

## **Online supplement**

Regarding the manuscript:

### **Day-to-day fluctuations in fasting plasma glucose do not influence gastric emptying in subjects with type 1 diabetes**

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**Supplementary Table 1.** Coefficients of variation for parameters characterizing gastric emptying kinetics and for fasting plasma glucose in type 1-diabetic and non-diabetic subjects undergoing three  $^{13}\text{C}$ -CO<sub>2</sub> octanoate mixed meal breath tests in the prospective, observational study

Parameter	Unit	Type 1-diabetes	Non-diabetic subjects	
Coefficient M		18.0 ± 2.3	15.7 ± 2.9	0.57
Coefficient k		18.1 ± 2.4	14.3 ± 2.6	0.32
Coefficient β		16.6 ± 2.7	18.4 ± 4.2	0.71
T <sub>1/2</sub>	[h]	21.0 ± 3.3	14.5 ± 2.7	0.21
T <sub>lag</sub>	[h]	23.6 ± 4.0	22.5 ± 4.8	0.86
Coefficient a		32.4 ± 2.4	19.3 ± 2.4	0.055
Gastric emptying coefficient		16.1 ± 1.6	8.9 ± 1.5	0.12
Fasting plasma glucose	[mmol/l]	34.1 ± 4.2	5.4 ± 1.3	< 0.0001

Mean ± SEM. Statistical analysis: Student's t-test

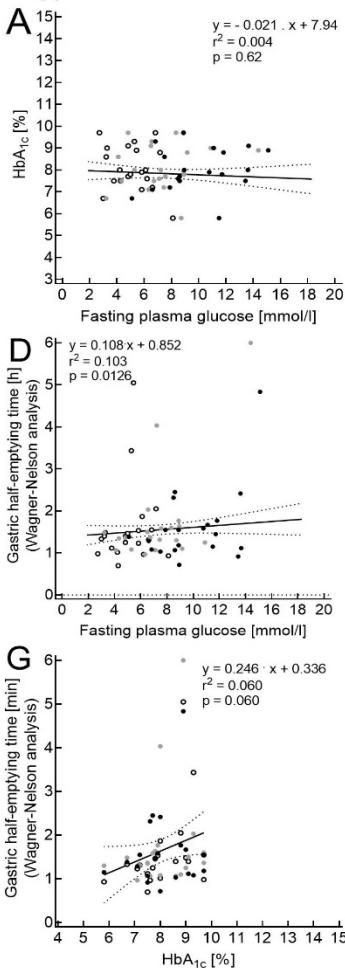
**Supplementary Table 2.** Relation of HbA<sub>1c</sub> (by tertile) to fasting plasma glucose and parameters characterizing gastric emptying in the cross-sectional study of type 1-diabetic subjects

Parameter [unit]	Tertile 1	Tertile 2	Tertile 3	Significance (p-value)
HbA <sub>1c</sub> [%]	6.3 ± 0.5	7.6 ± 0.3 <sup>a</sup>	9.9 ± 1.5 <sup>a,b</sup>	< 0.0001
HbA <sub>1c</sub> [mmol/mol]	45 ± 5	60 ± 3	85 ± 16	
Fasting plasma glucose [mmol/l]	8.1 ± 0.4	7.4 ± 0.4	7.7 ± 0.3	0.49
Gastric half-emptying time [min]	83 ± 4	92 ± 6	106 ± 8 <sup>a,b</sup>	0.0025
Gastric emptying lag time [min]	26 ± 1	27 ± 2	34 ± 3 <sup>a,b</sup> ,	0.0029

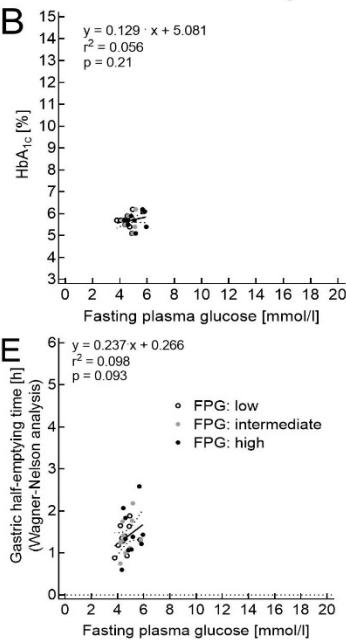
Mean ± SEM. Statistical analysis: ANOVA. <sup>a</sup>: Significant difference (p < 0.05) to tertile 1; <sup>b</sup>: Significant difference (p < 0.05) to tertile 2

### Prospective study

#### Type 1 diabetes mellitus

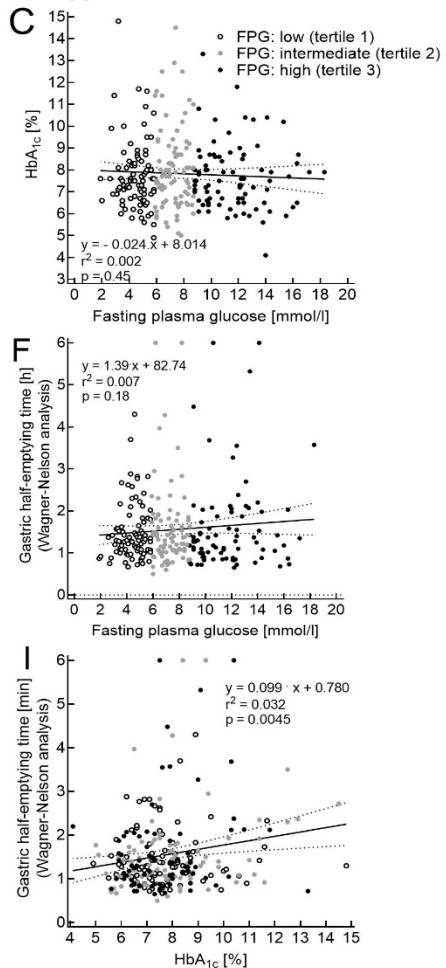


#### Non-diabetic subjects



### Cross-sectional study

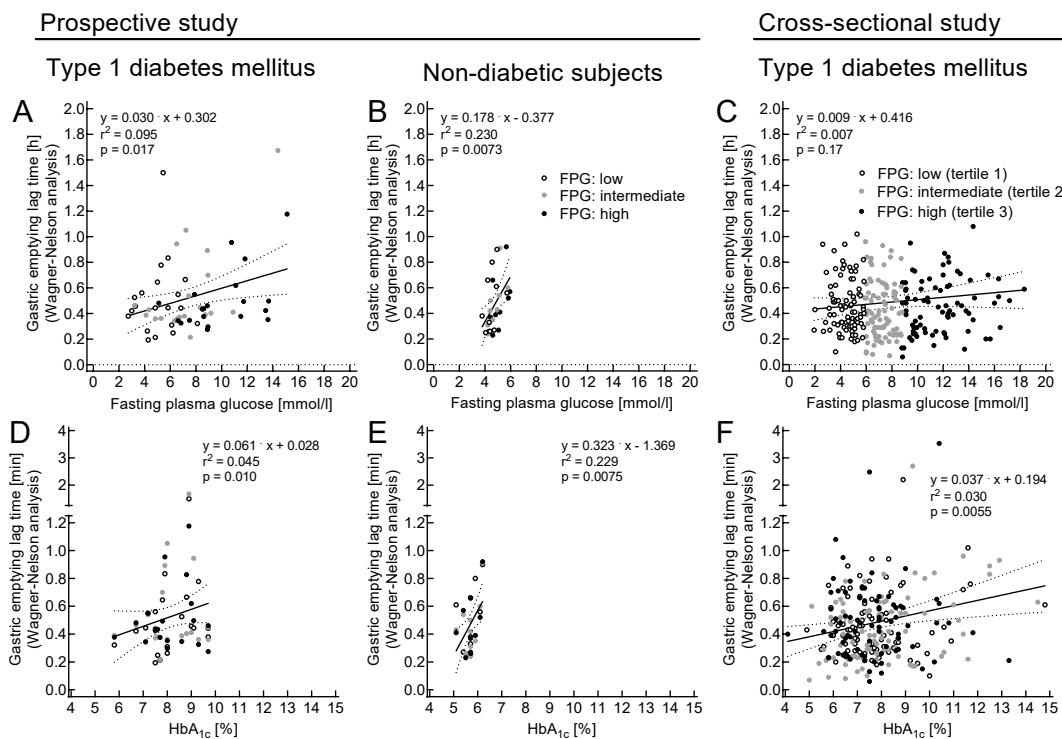
#### Type 1 diabetes mellitus



**Supplementary Figure 1.** Regression analysis relating fasting plasma glucose concentrations measured before initiating  $^{13}\text{C}$ -CO<sub>2</sub> octanoate mixed meal breath tests for measuring the velocity of gastric emptying to HbA<sub>1c</sub> concentrations (A-C) and gastric half-emptying times (determined by the Wagner-Nelson method; D-F), and of HbA<sub>1c</sub> concentrations (A-C) to gastric half-emptying times (determined by the Wagner-Nelson method; G-I) in patients with type 1 diabetes (prospective study, A, D, G; cross-sectional analysis, C, F, I) and in non-diabetic subjects (B, E, H) with (○), intermediate (●), or high (●) fasting plasma glucose (cross-sectional analysis: tertiles) before employing the  $^{13}\text{C}$ -CO<sub>2</sub> octanoate mixed meal breath test. The regression equation is shown together with  $r^2$  as a measure of goodness of fit and the p-value informing about the significance of the association.

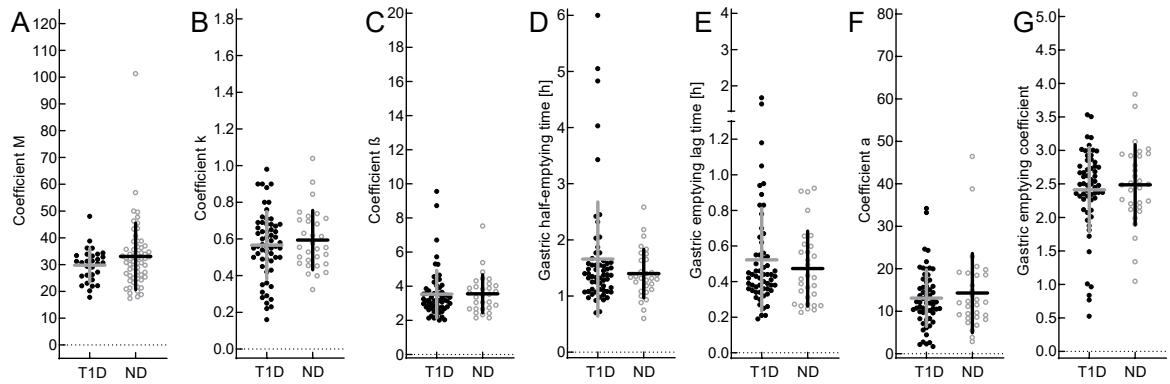
**Supplementary Table 3.** Multivariate regression analysis relating fasting plasma glucose and/or HbA<sub>1c</sub> to gastric half-emptying time

Prospective study, type 1 diabetes	$\beta$	SEM of $\beta$	B	SEM of B	T (57)	Significance p-value
Constant			- 0.949	1.032	- 0.92	0.36
Fasting plasma glucose [mmol/l]	0.306	0.122	0.103	0.041	2.51	0.015
HbA <sub>1c</sub> [%]	0.225	0.122	0.227	0.123	1.84	0.07
Regression: r = 0.391; r <sup>2</sup> = 0.153; corr. r <sup>2</sup> = 0.153; F (2, 57) = 5.15; p = 0.0088; SEM for the whole model 0.954						
Prospective study, non-diabetic subjects	$\beta^*$	SEM of $\beta$	b	Stdf.	t (27)	p-value
Constant			-1.198	1.449	-0.827	0.42
Fasting plasma glucose [mmol/l]	0.208	0.184	0.289	0.254	1.134	0.27
HbA <sub>1c</sub> [%]	0.262	0.184	0.199	0.140	1.427	0.16
Regression: r = 0.372; r <sup>2</sup> = 0.138; corr. r <sup>2</sup> = 0.074; F (2, 27) = 2.16; p = 0.13; SEM for the whole model 0.415						
Cross-sectional study, type 1 diabetes	$\beta$	SEM of $\beta$	B	SEM of B	t (252)	p-value
Constant			0.564	0.313	1.80	0.072
Fasting plasma glucose [mmol/l]	0.092	0.062	0.001	0.001	1.49	0.14
HbA <sub>1c</sub> [%]	0.182	0.062	0.102	0.035	2.94	0.0036
Regression: r = 0.200; r <sup>2</sup> = 0.040; corr. r <sup>2</sup> = 0.032; F (2,252) = 5.23; p = 0.0059; SEM for the whole model 0.915						

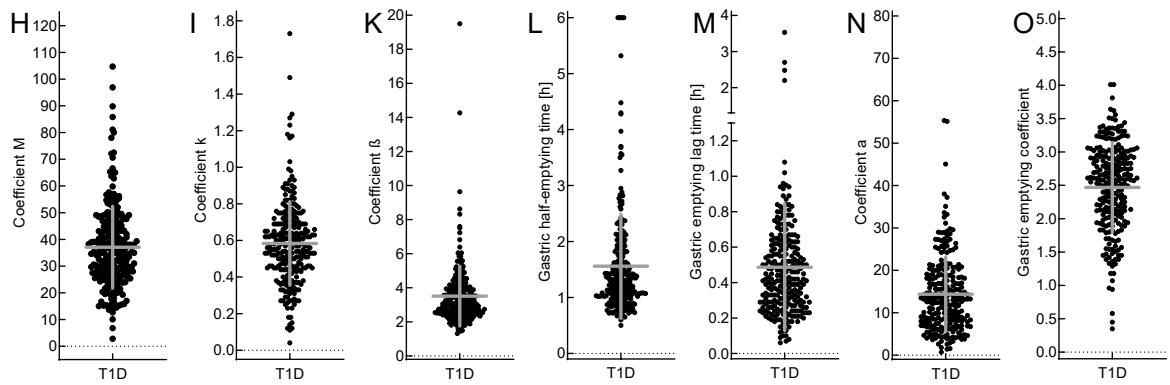


**Supplementary Figure 2.** Regression analysis relating fasting plasma glucose concentrations measured before initiating <sup>13</sup>C-CO<sub>2</sub> octanoate mixed meal breath tests for measuring the velocity of gastric emptying (A-C) or HbA<sub>1c</sub> concentrations (D-F) to gastric emptying lag times (determined by the Wagner-Nelson method; A-C) in patients with type 1 diabetes (prospective study, A, D; cross-sectional analysis, C, F) and in non-diabetic subjects (B, E) with (○), intermediate (●), or high (▲) fasting plasma glucose (cross-sectional analysis: tertiles). The regression equations are shown together with r<sup>2</sup> as a measure of goodness of fit and the p-values informing about the significance of the associations.

Prospective study



Cross-sectional study



**Supplementary Figure 3.** Parameters characterizing gastric emptying (coefficient M: A, H; coefficient k: B, I; coefficient  $\beta$ : C, K; gastric emptying half time: D, L; gastric emptying lag time: E, M (both determined by the Nelson-Wagner equations); coefficient a (F, N; and gastric emptying coefficient: G, H as determined in patients with type 1 diabetes (T1D, ●; prospective study, A-G; retrospective cross-sectional analysis, H-O) and in non-diabetic subjects (ND, ○; A-G) estimated employing the  $^{13}\text{C}$ -CO<sub>2</sub> octanoate mixed meal breath test. Mean values and standard deviation are indicated by horizontal and vertical bars.