

Supplemental Table 1. Metabolic characteristics and indices of insulin sensitivity and β cell function of subjects assessed by 2-h OGTT (n=291)

Characteristics	NGT	IFG/IGT	Type 2 diabetes	P value	P (NGT vs IFG/IGT)	P (NGT vs Type 2 diabetes)	P (IFG/IGT vs Type 2 diabetes)
Age (years)	47.11±7.42	48.9±6.95	47.01±6.37	0.121	—	—	—
Sex, n(M/F)	105(53/52)	115(58/57)	71(40/31)	0.693	—	—	—
BMI (kg/m^2)	24.33±3.12	25.16±4.85	26.27±2.74	0.008	0.156	0.002	0.057
Family history, n(%)	10(9.52)	20(17.39)	11(15.49)	0.228	—	—	—
Current smoking, n(%)	20(19.04)	10(8.70)	12(16.90)	0.073	—	—	—
Current drinking, n(%)	12(11.42)	10(8.70)	6(8.45)	0.734	—	—	—
Physical activity, n(%)	37(35.23)	43(37.39)	18(25.35)	0.22	—	—	—
FBG (mmol/L)	4.86±0.38	5.47±0.74	6.98±1.99	<0.001	0.001	<0.001	<0.001
2h-PBG (mmol/L)	6.12±0.99	8.31±1.76	14.76±3.72	<0.001	<0.001	<0.001	<0.001
HbA1c (%)	5.45±0.6	5.63±0.39	6.29±1.18	<0.001	0.168	<0.001	<0.001
HbA1c (mmol/mol)	37.41±4.7	39.1±4.27	46.45±13.02	<0.001	<0.001	<0.001	<0.001
Fasting insulin (mU/L)	5.26±2.95	7.72±4.4	7.72±4.09	<0.001	<0.001	<0.001	0.675
WHR	0.88±0.07	0.93±0.29	0.92±0.06	0.15	—	—	—
Body Fat (%)	27.73±7.37	29.19±8.86	29.53±8.02	0.374	—	—	—
SBP (mmHg)	125.26±13.94	132.9±55.23	136.06±20.78	0.134	—	—	—
DBP (mmHg)	81.59±10.81	83.89±10.82	89.94±12.83	<0.001	0.164	<0.001	0.001
ALT (U/L)	30.8±18.29	34.35±23.81	47.52±30.62	<0.001	0.258	<0.001	0.001

AST (U/L)	24.02±7.98	23.87±10.25	29.26±13.83	0.001	0.987	0.001	0.001
TC (mmol/L)	4.76±1.83	4.65±1.9	4.55±1.87	0.456	—	—	—
Triglyceride (mmol/L)	2.27±1.8	2.79±2.17	3.52±2.39	0.001	0.124	<0.001	0.004
HDL-c (mmol/L)	1.35±0.34	1.32±0.35	1.22±0.3	0.059	0.751	0.046	0.025
LDL-c (mmol/L)	3.24±0.71	3.32±0.74	3.30±0.83	0.725	—	—	—
eGFR (mL/min/1.73m ²)	95.45±15.87	96.16±16.74	95.19±18.25	0.749	—	—	—
RBP4 (µg/ml)	30.63(21.43–44.77)	37.60(29.05–49.16)	46.27(37.82–55.60)	0.001	0.009	0.001	0.006
HOMA-IR	0.99(0.69–1.47)	1.66(1.04–2.29)	1.92(1.37–3.04)	<0.001	<0.001	<0.001	0.026
QUICKI	0.38 (0.36–0.41)	0.35 (0.34–0.38)	0.35(0.32–0.36)	<0.001	<0.001	<0.001	0.026
HOMA-β	74.28(42.13–110.21)	79.75(41.70–121.75)	46.77(27.85–63.12)	0.001	0.919	<0.001	<0.001
Stumvoll first-phase insulin secretion index	917.59(730.27–1072.06)	669.36(414.36–951.73)	-262.07(-769.78–109.06)	<0.001	<0.001	<0.001	<0.001
Stumvoll second-phase insulin secretion index	215.19(176.45–251.09)	173.89(96.21–253.57)	-81.39(-211.23–10.80)	<0.001	<0.001	<0.001	<0.001

Data of demographic and metabolic characteristics of subjects at each clinical stage are presented as Means ± SD, unless otherwise indicated. Indices of insulin sensitivity and β cell function are expressed as median (interquartile range), where the interquartile range values indicated as 75th percentile-25th percentile. FBG, fasting blood glucose; 2h-PBG, 2h postprandial blood glucose; BMI, body mass index; WHR, Waist to hip ratio; SBP, systolic blood pressure; DBP, Diastolic blood pressure; TC, Total cholesterol; HDL-c, high-density lipoprotein cholesterol; LDL-c, low-density lipoprotein cholesterol; eGFR, estimated glomerular filtration rate.

Supplemental Table 2. Association of serum RBP4 with clinical characteristics of subjects assessed by 2-h OGTT (n=291)

Variable	Univariate		Multivariate	
	β	P value	β	P value
BMI	0.218	0.001	0.105	0.071
WHR	0.196	0.001	0.023	0.686
SBP(mmHg)	0.158	0.007	0.002	0.999
DBP(mmHg)	0.26	<0.001	0.246	<0.001
Triglyceride(mmol/L)	0.305	<0.001	0.235	<0.001
TC(mmol/L)	0.119	0.042	0.093	0.107
HDL-c(mmol/L)	-0.165	0.005	-0.135	0.024
LDL-c(mmol/L)	0.122	0.037	0.086	0.135
eGFR(mL/min/1.73m ²)	-0.007	0.9	-0.003	0.963

Multivariable mode is shown after adjustment for age, sex, smoking, drinking, physical activity, and family history of type 2 diabetes.

Supplemental Table 3. Association of serum RBP4 with β cell function assessed by 2-h OGTT (n=291)

Variable	Univariate		Multivariate model 1		Multivariate model 2	
	β	P value	β	P value	β	P value
FBG (mmol/L)	0.231	<0.001	0.209	<0.001	0.128	0.034
2h-PBG (mmol/L)	0.39	<0.001	0.369	<0.001	0.297	<0.001
HbA1c (%)	0.161	0.007	0.127	0.033	0.072	0.184
Fasting insulin (mU/L)	0.085	0.145	0.076	0.195	0.011	0.847
HOMA-IR	0.141	0.016	0.147	0.011	0.049	0.400
QUICKI	-0.181	0.002	-0.173	0.003	-0.088	0.154
HOMA- β	-0.066	0.263	-0.052	0.371	-0.089	0.155
Stumvoll first-phase insulin secretion index	-0.266	<0.001	-0.154	<0.001	-0.189	0.002
Stumvoll second-phase insulin secretion index	-0.320	<0.001	-0.325	<0.001	-0.257	<0.001

Multivariable mode 1 is shown after adjustment for age, sex, smoking, drinking, physical activity and family history of type 2 diabetes.

Multivariable mode 2 is shown after adjustment for the variables in model 1 plus DBP, Triglyceride, HDL-c.

Supplemental Table 4. Association of serum RBP4 with clinical characteristics and β cell function in subjects assessed by oral minimal model test (n=74)

Variable	Univariate		Multivariate	
	β	P value	β	P value
BMI	0.302	0.009	0.248	0.041
WHR	0.274	0.019	0.144	0.286
SBP(mmHg)	0.277	0.017	0.227	0.061
DBP(mmHg)	0.313	0.007	0.279	0.022
Triglyceride(mmol/L)	0.283	0.015	0.171	0.161
TC(mmol/L)	0.369	0.001	0.431	<0.001
HDL-c(mmol/L)	-0.033	0.781	0.226	0.111
LDL-c(mmol/L)	0.368	0.001	0.398	0.001
eGFR(mL/min/1.73m ²)	0.082	0.490	0.055	0.664
FBG(mmol/L)	0.208	0.076	0.133	0.283
2h-PBG (mmol/L)	0.271	0.020	0.229	0.064
HbA1c(%)	0.193	0.099	0.153	0.222
Fasting insulin(mU/L)	0.076	0.526	-0.041	0.752
HOMA-IR	0.023	0.846	-0.023	0.856
QUICKI	-0.066	0.577	-0.040	0.763
HOMA- β	-0.094	0.425	-0.076	0.543
Stumvoll first-phase insulin secretion index	-0.299	0.010	-0.266	0.031
Stumvoll second-phase insulin secretion index	-0.293	0.011	-0.263	0.033
IGI (pmol/mmol)	-0.275	0.018	-0.247	0.045
CPI (pmol/mmol)	-0.253	0.030	-0.208	0.084
SI	-0.216	0.045	-0.241	0.053
PhiD	-0.323	0.006	-0.297	0.015
PhiS	-0.392	0.001	-0.360	0.003
PhiT	-0.335	0.004	-0.306	0.013

Multivariable mode is shown after adjustment for age, sex, smoking, drinking, physical activity, and family history of type 2 diabetes.

Supplemental Table 5. Disposition indexes of the subjects assessed by oral minimal model test (n=74)

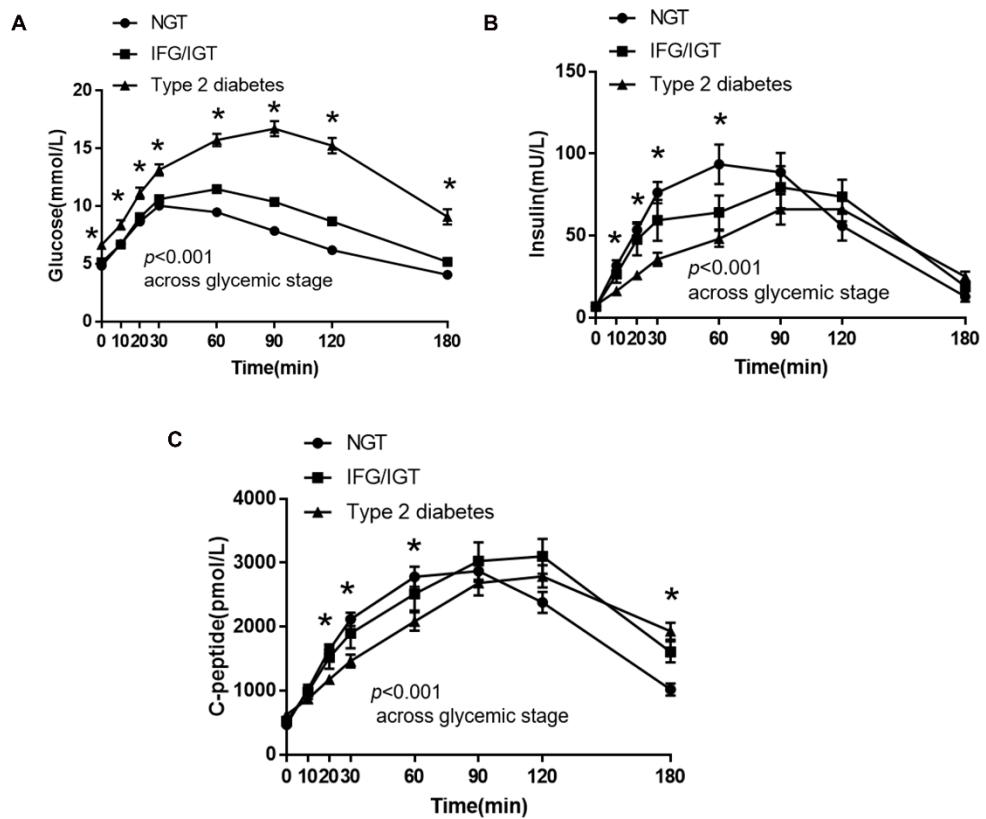
Variable	NGT	IFG/IGT	Type 2 diabetes	P value	P (NGT vs IFG/IGT)	P (NGT vs Type 2 diabetes)	P (IFG/IGT vs Type 2 diabetes)
DI-PhiD (10^{-13} dL/kg/min per μ U/min)	10672.17 (7194.05–19363.99)	5045.1369 (2804.15–8863.47)	426.14 (233.26–1589.20)	<0.001	0.018	<0.001	<0.001
DI-PhiS (10^{-13} dL/kg/min 2 per μ U/min)	786.45 (484.86–1381.92)	405.38 (209.39–784.25)	36.67 (19.65–212.70)	<0.001	0.140	<0.001	<0.001
DI-PhiT (10^{-13} dL/kg/min 2 per μ U/min)	1067.71 (631.92–1502.97)	580.56 (272.22–1186.90)	42.54 (22.23–249.68)	<0.001	0.248	<0.001	<0.001

Data are presented as the median (interquartile range) for the unadjusted data within each cell. Data were compared with Kruskal-Wallis followed by Nemenyi test to compare the data between two groups.

Supplemental Table 6. Association of serum RBP4 with disposition indexes assessed by oral**minimal model test (n=74)**

Variable	Univariate		Multivariate	
	β	P value	β	P value
DI-PhiD (10^{-13} dL/kg/min per μ U/min)	-0.366	<0.001	-0.282	0.016
DI-PhiS (10^{-13} dL/kg/min ² per μ U/min)	-0.356	0.002	-0.312	0.010
DI-PhiT (10^{-13} dL/kg/min ² per μ U/min)	-0.360	0.002	-0.284	0.018

Multivariable is shown after adjustment for age, sex, smoking, drinking, physical activity and family history of type 2 diabetes.



Supplemental Figure 1. A-C. Serum glucose (A), insulin (B), and C-peptide (C) concentrations at indicated time point after the 75g oral glucose challenge in subjects involved in oral minimal model test.