Nat. Volatiles & Essent. Oils, 2021; 8(6): 496-499

NVEO
Natural Volatiles &
Essential Oils

Evaluation Of Serum Levels Of Interleukin-10 Among Patients With Type Two Diabetes Mellitus (T2DM)

Bilal Akish Yousif and Zafir Hassan Ghali

Department of Biology, College of Education for pure Science, University of Wasit-Iraq

Abstract

Inflammation has a major role in the etiology and pathophysiology of type 2 diabetes(T2DM). This study aims to assess levels of interleukin-10 in sera from patients with T2DM. The number of participants in this study was 80 individuals.The quantities of interleukin-10 in serum were determined using an enzyme-linked immunosorbent assay method (ELISA). IL-10 concentrations displayed asignificant difference in T2DM patients(Mean ± SD 78.43 ± 4.87), compared with controls (Mean ± SD 94.78 ± 5.61), (P-value 0.00937, T-test 8.924), at P≤0.01. Concentrations of IL-10 in T2DM among males of studied groups showed significant difference comparing to controls(Mean ± SD 76.787 ±3.59 versus Mean ± SD 96.458 ±4.82), (P-value 0.0085, T- test 8.017). Also, there is a significant difference in relation to IL-10 levels of females of diabetic patients in comparison to controls(Mean ± SD 80.062 ±4.05 versus Mean ± SD 93.104 ±4.98), (P-value 0.0267, T-test 7.442). According to the results of the current study we conclude: IL-10 is a major contributor to the onset of type 2 diabetes mellitus and there may be a correlation between low levels of interleukin-10 and type two diabetes.

Keywords: Interleukin-10, T2DM, ELISA

Introduction

Inflammation has a major role in the etiology and pathophysiology of type 2 diabetes (T2DM) (Li et al., 2016).T2DM is characterized by a gradual impairment of glucose tolerance that begins with pancreatic islet hyperplasia and is followed by Langerhans β-cell proliferation. This process is associated with an inflammatory response that results in fibrosis and the apoptotic death of islet β-cells, leading in declining insulin levels and decreased glucose absorption, with the end consequence being sustained long-lasting hyperglycemia (Hameed et al., 2015).Persistent low-grade inflammation may eventually result in the clinical manifestations of T2DM.Increased blood levels of inflammatory cytokines such as C-reactive protein (CRP) or high-sensitivity C reactive protein (hs-CRP), interleukin-6 (IL-6), and tumor necrosis factor-alpha (TNF- alpha), might be indicative of a systemic and subclinical inflammatory process (TANG et al., 2013).The majority of cells in the adaptive and innate immune systems, including leukocytes, dendritic cells, and

macrophages, express interleukin-10 (IL-10), a multifunctional anti-inflammatory cytokine (Da Silva Pereira et al., 2018).IL-10 has been shown to suppress the production of pro-inflammatory cytokines, antigen presentation, and T cell proliferation (Saxena et al., 2015); it's the most broadly characterized anti-inflammatory cytokine to date. It acts to suppress pro-inflammatory responses by blocking the synthesis and release of inflammatory cytokines and macrophage recruitment (Moore et al., 2001). This studyaims to assess levels of interleukin-10 in sera from patients with T2DM.

MATERIALS & METHODS

The number of participants in this study was 80 individuals. they were separated into two parts:

1. The patients group which consisted of 50 subjects with T2DM (25 males and 25 females). The data recorded for all samples included: name, gender, age, other diseases, smoking, treatment, weight, height, body mass index, residence, profession, the patient's disease history, inheriting the disease in the family, and date of sample collection. All of the patients were diagnosed using the American Diabetes Association's criteria (ADA).
2. The Control group which comprised of 30 apparently healthy individuals (15 males and 15 females). Their data was recorded as is the case with the patients above.

The quantities of interleukin-10 in serum were determined using an enzyme-linked immunosorbent assay method (ELISA) using Human-IL-10- E-EL-H0103 (Elabscience Company /China)in accordance with the manufacturer's recommendations. The data was collated and statistically evaluated.

Results

The results of this study revealed that determination serum IL-10 concentrations as shown in Table 1 displayed ahighly significant difference in T2DM patients when compared with the control group. Diabetic patients (Mean ± SD 78.43 ± 4.87), compared with controls (Mean ± SD 94.78 ± 5.61), (P-value 0.00937, T-test 8.924), at P≤0.01

Table 1: IL-10 concentrations in diabetic patients and controls

Parameters Groups	IL-10 (Pg/ml) Mean ± SD
Control	94.78 ± 5.61
Diabetic Patients	78.43 ± 4.87
P-value	0.00937
T-test	8.924 **
**Significant at p value (P≤0.01).	

Interleukin-10 concentration among males and females

Concentrations of IL-10 in T2DM among males of studied groups showed significant difference comparing to controls Table 2 (Mean ± SD 76.787 ±3.59 versus Mean ± SD 96.458 ±4.82), (P-value 0.0085, T- test 8.017). Furthermore, there is a significant difference in

relation to IL-10 levels of females of diabetic patients in comparison to controls (Mean ± SD 80.062 ±4.05 versus Mean ± SD 93.104 ±4.98), (P-value 0.0267, T-test 7.442).

Table 2: IL-10 concentrations among male and females

Parameters / Groups	IL-10 (Pg/ml) Mean ± SD			
	Male	Female	P-value	T-test
Control	96.458 ±4.82	93.104 ±4.98	0.307	5.251 NS
Diabetic Patient	76.787 ±3.59	80.062 ±4.05	0.226	5.094 NS
P-value	0.0085	0.0267	----	----
T-test	8.017 **	7.442 *	----	----
*Significant at p value (P≤0.05), **Significant at p value (P≤0.01).				

DISCUSSION

Interleukins and diabetes have a strong correlation with their onset and progression. Changes in the levels of certain interleukins in the body can have an indirect effect on the immunological dynamics of diabetic patients, which is beneficial for diabetes diagnosis, therapy, and prognosis, as well as monitoring the incidence of diabetes (Grossmann et al., 2015). Because increased T2DM is connected to the secretion of proinflammatory cytokines, and decreased expression of the IL-10 gene results in increased production of these cytokines, which is detrimental(Naz et al., 2020).Interleukins and diabetes have a strong correlation with their occurrence and development. Changes in the levels of certain interleukins in the body can have an indirect influence on the immunological dynamics of patients with diabetes, which is helpful in the diagnosis, management, and prognosis of diabetes, as well as for monitoring the development of diabetes and evaluating treatment success (Grossmann et al., 2015).The present study's findings revealed a substantial difference in relation to IL-10 levels of all patients (males and females) of T2DM (Mean ± SD 78.43 ± 4.87), compared with controls (Mean ± SD 94.78 ± 5.61), (P-value 0.00937, T-test 8.924), P≤0.01. Van Exe et al., and his colleagues found T2DM is linked to a lack of IL-10 manufacturing capability (Van Exel et al., 2002). Previous research has established that T2DM patients have a considerably lower blood IL-10 level, and that IL-10 gene transfer is associated with good protection against T2DM (XU et al., 2015; Qiao et al., 2016). The connection between decreased IL-10 production and metabolic syndrome and T2DM has been identified. Around 75 percent of the variance in IL10 secretion capacity in persons is due to genetic factors that influence illness risk (Chang et al., 2005).According to the results of the current study we conclude: IL-10 is a major risk factor for type 2 diabetes mellitus and there may be a correlation between low levels of interleukin-10 and type two diabetes.

References

1. Li, Y., Li, M., Cui, X., Rong, S., Jin, G., & Zhang, H. et al. (2016). Research Progress on the Relationship between Interleukins Gene Polymorphism and Type 2 Diabetes. Proceedings Of The 2016 International Conference On Biomedical And Biological Engineering.
2. Hameed, I., Masoodi, S., Mir, S., Nabi, M., Ghazanfar, K., &Ganai, B. (2015). Type 2 diabetes mellitus: From a metabolic disorder to an inflammatory condition. World Journal Of Diabetes, 6(4), 598.
3. TANG, Z., FANG, Z., & ZHOU, L. (2013). Human genetics of diabetic vascular complications. Journal Of Genetics, 92(3), 677-694.
4. Da Silva Pereira, B., Polina, E., Crispim, D., Sbruzzi, R., Canani, L., & dos Santos, K. (2018). Interleukin-10 −1082A > G (rs1800896) polymorphism is associated with diabetic retinopathy in type 2 diabetes. Diabetes Research And Clinical Practice, 138, 187-192.
5. Saxena, A., Khosraviani, S., Noel, S., Mohan, D., Donner, T., & Hamad, A. (2015). Interleukin-10 paradox: A potent immunoregulatory cytokine that has been difficult to harness for immunotherapy. Cytokine, 74(1), 27-34.
6. Abdullah Hasan Jabbar, Salim OudahMezan, Salih Meri Al Absi et al., Assessment of anticholinesterase effect of polyvinylpyrrolidone/silver nanocomposite biosynthesized by Pandanus atrocarpus extract, Materials Today: Proceedings, https://doi.org/10.1016/j.matpr.2020.12.582
7. Grossmann, V., Schmitt, V., Zeller, T., Panova-Noeva, M., Schulz, A., &Laubert-Reh, D. et al. (2015). Profile of the Immune and Inflammatory Response in Individuals With Prediabetes and Type 2 Diabetes. Diabetes Care, 38(7), 1356-1364.
8. Naz, S., Shafique, N., Sharif, S., Manzoor, F., Saifi, S., Firasat, S., &Kaul, H. (2020). Association of Interleukin 10 (IL-10) Gene with Type 2 Diabetes Mellitus by Single Nucleotide Polymorphism of Its Promotor Region G/A 1082. Critical Reviews In Eukaryotic Gene Expression, 30(4), 285-289.
9. Van Exel, E., Gussekloo, J., de Craen, A., Frolich, M., Bootsma-van der Wiel, A., &Westendorp, R. (2002). Low Production Capacity of Interleukin-10 Associates With the Metabolic Syndrome and Type 2 Diabetes : The Leiden 85-Plus Study. Diabetes, 51(4), 1088-1092.
10. XU, A., ZHU, W., LI, T., LI, X., CHENG, J., & LI, C. et al. (2015). Interleukin-10 gene transfer into insulin-producing β cells protects against diabetes in non-obese diabetic mice. Molecular Medicine Reports, 12(3), 3881-3889.
11. Qiao, Y., Shen, J., He, L., Hong, X., Tian, F., & Pan, Y. et al. (2016). Changes of Regulatory T Cells and of Proinflammatory and Immunosuppressive Cytokines in Patients with Type 2 Diabetes Mellitus: A Systematic Review and Meta-Analysis. Journal Of Diabetes Research, 2016, 1-19.
12. Chang, Y., Huang, C., Wu, C., &Shiau, M. (2005). Association of Interleukin-10 A-592C and T-819C Polymorphisms with Type 2 Diabetes Mellitus. Human Immunology, 66(12), 1258-1263.