Submitted: 02.04.2022
Accepted: 07.07.2022
Early publication date: 12.12.2022

Endokrynologia Polska
DOI: 10.5603/EP.a2022.0089
ISSN 0423–104X, e-ISSN 2299–8306
Volume/Tom 73; Number/Numer 6/2022

Serum IL-38 levels in patients with type 2 diabetes mellitus

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Abstract

Introduction: Interleukin 38 (IL-38) is a new member of the IL-1 family, and it has anti-inflammatory activity. However, its role in type 2 diabetes mellitus (T2DM) has not been reported.

Material and methods: The study included 40 T2DM patients and 42 healthy control subjects. The anthropometric and biochemical measurements were performed using an automatic biochemical analyser, high-performance liquid chromatography, and electrochemiluminescence immunoassay. Circulating IL-38 levels were determined by enzyme-linked immunosorbent assay.

Results: Serum IL-38 levels in T2DM patients were significantly lower than those in controls. Correlation analysis showed that serum IL-38 was negatively correlated with systolic blood pressure and interleukin 17 (IL-17).

Conclusions: The results suggest that IL-38 may be a new biomarker of T2DM. **(Endokrynol Pol 2022; 73 (6): 988–989)**

Key words: *type 2 diabetes mellitus; interleukin 38; interleukin 17*

Introduction

Type 2 diabetes mellitus (T2DM) belongs to the group of chronic metabolic and chronic inflammatory diseases. Interleukin 38 (IL-38) is a novel member of the interleukin 1 (IL-1) cytokine family, and it has anti-inflammatory activity. Recently, we found that IL-38 can alleviate inflammation and liver inflammatory damage caused by obesity [1]. However, the role of IL-38 in T2DM has not yet been determined. In order to explore the clinical significance of IL-38 in T2DM, we measured the serum IL-38 concentration of normal subjects and T2DM patients, and analysed its relationship with insulin resistance (IR), anthropometric measurements, and metabolic parameters.

Material and methods

Forty patients with T2DM and 40 healthy controls in The Affiliated Hospital of Ningbo University School of Medicine were chosen for this study. The weight, height, and body mass index (BMI) of all subjects were recorded using standard anthropometric methods. The systolic blood pressure (SBP) and diastolic blood pressure (DBP) were measured by a designated nurse using a mercury sphygmomanometer. The levels of triglyceride (TG), total cholesterol (TC), high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C), C-reactive protein (CRP), and fasting blood glucose (FBG) in T2DM and healthy controls were determined using an automatic biochemical analyser. High-performance liquid chromatography was used to determine the level of glycated haemoglobin A_{1c} (HbA_{1c}). The concentration of fasting insulin (FINS) was determined by electrochemiluminescence immunoassay. IR was estimated using homeostasis model assessment of insulin resistance (HOMA-IR): HOMA-IR = FINS (μU/mL) × FBG (mmol/L)/22.5. Enzyme-linked immunosorbent assays (ELISA) were used to determine the serum levels of IL-38 and interleukin 17 (IL-17) of the subjects. All statistical analyses were performed using GraphPad Prism 9.0 software. Data were presented as mean ± SD. The unpaired *t* test was used for comparative analysis of the 2 groups. Correlations between IL-38 and variables were assessed by Pearson correlation analysis. $p < 0.05$ was considered statistically significant.

Results

As shown in Supplementary File — Table S1, there were no statistically differences in gender distribution, age, height, and DBP between the T2DM patients and the healthy control subjects ($p > 0.05$). The BMI, SBP, and body weight of the T2DM patients were higher than those of the control subjects, with a statistically significant difference ($p < 0.05$). The levels of TC, TG, HbA_{1c}, LDL, FBG, FINS, HOMA-IR, and CRP of the T2DM patients were significantly higher than those of the control subjects ($p < 0.05$). The HDL was not statistically different between the 2 groups ($p > 0.05$) (Supplementary File—Tab. S2).

As shown in Figure 1, we detected serum IL-38 and IL-17 levels by ELISA. The serum IL-38 levels in T2DM patients were significantly lower than those in the control group ($p < 0.001$, Fig. 1A). Conversely, serum

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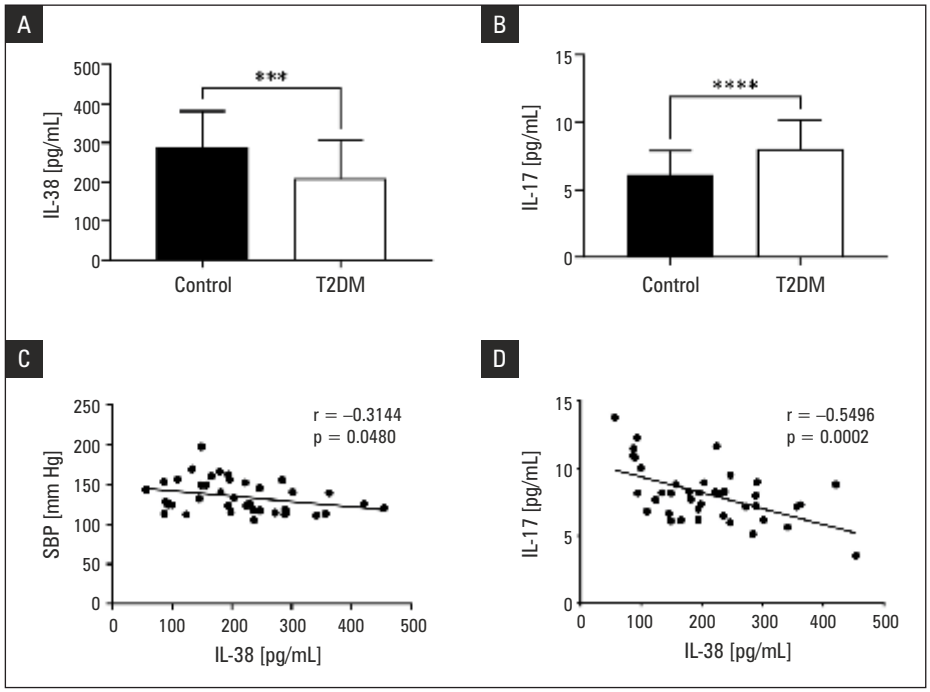

Figure 1. *Serum interleukin 38 and 17 (IL-38 and IL-17) levels in type 2 diabetes mellitus (T2DM) and correlation analysis. Control – healthy control group. SBP – systolic blood pressure. ***p < 0.001; ****p < 0.0001*

IL-17 levels in T2DM patients were significantly higher than those in healthy people ($p < 0.0001$, Fig. 1B). Pearson correlation analysis showed that serum IL-38 levels in T2DM patients were negatively correlated with SBP ($r = -0.3144$, $p < 0.05$, Fig. 1C) and IL-17 ($r = -0.5496$, $p < 0.001$, Fig. 1D).

Discussion

IL-38 is a newly discovered anti-inflammatory cytokine, being the 10th new member of the IL-1 family. Yu et al. [2] found that the expression of IL-38 was increased in the umbilical cord and placenta of patients with gestational diabetes mellitus. In this study, we found that the serum IL-38 levels in T2DM patients were reduced and the serum IL-17 levels were increased. Correlation analysis showed that IL-38 levels in T2DM patients were negatively correlated with SBP and IL-17.

Conclusions

Our study suggests that the serum IL-38 level is helpful in the diagnosis of T2DM. Further studies are needed to expand the current findings, especially to explore the exact mechanism of IL-38 in the pathogenesis of T2DM.

Funding

This study was supported by the National Natural Science Foundation of China (81970735), the Clinical Research and Application Project of Zhejiang Health Science and Technology Program (2022KY1148), and the Natural Science Foundation of Ningbo (2021J246, 202003N4115, 202003N4118).

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