

Supplementary Table S1| Multivariate logistic regression analysis

Variables	Model 1		Model 2	
	OR (95% CI)	P value	OR (95% CI)	P value
Age (Y)	0.954(0.889~1.024)	0.189	0.957(0.891~1.027)	0.221
BMI (kg/m ²)	0.766(0.569~1.03)	0.078	0.757(0.561~1.022)	0.069
Hb (g/L)	0.981(0.938~1.027)	0.411	0.983(0.939~1.029)	0.466
C-P (nmol/L)	0.878(0.025~30.953)	0.943	1.077(0.03~38.181)	0.967
2hC-P (nmol/L)	0.297(0.067~1.323)	0.111	0.268(0.057~1.254)	0.094
UACR (mg/g)	1.003(0.999~1.008)	0.167	1.003(0.999~1.008)	0.146
ALB (g/L)	1.085(0.888~1.326)	0.422	1.08(0.883~1.321)	0.455
CA (nmol/L)	1.002(1~1.004)	0.06	1.002(1~1.004)	0.058
GLCA (nmol/L)	0.998(0.94~1.06)	0.958	0.987(0.916~1.063)	0.728
TCA (nmol/L)	1.005(0.982~1.03)	0.667	1.003(0.986~1.021)	0.719
TDCA (nmol/L)	0.968(0.924~1.015)	0.177	0.964(0.918~1.013)	0.146
TUDCA (nmol/L)	1.045(0.941~1.161)	0.414	1.055(0.965~1.153)	0.239
TLCA (nmol/L)	-	-	1.241(0.608~2.534)	0.553

Supplementary Table S2| Multivariable Logistic Regression Analysis of DGAN Risk Factors Adjusted for Insulin and Metformin Use.

Model 3		
	OR (95% CI)	P value
Age (years)	0.923 (0.851–0.999)	0.049 ^a
BMI (kg/m²)	0.717 (0.484–1.062)	0.097
Hb (g/L)	1.003 (0.956–1.052)	0.903
FC-P (nmol/L)	0.333 (0.007–15.998)	0.578
2hC-P (nmol/L)	0.603 (0.134–2.713)	0.509
UACR (mg/g)	1.003 (0.999–1.006)	0.214
ALB (g/L)	1.008 (0.834–1.219)	0.934
TLCA (nmol/L)	0.894 (0.618–1.294)	0.552
Metformin	6.853(1.227–38.271)	0.028 ^a
Insulin	54.734(5.571–537.788)	0.001 ^b
P<0.05 was considered statistically significant. ^a P<0.05, ^b P<0.01.		

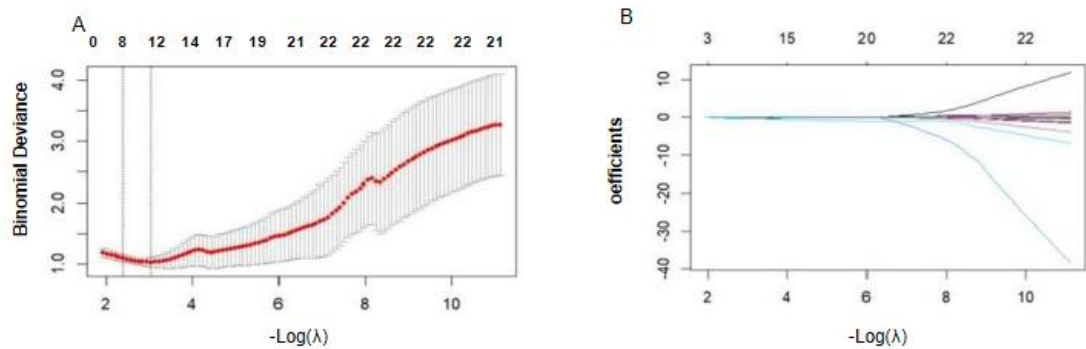
Supplementary Table S3| Three-way ANOVA of Metformin, Insulin, and TLCA with interaction effects.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	16.251 ^a	53	0.307	4.774	<0.001 ^b	0.861
Intercept	7.324	1	7.324	114.027	<0.001 ^b	0.736
Metformin	0.161	1	0.161	2.503	0.121	0.058
Insulin	0.5	1	0.5	7.777	0.008 ^b	0.159
TLCA (nmolL)	6.845	34	0.201	3.135	<0.001 ^b	0.722
Metformin * Insulin	0.261	1	0.261	4.067	0.05 ^a	0.09
Metformin * TLCA (nmolL)	1.816	8	0.227	3.535	0.003 ^b	0.408
Insulin * TL	1.253	6	0.209	3.251	0.01 ^b	0.322
Error	2.633	41	0.064			
Total	26	95				
Corrected TotalCA (nmolL)	18.884	94				

a. R Squared = .861 (Adjusted R Squared = .680)

^aP<0.05, ^bP<0.01

Hosmer and Lemeshow Test		
Chi-square	df	Sig.
13.501	8	0.096



Supplementary Figure 1 Selection of predictive variables using the least absolute shrinkage and selection operator (LASSO) regression model.

(A) Tuning parameter (λ) selection in the LASSO model performed via 10-fold cross-validation. The dashed vertical line indicates the optimal λ value (lambda.min) that gives the minimum binomial deviance.

(B) LASSO coefficient profiles of the 22 clinical and metabolic variables. The dashed vertical line is drawn at the value selected by 10-fold cross-validation (lambda.min), which resulted in 12 non-zero coefficients.