**Supplemental Figure 1. Violin plots presenting the distributions of serum polyols during pregnancy among all participants.**

A: Erythritol, B: Sorbitol, C: Xylitol.

The solid line represents the median; the dotted line represents the interquartile range.

The levels of serum erythritol, sorbitol, and xylitol are 3.05 (2.75-3.45) umol/L, 1.49 (1.24-1.89) umol/L, and 1.30 (1.59-1.90) umol/L, respectively.



**Supplemental Table S1. Temperature program of column incubator in GC-TOFMS**

|  |  |  |
| --- | --- | --- |
| **Rate (ºC /min)** | **Temperature (ºC）** | **Hold time (min)** |
| 20 | 80-175 | 0 |
| 10 | 175-210 | 0 |
| 10 | 210-300 | 0 |
| 6 | 300 | 6 |

**Supplemental Table S2. Participants' characteristics in participants with and without GDM**

|  |  |  |  |
| --- | --- | --- | --- |
| **Trait (units)** | **Non-GDM** | **GDM** | ***P*** |
| **Maternal traits collected at OGTT** | | |  |
| Participants, No. (%) | 109 | 109 | — |
| Age at OGTT (years) | 30.1 ± 4.3 | 30.0 ± 4.4 | 0.94 |
| Gestational age at OGTT (weeks) | 25.0 (25.0-26.0) | 24.5 (25.0-26.0) | 0.93 |
| Pre-pregnancy BMI (kg/m2) | 22.56 ± 3.4 | 22.55 ± 3.36 | 0.94 |
| BMI at OGTT (kg/m2) | 25.19 ± 3.52 | 25.24 ± 3.68 | 0.92 |
| Mean arterial pressure at OGTT (mmHg) | 87.6 ± 8.6 | 88.2 ± 8.9 | 0.64 |
| Fasting plasma glucose levels (mmol/L) | 4.39 ± 0.31 | 4.82 ± 0.54 | <0.0001 |
| 1h-plasma glucose levels (mmol/L) | 7.29 ± 1.26 | 9.71 ± 1.50 | <0.0001 |
| 2h-plasma glucose levels (mmol/L) | 6.48 ± 1.04 | 8.59 ± 1.44 | <0.0001 |
| Fasting insulin levels (mmol/L) | 39.56 (24.30-61.55) | 55.53 (34.43-75.09) | 0.0012 |
| 1h-insulin levels (mmol/L) | 346.90 (222.40-534.10) | 368.5 (275.30-552.40) | 0.11 |
| 2h-insulin levels (mmol/L) | 310.90 (201.00-448.20) | 421.6 (259.90-645.70) | 0.001 |
| HbA1c (%) | 4.80 ± 0.34 | 5.07 ± 0.37 | <0.0001 |
| HbA1c (mmol/mol) | 29.01 ± 0 3.67 | 31.94 ± 4.01 | <0.0001 |
| HOMA-IR | 1.31 (0.78-2.07) | 1.96 (1.10-2.85) | <0.0001 |
| HOMA-β | 150.49 (105.41-246.99) | 142.46 (110.21-190.84) | 0.45 |
| Matsuda's ISI derived from OGTT | 6.72 (4.61-11.23) | 4.29 (3.32-6.79) | <0.0001 |
| Triglycerides (mmol/L) | 1.43 (1.23-1.92) | 1.80 (1.41-2.19) | 0.0012 |
| Total cholesterol (mmol/L) | 5.24 ± 0.77 | 5.46 ± 0.89 | 0.059 |
| HDL-cholesterol (mmol/L) | 2.68 ± 0.58 | 2.64 ± 0.51 | 0.55 |
| LDL-cholesterol (mmol/L) | 2.76 (2.35-3.14) | 2.92 (2.44-3.40) | 0.082 |
| Family history of diabetes, No. (%) | 6 (5.5) | 10 (9.2) | 0.30 |
| **Maternal outcome** |  |  |  |
| Birth timing (weeks） | 39.0 ± 1.4 | 38.8 ± 1.4 | 0.19 |
| Full-term delivery, No. (%) | 98 (97.0) | 98 (93.3) | 0.33 |
| Cesarean section, No. (%) | 46 (46.9) | 39 (37.5) | 0.17 |
| **Child outcome** |  |  |  |
| Birth height (cm) | 50.0 (49.0 - 50.0) | 50 (49.0- 50.0) | 0.82 |
| Birth weight (kg) | 3.40 (3.05 - 3.60) | 3.40 (3.10- 3.80) | 0.38 |

Data are given as the median (interquartile range) for skewed variables, or as the number (portion) for categorical variables. For the comparisons of continuous variables, Student’s t-tests and Wilcoxon rank-sum tests were used. For the comparisons of categorical variables, the chi-square tests or Fisher’s exact tests were used. *P* values less than 0.05 were considered statistically significant. Abbreviations: OGTT: oral glucose tolerance test, MAP: mean arterial pressure, FPG: fasting plasma glucose, A1C: Hemo-globin A1c, ISI: insulin sensitivity index, HOMA-IR, homeostasis model assessment for insulin resistance, GDM: gestational diabetes mellitus, LDL: low-density lipoprotein, HDL: high-density lipoprotein.

**Supplemental Table S3. Participants' characteristics according to serum** **erythritol tertiles at fasting**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Trait (units)** | **Tertile1**  (<2.86 umol/L) | **Tertile2**  (2.86-3.32 umol/L) | **Tertile3**  (≥3.31 umol/L) | ***P*** |
| **Maternal traits collected at OGTT during pregnancy** | | | | |
| Participants, No. (%) | 72 | 72 | 74 |  |
| Age at OGTT (years) | 28.8 ± 4.1 | 31.2 ± 4.3 | 30.2 ± 4.3 | 0.0042 |
| Gestational age at OGTT (weeks) | 25.0 (24.0 -26.0) | 25.0 (25.0 -26.0) | 25.0 (25.0 -26.0) | 0.85 |
| Pre-pregnancy BMI (kg/m2) | 22.8 ± 3.5 | 22.6 ± 3.5 | 22.3 ± 3.1 | 0.77 |
| Mean arterial pressureat OGTT (mmHg) | 88.1 ± 8.2 | 87.8 ± 9.2 | 87.8 ± 8.9 | 0.97 |
| Fasting plasma glucose (mmol/L) | 4.52 ± 0.46 | 4.58 ± 0.41 | 4.71 ± 0.55 | 0.20 |
| 1h-plasma glucose (mmol/L) | 8.09 ± 1.76 | 8.49 ± 1.72 | 8.91 ± 1.96 | 0.025 |
| 2h-plasma glucose (mmol/L) | 7.14 ± 1.48 | 7.53 ± 1.57 | 7.93 ± 1.78 | 0.025 |
| Fasting insulin (mmol/L) | 39.87 (27.32-64.97) | 46.49 (31.72-62.06) | 48.65 (29.90-77.59) | 0.42 |
| 1h-insulin (mmol/L) | 341.50 (216.45-463.60) | 351.05 (246.30-542.25) | 397.40 (292.00-539.60) | 0.23 |
| 2h-insulin (mmol/L) | 305.35 (199.25-453.50) | 367.40 (266.60-506.20) | 445.25 (267.70-581.10) | 0.037 |
| HbA1c (%) | 4.88 ± 0.30 | 4.94 ± 0.31 | 4.99 ± 0.48 | 0.13 |
| HbA1c (mmol/mol) | 29.89 ± 3.28 | 30.25 ± 3.39 | 31.07 ± 5.28 | 0.13 |
| HOMA-IR | 1.30 (0.88-2.26) | 1.58 (1.06-2.23) | 1.58 (0.94-2.80) | 0.34 |
| HOMA-β | 152.07 (115.16-205.22) | 144.64 (109.00-209.31) | 139.19 (104.63-216.83) | 0.83 |
| Matsuda's ISI derived from OGTT | 6.78 (4.02-9.00) | 5.41 (3.95-7.26) | 4.62 (3.36-7.12) | 0.046 |
| Triglycerides (mmol/L) | 1.53 (1.23-2.01) | 1.43 (1.21-2.23) | 1.79 (1.50-2.14) | 0.015 |
| Total cholesterol (mmol/L) | 5.19 ± 0.77 | 5.39 ± 0.87 | 5.47 ± 0.86 | 0.12 |
| HDL-cholesterol (mmol/L) | 2.63 ± 0.56 | 2.67 ± 0.57 | 2.67 ± 0.51 | 0.90 |
| LDL-cholesterol (mmol/L) | 2.71 (2.32-3.06) | 2.78 (2.36-3.35) | 2.94 (2.61-3.33) | 0.11 |
| **Maternal outcome** |  |  |  |  |
| Birth timing (weeks） | 39.1 ± 1.1 | 38.7 ± 1.6 | 38.8 ± 1.5 | 0.25 |
| Full-term delivery, No. (%) | 65 (98.5) | 67 (94.4) | 65 (94.2) | 0.091 |
| Cesarean section, No. (%) | 26 (41.3) | 35 (50.0) | 24 (34.8) | 0.98 |
| **Child outcome** |  |  |  |  |
| Birth height (cm) | 50.0 (49.0-50.0) | 50.0 (49.0-50.0) | 50.0 (50.0-50.0) | 0.25 |
| Birth weight (kg) | 3.45 (3.10-3.60) | 3.30 (3.10-3.60) | 3.53 (3.00-3.88) | 0.35 |

Data are given as median (interquartile range) for skewed variables, or number (proportion) for categorical variables. For the comparisons of continuous variables, ANOVA and Kruskal-Wallis tests were used to calculate *P* values. For the comparison of categorical data, chi-square tests were used to calculate *P* values. the chi-square tests or Fisher's exact tests were used. *P* values less than 0.05 were considered statistically significant.

**Supplemental Table S4. Participants' characteristics according to maternal serum** **sorbitol tertiles at fasting**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Trait (units)** | **Tertile1**  (<1.32 umol/L) | **Tertile2**  (1.32-1.69 umol/L) | **Tertile3**  (≥1.69 umol/L) | ***P*** |
| **Maternal traits collected at OGTT during pregnancy** | | | | |
| Participants, No. (%) | 72 | 73 | 73 |  |
| Age at OGTT (years) | 29.8 ± 4.5 | 30.0 ± 3.9 | 30.3 ± 4.5 | 0.75 |
| Gestational age at OGTT (weeks) | 25.0 (25.0-26.0) | 25.0 (25.0-26.0) | 25.0 (24.0-26.0) | 0.37 |
| Pre-pregnancy BMI (kg/m2) | 22.2 ± 3.6 | 22.9 ± 3.4 | 22.6 ± 3.2 | 0.40 |
| Mean arterial pressure at OGTT (mmHg) | 87.9 ± 8.7 | 87.8 ± 9.0 | 88.0 ± 8.7 | 0.99 |
| Fasting plasma glucose (mmol/L) | 4.43 ± 0.46 | 4.57 ± 0.41 | 4.81 ± 0.51 | <0.0001 |
| 1h-plasma glucose (mmol/L) | 7.77 ± 1.72 | 8.30 ± 1.69 | 9.43 ± 1.72 | <0.0001 |
| 2h-plasma glucose (mmol/L) | 6.91 ± 1.46 | 7.47 ± 1.54 | 8.21 ± 1.67 | <0.0001 |
| Fasting insulin (mmol/L) | 41.13 (30.76-61.52) | 42.05 (22.45-69.49) | 54.64 (34.96-72.53) | 0.069 |
| 1h-insulin (mmol/L) | 337.35 (216.45-472.85) | 368.50 (222.40-536.20) | 374.40 (300.90-596.80) | 0.033 |
| 2h-insulin (mmol/L) | 304.85 (196.45-453.05) | 346.00 (240.70-513.60) | 421.60 (290.00-675.40) | 0.0037 |
| HbA1c (%) | 4.84 ± 0.38 | 4.94 ± 0.32 | 5.03 ± 0.40 | 0.028 |
| HbA1c (mmol/mol) | 29.43 ± 4.19 | 30.47 ± 3.53 | 31.51 ± 4.34 | 0.028 |
| HOMA-IR | 1.36 (0.97-2.21) | 1.42 (0.76-2.41) | 1.95 (1.10-2.91) | 0.019 |
| HOMA-β | 161.29 (116.94-267.56) | 137.68 (86.45-192.44) | 141.57 (112.09-190.42) | 0.024 |
| Matsuda's ISI derived from OGTT | 6.37 (4.64-8.70) | 5.63 (3.83-8.77) | 4.20 (3.07-6.82) | 0.0003 |
| Triglycerides (mmol/L) | 1.63 (1.27-2.12) | 1.45 (1.17-1.90) | 1.79 (1.47-2.15) | 0.12 |
| Total cholesterol (mmol/L) | 5.39 ± 0.87 | 5.18 ± 0.79 | 5.48 ± 0.83 | 0.084 |
| HDL-cholesterol (mmol/L) | 2.72 ± 0.57 | 2.63 ± 0.54 | 2.63 ± 0.53 | 0.56 |
| LDL-cholesterol (mmol/L) | 2.80 (2.47-3.16) | 2.70 (2.22-3.02) | 3.01 (2.58-3.41) | 0.19 |
| **Maternal outcome** |  |  |  |  |
| Birth timing (weeks） | 39.0 ± 1.3 | 39.0 ± 1.4 | 38.7 ± 1.5 | 0.23 |
| Full-term delivery, No. (%) | 66 (97.1) | 68 (97.1) | 63 (92.7) | 0.34 |
| Cesarean section, No. (%) | 26 (40.6) | 31 (44.3) | 28 (41.2) | 0.90 |
| **Child outcome** |  |  |  |  |
| Birth height (cm) | 50.0 (49.0-50.0) | 50.0 (49.0-50.0) | 50.0 (50.0-50.5) | 0.065 |
| Birth weight (kg) | 3.25 (3.00-3.55) | 3.50 (3.20-3.75) | 3.45 (3.10-3.80) | 0.0025 |

Data are given as median (interquartile range) for skewed variables, or number (proportion) for categorical variables. For the comparison of continuous variables, ANOVA and Kruskal-Wallis tests were used to calculate *P* values. For the comparison of categorical data, chi-square tests were used to calculate *P* values. the chi-square tests or Fisher's exact tests were used. *P* values less than 0.05 were considered statistically significant.

**Supplemental Table S5. Participants' characteristics according to serum xylitol tertiles at fasting**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Trait (units)** | **Tertile1**  (<1.39 umol/L) | **Tertile2**  (1.39-1.81umol/L) | **Tertile3**  (≥1.81 umol/L) | ***P*** |
| **Maternal traits collected at OGTT during pregnancy** | | | | |
| Participants, No. (%) | 72 | 72 | 74 |  |
| Age at OGTT (years) | 29.8 ± 4.0 | 30.4 ± 4.7 | 29.9 ± 4.2 | 0.66 |
| Gestational age at OGTT (weeks) | 25.0 (25.0-26.0) | 25.0 (24.5-26.0) | 25.0 (24.0-26.0) | 0.89 |
| Pre-pregnancy BMI (kg/m2) | 22.8 ± 3.8 | 22.6 ± 3.0 | 22.3 ± 3.3 | 0.81 |
| Mean arterial pressureat OGTT (mmHg) | 88.0 ± 9.5 | 88.5 ± 8.8 | 87.3 ± 7.9 | 0.99 |
| Fasting plasma glucose (mmol/L) | 4.66 ± 0.50 | 4.60 ± 0.43 | 4.55 ± 0.52 | 0.42 |
| 1h-plasma glucose (mmol/L) | 8.38 ± 1.87 | 8.85 ± 1.61 | 8.28 ± 1.99 | 0.14 |
| 2h-plasma glucose (mmol/L) | 7.39 ± 1.58 | 7.94 ± 1.65 | 7.28 ± 1.63 | 0.029 |
| Fasting insulin (mmol/L) | 55.40 (36.26-77.41) | 44.64 (30.81-61.49) | 40.09 (22.98-66.75) | 0.016 |
| 1h-insulin (mmol/L) | 371.75 (246.95-501.80) | 415.10 (264.00-585.30) | 334.15 (231.20-521.90) | 0.16 |
| 2h-insulin (mmol/L) | 318.75 (230.95-523.00) | 412.75 (253.15-538.50) | 322.15 (210.80-507.90) | 0.27 |
| HbA1c (%) | 4.94 ± 0.33 | 4.95 ± 0.30 | 4.92 ± 0.47 | 0.78 |
| HbA1c (mmol/mol) | 30.51 ± 3.63 | 30.63 ± 3.28 | 30.29 ± 5.18 | 0.78 |
| HOMA-IR | 1.94 (1.19-2.72) | 1.56 (1.05-2.26) | 1.33 (0.76-2.43) | 0.019 |
| HOMA-β | 159.63 (119.38-247.60) | 143.36 (104.63-209.31) | 136.51 (105.41-181.56) | 0.13 |
| Matsuda's ISI derived from OGTT | 4.99 (3.73-7.26) | 5.20 (3.56-7.42) | 6.48 (3.93-11.29) | 0.068 |
| Triglycerides (mmol/L) | 1.73 (1.39-2.30) | 1.66 (1.27-2.12) | 1.47 (1.27-1.87) | 0.037 |
| Total cholesterol (mmol/L) | 5.51 ± 0.91 | 5.31 ± 0.77 | 5.25 ± 0.82 | 0.16 |
| HDL-cholesterol (mmol/L) | 2.69 ± 0.56 | 2.53 ± 0.55 | 2.75 ± 0.51 | 0.049 |
| LDL-cholesterol (mmol/L) | 2.96 (2.49-3.41) | 2.83 (2.47-3.32) | 2.68 (2.22-3.14) | 0.021 |
| **Maternal outcome** |  |  |  |  |
| Birth timing (weeks） | 38.8 ± 1.3 | 39.0 ± 1.1 | 38.8 ± 1.8 | 0.97 |
| Full-term delivery, No. (%) | 67 (95.7) | 67 (98.5) | 63 (92.7) | 0.24 |
| Cesarean section, No. (%) | 24 (35.3) | 28 (41.8) | 33 (49.3) | 0.26 |
| **Child outcome** |  |  |  |  |
| Birth height (cm) | 50.0 (49.0 -50.0) | 50.0 (50.0-50.0) | 50.0 (49.0-50.0) | 0.35 |
| Birth weight (kg) | 3.40 (3.05-3.65) | 3.40 (3.15-3.78) | 3.43 (3.05-3.80) | 0.72 |

Data are given as median (interquartile range) for skewed variables, or number (proportion) for categorical variables. For the comparison of continuous variables, ANOVA and Kruskal-Wallis tests were used to calculate *P* values. For the comparison of categorical data, chi-square tests were used to calculate *P* values. the chi-square tests or Fisher's exact tests were used. *P* values less than 0.05 were considered statistically significant.

**Supplemental Table S6. Spearman correlation analysis between maternal serum polyols levels and clinical traits**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Trait (units)** | **Erythritol** | |  | **Sorbitol** | |  | **Xylitol** | |
| **Spearman's rho** | ***P*** |  | **Spearman's rho** | ***P*** |  | **Spearman's rho** | ***P*** |
| Gestational diabetes (yes=1, no=0) | 0.1762 | 0.0091 |  | 0.3908 | <0.0001 |  | -0.2090 | 0.0019 |
| Age at OGTT (years) | 0.1325 | 0.051 |  | 0.0967 | 0.15 |  | 0.0336 | 0.62 |
| Gestational age at OGTT (weeks) | -0.0355 | 0.60 |  | -0.0906 | 0.18 |  | 0.0073 | 0.92 |
| Pre-pregnancy BMI (kg/m2) | -0.0490 | 0.47 |  | 0.0206 | 0.76 |  | -0.0107 | 0.88 |
| Mean arterial pressure at OGTT (mmHg) | -0.0133 | 0.85 |  | -0.0583 | 0.41 |  | -0.0142 | 0.84 |
| Fasting plasma glucose (mmol/L) | 0.1497 | 0.027 |  | 0.3458 | <0.0001 |  | -0.0549 | 0.42 |
| 1h-plasma glucose (mmol/L) | 0.1766 | 0.0090 |  | 0.4006 | <0.0001 |  | -0.0284 | 0.68 |
| 2h-plasma glucose (mmol/L) | 0.1912 | 0.0046 |  | 0.3512 | <0.0001 |  | -0.0072 | 0.92 |
| Fasting insulin (mmol/L) | 0.1311 | 0.054 |  | 0.1313 | 0.053 |  | -0.1890 | 0.0052 |
| 1h-insulin (mmol/L) | 0.1119 | 0.099 |  | 0.1637 | 0.016 |  | -0.0553 | 0.42 |
| 2h-insulin (mmol/L) | 0.1904 | 0.0048 |  | 0.2444 | 0.0003 |  | -0.0296 | 0.66 |
| HbA1c (%) | 0.1174 | 0.084 |  | 0.1916 | 0.0045 |  | 0.0142 | 0.83 |
| HbA1c (mmol/mol) | 0.1174 | 0.084 |  | 0.1916 | 0.0045 |  | 0.0142 | 0.83 |
| HOMA-IR | 0.1438 | 0.034 |  | 0.1748 | 0.0099 |  | -0.1815 | 0.0074 |
| HOMA-β | -0.0092 | 0.89 |  | -0.1436 | 0.035 |  | -0.1454 | 0.032 |
| Matsuda's ISI derived from OGTT | -0.2015 | 0.0029 |  | -0.2719 | <0.0001 |  | 0.1366 | 0.045 |
| Triglycerides (mmol/L) | 0.2097 | 0.0022 |  | 0.1328 | 0.054 |  | -0.1556 | 0.024 |
| Total cholesterol (mmol/L) | 0.1306 | 0.058 |  | 0.0803 | 0.24 |  | -0.1376 | 0.046 |
| Low-density lipoprotein cholesterol (mmol/L) | 0.1495 | 0.030 |  | 0.1103 | 0.11 |  | -0.1793 | 0.0090 |
| High-density lipoprotein cholesterol (mmol/L) | 0.0312 | 0.65 |  | -0.0757 | 0.27 |  | 0.0824 | 0.23 |
| Alanine aminotransferase (mmol/L) | 0.0941 | 0.17 |  | 0.1710 | 0.012 |  | 0.0895 | 0.19 |
| Total bilirubin (mmol/L) | -0.1162 | 0.089 |  | -0.0259 | 0.71 |  | -0.0299 | 0.66 |
| **Maternal outcome** |  |  |  |  |  |  |  |  |
| Birth timing (weeks） | -0.0970 | 0.17 |  | -0.1054 | 0.13 |  | 0.0122 | 0.86 |
| Full-term delivery, No. (%) | -0.0990 | 0.16 |  | -0.1202 | 0.085 |  | -0.0597 | 0.39 |
| Cesarean section, No. (%) | -0.0399 | 0.57 |  | 0.1580 | 0.74 |  | 0.1139 | 0.11 |
| **Child outcome** |  |  |  |  |  |  |  |  |
| Birth height (cm) | 0.1233 | 0.078 |  | 0.1580 | 0.024 |  | 0.0502 | 0.48 |

*P* values equal to or less than 0.05 were considered statistically significant.