**Table S1. Raw materials and mixing ratio of the study intervention**

|  | Raw material | Mixing ratio (%) | Content (mg) |
|---|---|---|---|
| BB-3 | *Bifidobacterium breve* B-3 [*] | 11.11 | 50.00 |
|  | Maltodextrin | 85.89 | 386.50 |
|  | Magnesium stearate | 1.00 | 4.50 |
|  | Silicon dioxide | 2.00 | 9.00 |
|  | Total | 100.00 | 450.00 |
| Placebo | Maltodextrin | 97.00 | 436.50 |
|  | Magnesium stearate | 1.00 | 4.50 |
|  | Silicon dioxide | 2.00 | 9.00 |
|  | Total | 100.00 | 450.00 |

[*]*Bifidobacterium breve* B-3 contains $1 \times 10^{11}$ CFU of *Bifidobacterium breve* B-3 per 1 g of corn starch including *Bifidobacterium breve* B-3 as the same raw material as the B-3-EX product sold commercially by Morinaga Dairy in Japan. Every 50 mg of *Bifidobacterium breve* contains $5 \times 10^9$ CFU of *Bifidobacterium breve* B-3.

**Table S2. Changes in body weight and body mass index (PPS)**

| | | BB-3 group (N=42) | Placebo group (N=41) |
|---|---|---|---|
| Body weight (kg), mean±SD | V2 | 72.71±8.22 | 70.82±8.17 |
| | V5 | 71.48±7.80 | 70.67±8.25 |
| | V5-V2 | -1.23±1.83 | -0.15±1.49 |
| | *p*-value | <0.0001[2] | 0.5332[1] |
| Difference V5-V2 (Tx-Px) | | -1.08±1.67 | |
| *p*-value | | 0.0060[3] | |
| Body mass index (kg/m²), mean±SD | V2 | 26.93±1.29 | 26.85±1.38 |
| | V5 | 26.49±1.34 | 26.79±1.51 |
| | V5-V2 | -0.43±0.64 | -0.06±0.57 |
| | *p*-value | 0.0001[1] | 0.5344[1] |
| Difference V5-V2 (Tx-Px) | | -0.38±0.61 | |
| LS mean difference | | -0.37 | |
| *p*-value | | 0.0074[4] | |

[1] p-value for the paired t-test (T)

[2] p-value for the Wilcoxon signed rank test (W)

[3] p-value for the Wilcoxon rank sum test

[4] p-value for ANCOVA adjusted for baseline values and sex

**Table S3. Changes in waist circumference, hip circumference, and waist-hip-ratio (PPS)**

| | | BB-3 group (N=42) | Placebo group (N=41) |
|---|---|---|---|
| Waist circumference (cm), mean±SD | V2 | 88.39±4.58 | 87.62±5.55 |
| | V5 | 86.39±4.15 | 87.86±5.50 |
| | V5-V2 | -2.01±3.12 | 0.23±3.95 |
| | *p*-value | 0.0002[1] | 0.7423[2] |
| | Difference V5-V2 (Tx-Px) | -2.24±3.55 | |
| | *p*-value | 0.0042[3] | |
| Hip circumference (cm), mean±SD | V2 | 99.04±3.66 | 98.60±3.89 |
| | V5 | 97.96±3.35 | 98.58±3.56 |
| | V5-V2 | -1.08±2.50 | -0.02±2.20 |
| | *p*-value | 0.0011[2] | 0.9493[1] |
| | Difference V5-V2 (Tx-Px) | -1.06±2.35 | |
| | *p*-value | 0.0161[3] | |
| Waist:hip ratio, mean±SD | V2 | 0.89±0.04 | 0.89±0.05 |
| | V5 | 0.88±0.04 | 0.89±0.05 |
| | V5-V2 | -0.01±0.03 | 0.00±0.04 |
| | *p*-value | 0.0468[2] | 0.6571[1] |
| | Difference V5-V2 (Tx-Px) | -0.01±0.03 | |
| | *p*-value | 0.1861[3] | |

[1] p-value for the paired t-test (T)
[2] p-value for the Wilcoxon signed rank test (W)
[3] p-value for the Wilcoxon rank sum test

**Table S4. DEXA results by anatomical region at 12 weeks from baseline (PPS)**

| | | | BB-3 group (N=42) | Placebo group (N=41) |
|---|---|---|---|---|
| Body fat mass (g), mean±SD | Arm | V2 | 2717.45±451.18 | 2851.51±570.51 |
| | | V5 | 2684.07±525.71 | 2854.12±532.35 |
| | | V5-V2 | -33.38±303.75 | 2.61±212.80 |
| | | *p*-value | 0.3292[2] | 0.9378[1] |
| | | Difference V5-V2 (Tx-Px) | -35.99±262.80 | |
| | | *p*-value | 0.4046[4] | |
| | Legs | V2 | 7171.36±1802.64 | 7672.22±1758.44 |
| | | V5 | 7004.48±1765.71 | 7588.22±1831.60 |
| | | V5-V2 | -166.88±403.76 | -84.00±339.32 |
| | | *p*-value | 0.0106[1] | 0.1208[1] |
| | | Difference V5-V2 (Tx-Px) | -82.88±373.33 | |
| | | LS mean difference | -90.29 | |
| | | *p*-value | 0.2834[3] | |
| | Trunk | V2 | 14606.17±2651.25 | 14693.63±2329.44 |
| | | V5 | 14224.12±2643.83 | 14710.20±2390.93 |
| | | V5-V2 | -382.05±738.20 | 16.56±700.23 |
| | | *p*-value | 0.0017[1] | 0.8804[1] |
| | | Difference V5-V2 (Tx-Px) | -398.61±719.70 | |
| | | LS mean difference | -399.78 | |
| | | *p*-value | 0.0144[3] | |
| | Android | V2 | 2353.33±501.31 | 2381.15±488.41 |
| | | V5 | 2268.76±467.66 | 2392.17±486.80 |
| | | V5-V2 | -84.57±184.00 | 11.02±148.78 |
| | | *p*-value | 0.0048[1] | 0.6378[1] |
| | | Difference V5-V2 (Tx-Px) | -95.60±167.54 | |

| | | | | |
|---|---|---|---|---|
| | | LS mean difference | -93.27 | |
| | | *p*-value | 0.0104[3] | |
| | Gynoid | V2 | 3884.48±977.53 | 4112.54±979.29 |
| | | V5 | 3818.45±1008.41 | 4150.12±929.63 |
| | | V5-V2 | -66.02±149.31 | 37.59±526.11 |
| | | *p*-value | 0.0065[1] | 0.5925[2] |
| | | Difference V5-V2 (Tx-Px) | -103.61±384.67 | |
| | | *p*-value | 0.4202[4] | |
| Body fat percentage (%), mean±SD | Arm | V2 | 36.37±8.45 | 39.40±8.51 |
| | | V5 | 36.16±8.88 | 39.29±8.22 |
| | | V5-V2 | -0.21±2.02 | -0.11±1.71 |
| | | *p*-value | 0.5095[1] | 0.9400[2] |
| | | Difference V5-V2 (Tx-Px) | -0.10±1.87 | |
| | | *p*-value | 0.5060[4] | |
| | Legs | V2 | 33.05±7.71 | 35.80±7.53 |
| | | V5 | 32.85±7.70 | 35.53±7.65 |
| | | V52-V2 | -0.20±1.20 | -0.27±1.15 |
| | | *p*-value | 0.2916[1] | 0.1410[1] |
| | | Difference V5-V2 (Tx-Px) | 0.07±1.18 | |
| | | LS mean difference | 0.07 | |
| | | *p*-value | 0.7886[3] | |
| | Trunk | V2 | 40.39±6.76 | 42.19±6.06 |
| | | V5 | 39.94±6.87 | 42.20±6.16 |
| | | V5-V2 | -0.45±1.81 | 0.01±1.40 |
| | | *p*-value | 0.1167[1] | 0.9647[1] |
| | | Difference V5-V2 (Tx-Px) | -0.46±1.62 | |
| | | LS mean difference | -0.49 | |

| | | | | |
|---|---|---|---|---|
| | | *p*-value | 0.1765[3] | |
| | Android | V2 | 42.67±7.63 | 44.54±6.58 |
| | | V5 | 42.42±7.61 | 44.77±6.74 |
| | | V5-V2 | -0.26±2.19 | 0.23±1.75 |
| | | *p*-value | 0.4517[1] | 0.4121[1] |
| | | Difference V5-V2 (Tx-Px) | -0.48±1.99 | |
| | | LS mean difference | -0.52 | |
| | | *p*-value | 0.2279[3] | |
| | Gynoid | V2 | 35.81±8.63 | 39.07±8.38 |
| | | V5 | 35.72±8.86 | 38.90±8.34 |
| | | V5-V2 | -0.09±1.35 | -0.16±1.50 |
| | | *p*-value | 0.6752[1] | 0.4891[1] |
| | | Difference V5-V2 (Tx-Px) | 0.08±1.43 | |
| | | LS mean difference | 0.07 | |
| | | *p*-value | 0.8401[3] | |
| Fat-free mass (g), mean±SD | Arm | V2 | 5259.83±1434.55 | 4825.59±1447.03 |
| | | V5 | 5221.40±1398.37 | 4864.32±1466.10 |
| | | V5-V2 | -38.43±321.71 | 38.73±265.01 |
| | | *p*-value | 0.7728[2] | 0.4868[2] |
| | | Difference V5-V2 (Tx-Px) | -77.16±295.07 | |
| | | *p*-value | 0.4415[4] | |
| | Legs | V2 | 15562.10±3223.26 | 14749.71±3172.57 |
| | | V5 | 15316.62±3075.54 | 14747.10±3177.69 |
| | | V5-V2 | -245.48±629.62 | -2.61±508.51 |
| | | *p*-value | 0.0155[1] | 0.9739[1] |
| | | Difference V5-V2 (Tx-Px) | -242.87±573.02 | |
| | | LS mean difference | -204.55 | |
| | | *p*-value | 0.1023[3] | |

| | | | |
|---|---|---|---|
| Trunk | V2 | 22465.10±3967.22 | 21025.29±3809.72 |
| | V5 | 22276.95±4001.92 | 21006.56±3684.69 |
| | V5-V2 | -188.14±1230.11 | -18.73±738.79 |
| | *p*-value | 0.6141[2] | 0.8718[1] |
| | Difference V5-V2 (Tx-Px) | -169.41±1017.57 | |
| | *p*-value | 0.7987[4] | |
| Android | V2 | 3233.17±688.73 | 3014.71±580.10 |
| | V5 | 3151.40±654.83 | 2999.66±565.22 |
| | V5-V2 | -81.76±205.95 | -15.05±137.82 |
| | *p*-value | 0.0138[1] | 0.5925[2] |
| | Difference V5-V2 (Tx-Px) | -66.71±175.64 | |
| | *p*-value | 0.1329[4] | |
| Gynoid | V2 | 7305.05±1578.33 | 6848.68±1493.16 |
| | V5 | 7196.81±1545.12 | 6833.27±1474.53 |
| | V5-V2 | -108.24±268.91 | -15.41±168.28 |
| | *p*-value | 0.0126[1] | 0.5608[1] |
| | Difference V5-V2 (Tx-Px) | -92.82±224.92 | |
| | LS mean difference | -71.70 | |
| | *p*-value | 0.1419[3] | |

[1] p-value for the paired t-test

[2] p-value for the Wilcoxon signed rank test

[3] p-value for ANCOVA adjusted for baseline and sex

[4] p-value for the Wilcoxon rank sum test

**Table S5. CT results at 12 weeks from baseline (PPS)**

| | | BB-3 group (N=42) | Placebo group (N=41) |
|---|---|---|---|
| Total fat area (cm²), mean±SD | V2 | 359.07±60.96 | 378.02±59.20 |
| | V5 | 359.73±66.35 | 389.58±74.95 |
| | V5-V2 | 0.66±52.06 | 11.56±51.91 |
| | *p*-value | 0.9347[1] | 0.1616[1] |
| | Difference V5-V2 (Tx-Px) | -10.90±51.98 | |
| | LS mean difference | -12.78 | |
| | *p*-value | 0.2591[3] | |
| Subcutaneous fat area (cm²), mean±SD | V2 | 218.72±52.88 | 242.90±52.65 |
| | V5 | 220.98±64.55 | 254.93±65.79 |
| | V5-V2 | 2.26±44.79 | 12.03±41.32 |
| | *p*-value | 0.7456[1] | 0.0697[1] |
| | Difference V5-V2 (Tx-Px) | -9.77±43.11 | |
| | LS mean difference | -11.76 | |
| | *p*-value | 0.2246[3] | |
| Visceral fat area (cm²), mean±SD | V2 | 140.35±47.36 | 132.68±44.92 |
| | V5 | 138.75±48.78 | 134.65±43.95 |
| | V5-V2 | -1.60±26.72 | 1.97±24.15 |
| | *p*-value | 0.7008[1] | 0.6039[1] |
| | Difference V5-V2 (Tx-Px) | -3.57±25.48 | |
| | LS mean difference | -2.29 | |
| | *p*-value | 0.6776[3] | |
| Visceral fat:subcutaneous fat ratio (VSR), mean±SD | V2 | 0.70±0.34 | 0.58±0.26 |
| | V5 | 0.71±0.39 | 0.57±0.26 |
| | V5-V2 | 0.01±0.19 | -0.02±0.15 |
| | *p*-value | 0.5564[2] | 0.0891[2] |
| | Difference V5-V2 (Tx-Px) | 0.02±0.17 | |
| | *p*-value | 0.8163[4] | |

[1] p-value for the paired t-test

[2] p-value for the Wilcoxon signed rank test

[3] p-value for ANCOVA adjusted for baseline and sex

[4] p-value for the Wilcoxon rank sum test

**Table S6. Results of blood lipid levels at 12 weeks from baseline (PPS)**

| | | BB-3 group (N=42) | Placebo group (N=41) |
|---|---|---|---|
| Total cholesterol (mg/dl), mean±SD | V1 | 198.05±32.62 | 201.41±36.59 |
| | V5 | 188.81±31.41 | 196.05±35.21 |
| | V5-V1 | -9.24±23.83 | -5.37±25.93 |
| | *p*-value | 0.0160[1] | 0.1927[1] |
| | Difference V5-V1 (Tx-Px) | -3.87±24.89 | |
| | LS mean difference | -4.41 | |
| | *p*-value | 0.3847[3] | |
| LDL cholesterol (mg/dl), mean±SD | V1 | 119.07±26.33 | 121.51±27.23 |
| | V5 | 111.50±22.07 | 117.49±25.21 |
| | V5-V1 | -7.57±16.07 | -4.02±16.89 |
| | *p*-value | 0.0040[1] | 0.1349[1] |
| | Difference V5-V1 (Tx-Px) | -3.55±16.48 | |
| | LS mean difference | -4.27 | |
| | *p*-value | 0.1889[3] | |
| Triglyceride (mg/dl), mean±SD | V1 | 150.83±83.53 | 145.15±80.41 |
| | V5 | 149.38±73.95 | 135.41±64.38 |
| | V5-V1 | -1.45±84.08 | -9.73±56.75 |
| | *p*-value | 0.9114[1] | 0.6610[2] |
| | Difference V5-V1 (Tx-Px) | 8.28±71.89 | |
| | *p*-value | 0.6325[4] | |
| HDL cholesterol (mg/dl), mean±SD | V1 | 53.50±10.82 | 54.98±10.44 |
| | V5 | 50.10±8.90 | 51.98±9.79 |
| | V5-V1 | -3.40±6.16 | -3.00±6.86 |
| | *p*-value | 0.0009[1] | 0.0079[1] |
| | Difference V5-V1 (Tx-Px) | -0.40±6.52 | |
| | LS mean difference | -0.60 | |
| | *p*-value | 0.6300[4] | |
| Leptin (mg/dl), mean±SD | V1 | 21.03±14.23 | 28.22±15.77 |
| | V5 | 17.33±11.89 | 28.16±19.54 |
| | V5-V1 | -3.69±6.59 | -0.06±11.92 |
| | *p*-value | 0.0004[2] | 0.5793[2] |
| | Difference V5-V1 (Tx-Px) | -3.63±9.60 | |
| | *p*-value | 0.1425[4] | |
| Adiponectin (mg/dl), mean±SD | V1 | 6933.11±3818.28 | 8448.21±4762.79 |
| | V5 | 6494.44±3091.42 | 8764.41±5787.27 |
| | V5-V1 | -438.67±2193.65 | 316.21±2706.40 |
| | *p*-value | 0.2496[2] | 0.5113[2] |

| | |
|---|---|
| Difference V5-V1 (Tx-Px) | -754.87±2460.25 |
| *p*-value | 0.7882[4] |

[1] p-value for the paired t-test

[2] p-value for the Wilcoxon signed rank test

[3] p-value for ANCOVA adjusted for baseline and sex

[4] p-value for the Wilcoxon rank sum test

**Table S7. Adverse effects (SAS)**

| | | BB-3 group (N=51) | Placebo group (N=49) |
|---|---|---|---|
| | | n (%) [F] | n (%) [F] |
| AE | | 15 (29.41) [21] | 14 (28.57) [19] |
| | (95% CI†) | (16.91, 41.92) | (15.92, 41.22) |
| | p-value[1] | 0.9262 | |
| ADR | | 0 (0.00) [0] | 0 (0.00) [0] |
| | (95% CI†) | (0.00, 0.00) | (0.00, 0.00) |
| | p-value[1] | - | |
| SAE | | 0 (0.00) [0] | 0 (0.00) [0] |
| | (95% CI†) | (0.00, 0.00) | (0.00, 0.00) |
| | p-value[1] | - | |

Note: [F]=frequency

[1] Compared between groups; p-value for the Chi-square test (C) or Fisher's exact test (F)

**Table S8. Changes in physical activity and dietary habits (PPS)**

| | | BB-3 group (N=42) | Placebo group (N=41) |
|---|---|---|---|
| IPAQ Total Physical activity (MET-min/week) | V2 | 2401.50±1955.78 | 2848.59±3562.14 |
| | V5 | 4151.02±5655.05 | 2808.20±3294.04 |
| | V5-V2 | 1749.52±4582.37 | -40.39±2645.99 |
| | *p*-value | 0.3412[2] | |
| IPAQ Total Energy expenditure (Kcal/week) | V2 | 3065.91±2694.03 | 3653.76±4955.91 |
| | V5 | 5257.72±7531.41 | 3509.73±4546.55 |
| | V5-V2 | 2191.81±5915.85 | -144.02±3317.14 |
| | *p*-value | 0.3458[2] | |
| Dietary survey (Kcal) | V2 | 1883.56±573.85 | 1827.53±657.96 |
| | V5 | 1811.72±440.19 | 1721.49±545.25 |
| | V5-V2 | -71.84±579.75 | -106.03±704.08 |
| | *p*-value | 0.8734[2] | |

[1] p-value for the two-sample t-test, [2] p-value for the Wilcoxon rank sum test

The International Physical Activity Questionnaires (IPAQ) was used to assess physical activity, while the 24-hour dietary recall method was used to assess dietary habits.

**Table S9. Blood test results (SAS)**

| | | BB-3 (N=51) | Placebo (N=49) |
|---|---|---|---|
| WBC (10³/μl), mean±SD | V1 | 6.12±1.35 | 6.21±2.11 |
| | V5 | 5.93±1.09 | 6.10±1.71 |
| | V5-V1 | -0.09±0.85 | -0.16±1.45 |
| | *p*-value | 0.4665[1] | 0.9662[2] |
| | *p*-value | 0.5423[4] | |
| RBC (10³/μl), mean±SD | V1 | 4.64±0.44 | 4.66±0.42 |
| | V5 | 4.91±0.45 | 4.80±0.44 |
| | V5-V1 | 0.22±0.28 | 0.13±0.31 |
| | *p*-value | 0.0000[2] | 0.0008[2] |
| | *p*-value | 0.3370[4] | |
| Hemoglobin (g/dl), mean±SD | V1 | 13.94±1.53 | 14.06±1.45 |
| | V5 | 14.67±1.43 | 14.49±1.24 |
| | V5-V1 | 0.56±0.78 | 0.36±0.75 |
| | *p*-value | 0.0000[2] | 0.0006[2] |
| | *p*-value | 0.7163[4] | |
| Hematocrit (%), mean±SD | V1 | 41.25±4.01 | 41.62±3.93 |
| | V5 | 43.25±3.85 | 42.85±3.44 |
| | V5-V1 | 1.57±2.27 | 1.00±2.63 |
| | *p*-value | 0.0000[2] | 0.0024[2] |
| | *p*-value | 0.6642[4] | |
| Platelets (10³/μl), mean±SD | V1 | 251.80±58.64 | 268.04±65.58 |
| | V5 | 268.07±65.62 | 273.79±58.18 |
| | V5-V1 | 18.80±36.03 | 8.53±40.91 |
| | *p*-value | 0.0000[2] | 0.0165[2] |
| | *p*-value | 0.5477[4] | |
| Glucose (mg/dl), mean±SD | V1 | 93.22±9.52 | 96.12±12.90 |
| | V5 | 92.47±9.31 | 90.79±14.29 |
| | V5-V1 | -1.53±10.48 | -5.95±11.03 |
| | *p*-value | 0.3316[1] | 0.0010[1] |
| | *p*-value | 0.0572[3] | |
| BUN (mg/dl), mean±SD | V1 | 14.09±3.28 | 14.11±3.75 |
| | V5 | 13.59±3.50 | 13.17±3.54 |
| | V5-V1 | -0.48±3.36 | -0.90±3.48 |
| | *p*-value | 0.3479[1] | 0.0963[1] |
| | *p*-value | 0.5599[3] | |
| Creatinine (mg/dl), | V1 | 0.82±0.13 | 0.85±0.15 |
| | V5 | 0.81±0.15 | 0.81±0.18 |

| | | | |
|---|---|---|---|
| mean±SD | V5-V1 | -0.02±0.10 | -0.03±0.11 |
| | p-value | 0.1702[1] | 0.0363[1] |
| | p-value | | 0.5349[1] |
| Total protein (g/dl), mean±SD | V1 | 7.40±0.35 | 7.42±0.32 |
| | V5 | 7.27±0.38 | 7.21±0.33 |
| | V5-V1 | -0.14±0.39 | -0.21±0.37 |
| | p-value | 0.0057[2] | 0.0006[1] |
| | p-value | | 0.4515[4] |
| Albumin (g/dl), mean±SD | V1 | 4.26±10.27 | 4.29±0.24 |
| | V5 | 4.20±0.06 | 4.28±0.25 |
| | V5-V1 | -0.07±0.31 | -0.03±0.23 |
| | p-value | 0.0990[2] | 0.3357[1] |
| | p-value | | 0.5856[4] |
| Total bilirubin (mg/dl), mean±SD | V1 | 0.81±0.37 | 0.79±0.31 |
| | V5 | 0.88±0.44 | 0.73±0.28 |
| | V5-V1 | 0.03±0.26 | -0.08±0.32 |
| | p-value | 0.4243[1] | 0.1043[1] |
| | p-value | | 0.0740[3] |
| AST (UL), mean±SD | V1 | 23.69±6.30 | 25.35±10.34 |
| | V5 | 24.33±6.62 | 29.02±36.29 |
| | V5-V1 | 0.84±6.18 | 4.74±36.42 |
| | p-value | 0.3640[1] | 0.6786[2] |
| | p-value | | 0.6725[4] |
| ALT (U/L), mean±SD | V1 | 21.73±9.69 | 25.80±18.74 |
| | V5 | 25.76±13.83 | 25.74±16.31 |
| | V5-V1 | 3.89±10.35 | 1.26±13.27 |
| | p-value | 0.0239[2] | 0.4360[2] |
| | p-value | | 0.3215[4] |
| γ-GT (U/L), mean±SD | V1 | 31.00±27.77 | 28.47±22.58 |
| | V5 | 31.64±30.64 | 27.42±19.90 |
| | V5-V1 | -0.78±12.26 | -0.23±5.96 |
| | p-value | 0.3109[2] | 0.6757[2] |
| | p-value | | 0.6363[4] |

[1] p-value for the paired t-test
[2] p-value for the Wilcoxon signed rank test
[3] p-value for the two-sample t-test
[4] p-value for the Wilcoxon rank sum test

**Table S10. Urine test results (SAS)**

| | | Week 12/baseline (Week 1) | Normal, n (%) | Abnormal, n (%) |
|---|---|---|---|---|
| **Specific gravity** | BB-3 group (N=51) | Normal, n (%) | 34 (66.67) | 5(9.80) |
| | | Abnormal, n (%) | 4 (7.84) | 2(3.92) |
| | | *p*-value | | 0.7389[1] |
| | Placebo group (N=49) | Normal, n (%) | 35 (71.43) | 4(8.16) |
| | | Abnormal, n (%) | 2 (3.92) | 2(3.92) |
| | | *p*-value | | 0.4142[1] |
| **pH** | BB-3 group (N=51) | Normal, n (%) | 45 (88.24) | 0 (0.00) |
| | | Abnormal, n (%) | 0 (0.00) | 0 (0.00) |
| | | *p*-value | | - |
| | Placebo group (N=49) | Normal, n (%) | 43 (87.76) | 0 (0.00) |
| | | Abnormal, n (%) | 0(0.00) | 0 (0.00) |
| | | *p*-value | | - |
| **Protein** | BB-3 group (N=51) | Normal, n (%) | 30 (58.82) | 7 (13.73) |
| | | Abnormal, n (%) | 7 (13.73) | 1 (1.96) |
| | | *p*-value | | 1.0000[1] |
| | Placebo group (N=49) | Normal, n (%) | 32 (65.31) | 7 (14.29) |
| | | Abnormal, n (%) | 2 (3.92) | 2 (3.92) |
| | | *p*-value | | 0.0956[1] |
| **Glucose** | BB-3 group (N=51) | Normal, n (%) | 45 (88.24) | 0 (0.00) |
| | | Abnormal, n (%) | 0 (0.00) | 0 (0.00) |
| | | *p*-value | | - |
| | Placebo group (N=49) | Normal, n (%) | 42 (85.71) | 1 (2.04) |
| | | Abnormal, n (%) | 0 (0.00) | 0 (0.00) |
| | | *p*-value | | - |

| Blood (RBC) | BB-3 group (N=51) | Normal, n (%) | 27 (52.94) | 8 (15.69) |
| --- | --- | --- | --- | --- |
| | | Abnormal, n (%) | 3 (5.88) | 7 (13.73) |
| | | *p*-value | | 0.1317[1] |
| | Placebo group (N=49) | Normal, n (%) | 24 (48.98) | 7 (14.29) |
| | | Abnormal, n (%) | 3 (5.88) | 9 (17.65) |
| | | *p*-value | | 0.2059[1] |

[1] *p*-value for McNemar's test

**Table S11.** Abbreviations and glossary of terms

| | |
|---|---|
| ADR | Adverse drug reaction |
| AE | Adverse event |
| ALP | Alkaline phosphatase |
| ALT | Alanine aminotransferase |
| ANCOVA | Analysis of covariance |
| AST | Aspartate aminotransferase |
| BB-3 | *Bifidobacterium breve* B-3 |
| BUN | Blood urea nitrogen |
| CFU | Colony-forming units |
| CIM | carbohydrate-insulin model |
| COVID-19 | Coronavirus disease 2019 |
| CRP | C-reactive protein |
| CT | Computed tomography |
| DALY | the global deaths and disability-adjusted life years |
| DEXA | Dual energy x-ray absorptiometry |
| EBM | energy balance model |
| ESR | Erythrocyte sedimentation rate |
| FAS | Full analysis set |
| GBD | Global Burden of Disease Study |
| $\gamma$-GT | Gamma-glutamyltransferase |
| HCG | Human chorionic gonadotropin |
| HDL-C | High density lipoprotein-cholesterol |
| IPAQ | International Physical Activity Questionnaires |
| IRB | Institutional review board |
| IWRS | Interactive web response system |
| LDL-C | Low-density lipoprotein-cholesterol |
| MET | Metabolic equivalent of task |
| PPS | Per protocol set |
| RBC | Red blood cell |
| SAE | Serious adverse event |
| SAS | Safety analysis set |
| TG | Triglyceride |
| VSR | Visceral fat area/subcutaneous fat area ratio |
| UNL | Upper normal limit |
| WBC | White blood cell |