

SUPPLEMENTARY DATA

**Supplementary Table 1.** Descriptive characteristics of study populations. Data shown as mean (standard deviation) are for a subset of patients with liver biopsies that were used for the gene expression and glycogen content analyses. Pairwise comparisons were performed by Student's T-test. Percent comparisons were made by Fisher's test. Significance levels are indicated by stars (\*\*: P<0.01, \*\*\*: P<0.001).

	<b>No-Diabetes (N=34)</b>	<b>Diabetes (N=36)</b>
Age (years),	48.3 (11.1)	53.1 (12.2)
Female (%)	97%	94%
White (%)	100%	97%
BMI (kg/m <sup>2</sup> )	48.8 (9.1)	46.5 (8.1)
Glucose (mg/dL)	94.1 (9.1)	136.2 (59.5)***
Insulin (μU/mL)	14.0 (6.2)	24.1 (20.9)**
HbA1c (%)	5.7 (0.4)	7.8 (1.9)***
HbA1c (mmol/mol)	39.2 (4.1)	62.0 (20.8)***

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**Supplementary Table 2.** Summary of pairwise comparisons between non-Diabetic and Diabetic patients for the indicated variables. Samples sizes (n), means (standard deviation), and medians of serum FGF19 and total bile acid levels for the subset of patients from whom liver biopsies were used for measuring hepatic glycogen content and hepatic gene expression (adjusted by GAPDH and presented as  $\Delta$ Ct-value: SD: standard deviation).

Serum FGF19, total bile acids, and glycogen content comparisons between the two groups (No-Diabetes and Diabetes) were performed by using the Wilcoxon Rank Sum test (\*: P<0.05). Hepatic gene expression comparisons between groups for *CYP7A1*, *FGFR4*,  *$\beta$ Klotho*, *FXR*, and glycogen synthase were performed by using the two-sample T-test. Percentages of liver disease (normal, NAFLD, NASH) were compared between and within the two groups by Chi square test (\*: P<0.05). There were no significant associations between NAFLD and NASH with FGF19 or bile acids.

	<b>No-Diabetes</b> Sample size Mean (SD) Median	<b>Diabetes</b> Sample size Mean (SD) Median
FGF19 (pg/mL)	33 139.4 (103.5) 103.2	36 85.9 (2.8) 60.3*
Total bile acids ( $\mu$ mol/L)	19 4.8 (3.5) 3.0	20 5.6 (2.8) 4.5
Glycogen accumulation ( $\mu$ g/mL)	25 293.7 (116.6) 295.9	23 281.8 (95.6) 288.1
<i>CYP7A1</i>	32 5.09 (1.86) 5.0	35 4.36 (1.70) 4.2
<i>FGFR4</i>	32 4.50 (0.55) 4.6	35 4.61 (0.66) 4.6
<i><math>\beta</math>Klotho</i>	28 5.51(0.60) 5.5	36 5.45 (0.72) 5.6
<i>FXR</i>	32 2.66 (0.44) 2.6	35 2.50 (0.64) 2.5
Glycogen Synthase	31 2.70 (0.91) 2.9	34 2.23 (3.60) 2.8
Normal (%)	41	11
NAFLD (%)	29	42
NASH (%)	29	47*

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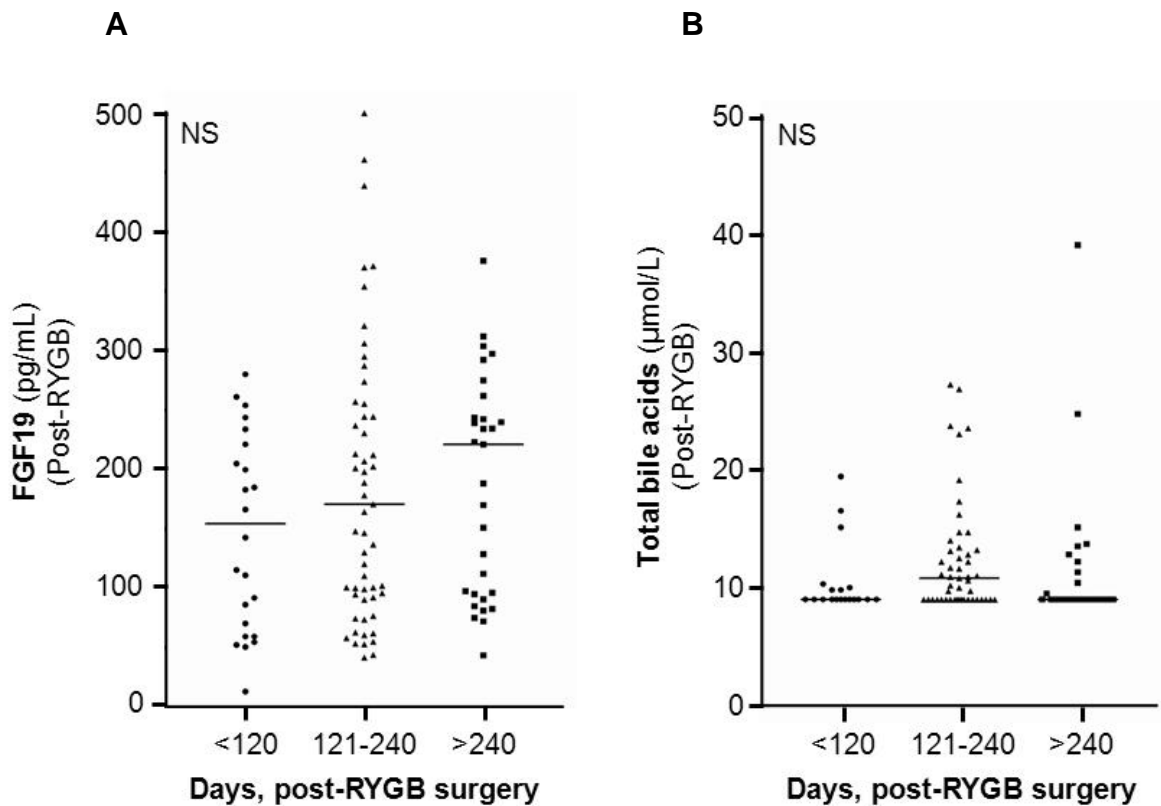
**Supplementary Table 3.** Descriptive characteristics of study populations used for measuring changes in FGF19 and BA after RYGB surgery. The data shown are for subsets of patients that were used for measuring changes in FGF19 and BA after RYGB surgery (Table 3). Diabetes remission in Diabetes-R or lack of remission in Diabetes-NoR, was determined according to Buse and colleagues (Buse et al., 2009) and confirmed by ICD-9 code for Diabetes, use of antidiabetic medication, and glucose and HbA1c levels. Means (standard deviation) between all three groups were compared using ANOVA. Percentages between all groups were compared using Fisher's exact test. Significance levels are indicated by stars (\*: P<0.05, \*\*\*: P<0.001).

	<b>No-Diabetes N=37</b>	<b>Diabetes-R N=45</b>	<b>Diabetes-NoR N=30</b>
Age (years)	44.1 (9.8)	48.4 (11.5)	51.7 (10.1)*
Female (%)	95	82	80
White (%)	100	98	100
	<b>Preoperatively</b>		
BMI (kg/m <sup>2</sup> )	48.2 (7.0)	49.1 (7.5)	48.9 (6.7)
Glucose (mg/dL)	91.1 (8.0)	114.9 (61.9)	169.5 (89.9)***
Insulin (μU/mL)	17.7 (9.0)	23.5 (15.6)	18.7 (11.2)
HbA1c (%)	5.7 (0.3)	6.7 (1.0)	7.9 (1.5)***
HbA1c (mmol/mol)	39.1 (3.7)	49.4 (11.3)	62.7 (16.1)***
	<b>Postoperatively</b>		
BMI (kg/m <sup>2</sup> )	37.1 (6.5)	36.2 (5.6)	38.9 (6.0)
Glucose (mg/dL)	88.1 (9.0)	97.4 (19.9)	129.1 (36.3)***
Insulin (μU/mL)	NA	NA	NA
HbA1c (%)	NA	5.6 (0.5)	6.8 (0.8)***
HbA1c (mmol/mol)	NA	37.2 (5.1)	50.9 (9.3)***

NA: not available - not a standard laboratory postoperatively.

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**Supplementary Figure 1.** Comparison of FGF19 and total bile acid serum levels between three intervals of samples collected after RYGB from Non-Diabetic, Diabetic-R, and Diabetic-NoR patients combined. **(A)** FGF19 serum levels were not significantly different (NS) between the three intervals <120 days (N=24), 121-240 (N=57), and >240 (N=31), (P-value: 0.357). This was also the case when comparing the change in FGF19 (Table 3 & S3) using serum samples before and after RYGB surgery (P-value: 0.726). **(B)** Total bile acid serum levels were not significantly different (NS) between the three intervals <120 days (N=19), 121-240 (N=49), and >240 (N=26), (P-value: 0.475). This was also the case when comparing the change in total bile acids (Tables 3 & S3) using serum samples before and after RYGB surgery (P-value: 0.687). There were no significant differences when performing the same series of analyses for each one of the three patient groups (No-Diabetes, Diabetes-R, and Diabetes-NoR) individually.



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### References

Buse, J.B., Caprio, S., Cefalu, W.T., Ceriello, A., Del Prato, S., Inzucchi, S.E., McLaughlin, S., Phillips, G.L., 2nd, Robertson, R.P., Rubino, F., Kahn, R., and Kirkman, M.S. (2009). How do we define cure of diabetes? *Diabetes Care* 32, 2133-2135.