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Glucagon like peptide-1 and blood pressure in young and healthy adults: a population-based study

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Purpose

Hypertension and diabetes are highly correlated. We hypothesized that **glucagon-like-peptide 1 (GLP-1)**, a key factor in the regulation of glucose homeostasis, might be implicated in this relationship.

Methods

Healthy adults aged 25 to 41 years were enrolled in a population-based study. Established cardiovascular disease, diabetes or a body mass index >35 kg/m² were exclusion criteria. Fasting plasma GLP-1 levels as determined with a novel high-sensitive assay and ambulatory blood pressure (BP) data were available in **1479 participants** not using antihypertensive treatment. Multivariable linear regression models were constructed to assess the relationships of GLP-1 with ambulatory BP.

Results

Median age of our population was 38 years (Baseline characteristics Tab. 1). **Mean systolic and diastolic BP** across increasing **GLP-1 quartiles** were **120.6, 122.8, 123.2** and **124.9** mmHg, **p<0.0001** and **77.1, 78.7, 78.9** and **79.9** mmHg, **p<0.0001** respectively. We found a **linear relationship** of **GLP-1** with 24-hour ambulatory **BP** after multivariable adjustment (Tab. 2 and Fig. 1). In separate analyses, GLP-1 was significantly related to both **awake** (β per 1 log-unit increase in GLP-1 2.07; 95% CI 1.03, 3.11; p=<0.0001 for systolic and 1.19; 95% CI 0.39, 1.99; p=0.004 for diastolic BP) and **asleep BP** (1.37; 95% CI 0.29, 2.45; p=0.01 for systolic and 1.08; 95% CI 0.29, 1.87; p=0.007 for diastolic BP).

Table 1 Baseline characteristics over glucagon like peptide-1 quartiles

	Q1 n=370	Q2 n=369	Q3 n=371	Q4 n=369
GLP-1 range	≤24.0	24.0-31.9	31.9-43.6	>43.6
Age, years*	38.5 (33.2;40.9)	38.8 (33.7;40.9)	37.5 (32.5;40.6)	37.5 (31.8;40.6)
Sex (male)	150 (40.5)	180 (48.8)	176 (47.4)	184 (49.9)
BMI, kg/m²*	23.5 (21.4;26.4)	24.3 (22.0;26.6)	24.3 (22.0;27.3)	24.4 (22.4;27.6)
Hemoglobin A_{1c}, %	5.4 (5.3;5.7)	5.5 (5.2;5.7)	5.5 (5.2;5.7)	5.5 (5.3;5.7)
HOMA-IR**	1.1 (0.8;1.5)	1.2 (0.9;1.8)	1.3 (1.0;2.0)	1.5 (1.0;2.3)

* = p ≤ 0.01, ** = p ≤ 0.0001; GLP-1=glucagon like peptide-1, BMI=body mass index, HOMA-IR=homeostatic model assessment insulin resistance.

Figure 1 Glucagon like peptide-1 quartiles and systolic 24 h blood pressure (multivariable linear regression model)

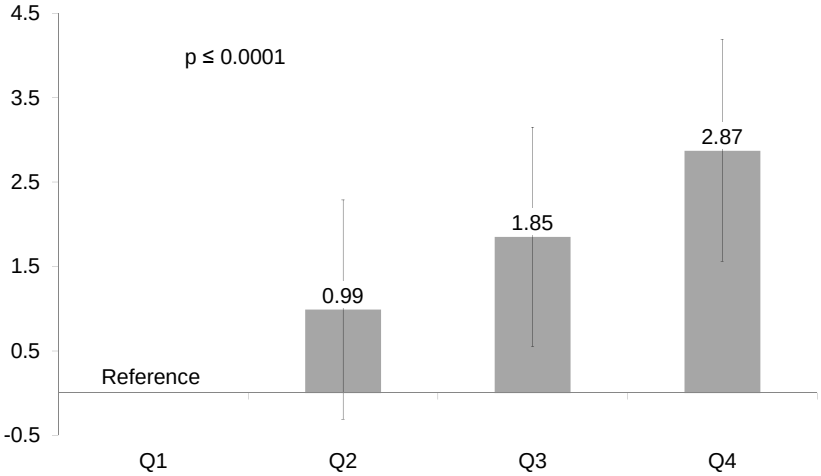

Table 2 Glucagon like peptide-1 (log-transformed) and systolic and diastolic 24 h blood pressure (multivariable linear regression model)

BP, β (95% CI)	Systolic 24 h	Diastolic 24 h
age-, sex adjusted	2.43 (1.42;3.44)**	1.93 (1.17;2.69)**
fully adjusted†	2.03 (1.04;3.02)**	1.26 (0.50;2.01)*

* = p ≤ 0.01, ** = p ≤ 0.0001; † adjusted for sex, age, BMI, hs-CRP, physical activity, LDL, HDL, NT pro-BNP, GFR, HbA1c, smoking status, alcohol intake, body composition and education.

Conclusion

Fasting plasma levels of GLP-1 were significantly related to **systolic and diastolic BP** in a large cohort of young and healthy adults.

Disclosures: J.T. and J.E. are employees of Singulex.

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