacaccgccc gtcacaccat gggagtcagt aacgcccga gtcagtgacc caaccgcaag
1440

gagggagctg ccgaagggtgg gaccgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 389

<211> 1527

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000153905|DFNHJFHB_00540 16S ribosomal RNA

<400> 389

tcagagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgggaaa cttttcattg aagcttcggc agatttggtc tgtttctagt ggcggaacggg
120

tgagtaacgc gtgggtaacc tgccttatac agggggataa caaccagaaa tggttgctaa
180

taccgcataa gcgcacagga ccgcatggtc cgggtgtgaaa aactccggtg gtataagatg
240

gacccgcgtt ggattagcta gttggcaggg taacggccta ccaaggcgac gatccatagc
300

cggcctgaga ggggtgaacgg ccacattggg actgagacac ggcccagact cctacgggag
360

gcagcagtgg ggaatattgc acaatggggg aaaccctgat gcagcgacgc cgcgatgaagg
420

aagaagtatc tcggtatgta aacttctatc agcagggaag atagtgacgg tacctgacta
480

agaagccccg gctaactacg tgccagcagc cgcggttaata cgtagggggc aagcggtatc
540

cggatttact ggggtgtaaag ggagcgtaga cggactggca agtctgatgt gaaaggcggg
600

ggctcaaccc ctggactgca ttggaaactg ttagtcttga gtgccggaga ggtaagcgga
660

attcctagtg tagcggtgaa atgcgtagat attaggagga acaccagtgg cgaaggcggc
720

ttactggacg gtaactgacg ttgaggctcg aaagcgtggg gagcaaacag gattagatac
780

cctggtagtc cacgccgtaa acgatgaata ctaggtgttg gggagcaaag ctcttcggtg
840

ccgccgcaaa cgcattaagt attccacctg gggagtacgt tcgcaagaat gaaactcaaa
900

ggaattgacg gggacccgca caagcgggtg agcatgtggg ttaattcgaa gcaacgcgaa
960

gaaccttacc aagtcttgac atccctctga ccgttcctta accggaactt tccttcggga
1020

cagaggagac aggtggtgca tggttgtcgt cagctcgtgt cgtgagatgt tgggttaagt
1080

cccgcaacga gcgcaacccc tatccccagt agccagcggg tcggccgggc actctgagga
1140

gactgccagg gataacctgg aggaaggcgg ggatgacgtc aaatcatcat gccccttatg
1200

atttgggcta cacacgtgct acaatggcgt aaacaaaggg aagcgagcct gcgaaggtaa
1260

gcaaatccca aaaataacgt cccagttcgg actgcagtct gcaactcgac tgcacgaagc
1320

tggaatcgct agtaatcgcg gatcagaatg ccgcggtgaa tacgttcccg ggtcttgtac
1380

acaccgcccg tcacaccatg ggagtcagta acgcccgaag tcagtgcact aactgcaaag
1440

aaggagctgc cgaaggcggg accgatgact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g g c t g g a t c a c c t c c t t t
1527

<210> 390

<211> 1527

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000153905|DFNHJFHB_02504 16S ribosomal RNA

<400> 390

tcagagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcttaaca catgcaagtc
60

gaacgggaaa cttttcattg aagcttcggc agatttggtc tgtttctagt ggcggacggg
120

tgagtaacgc gtgggtaacc tgccttatac aggggggataa caaccagaaa tggttgctaa
180

taccgcataa 240	gcgcacagga	ccgcatggtc	tagtgtgaaa	aactccggtg	gtataagatg
gacccgcgtt 300	ggattagcta	gttggcaggg	taacggccta	ccaaggcgac	gatccatagc
cggcctgaga 360	gggtgaacgg	ccacattggg	actgagacac	ggcccagact	cctacgggag
gcagcagtgg 420	ggaatattgc	acaatggggg	aaaccctgat	gcagcgacgc	cgcgatgaagg
aagaagtatc 480	tcggtatgta	aacttctatc	agcagggaag	atagtgacgg	tacctgacta
agaagccccg 540	gctaactacg	tgccagcagc	cgcggttaata	cgtagggggc	aagcggtatc
cggatttact 600	gggtgtaaag	ggagcgtaga	cggactggca	agtctgatgt	gaaaggcggg
ggctcaaccc 660	ctggactgca	ttggaaactg	ttagtcttga	gtgccggaga	ggtaagcgga
attcctagtg 720	tagcggtgaa	atgcgtagat	attaggagga	acaccagtgg	cgaaggcggc
ttactggacg 780	gtaactgacg	ttgaggctcg	aaagcgtggg	gagcaaacag	gattagatac
cctggtagtc 840	cacgccgtaa	acgatgaata	ctaggtgttg	gggagcaaag	ctcttcggtg
ccgccgcaaa 900	cgcattaagt	attccacctg	gggagtacgt	tcgcaagaat	gaaactcaaa
ggaattgacg 960	gggacccgca	caagcggtag	agcatgtggg	ttaattcgaa	gcaacgcgaa
gaaccttacc 1020	aagtcttgac	atccctctga	ccgttcctta	accggaactt	tccttcggga
caggggagac 1080	aggtgggtgca	tggttgctcg	cagctcgtgt	cgtgagatgt	tgggttaagt

cccgcaacga gcgcaacccc tatccccagt agccagcagt ccggctgggc actctgagga
1140

gactgccagg gataacctgg aggaaggcgg ggatgacgtc aaatcatcat gccccttatg
1200

atttgggcta cacacgtgct acaatggcgt aaacaaaggg aagcaagcct gcgaaggtaa
1260

gcaaatccca aaaataacgt cccagttcgg actgcagtct gcaactcgac tgcacgaagc
1320

tggaatcgct agtaatcgcg gatcagaatg ccgcggtgaa tacgttcccg ggtcttgtac
1380

acaccgcccg tcacaccatg ggagtcagta acgcccgaag tcagtgacct aactgcaaag
1440

aaggagctgc cgaaggcggg accgatgact ggggtgaagt cgtaacaagg tagccgtatc
1500

g g a a g g t g c g g c t g g a t c a c c t c c t t t
1527

<210> 391

<211> 1177

<212> DNA

<213> artificial sequence

<220>

<223> SPC10820|DLMKICIM_03226 16S ribosomal RNA (partial)

<400> 391

cctacgggag gcagcagtgg ggaatattgc acaatggggg aaaccctgat gcagcgacgc
60

cgcggtgaagg aagaagtatc tcggtatgta aacttctatc agcagggaag atagtgacgg
120

tacctgacta agaagccccg gctaactacg tgccagcagc cgcggttaata cgtagggggc
180

aagcgttatc cggatttact ggggtgtaaag ggagcgtaga cggactggca agtctgatgt
240

gaaaggcggg ggctcaaccc ctggactgca ttggaaactg ttagtcttga gtgccggaga
300

ggtaagcgga attcctagt tagcggtgaa atgcgtagat attaggagga acaccagtgg
360

cgaaggcggc ttactggacg gtaactgacg ttgaggctcg aaagcgtggg gagcaaacag
420

gattagatac cctggtagtc cacgccgtaa acgatgaata ctaggtgttg gggagcaaag
480

ctcttcggtg ccgccgcaaa cgcattaagt attccacctg gggagtacgt tcgcaagaat
540

gaaactcaaa ggaattgacg gggacccgca caagcgggtg agcatgtggt ttaattcgaa
600

gcaacgcgaa gaaccttacc aagtcttgac atccctctga ccgactctta accgagtctt
660

tccttcggga cagaggagac aggtggtgca tggttgtcgt cagctcgtgt cgtgagatgt
720

tgggttaagt cccgcaacga gcgcaacccc tatccccagt agccagcggg tcggccgggc
780

actctgagga gactgccagg gataacctgg aggaaggcgg ggatgacgtc aaatcatcat
840

gcccttatg atttgggcta cacacgtgct acaatggcgt aaacaaaggg aagcaagcct
900

gcgaaggtaa gcaaatccca aaaataacgt cccagttcgg actgcagtct gcaactcgac
960

tgcacgaagc tggaatcgct agtaatcgcg gatcagaatg ccgcggtgaa tacgttcccg
1020

ggtcttgtag acaccgcccg tcacaccatg ggagtcagta acgcccgaag tcagtgacct
1080

aaccgcaagg gaggagctgc cgaaggcggg accgatgact ggggtgaagt cgtaacaagg
1140

tagccgtatc ggaagggtgcg gctggatcac ctcccttt
1177

<210> 392

<211> 1529

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000153925|CO0EMKBM_00189 16S ribosomal RNA

<400> 392

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcctaaca catgcaagtc
60

gagcgaagca ctttgcttag attcttcgga tgaagaggat tgtgactgag cggcggacgg
120

gtgagtaacg cgtgggtaac ctgcctcata caggggggata acagttagaa atgactgcta
180

ataccgcata agaccacagc accgcatggc gcggggggtaa aaactccggc ggtatgagat
240

ggacccgcgt ctgattagct agttggtaag gtaacggctt accaaggcga cgatcagtag
300

ccgacctgag aggggtggccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtgagc
420

gaagaagtat ttcggtatgt aaagctctat cagcagggaa gaaaatgacg gtacctgact
480

aagaagcacc ggctaaatac gtgccagcag ccgcggtaat acgtatggcg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgtag acggatgggc aagtctgatg tgaaaacccg
600

gggctcaacc ccgggactgc attggaaact gttcatctag agtgctggag aggtaagtgg
660

aattcctagt gtagcggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac agtaactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgact actagggtgtc ggggtggcaaa gccattcggg
840

gccgcagcaa acgcaataag tagtccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac ctgctcttga catcccgtg accggacggg aatgcgtcct tcccttcggg
1020

gcagcggaga caggtggtgc atggttgtcg tcagctcgtg tcgtgagatg ttggggttaag
1080

tcccgcaacg agcgcaaccc ctatcttttag tagccagcgg ccaggccggg cactctagag
1140

agactgccgg ggataacccg gaggaagggtg gggatgacgt caaatcatca tgccccttat
1200

gagcaggggt acacacgtgc tacaatggcg taaacaaagg gaagcgagac cgcgagggtg
1260

agcaaattccc aaaaataacg tctcagttcg gattgtagtc tgcaactcga ctacatgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcgggtga atacgttccc ggggtcttgta
1380

cacaccgccc gtcacaccat gggagtcagt aacgcccga gtcagtgacc caaccgtaag
1440

gagggagctg ccgaaggcgg gaccgataac tgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1529

<210> 393
<211> 1529
<212> DNA
<213> artificial sequence

<220>
<223> GCF_000153925|C00EMKBM_01225 16S ribosomal RNA

<400> 393
aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcctaaca catgcaagtc
60

gagcgaagca ctttgcttag attcttcgga tgaagaggat tgtgactgag cggcggacgg
120

gtgagtaacg cgtgggtaac ctgcctcata cagggggata acagttagaa atgactgcta
180

ataccgcata agaccacagc accgcatggc gcgggggtaa aaactccggc ggtatgagat
240

ggacccgcgt ctgattagct agttggtaag gtaacggctt accaaggcga cgatcagtag
300

ccgacctgag aggggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtgagc
420

gaagaagtat ttcgggtatgt aaagctctat cagcagggaa gaaaatgacg gtacctgact
480

aagaagcacc ggctaaatac gtgccagcag ccgcggtaat acgtatggcg caagcggttat
540

ccggattttac tgggtgtaaa gggagcgtag acggatgggc aagtctgatg tgaaaacccg
600

gggctcaacc ccgggactgc attggaaact gttcatctag agtgctggag aggtaagtgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac agtaactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgact actaggtgtc ggggtggcaaa gccattcggg
840

gccgcagcaa acgcaataag tagtccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac ctgctcttga catcccgtctg accggacggg aatgcgtcct tcccttcggg
1020

gcagcggaga caggtgggtgc atggttgctg tcagctcgtg tcgtgagatg ttgggttaag
1080

tccccgcaac gagcgcaacc cctatcttta gtagccagcg gccaggccgg gcactctaga
1140

gagactgccg gggataacct ggaggaaggt ggggatgacg tcaaatacgc atgcccctta
1200

tgagcagggc tacacacgtg ctacaatggc gtaaacaag ggaagcgaga ccgcgaggtg
1260

gagcaaattc caaaaataac gtctcagttc ggattgtagt ctgcaactcg actacatgaa
1320

gctggaatcg ctagtaatcg cgaatcagaa tgtcgcgggtg aatacgttcc cgggtcttgt
1380

acacaccgcc cgtcacacca tgggagtcag taacgcccga agtcagtgac ccaaccgtaa
1440

ggagggagct gccgaaggcg ggaccgataa ctgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1529

<210> 394

<211> 1056

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000153925|C00EMKBM_01235 16S ribosomal RNA (partial)

<400> 394

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcctaaca catgcaagtc
60

gagcgaagca ctttgcttag attcttcgga tgaagaggat tgtgactgag cggcggacgg
120

gtgagtaacg cgtgggtaac ctgcctcata cagggggata acagttagaa atgactgcta
180

ataccgcata agaccacagc accgcatggt gcgggggtaa aaactccggt ggtatgagat
240

ggacccgcgt ctgattagct agttggtaag gtaacggctt accaaggcga cgatcagtag
300

ccgacctgag agggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtgagc
420

gaagaagtat ttcggtatgt aaagctctat cagcagggaa gaaaatgacg gtacctgact
480

aagaagcacc ggctaaatac gtgccagcag ccgcggtaat acgtatggtg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgtag acggatgggc aagtctgatg tgaaaacccg
600

gggctcaacc ccgggactgc attggaaact gttcatctag agtgctggag aggtaagtgg
660

aattcctagt gtagcggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac agtaactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgact actaggtgtc ggggtggcaaa gccattcgg
840

gccgcagcaa acgcaataag tagtccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg ggagcatgtg gtttaattcg aagcaacgcg
960

aagaacctta cctgctcttg acatcccgtg gaccggacgg taatgcgtcc ttcccttcgg
1020

g c a g c g g a g a c a g g t g g t g c a t g g t t g t c g t c a g c t
1056

<210> 395

<211> 1529

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000153925|C00EMKBM_01236 16S ribosomal RNA

<400> 395

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcctaaca catgcaagtc
60

gagcgaagca ctttgcttag attcttcgga tgaagaggat tgtgactgag cggcggacgg
120

gtgagtaacg cgtgggtaac ctgcctcata cagggggata acagttagaa atgactgcta
180

ataccgcata agaccacagc accgcatggc gcgggggtaa aaactccggt ggtatgagat
240

ggacccgcgt ctgattagct agttggtaag gtaacggctt accaaggcga cgatcagtag
300

ccgacctgag aggggtggccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtgagc
420

gaagaagtat ttcggtatgt aaagctctat cagcagggaa gaaaatgacg gtacctgact
480

aagaagcacc ggctaaatac gtgccagcag ccgcggtaat acgtatgggtg caagcgttat
540

ccggattttac tgggtgtaaa gggagcgtag acggatgggc aagtctgatg tgaaaacccg
600

gggctcaacc ccgggactgc attggaaact gttcatctag agtgctggag aggtaagtgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac agtaactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgact actaggtgtc ggggtggcaaa gccattcggg
840

gccgcagcaa acgcaataag tagtccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac ctgctcttga catcccgtg accggacggg aatgcgtcct tcccttcggg
1020

gcagcggaga cagggtgggtgc atggttgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ctatcttttag tagccagcgg ccaggccggg cactctagag
1140

agactgccgg ggataacccg gaggaagggtg gggatgacgt caaatcatca tgccccttat
1200

gagcagggct acacacgtgc tacaatggcg taaacaaagg gaagcgagac cgcgaggtgg
1260

agcaaattccc aaaaataacg tctcagttcg gattgtagtc tgcaactcga ctacatgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcggtga atacgttccc gggctcttgta
1380

cacaccgccc gtcacaccat gggagtcagt aacgcccga gtcagtgacc caaccgtaag
1440

gagggagctg ccgaaggcgg gaccgataac tgggggtgaa gtcgtaacaa ggtagccgta
1500

t c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1529

<210> 396

<211> 1177

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000153925|C00EMKBM_01246 16S ribosomal RNA (partial)

<400> 396

aacgagagtt tgatcctggc tcaggatgaa cgctggcggc gtgcctaaca catgcaagtc
60

gagcgaagca ctttgcttag attcttcgga tgaagaggat tgtgactgag cggcggacgg
120

gtgagtaacg cgtgggtaac ctgcctcata caggggggata acagttagaa atgactgcta
180

ataccgcata agaccacagc accgcatggt gcggggggtaa aaactccggt ggtatgagat
240

ggacccgcgt ctgattagct gggttggtgtaag gtaacggctt accaaggcga cgatcagtag
300

ccgacctgag agggtgaccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtgagc
420

gaagaagtat ttcggtatgt aaagctctat cagcagggaa gaaaatgacg gtacctgact
480

aagaagcacc ggctaaatac gtgccagcag ccgcggtaat acgtatggtg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgtag acggatgggc aagtctgatg tgaaaacccg
600

gggctcaacc ccgggactgc attggaaact gttcatctag agtgctggag aggtaagtgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac agtaactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgact actaggtgtc ggggtggcaaa gccattcggg
840

gccgcagcaa acgcaataag tagtccacct gggggagtag gttcgcaaga atgaaactca
900

aaggaattga cgggggaccc gcacaagcgg tggagcatgt ggtttaattc gaagcaacgc
960

gaagaacctt acctgctctt gacatcccgc tgaccggacg gtaatgcgtc cttcccttcg
1020

gggcagcggg gacaggtggg gcatggttgt cgtcagctcg tgtcgtgaga tgttgggtta
1080

agtcccgcac gagcgcaacc ctatctttag tagcagcggc caggccgggc actctaaaag
1140

agactgccgg ggataatccc gggagggaagg tggggat
1177

<210> 397

<211> 1528

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000153925|C00EMKBM_01507 16S ribosomal RNA

<400> 397

tacgagagtt tgatcctggc tcaggatgaa cgcgggcggc gtgcctaaca catgcaagtc
60

gagcgaagca ctttgcttag attcttcgga tgaagaggat tgtgactgag cggcggacgg
120

gtgagtaacg cgtgggtaac ctgcctcata cagggggata acagttagaa atgactgcta
180

ataccgcata agaccacagc accgcatggt gcgggggtaa aaactccggt ggtatgagat
240

ggacccgcgt ctgattagct agttggtaag gtaacggctt accaaggcga cgatcagtag
300

ccgacctgag aggggtggccg gccacattgg gactgagaca cggcccaaac tcctacggga
360

ggcagcagtg gggaatattg cacaatgggg gaaaccctga tgcagcgacg ccgcgtaggc
420

gaagaagtat ttcggtatgt aaagctctat cagcagggaa gaaaatgacg gtacctgact
480

aagaagcacc ggctaaatac gtgccagcag ccgcggtaat acgtatggtg caagcgttat
540

ccggatttac tgggtgtaaa gggagcgtag acggatgggc aagtctgatg tgaaaacccg
600

gggctcaacc ccgggactgc attggaaact gttcatctag agtgctggag aggtaagtgg
660

aattcctagt gtagcgggtga aatgcgtaga tattaggagg aacaccagtg gcgaaggcgg
720

cttactggac agtaactgac gttgaggctc gaaagcgtgg ggagcaaaca ggattagata
780

ccctggtagt ccacgccgta aacgatgact actaggtgtc ggggtggcaaa gccattcgggt
840

gccgcagcaa acgcaataag tagtccacct ggggagtagc ttcgcaagaa tgaaactcaa
900

aggaattgac ggggacccgc acaagcgggtg gagcatgtgg ttttaattcga agcaacgcga
960

agaaccttac ctgctcttga catcccgctg accggacggt aatgcgtcct tcccttcggg
1020

gcagcggaga caggtgggtgc atggttgtcg tcagctcgtg tcgtgagatg ttgggttaag
1080

tcccgcaacg agcgcaaccc ctatcttttag tagccagcgg ccaggccggg cactctagag
1140

agactgccgg ggataacccg gaggaagggtg gggatgacgt caaatcatca tgccccttat
1200

gagcagggct acacacgtgc tacaatggcg taaacaaagg gaagcgagac cgcgagggtg
1260

agcaaattccc aaaaataacg tctcagttcg gattgtagtc tgcaactcga ctacatgaag
1320

ctggaatcgc tagtaatcgc gaatcagaat gtcgcgggtga atacgttccc gggctcttgta
1380

cacaccgccc gtcacaccat gggagtcagt aacgcccga gtcagtgacc caaccgtaag
1440

gagggagctg ccgaaggcgg gaccgataac tgggggtgaag tcgtaacaag gtagccgtat
1500

c g g a a g g t g c g g c t g g a t c a c c t c c t t t
1528

<210> 398

<211> 1526

<212> DNA

<213> artificial sequence

<220>

<223> GCF_000238635|HAPADMKB_02106 16S ribosomal RNA

<400> 398

aatgaagagt ttgatcctgg ctcaggacga acgctggcgg cgcgccctaac acatgcaagt
60

cgaacggagc tgttttctct gaagttttcg gatggaagag agttcagctt agtggcgaac
120

gggtgagtaa cacgtgagca acctgccttt cagtggggga caacatttgg aaacgaatgc
180

taataccgca taagaccaca gtgtcgcgatg gcacaggggt caaaggattt atccgctgaa
240

agatgggctc gcgtccgatt agctagatgg tgaggtaacg gcccaccatg gcgacgatcg
300

gtagccggac tgagaggttg aacggccaca ttgggactga gacacggccc agactcctac
360

gggaggcagc agtggggaat attgcacaat gggggaaacc ctgatgcagc gacgccgcgt
420

ggaggaagaa ggtcttcgga ttgtaaactc ctgtcccagg ggacgataat gacggtaccc
480

tgggaggaag caccggctaa ctacgtgcc a gcagccgcgg taaaacgtag ggtgcaagcg
540

ttgtccggaa ttactgggtg taaagggagc gcaggcggat tggcaagttg ggagtgaaat
600

ctatgggctc aacccataaa ttgctttcaa aactgtcagt cttgagtggg gtagaggtag
660

gcggaattcc cgggtgtagcg gtggaatgcg tagatatcgg gaggaacacc agtggcgaag
720

gcggcctact gggcactaac tgacgctgag gctcgaaagc atgggtagca aacaggatta
780

gataccctgg tagtccatgc cgtaaacgat gattactagg tgtgggagga ttgaccctt
840

ccgtgccgca gttaacacaa taagtaatcc acctggggag tacgaccgca aggttgaaac
900

tcaaaggaat tgacgggggc ccgcacaagc agtggagtat gtggtttaat tcgaagcaac
960

gcgaagaacc ttaccaggtc ttgacatcgg atgcatacct aagagattag ggaagtcctt
1020

cgggacatcc agacagggtg tgcattggtt tcgtcagctc gtgtcgtgag atgttgggtt
1080

aagtcccgca acgagcgcaa cccttatcgt tagttactac gcaagaggac tctagcgaga
1140

ctgccgttga caaacgggag gaagggtggg atgacgtcaa atcatcatgc cctttatgac
1200

ctgggctaca cacgtactac aatggctatt aacagagaga agcgataccg cgagggtggag
1260

caaacctcac aaaaatagtc tcagttcgga tcgcaggctg caaccgcct gcgtgaagcc
1320

ggaattgcta gtaatcgcgg atcagcatgc cgcggtgaat acgttcccgg gccttgtaca
1380

caccgcccgt cacaccatga gagccggggg gaccgaagt cggtagtcta accgcaagga
1440

ggacgccgcc gaaggtaaaa ctggtgattg ggggtgaagtc gtaacaagggt agccgtatcg
1500

g a a g g t g c g g c t g g a t c a c c t c c t t t
1526